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PH.D. IN ACCOUNTING AND FINANCE

THE ECONOMIC AND FINANCIAL ASSESSTMENT FOR SMRs OVER NUCLEAR POWER IN TÜRKİYE

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In remembrance of my deceased father

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Sürdürülebilir ve güvenilir enerji kaynaklarına olan küresel talep arttıkça, nükleer enerji sektörü dünya enerji portföyüne önemli bir katkıda bulunmaya devam ediyor. Bu araştırma, Küçük Modüler Reaktör (SMR) teknolojisi ile büyük reaktör teknolojisinin enerji üreticileri olarak karşılaştırmalı analizine odaklanarak, SMR'lerin nükleer enerjinin geleceğini şekillendirmedeki potansiyelini anlamayı amaçlamaktadır. Çalışmanın merkezi, SMR teknolojisinin büyük ölçekli reaktörleri yerine geçip geçemeyeceği üzerinde şekilleniyor.

Tezde kullanılan çok yönlü bir metodoloji bulunmaktadır. SMR ve büyük reaktör projelerini değerlendirmek için iki farklı finansal model oluşturulmuş, ardından finansal açıdan uygun olan seçeneği belirlemek için bir analiz yapılmıştır. Daha sonra, proje yürütümünde devlet veya özel sektör katılımının uygunluğunu belirlemek amacıyla bir maliyet-etkinlik analizi aracılığıyla kapsamlı bir analiz gerçekleştirilmiştir. Finansal modellerin temel varsayımları ve girdileri, teknik makalelerden ve resmi basın açıklamalarından çıkartılmış, nükleer santral seçiminin mali açıdan karmaşıklıklarını taklit etmek amacıyla uzman değerlendirmeleri ile desteklenmiştir. Nükleer saha hazırlık ve reaktör teknolojisinin seçimi gibi teknik hususlar bu analizden yer almamaktadır.

Bulgular, değerlendirmenin esasen finansal faktörlere dayanmasına rağmen, yeni SMR projelerini başlanabilmesi hususunda detaylı bir teknik çalışma yapmanın zorunlu olduğunu vurgulamaktadır. Özellikle, Türkiye'de SMR projelerinin başlatılabilirliğini doğru bir şekilde değerlendirmek için, hem finansal hem de teknik boyutları içeren bütünsel bir analiz gereklidir. Araştırma, SMR projelerinin Enerji Birim Maliyetinin (LCOE) uygun kararlar alındığında büyük reaktörlere karşı rekabetçi olabileceğini ortaya koymaktadır.

Sonuç olarak, bu çalışma, nükleer enerjinin evrimi üzerine olan tartışmalara, SMR teknolojisinin dönüştürücü bir güç olma potansiyelini inceleyerek katkıda bulunmaktadır. Finansal analizler ve uzman görüşlerini bir araya getirerek, araştırma, enerji üretiminde SMR'lerin uygunluğu konusunda önemli bir perspektif ortaya koymaktadır.

Anahtar Kelimeler: finansal model, ekonomik analiz, nükleer enerji, küçük modüler reaktörler, projelendirme yaklaşımı seçimi

ABSTRACT

ŞAHİN, Ahmet Gökhan. The economic and financial assessment for SMRs over nuclear power in Türkiye. Başkent University, Institute of Social Sciences, Ph.D.in Accounting and Finance, 2024.

As the global demand for sustainable and reliable energy sources intensifies, the nuclear power sector remains a pivotal contributor to the world's energy portfolio. This research delves into the comparative analysis of Small Modular Reactor (SMR) technology and large reactor technology as energy generators, aiming to discern the potential of SMRs to shape the future of nuclear power. The central inquiry revolves around whether SMR technology can supplant large-scale reactors.

There is a multifaceted methodology employed in the thesis. Two distinct financial models are created to assess SMR and large reactor projects, followed by identifying the most financially viable option. Subsequently, a comprehensive analysis is conducted to determine the suitability of either government or private sector engagement in project execution through a value-for-money analysis. The financial models' fundamental assumptions are drawn from technical papers and official press releases, supplemented by expert judgments to emulate the complexities of nuclear plant selection from a financial standpoint. Technical considerations such as site preparation and technology selection are intentionally excluded from this analysis.

The findings underscore that while the evaluation primarily hinges on financial factors, a thorough technical examination is imperative to arrive at a robust recommendation for initiating new SMR projects. Notably, it is illuminated that an accurate assessment of the feasibility of commencing SMR projects in Türkiye necessitates a holistic analysis that encompasses both financial and technical dimensions. The research reveals that the Levelized Cost of Energy (LCOE) for SMR projects can be competitive against the large reactors provided project stakeholders make prudent decisions and take the proper steps.

In summation, this study contributes to the discourse on the evolution of nuclear power by scrutinizing the potential of SMR technology as a transformative force. By weaving together financial analyses and expert insights, the research outlines a nuanced perspective on the feasibility of SMRs in energy generation.

Key Words: financial model, economic assessment, nuclear power, small modular reactor, service supply selection

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ABBREVIATIONS

ARIS Advanced Reactors Information System

ATM Automated Teller Machine

BWR Boiling Water Reactors

CAPEX Capital Expenditures

DCF Discounted Cash Flow

DSM Demand-Side Management

EDF Electricité de France

EPR European Pressurized Reactor

FBRS Fast Breeder Reactors

FOAK First of a Kind

FWR Fast Breeder Reactor

GCR Gas-cooled Reactor

GDP Gross Domestic Product

HTGR High-temperature Gas-cooled Reactors

IEA International Energy Agency

IAEA International Atomic Energy Agency

KG Kilogram

KW Kilowatt

LCOE Levelized Cost of Electricity

LUEC Levelized Unit Electricity Cost

LWGR Light Water Graphite reactor

MCP Market Clearing Price

MSR Molten Salt Reactors

MW Megawatt

NEI Nuclear Energy Institute

NEPUD Department of Ministry of Energy and Natural Sources

NPP Nuclear Power Plant

NPV Net Present Value

NRA Nuclear Regulatory Authority

OECD Organisation for Economic Co-operation and Development

OPEC Organization of the Petroleum Exporting Countries

OPEX Operational Expenditures

PHWR Pressurized Heavy Water Reactors

PPA Power Purchase Agreement

PSC Public Sector Comparator

PWR Pressurized Water Reactors

R&D Research and Development

SB Special Bid

SMP System Marginal Price

SPV Special Purpose Vehicle

UN United Nations

USD United States Dollar

VAT Value Added Tax

WACC Weighted Average Cost of Capital

WNA World Nuclear Association

INTRODUCTION

A growing population, more electronics and more cars will literally increase energy demand. Twenty-five years ago, there were no mobile phones, Bluetooth devices, ATMs, modems, tablets, kindles, or home appliances. Nowadays, the number of electronic devices and automobiles has increased dramatically. It seems that further electric vehicles and appliances will enter our lives in the future. If such technological trends continue, electric vehicles and robots will become a large part of our lives, increasing the demand for energy. According to the Key World Energy Statistics (IEA 2021), global energy consumption in 2017 more than doubled compared to 1971, but the diversity of energy resources changed during that time (IEA, 2021). In order to meet the growth of energy consumption in the world, energy generation capacity must be grown in parallel with that consumption. As a result, global energy consumption in 2035 is expected to be more than double what it was in 1995. China and India are expected to become the world's largest electricity consumers.

During the Covid-19 pandemic, declining commodity demand has impacted industries and supply chains. On the other hand, as countries called off the lockdowns, increments in demands in the commodities caused unexpected fuel and technology demands. That upcoming immediate energy demand has become the most challenging issue in the energy sector.

Electricity demand is expected to grow by more than 1.000 terawatt hours in 2022, with consumption returning to pre-pandemic levels; however, this sharp increase had a reasonable impact on an increase in electricity demand in 2021 (IEA, 2021).

The popularity of renewable energy plant projects has increased during the Covid-19 pandemic due to several reasons such as being of green energy and zero carbon emission target. Even if the proportion of renewables has increased among the other resources because of the decrease in overall energy demand, it could not rise that much against increasing that.

Both diesel and gasoline are used in aviation, sea-freight and road transport. However, restrictions and lockdowns imposed by countries have adversely affected the aviation sector on the international and domestic front. On the contrary, road transport has become a vital for the supply chain with both diesel and gasoline expected to be back within touching distance of pre-pandemic levels early in 2022. (IEA,2021).

After declining in energy demand in 2020, OPEC+ implemented the cut in oil supply. Nevertheless, uncertainty about energy demand persists, leading to uncertainties in the allocation of petroleum products among the world's major oil producing countries. Finally, probably the most important issue is the social and environmental pressures on oil companies that influence their investment decisions.

In another respect, electric vehicles are very likely to have a negative impact on oil demand. Oil demand declined in 2020 while natural gas demand increased. In 2021, natural gas demand was well above pre-pandemic levels. Natural gas prices had a sharp increase in the first quarter of 2021. Increased natural gas demand has caused both planned and unplanned outages on the supply side (Macrotrends.com, 15 April 2022).

Global coal demand fell by 4% in 2020, the steepest decline in 70 years. Solid fuels are more important than liquid or gaseous forms in the energy mix. Some solid fuels are used in some technological products to produce electricity and heat to reduce carbon emission. On the other hand, using solid fuels for the cooking and heating purposes is the major cause of air pollution and related health issues.

Countries have different energy mix policies to meet their energy needs. Energy mix consisting of renewables, nuclear and fossil fuels per capita in the world from 1965 to 2019 (2020 due to the exceptional circumstances of the Covid-19 pandemic) excluded). All types of forms of energy production are increasing. The growth of renewable energy per capita is higher than that of nuclear energy per capita; however, the growth of nuclear energy per capita is higher than that of fossil fuels. If the growing energy demand had added, it would not have been met with the increasing energy generation of renewables, nuclear and fossil fuels. The share of renewable energy has increased dramatically in recent years. Since 2011, nuclear energy per capita has plateaued for several reasons. The Fukushima accident and increased construction costs for new nuclear power plants may be the main causes.

Over the past 12 years, renewable energy has been considered as one of the easiest way to meet energy demand, and it is supported by governments over concerns about the climate crisis. In 1965, 94% of energy production was met by fossil fuels, 0% from nuclear energy and 6% from renewables. Today, all that has changed with 11% renewables, 4% nuclear, and 84% fossil fuels. While the share of energy from fossil fuels is decreasing, energy from nuclear and renewable energy may increase in the future.

According to the IAEA, clean energy means producing energy from sources that do not emit or release many greenhouse gases. The less carbon emitted, the cleaner it is. The word of clean energy refers to lower air pollution from carbon emissions during energy production.

Greenhouse gases include carbon dioxide, methane, water vapor, nitrous oxide, and ozone. As they absorb heat and radiate it back to the earth, the average temperature of the earth rises. The increase in the average temperature of the earth is called global warming, and global warming itself can be detrimental for all living creatures on earth. Precautions must be taken against global warming, which is devastating the world.

Fossil fuels are and still occupy a leading position in energy production. Fossil fuels, on the other hand, are the main contributors to greenhouse gases and are also responsible for global warming. Carbon dioxide is released when fossil fuels burn. Since the Industrial Revolution, carbon emissions from industrial activities have increased dramatically.

To reduce carbon emissions and combat climate change, more than 180 UN Member countries have come together to sign an agreement to keep the global average temperature well below 2°C.

One of the most important power generations is nuclear power, which reduces global carbon/greenhouse gas emissions. While nuclear power plants produce electricity, less than 1% of carbon dioxide is emitted. According to the IEA, the use of nuclear energy has reduced carbon dioxide emissions by more than 60 gigatons over the past 50 years. That's almost two years' worth of global energy-related emissions (IAEA, 2020).

SMRs are widely considered as a new nuclear design, but early small reactor technology is not all that new. The first reactors based on light water reactor technology were in commercial use from 1950 to 1960. At the same time, governments designed and built small nuclear reactors for military and security purposes. Today, SMRs are already making headlines as the new gamer in the nuclear energy industry due to its modular design. As mentioned earlier, SMRs can generate power from 10 megawatts to 300 megawatts.

As defined by the International Atomic Energy Agency (IAEA), as a newer generation of nuclear power plants, small modular reactors generate up to 300 MW of power and their components can be transported in a modular structure (IAEA, 2016).

The World Nuclear Association (WNA) defines small modular reactors as nuclear reactors which generate electric power 300 MW or less, and designed with a modular structure using module factory fabrication. In this definition, WNA also notes that small modular reactors have a shorter construction period than large reactors, which is an important point in terms of risk perspective (WNA, 2022).

According to the Nuclear Energy Institute (NEI), small modular reactors are defined as advanced reactors that produce 300 MW or less of electricity. Small modular reactors are built in a short construction period, and the components are fabricated in the factory to minimize the transport costs. Together with large conventional reactors and other advanced reactors, SMRs meet zero-carbon emission targets and diminish the effects of climate change.

In SMR technology, the key point is modularity, which has been implemented in several sectors such as shipbuilding, gas and oil. Except for the modularity aspect, the working principles are similar to each other. Since large reactor projects are not viable, SMR is also rated as infeasible (Lloyd, 2019).

According to the OECD Nuclear Energy Agency, SMRs have some more potential than large nuclear reactors. With advanced construction technology, multiple model plant options, and flexible capacity options, SMRs can deliver several additional benefits (NEA, 2021).

Modular design aims to transfer time-consuming, complicated construction works from an NPP to a factory where better tools and conditions can be produced with developed productivity and higher learning curves. (Lloyd, 2019).

Despite the advantages of SMRs, there are still some challenges in funding SMRs, as no approved SMR designs have been funded worldwide. On the other hand, the financial sector is concerned with managing funds by taking account of time, financial resources, and the associated risks.

The first chapter introduces the importance of nuclear energy for clean energy production and outlines the principles of nuclear power, focusing on the emerging small modular reactor (SMR) technology and its potential advantages and disadvantages. The second chapter discusses the economic parameters and factors, including political and fiscal considerations, that need to be considered when analyzing a project's economic feasibility. The third chapter presents a financial model for a large reactor technology, EPR, and explains the assumptions and scenarios used for evaluating its financial feasibility. The fourth chapter presents a financial model for a small modular reactor technology, specifically Candu SMR, and details the assumptions and scenarios considered in the analysis. The fifth chapter compares the social and financial aspects of large reactor and SMR technologies in Türkiye, utilizing metrics like net present value and levelized electricity costs. The sixth chapter focuses on a value-for-money assessment to determine whether the government should involve the private sector in deploying eleven SMRs in Türkiye or undertake the project independently. The last chapter examines the financial and economic aspects of deploying eleven CANDU SMRs in Türkiye, with a focus on assessing their macroeconomic impact and discussing Turkey's nuclear energy policy and plans for nuclear power plants. The conclusion discusses the growing importance of nuclear energy, particularly small modular reactor (SMR) technology, as a sustainable and reliable energy source, highlighting the challenges in securing funding for SMR projects and conducting a comprehensive financial analysis of SMRs compared to large reactor projects in Türkiye. The study aims to provide insights into the feasibility of SMR investments and their potential to meet Türkiye's energy needs more economically, emphasizing the importance of selecting the right project execution model, and ultimately offering valuable guidance for policymakers in shaping Türkiye's energy future.

1. CHAPTER: THE SMRs

Nuclear energy is an important source of energy in terms of clean energy production and low emissions. 10 % of the world's global energy generation is met by nuclear power. Nuclear power is an inevitable energy source for countries planning to reach zero-carbon emissions targets and protect the environment from air pollution.

Nuclear power produces electricity by harnessing the energy released when the nucleus of a heavy atom, such as uranium-235, splits in a process called nuclear fission. This process produces heat, which is used to create steam that turns turbines and ultimately generates electricity. Nuclear reactors use a variety of materials and methods to control and maintain these reactions.

In this chapter, the main principles of nuclear power have been explained and given brief information about nuclear power's status in the world. Recently, the economics of nuclear power is challenging the world, but countries are looking for a solution for reaching the zero-carbon emissions target. It is discussed whether new generation SMRs will take the place of the traditional reactor or not. In this chapter, some of SMRs' technical specifications capacity have been mentioned, and advantages and disadvantages have been discussed.

1.1. Basis of Nuclear Power

To clearly understand what SMRs are, the basis of nuclear power will be explained not in detail but briefly. As people's demand for electricity has increased, scientists have been looking for new inventions to generate electricity from various sources. Nuclear power is just one of them. In nuclear power, uranium-235 atoms react with neutrons and split into various fission fragments. This reaction reveals two or three neutrons and high binding energies. This energy is transferred to the coolant and steam is produced in the primary or secondary circuit, depending on the reactor type. This steam turns a turbine, and the turbine's magnetic field generates electricity. All power plants convert heat into electricity. Nuclear power plants use uranium and are similar to thermal power plants in this respect. There are two types of reaction called fission and fusion in the nuclear reactions.

Nuclear fission means that atoms split apart. When a fissile isotope absorbs a neutron, it splits in two and releases at least two neutrons. This allows the nuclear fission chain reaction to release an enormous amount of heat. Nuclear fission is widespread in nuclear energy. The neutrons emitted are high energy "fast" neutrons. These neutrons must be moderated by a moderator so that a chain reaction can occur. The chain reaction is controlled using control rods inserted into the core that absorb neutrons to slow down or stop the reaction. Moderators are called reactor types, taking into account the use of different types of materials. In a fusion reaction, two atoms merge to form a single heavier atom. The process releases energy because the total mass of the resulting single atom is less than the mass of the two original atoms. The leftover mass becomes energy.

In a nuclear reaction, the nucleus must split into two parts. Uranium and plutonium are fissile materials. Uranium is found in nature as Uranium-238 (U238) and Uranium-235 (U235) isotopes. The fissile Uranium is U235. Plutonium is not found in nature, but is obtained from Uranium. When uranium 235 reacts with a neutron, they undergo a fission chain reaction.

The ratio of U235 isotope in natural uranium is only 0.72%. In order to be used in electricity generation, the ratio of U235 is increased to sustain a chain reaction, which is a process known as "enrichment."

A nuclear reactor works by using the energy that is released when the nucleus of a heavy atom splits. That process is called fission. In reactors, fission occurs when uranium atoms are hit by slow-moving neutrons. Absorbing these excess neutrons sometimes causes the atoms to break apart.

In the operation of a nuclear reactor, fuel assemblies are put into place and then the control rods are slowly lifted until a chain reaction can just be sustained. As the reaction proceeds, the number of uranium-235 nuclei decreases and fission by-products which absorb neutrons build up.

The first nuclear power plant works has started at the beginnings of 1900's and eventually, the first nuclear power plant has started to generate electricity in 1950's in the United States. Since 1950, some countries have started to work hard and nowadays and increased the number of nuclear power plants to meet their energy needs. As of 2022, there are 439 nuclear reactors in operation and 92 units of them are in the United States, France has 56 reactors and China has 54 respectively, and 237 nuclear reactors are in 27 different countries.

There are 6 main types of reactors named Boiling Water Reactors (BWR), Pressurized Water Reactors (PWR), Pressurized Heavy Water Reactors (PHWR), Gas-cooled Reactor (GCR), Fast Breeder Reactor (FWR) and Light Water Graphite reactor (LWGR) that are used in the nuclear power plants.

While boiling water is used as a moderator in slowing down the neutron in the BWRs, pressurized water is used in PWRs. PHWRs use heavy water (deuterium oxide, D2 O) as moderator. The LWGRs have enriched fuel in pressure tubes with the light water coolant. These are surrounded by the graphite moderator. Carbon dioxide is used as the coolant and graphite as the moderator in the GCRs. In the FBRS, there is no using moderator. The core is surrounded by uranium 238. While neutrons escape from the core, it is absorbed by the uranium-238 which is separated during subsequent reprocessing for use as fuel.

1.2. Nuclear Power Status in The World

Clean energy is needed all over the world. Increasing the number of reactors in operation is an alternative option to meet this need. Since the construction of the first nuclear power plant in the United States, the number of nuclear reactors has increased each year. According to the latest statistics on the operation of nuclear reactors, the number of nuclear reactors in each country is:

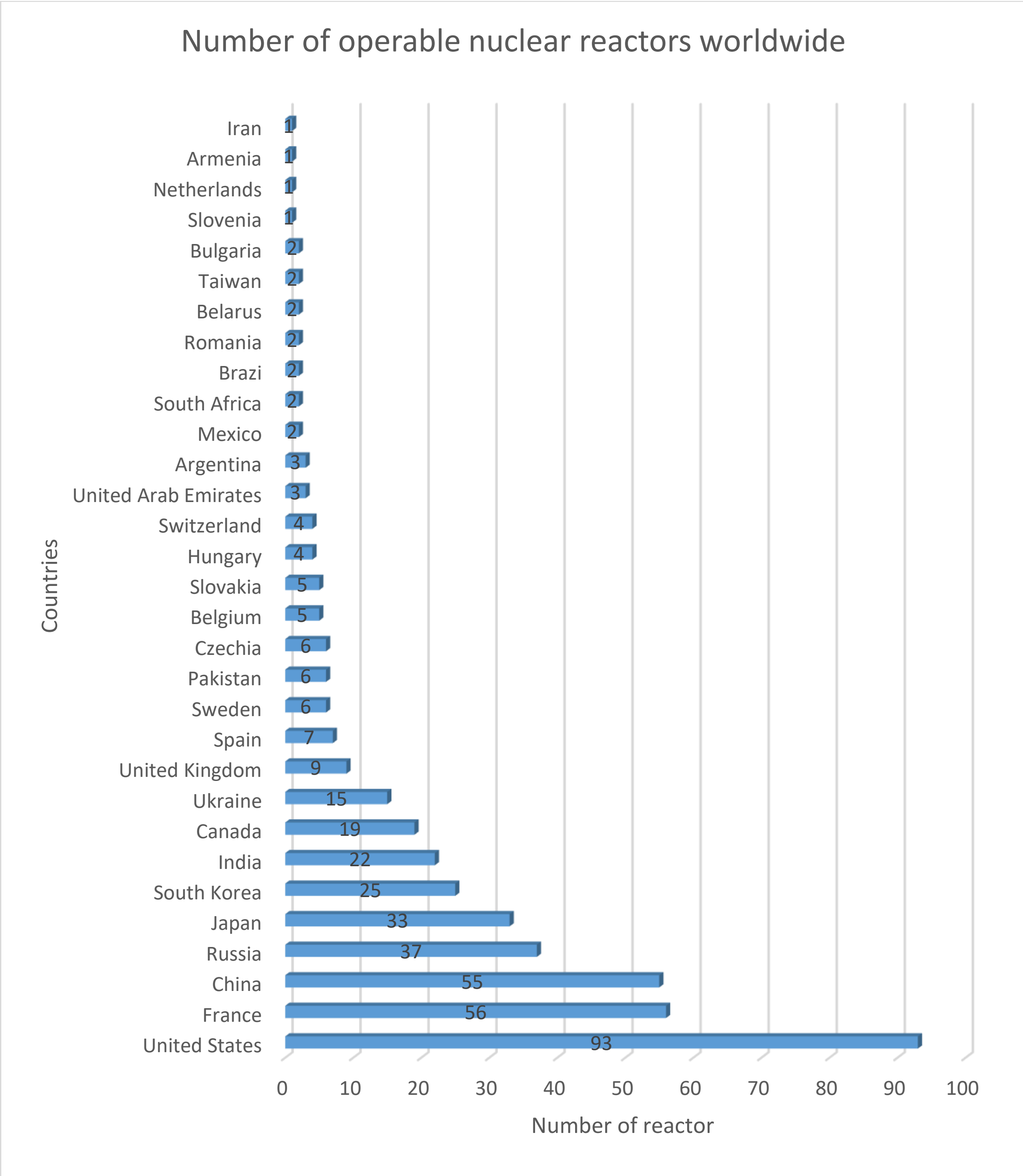

Figure 1.1. Number of operable nuclear power reactors worldwide as of Sep 2023, by country

According to the World Nuclear Performance Report 2022 by World Nuclear Association, In 2021, alongside the commencement of construction for eight large pressurized water reactors (PWRs), there were also new construction initiatives, including a lead-cooled fast reactor located near Tomsk in Russia and a small modular reactor situated in Changjiang, Haiyang Province, China. As a result, the total number of units under construction by the end of 2021 increased to 53, marking an increase of four units compared to the previous year. Notably, six reactors were connected to the grid for the first time in

2021. The Shandong Shidaowan project is of particular significance, which incorporates two interconnected 250 MWt high-temperature pebble-bed reactor (HTR-PM) modules linked to a 200 MWe steam turbine. It is anticipated that future larger power plants will be based on a greater number of HTR-PM modules. In 2022, the total net electrical capacity of nuclear reactors worldwide was 398.18 GW, with 430 reactors in operation. By the end of the year, the total net electrical capacity decreased slightly to 389.51 GW, and the number of operational reactors also decreased to 436 (WNA, 2022).

According to the IAEA latest data, in 2021 the sum of Reference Unit Power (net capacity) of reactors in operation within 2021 as shown below.

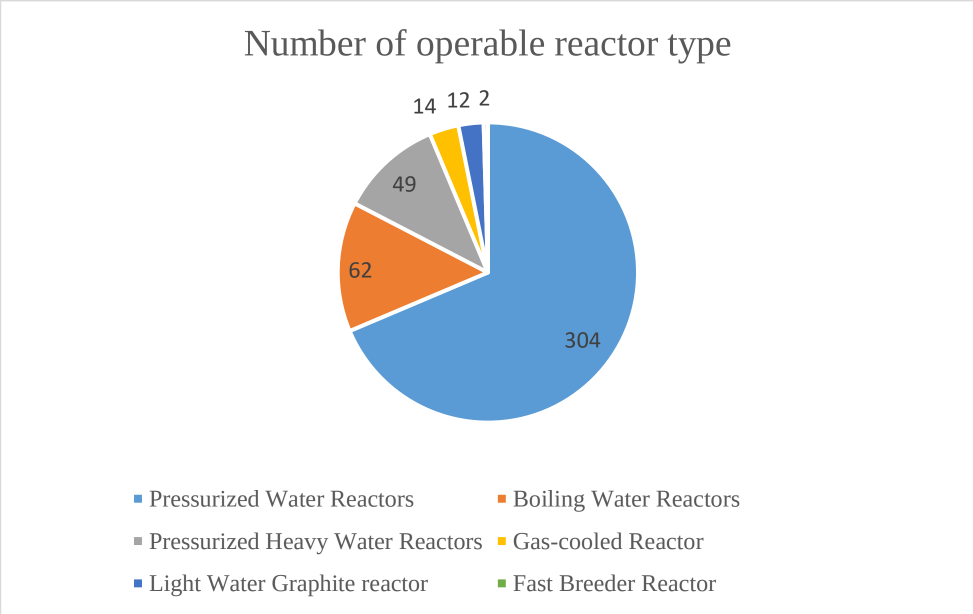

Figure 1.2. Number of operable reactor type as of 2021

As it's seen in Figure 1.2. The most common reactor type is the pressurized water reactor which consists of 304 reactors.

1.3. A new power plant type in the nuclear industry: The small modular reactors

After the Fukushima accident that was a major nuclear accident at the Fukushima Daiichi nuclear power plant in Ōkuma, Fukushima, Japan which began on March 11,2011, the safety costs of nuclear power plants increased dramatically. Rising costs and risk concerns have led to discussions and negotiations to build new nuclear power plants. Meanwhile, high levels of air pollution, the climate crisis and increased energy demand have revived the expansion of existing power plants by building new nuclear power plants and refurbishing them. High construction costs, delays and funding issues are the main issues in this contradiction. Delays in the construction of nuclear power plants have a negative impact on the positive cash flow from operations and the return on investment. So, it was another challenge in financing the power plant. Nuclear power plant components are very heavy for logistics operations that's why they are being prepared logistics site. (Lloyd, 2019). That requires public acceptance if fabrication is close to a residential area.

Lack of knowledge is the other challenge about new nuclear power plant around the world. There are only eight countries which have experience and knowledge of nuclear power plant construction and operation.

Wind and solar power plants are cheaper than the other energy plants but they do not produce enough power to take place of nuclear power for the time being. The game can change in the future.

All these paradigms mentioned above caused to negotiate whether modular reactor technology could be an option or not. Even if there are still some challenges that SMR technology will face in the future, it is important to examine them to be prepared for what’s coming from now on.

Definitions of SMR

According to the definition of the International Atomic Energy Agency (IAEA), as a newer generation of nuclear power plants, small modular reactors generate electric power up to 300 MW and their components can be transported in a modular structure (IAEA, 2016).

World nuclear association (WNA) defined small modular reactors as nuclear reactors which generate electric power 300 MW or less, and designed with a modular structure using module factory fabrication. In this definition, WNA also indicates that small modular reactors have a short construction period in comparison with large-scale reactors, which is a key point in terms of risk perspective (WNA, 2020).

According to the Nuclear Energy Institute (NEI), small modular reactors are defined as the developed reactors that produce 300 MW or less of electricity. Small modular reactors are built in a short construction period, and the components are fabricated in the factory to minimize the transport costs. Together with large, traditional reactors and other advanced reactors, SMRs meet zero-carbon emission targets and diminish the effects of climate change (NEI, 2019).

1.3.1. Fundamentals of Small Modular Reactors

The definitions above focus on the three main ideas about small modular reactors that reactors have to be:

Lower generation capacity that is less than 300 MW of electricity,

Modular structure that enables construction and transport of components easier,

Lower construction cost.

Some information can be derived by analyzing these three features of the miniature modular reactor technology. The first is its lower power generation capacity, indicating that SMRs require less area than large reactor technologies. We have found that there is some flexibility when choosing where to build a new SMR system. The second is a modular design that facilitates building and transporting components and ensures control of manufacturing cosA third advantage is the low construction cost. This will result in a shorter construction period and a little less financial impact from construction delays. SMR has significant cost reduction functions through modularization and factory construction, and further shortening of the construction period and cost reduction can be expected by reducing manufacturing costs at the site. (IAEA, 2016) Modularity is one of the key features of the SMR, enabling factory manufacturing of reactor and containment components, which are key components of nuclear power plants. As a cost-optimizing tool for small modular nuclear reactor plants, modularization can be a strategic way for decision-makers to move forward with their projects. Modularization is also a solution to the problem of long build times and high risk of delays (Rasti, 2020). Initial investment costs are one of the most significant challenges that nuclear plants face. Financing a nuclear power plant is extremely risky for both the country and the financial institution from the financial and macroeconomic impact aspects. The third feature of the SMRs is lower construction costs can solve the financing of a newly build SMR plant.

1.3.2. Modular approach

As the name suggests, SMRs' components can be manufactured and shipped as modules and a lot of installation process can be implemented on the site. Most of SMR Plants can be installed in one or more module structures. Although, there are different reactor technology type that are under development such as water-cooled reactors, high temperature gas cooled reactors, liquid-metal, sodium and gas-cooled reactors with fast neutron spectrum, and molten salt reactors, the number of approved design is still one as of February, 2022. There are still many challenges that SMRs face in terms of financial feasibility, and performance safety in comparison with large reactor plants.

1.3.3. Technical specifications and different types of SMRS (SMR Technologies)

Small Modular Reactor (SMR) technology refers to a type of nuclear reactor that is designed to be smaller in size and capacity compared to traditional large-scale nuclear reactors. SMRs have a modular structure, and they can be fabricated on the site. SMRs offer several advantages, including enhanced safety features, scalability, and the potential for more flexible deployment in various locations.

1.3.3.1. Reactor types

Pressurized water reactors (PWRs) are very common among the other reactor types. About 70 % of reactors consist of PWRs. There are primary and secondary circuits in the PWR reactor. A PWR reactor has a primary circuit and a secondary circuit. The primary circuit keeps the water from boiling by pressurizing the reactor, and the secondary circuit boils the water to spin the turbine and generate electricity (Zohuri, 2019).

Boiling Water Reactors (BWR): Contrary to PWRs, BWR has only one circuit that allows water to boil inside. The boiling water in the circuit produces steam that turns the turbine. BWRs are the second most common reactors among the other reactors (Zohuri, 2019).

Pressurized heavy water reactors (PHWRs): PHWRs use heavy water that differentiates from normal water in terms of chemical structure. Nuclear reactions are cooled and control by the heavy water in PWHR technology (WNA, 2016).

Liquid metal fast reactors (LMFRs): Liquid metal fast reactors (LMFRs) use different liquid metals such as lead and sodium to cool the core. It has been using in the Beloyarsk Nuclear Power Plant in Russia. Liquid metal reactors can be fuelled with a metallic form of uranium, as well as recycled nuclear waste (WNA, 2016).

Molten salt reactors (MSR): A molten salt reactor (MSR) is a type of reactor where the primary nuclear reactor uses a molten salt mixture as a coolant. There are two existing research reactors in operation that use MSR reactor type in the United States (WNA, 2021).

High-temperature gas-cooled reactors (HTGRs) High-temperature gas-cooled reactors (HTGRs) are cooled by gas (e.g. helium, carbon dioxide) with the uranium fuel being either in the shape of fuel rods (surrounded by graphite blocks) or fuel particles (uranium 'balls' covered with different materials such as silicon carbide). (WNA, 2016)

1.3.3.2. Megawatt basis reactor types

Megawatt electricity capacities of the different reactor technologies are as follow in Table 1.1.

Table 1.1. Megawatt Outputs of existing SMR

Reactor Type	Megawatt Output
Pressurised water reactors (PWRs)	From 68 Kw(e) to 443 Mw(e)
Boiling Water Reactors (BWR)	From 3 Mw(e) to 300 Mw(e)
Pressurised heavy water reactors (PWHRs)	300 MW(e)
Liquid metal fast reactors (LMFRs)	From 3 Mw(e) to 450 Mw(e)
Molten salt reactors (MSR)	From 20 Mw(t) to 1200 Mw(e)
High-temperature gas-cooled reactors	From 3 Mw(e) to 300 Mw(e)

Source: Advances in Small Modular Reactor Technology Developments A Supplement to: IAEA Advanced Reactors Information System (ARIS) 2022 Edition

Plant footprint, fuel type and design status and developer country parts of the technical specification will be discussed for the different ongoing developing SMR projects in the next section (ARIS, 2022).

1.3.3.3. Current SMR status and research and development activities in the world

Appendix 1 shows that the current status of Small Modular Reactor Projects in the world published by IAEA, there are 83 existing SMR projects which are in various statuses in the world, and three of them are in operation. On the other hand, the remaining 80 of them are in different situations.

In this study, CANDU Small Modular Reactor, which is in conceptual design status and made in Canada, will be analyzed financially, and will be made a comparison with the large reactor named EPR which has been designed and developed mainly by Framatome and Électricité de France in France and by Siemens in Germany.

The reactor design of a large plant (EPR) to be implemented that is subject to comparison in this study is that the EPR nuclear reactor design has an output of 1650 MW(e) and is of the pressurized water reactor (PWR) type. EDF, Framatome, and Siemens jointly designed it and is in France and Germany, where it is currently in operation.

The CANDU SMR nuclear reactor has an output of 300 MW(e). It is a pressurized heavy water reactor (PHWR) type designed by CANDU Energy Inc. in Canada, and it is currently in the conceptual design phase. The reactor design of the small modular reactor (CANDU) to be implemented is subject to comparison in this study. Its capacity can be calculated and compared easily with a large reactor type in Türkiye.

1.3.3.4. Significant challenges of SMR deployments

Financial affordability: Nuclear energy investments are one of the most important investments to reduce carbon emissions and make the world a sustainable place. They are very important investments in fighting the climate crisis. Although there are too many benefits of nuclear power, financing nuclear power plants are one of the biggest challenges that require attractive financing tools and long-term investment (IAEA Bulletin, 2020).

Additionally, unpredictable energy markets and energy prices make predicting nuclear power projects difficult. As it is known, a volatile market is one of the biggest challenges for such a long-term nuclear investment. (IAEA Bulletin, 2020)

In 2022, countries have started to increase their political interest rate to counter the inflation threat. Therefore, financial institutions have reflected this change in the credits. Due to high-interest rates, financing new projects becomes hard to invest in. Increasing financing costs are also a big challenge for nuclear projects. Thanks to the carbon tax, nuclear investments can be affordable again in the near future. The carbon tax (pricing) is likely a solution for finding finance for the nuclear project and an incentive for the increasing number of nuclear power plant projects in the future. The carbon tax provides that a factory that emits large amounts of carbon dioxide would pay more tax than a factory using low carbon energy sources and emitting less carbon.

Legal framework and licensing issue: Unfortunately, there are no SMR projects that have a completed licensing. Licensing of nuclear projects is very vital before installation in terms of safety and regulation. Ensuring the protection of people and the environment and minimizing the risk of accidents and radioactive releases are the key issues for legal framework and licensing for both large reactors and SMRs (IAEA Bulletin, 2020).

Currently, IAEA has been working on technology-independent licensing because there are more than 12 countries working on SMRs projects that may be a solution for licensing all the existing SMRs. (Nuclear Technology Development and Economics, 2021)

FOAK Encouragement: FOAK SMR may be a basis plant for optimizing the existing design features and will provide some key benefits for the developer country in terms of design review, construction delays and alternative financing sources.

Monitoring the program of a FOAK comprehensively and creating a learning experience for the FOAK SMR project may be an important step for future SMRs.

Commercializing issue: Although there are more than 70 existing SMR projects that are in the developing phase, just some of them are suitable for commercialisation because of their Megawatt output capacity. Output is the key feature for commercializing and generating revenue from production. Therefore, because of existing projects' output capacity and some other features that are not suitable for commercializing, they are likely excluded from the market.

1.3.4. Advantages & disadvantages of SMRs

One of the most important issues in electricity production is the choice of technology which means choosing a appropriate type of power plant. Therefore, it is essential to disclose the advantages and disadvantages of a large reactor and a small modular reactor. SMRs are new in terms of some specifications in the nuclear industry since they are not a scaled model of large reactor, but a new concept of a nuclear power plant. In this section, there is no benchmarking between a large reactor and a small modular reactor, but the advantages and disadvantages of a small modular reactor deployment without digitizing any parameters associated with a small modular reactor design.

Modularity advantage can get more than one plant standardized. In this context, it can be a benefit to deploy a set of SMR to get standardization in small modular power plants. Whilst deploying more than one SMR, there can be a learning curve effect in the construction of the SMR in terms of cost effectiveness. The learning curve has not only cost effectivity but also provides more benefits such as process development and shortening the construction period of an SMR.

The initial investment is the amount needed for capital expenditure in an investment. For example, the nuclear-specific components and construction costs are considered as initial investment costs in the nuclear industry. As it is known, large nuclear reactors have more capacity than small modular reactors. A high initial investment is one of the strongest barriers in front of any investment. The initial investment cost has extreme effects on a nuclear project that carries multi risks such as a large reactor. The SMR gets a chance to present itself that has low initial investment cost in terms of attractiveness for stakeholders. The SMR gets a chance to present itself that has a low initial investment cost in terms of a financial attractiveness for stakeholders.

A short construction period is a relativistic approach for a small modular reactor. If it is considered the only period of building a plant without considering its electricity generation capacity, it can be easily said that building an SMR takes less than a large plant. On the other hand, if the electricity generation capacity is considered as a parameter of the construction period, in that case, 1200-Megawatt capacity for both a large reactor and a small modular reactor, it will be hard to say that completion of construction at the same time (Locatelli et. al., 2014).

Easy Siting is one of the most significant benefits of a small modular reactor plant. Because of a small modular reactor's lower capacity, it offers increased flexibility in operation and financing for investors. It also requires less area for site. Finally, it can be more deployable in comparison with a large reactor. (Ingersoll and Carelli, 2020)

Passive safety systems, design simplicity and easy decommissioning are the other advantages of SMRs (NEA, 2016).

Many researchers have shown that size is an essential parameter in evaluating the small modular reactor deployment in terms of economy of scale. (Locatelli, Bingham and Mancini, 2014). When an SMR's electricity generation capacity is benchmarked with a large reactor, the levelized cost of unit electricity of a large which is a crucial parameter in an investment evaluation is less than a small modular reactor's one. From this aspect, it can be said that small modular reactors were less financially feasible than large reactors.

Due to being a modular structure, SMR has another disadvantage related to its construction. In this case, modularity can also be a disadvantage for SMR deployment because of the shipping costs of modular components.

According to a study conducted by Vujic, Bergmann, Skoda and Miletic, there are three more obstacles for SMRs that must be overcome in order to be deployed. They are "An increased number of SMR may require more spent fuel storage area which can be remote and be more difficult to transport", "public acceptance can be new challenges for more than one place for SMR siting" and finally "certification and licensing can be disadvantages for a mature SMR deployment" (Vujic, Bergmann, Skoda and Miletic, 2012).

1.4. Future Trends of SMRs

Increased demand for electricity around the world has been forcing countries to find a way to struggle with power cuts. As a result, some countries have developed a new strategy for recovering from the power cuts. It is mentioned that some projects are in development, some are in licensing, and some are in construction phases in the "Current SMR Status an Research and Development Activities in the world" section. There are an increased number of SMR projects that are conducted or supported by governments with direct capital injections or fiscal incentives. It can be thought that the government’s endeavors might be a sign to struggle with the increased electricity demand. Only time will tell if that is the case.

1.5. Fields of Usage of SMRs

As is known, one of the main purposes of deploying a Small Modular Reactor plant is to generate electricity to meet energy shortages. On the other hand, the SMRs have more usable area than power generation. SMRs provide an emissions reduction solution not only for power generation but also in other areas such as district heating and water desalination. For some reactor types, SMRs are capable of generating hydrogen (NEA, 2016).

A report entitled “The rise of nuclear technology 2.0”, published by the Tractebel Company indicated that the SMR could be a tool for the production of hydrogen that can be used as a raw material for steel and fertilizers production or as an intermediary to eMolecules synthetization (Toure et. al., 2020).

2. CHAPTER: SCOPE OF PROJECT ECONOMIC ANALYSIS

It is clear that a project cannot be implemented in isolation from some economic parameters. It is vital to understand the current economic situation, the economic performance of the country and how macroeconomic factors may affect it while putting the project into effect. Key economic factors, which include political interest rate, fiscal incentives, or tax environment etc., in which the project is implemented, will be key assumptions in the project economic analysis.

Demand estimation is fundamental for identifying the goods and services needed while understanding the critical economic benefits of a project. Demand analysis is essential for the estimation of the revenue generation in the project. Market research, and off-takers perceptions, are also important in the creation of company policy.

To create a sound financial model for developing a benchmark between a large and small modular reactor technology, Türkiye's macroeconomic factors and international macroeconomic factors considered.

The scope of the project economic analysis methodology used in this study includes the headlines as follows, and the financial model created for this study will be performed in Microsoft Office Excel.

2.1. Developing and Efficiently Organizing Assumptions, Requirements, and Inputs

The reason for creating an analysis for a project is to show that there are some unknowns that must be fulfilled. What further actions could be taken to improve, and what data is needed to understand a project better? This question is answered while creating an assumption set, and the actions that will be taken into accounts likely to be considered as a requirement set.

On the other hand, some figures are near-real such as inputs and costs, but some of them are still being considered assumptions because of the nature of a project. Inputs are used to calculate the intermediate variables, which are used to calculate the outputs. For example, the tax would be calculated from generated profit. Inputs consist of several areas such as project lifetime, equity ratio, debt ratio, interest rate, market price, price in a PPA, corporate income tax, inflation rate, and learning curve. The project owner can provide some inputs, and some can be obtained from the market or a data provider.

2.2. Structuring Timelines

A project timeline provides a simple visual overview of a project from start to finish. It is a helpful way of monitoring and calculating the project outputs. It is also an easy way of calculating outputs in an excel file. For example, it can be calculated the amortized costs or interest payments etc. and shown throughout the years in the financial model.

2.3. Generating Revenues, Expenses, and Capital Expenditures to Derive Pretax Cash Flow

Another critical case is that of models with a time axis (perhaps to forecast items such as volumes, prices, revenues or capital expenditures), in which an important issue is if the assumptions used for the forecast (e.g. for the growth rate in revenues) should be individual to each time period, or common to several time periods: a different assumption in each period can be cumbersome and inhibit sensitivity analysis, whereas a single assumption that applies to all future periods may be too crude (and unrealistic), resulting in an excessively high sensitivity of the output to the input value.

While calculating revenue, sales volume, market price, and price in the PPA, capacity factors are the key issues to be assessed in the financial model. Capital expenditures are also crucial factors for the initial investment amount, amortization calculation and project finance depending on the debt-to-equity ratio of a project.

2.4. Structuring Capital Budgeting And Financing/Funding

Investment proposals may start from many different parts of the organization. So companies need to develop an investment appraisal procedure to ensure that every project is evaluated consistently.

Capital budgeting's main target is to identify projects that produce cash flows that exceed the cost of the project for a company. Thus, the projects can increase the company's value or meet the expected rate of return for investors.

Financing a project is a crucial factor in capital budgeting while evaluating a project. In general, nuclear power plants are financed by financial institutions or governments. Therefore, partially funding and financing are available for nuclear power plant projects. Section 3 and section 4 describe a debt-to-equity ratio for the projects.

Therefore, capital budget structure and financing/funding mechanism are fundamental parameters for calculating a project's internal rate of return, which is one of the most essential indicators of a project.

2.5. Determining A Dividend Policy

The value of a company or project is affected by three main policies. They are investment, financing, and dividend policy. Therefore, it is important to develop an appropriate dividend policy.

Generally, the dividend policy is set out and recorded in the company's articles of association. Therefore, it is not updated frequently by upper management. Dividends are defined as rewards to shareholders who fund the project. Shareholders fund the project and expect the money to come back during the life of the project. A dividend policy is a method of distributing net income to shareholders.

In Türkiye, a dividend policy is mandatory under Turkish Commercial Code No. 6102. Therefore, every company must have a dividend policy stated in its Articles of Incorporation. On the other hand, there are some principles to consider when paying dividends. A company cannot distribute net income contrary to the rules of its articles of association, nor can it distribute if it is illiquid. It is not advisable to share net income among shareholders when the company has current liabilities that need to be paid. Company growth rates, competitors' dividend policies, and shareholder tax issues are other factors to consider when paying dividends.

2.6. Incentives

Incentives are kinds of funding for a project for a while. Governments desire to increase investments in their countries for several reasons and provide some incentives for upturning the attractiveness of the projects. Even if all governments have different incentive policies, they want to encourage investors to invest in demanded areas, attract foreign investors or increase investments in strategic areas.

The Turkish Government has announced several incentives to attract foreign and domestic investors in Türkiye. The Turkish Government offers a comprehensive investment incentives program with a wide range of instruments that helps to minimize the upfront cost burden and accelerate the returns on investments. The definitions of incentives that are applicable in the nuclear industry are as follows in Türkiye (The Republic of Türkiye Investment Office, 2022).

1. VAT Exemption: Value-Added Tax (VAT) is not payable for machinery and equipment to be purchased.
2. Customs Duty Exemption: Customs duty is not payable for machinery and equipment to be supplied from abroad.
3. Corporate Tax Reduction: Corporate tax is paid with reduction,
4. Social Security Premium Support (Employer's Share): The employer's share of the social security premium calculated for employment will be covered by the government.
5. Social Security Premium Support (Employee's Share): The employee's share of the social security premium calculated on the basis of the legal minimum wage for employment will be covered by the government.
6. Income Tax Withholding Support: The income tax determined for employment will be exempt.
7. Interest Rate Support: A certain portion of the interest to be paid for loans obtained will be covered by the government.
8. Land Allocation: Land is allocated for investment based on the availability, in accordance with the principles and procedures set by the Ministry of Environment and Urbanization.
9. VAT Refund: VAT refund is provided for building and construction expenditures.
10. Infrastructure Support: Investor's infrastructural needs such as electricity, natural gas, etc. can be covered.
11. Energy Support: Energy expenditures will be partially rebated to the investor.
12. Capital Contribution Support: Government can make capital contribution of up to 49% of the investment amount.
13. Purchasing Guarantee: Public purchase guarantee can be provided for products to be produced within the scope of the investment.
14. Facilitation of Authorization/ Permit/ License Procedures: An exception may be introduced by virtue of a presidential decree for authorizations, allocation, permits, licenses and registrations among other restrictive provisions.
15. Training Support: Daily expenses and eligible training costs will be covered by İŞKUR.

16. Qualified Personnel Support: Gross wages of qualified personnel to be employed for up to 5 years will be covered (up to 20 times the gross minimum wage)
17. R&D/Design Discount: R&D and design expenditures are wholly deductible from the corporate tax base.
18. Corporate Tax Exemption: No corporate tax is payable.
19. Cash Support: Eligible expenditures are partially rebated by the institution providing support after the expenditures are paid.
20. Credit Support: Credit opportunities with reduced rates are provided to investors to improve exportation.
21. Special Consumption Tax Exemption: Enterprises in free zones are exempt from special consumption tax.
22. Property Tax Exemption: No property tax is payable for land and buildings.
23. Stamp Duty Exemption: No stamp duty is payable for documents.

Nuclear projects are accepted as strategic investments, so any investment related to the nuclear industry may benefit from all the incentives in Türkiye.

In this study, the financial models for both large and small modular reactor technologies contain all the above incentives.

2.7. Estimating A Learning Curve

The learning curve model is widely used in nuclear power plant projects and means that costs can be reduced with technological progress and learning by performing and doing. If a nuclear power plant project is installed for the first time, which is called first of a kind, is expected to cost more than the next projects. The learning curve is the cost reduction realized in this way for every cumulative doubling of production.

Although recent studies indicated that the SMRs would not benefit from economies of scale, they would reduce the costs with modularization, simplification and standardization compared to those of larger nuclear reactors. Factory fabrication also provides an environment of enhanced quality control that can diminish construction risks, foster learning, and enable the introduction of new manufacturing techniques. On the other hand, these kinds of benefits have yet to demonstrate for SMRs.

Learning Curves in the nuclear industry

A study conducted by EY in 2016 indicated that minimal learning through on-site construction of large reactors was achieved; Japan and South Korea have improved this, with rates of 5%, through design standardization, modularization, advanced construction methods and consistent project delivery. More vital learning of 8% to 10% could be achieved for SMRs, with their more significant proportion of factory build (45% to 60%), compared to the large reactors (30% to 35%). In the same study, it is implied that the effect of learning has a potential to reduce the CAPEX of SMRs by 5% to 10% per doubling of production; the potential rate of learning for large reactors is 1% to 5%, due to lower proportions of factory build and lower production volumes and serial manufacture can succeed 8 % learning curve that will be subject to this study. (EY, 2016)

Particularly, one of the most challenging issues is the LCOE compared to large reactors, which is expected to drive down costs. Therefore, it is expected that the first SMR would have less than 30% LCOE with a large reactor. (EY, 2016)

2.8. Generating Financial Reports And Financial Analysis

Statement of financial position (balance sheet), statement of performance (income statement), cash flow statement and changes in equity statements are performed for both the large reactor and the small modular reactor models. For comparing the large reactor and the small modular reactor financial statements, it is essential to analyze the financial statements with the following analysis tools, ratio analysis, vertical, horizontal and trend analysis.

2.9. Valuation

Valuation is a quantitative process of calculating the fair value of a current asset or a firm and the projected ones. Although there are many techniques in the valuation of a firm or a project, the DCF (Discounted Cash Flow) method will be used in this study. By determining some assumptions and creating input data sets, it is planned to forecast the projects' free cash flow and discount them to today at the project's weighted average cost of capital (WACC).

The Discounted Cash Flow model is the most detailed, and it requires the most estimates and assumptions. Nevertheless, the effort required for preparing a DCF model will also often result in the most accurate valuation. A DCF model allows us to forecast value based on different scenarios and even perform a sensitivity analysis.

Although it is one of the most accurate methods, it has some limitations like other techniques. Degree of complexity and mathematical forms and using complex excel functions are the critical challenges in the DCF method. Like all methods, having accurate assumptions and estimates is mandatory to put forward more accurate results for a project.

3. CHAPTER: A FINANCIAL MODEL of A LARGE REACTOR TECHNOLOGY

In this section, to make an accurate comparison between the large reactor and small modular reactor technologies, a financial model has been created based on Microsoft Excel.

As mentioned earlier, we assume that we have deployed two reactors of EPR and settled in a certain place technically determined earlier. Although site selection costs has been calculated, technical evaluation was excluded in the financial model.

To eliminate some uncertainties in the model, at least, some of assumptions taken into account in the financial model are based on the technical papers and official announcements in the press. On the other hand, some assumptions are based on expert judgements to provide a real experience to evaluate a nuclear plant selection in terms of financial feasibility.

In the created financial model for large reactor technology, we evaluated the investment on a base-case scenario and then put different scenarios into effect using Microsoft Excel Tools. Finally, we compared the numeric results with the SMR financial model.

Mainly, an EPR reactor's capacity is 1650 MW(e). We deployed two EPR reactors to make an accurate comparison with SMR plant, which consists of eleven Candu SMR, which has 300 MW(e) in order to make equal the total capacity of the projects to 3300 MW(e).

3.1. Inputs and Assumptions

In the financial model for the large power plant project, it is benefited from several inputs and assumptions to interpret the results accurately. Assumptions include inflation rates or market conditions. Inputs include economic lifetime, capital, financing structure, etc. However, some inputs and assumptions are based on the estimation calculated in this study to enforce the impact of the study.

3.1.1. Inputs

Although we have not determined the technical criteria set for the reactor selection, we have paid attention to the maturity of the reactor type in terms of implementation easiness and having technical parameters publicly available for calculation in the financial model.

The main assumptions in the financial model are the reactor tech and its capacity because of generated output and its lifetime.

Table 3.1. Reactor Technical Information of the Large Plant Project

	Reactor Tech Info	Unit	Large Plant
1	Number of Reactor	*Number*	2
2	Lifetime	*Years*	60
3	Reactor Tech	*Text*	EPR
4	Currency	*Text*	USD
5	Start Date	*Date*	1.01.2023
6	End Date	*Date*	1.01.2083

Table 3.2. Market assumptions of the large plant project

	Electricty Price		
7	Market Price	*Amount*	129,09
8	PPA Price	*Amount*	193,6
9	PPA Period		Based on different scenarios.

Once we started to create the financial model, the current electric price in the market was 129,09 USD/KW. We checked the power purchase agreement of Akkuyu NPP in late 2012, and the PPA price was increased by approximately 50 % of the market price.

The formula for calculation of PPA price is as follow which is shown in the Table 3.2.

$$PPA\ Price = Market\ Price\ x\ (1 + 50\ \%)$$

Table 3.3. Amortization and depreciation for CAPEX for the large plant in the financial model

10	**Amortization & Depreciation**	*Years*	40

Table 3.4. Financing assumptions and inputs for the large reactor financial model

	Financing		
11	Interest Rate	*%*	9 %
12	Loan Maturity	*Years*	15
14	Decommissioning Fund	*Per KW*	0,15
15	Operation Period	*Years*	60
16	Equity	*%*	30 %
17	Debt	*%*	70 %

In the financial model, we assume the project is financed with equity and debt by lending at a 9 % interest rate and 15 years of credit payback. 30 % of the initial investment is financed by the shareholders, and the lenders finance 70 % of it.

Sizeable project-financed projects such as nuclear are mainly financed by a mix of commercial debt and equity, with average debt-to-equity ratios hovering between 60% and %70 globally. We have used 30% equity and 70% debt in this study.

Table 3.5.Reactor capacity of the large plant project

	Capacity		
18	Capacity	*MW*	1.650
19	Installed capacity	*%*	90%
20	Total Capacity (Two reactors)	*MW*	1650 x 2 Reactor
	Net Capacity *		2970

An EPR reactor’s net power output is 1650 MW and its installed capacity is 90 %.

$$Net\ Capacity = Total\ Capacity\ x\ Available\ Capacity\ (\%)$$

In the model, we calculated the net generated output as follows:

1650 x (2 Reactors) x 0,90 = 2970 MW

Table 3.6. Construction and commercial operation timeline

	Construction and operation timeline		
	Lifetime Schedule		Reactor 1
21	Construction Start Date	*Date*	1.01.2023
22	Operation Start Date	*Date*	1.01.2030
	Construction Timeline		Reactor 2
23	Construction Start Date	*Date*	1.01.2025
24	Operation Start Date	*Date*	1.01.2032

Appendix 2 shows the list of commercial nuclear reactors worldwide and those reactors' construction duration (unfinished reactors excluded). As a result of the basic calculation of the average construction duration of nuclear reactors, we see that the duration is 7,34. Once we filter by PWR reactors in the list, we only observe 0,01-year change, which is 7,33 years. Due to the world's latest technology and supply chain developments, we calculate a seven-year construction duration for each reactor deployment.

Table 3.7. Dividend distributions

	Dividend Distribution		
	Dividend		80%
31	Legal reserve I as % of capital	*%*	20%
32	Legal reserve I as % of net income	*%*	5%
33	First dividend as % of capital	*%*	5%
34	Legal reserve II / 2nd dividend	*%*	10%
35	Legal reserve II as % of capital	*%*	30%

The dividend distribution policy of the project is under Turkish Tax Law.

Table 3.8. Taxing

	Taxing		
36	CIT Rate	*%*	23%
37	Tax carry loss year	*Year*	5

Corporate income tax is calculated over 23 %, and the tax carry for loss year is five years.

Table 3.9. Fiscal incentives

	Incentives (Non-refundable)		
38	Tax Incentive for CIT	*%*	90%
39	Social Security Incentives	*%*	17,5%
40	Withholding Tax Incentive	*%*	20%
41	Interest support	*Basis point*	0,05
42	Energy Support		5%
43	Training Support		5%

All related fiscal incentives in the Turkish Fiscal Incentive program exist in the financial model.

Table 3.10. CAPEX breakdown of the large plant project

	Capex Breakdown Per Reactor		
44	Nuclear Island	33%	3.073.882.353
45	Turbine Island	16%	1.505.882.353
46	EC&I	21%	1.976.470.588
47	Civils	30%	2.823.529.412
48	Licensing	0,3%	64.000.000

According to an official announcement by EDF in 2019, EDF estimated that six EPR2 reactors would cost 56 billion USD. In this study, we deployed one reactor for 9,44 billion USD. Table 3.10. shows the breakdown of CAPEX for one reactor.

Table 3.11. OPEX breakdown of the large plant project

	Plant Operating Cost		
49	Fuel	15,0%	68.598.750
50	Maintenance	20,0%	91.465.000
51	Personnel	10,0%	45.732.500
52	Consumables	2,0%	9.146.500
53	Outages	29,0%	132.624.250
54	Insurance	7,0%	32.012.750
55	Corporate overhead	8,0%	36.586.000
56	Fuel storage	9,0%	41.159.250

According to a study by World Nuclear Association, the percental breakdown of a nuclear plant's operational expenditures is shown in Table 3.11. Total operational expenditure is 457,3 million dollars in the financial model.

Table 3.12. Value Added Tax on Revenue, Operational Expenditures, and Capital Expenditures

	Value Added Tax	
60	VAT on Revenue	18%
61	VAT on OPEX	18%
62	VAT on CAPEX (Fiscal Inc. Included)	0%

3.1.2. Capital expenditures & amortization

Table 3.13. Capital Expenditures of large reactor power plant project

CAPEX and Amortization & Depreciation *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Capex 1st Reactor	-	…	-	…	-
Nuclear Island	-	…	76,85	…	-
Turbine Island	-	…	37,65	…	-
EC&I	-	…	49,41	…	-
Civils	-	…	70,59	…	-
Licensing	-	…	1,60	…	-
Capex 2nd Reactor	-	…	-	…	-
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Total Depreciation and Amortization	**-**	**…**	**237,69**	**…**	**-**
Accumulated Depreciation and Amortization	**-**	**…**	**491,39**	**…**	**18.887,53**

CAPEX	-	…	-	…	-
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-

Civils	**-**	…	**-**	…	**-**
Licensing	**-**	…	**-**	…	**-**
Capex 2nd Reactor	**-**	…	**-**	…	**-**
Nuclear Island	**-**	…	**-**	…	**-**
Turbine Island	**-**	…	**-**	…	**-**
EC&I	**-**	…	**-**	…	**-**
Civils	**-**	…	**-**	…	**-**
Licensing	**-**	…	**-**	…	**-**
TOTAL Capex Cash Outflow	**-**	**…**	**-**	**…**	**-**
TOTAL Capex AcuCumulated	**-**	**…**	**9.507,76**	**…**	**18.887,53**

Capital expenditures include nuclear island, turbine island, electrical control and instrumentation, civils and licensing that cost 9,44 Billion USD/reactor. The facility's office equipment, furniture, and tools have been excluded from the financial model due to not impacting the financial statement significantly.

The total amount has depreciated for forty years, and its amortization method is straight-line.

Each reactor's capital expenditures started to depreciate after being ready to operate in the year 2030 for the first reactor's capital expenditures and the year 2032 for the second reactor's capital expenditures, respectively.

3.1.3. Operation and maintenance

Table 3.14. Operating Expenditures of large reactor power plant project

Operating Expenditures *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Unit 1					
Fuel	0	…	81,98	…	258,54
Maintenance	0	…	54,65	…	172,36
Consumables	0	…	5,47	…	17,24
Outages	0	…	79,25	…	249,92
Insurance	0	...	19,13	…	60,33
Fuel storage	0	...	24,59	…	77,56

Unit 2					
Fuel	0	...	-	…	258,54
Maintenance	0	...	-	…	172,36
Consumables	0	...	-	…	17,24
Outages	0	...	-	…	249,92
Insurance	0	...	-	…	60,33
Fuel storage	0	...	-	…	77,56
In the scope of Incentive	0	...	-	…	-
Personnel	0	...	54,65	…	172,36
Training Cost	0	...	10,93	…	34,47
Corporate overhead	0	...	43,72	…	137,89
Energy Cost	0	...	6,56	…	20,68
TOTAL	**0**	**...**	**-**	**…**	**-**
TOTAL Cost of Services	**0**	**...**	**345,96**	**…**	**1.926,98**
TOTAL General Ad. Expenses	**0**	**...**	**17,49**	**…**	**55,16**
TOTAL Costs	**0**	**...**	**363,45**	**…**	**1.982,14**

Operational expenditure includes various costs such as maintenance, consumables, outages, insurance, and fuel storage. General expenses are excluded during the construction period. Incentives subject to operational expenditures, which are social security incentives, withholding tax incentives, training support, and energy support, are calculated by deducting from expenses yearly.

Due to there being no operation in the construction period, operational expenditures do not exist. On the other hand, when commercial operation starts, operational expenditures start to increase.

For Unit 1:

- Fuel costs increase from 0 to 258.54 million dollars.
- Maintenance costs increase from 0 to 172.36 million dollars.
- Consumables costs increase from 0 to 17.24 million dollars.
- Outages costs increase from 0 to 249.92 million dollars.
- Insurance costs increase from 0 to 60.33 million dollars.
- Fuel storage costs increase from 0 to 77.56 million dollars.

3.1.4. Fuel costs

Table 3.15. Fuel costs of large reactor power plant project

Fuel Costs *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Fuel Costs					
Unit 1	-	…	80,37	…	253,47
Unit 2	-	…	-	…	253,47
Total Fuel Cost	**-**	**…**	**80,37**	**…**	**506,94**

Uranium is the most commonly used fuel in nuclear power plants in the nuclear industry. A specific type of uranium (U-235) is used as fuel in nuclear power plants because the atoms are easily split apart.

According to a technical paper by The UX Consulting Company in 2016, a typical 1000 MW capacity needs only about 25000 kg of fuel annually (The Ux Consulting Company, 2016). In this study, we calculate the fuel requirement for a 1650 MW reactor with the following formula.

25000 kg / 1000 MW x 1650 MW = 41250 kg fuel in a year.

Table 3.16. Approximate costs of a nuclear reactor fuel

Process	**Amount required x price**	**Cost**	**Propotion of Total**
Uranium	8,9 kg x 94,6 $	842 $	51%
Conversion	7,5 kg x 16 $	120 $	7%
Enrichment	7,3 SWU x 55 $	401 $	24%
Fuel fabrication	per kg	300 $	18%
Total		**1663 $**	

Table 3.16. shows the approximate costs to get 1 Kg uranium as nuclear reactor fuel. In this study, the cost of yearly consumption is calculated by using the following formula:

25000 kg / 1000 MW x 1650 MW x 1663 $

A 2 % price increment has been considered each year to make a more accurate valuation.

3.2. Financing and Funding

Table 3.17. Financing mechanism of large reactor power plant project

Financing and Funding *(Dollars in million)*	
Equity	30%
Debt	70%
Interest Rate	9%
Loan maturity	15
Grace Period	7 years
TOTAL	18.887,53
Debt	13.221,27
Equity	5.666,26
	-
TOTAL	**18.887,53**

Table 3.18. Loan Amortization Table of the Large Plant

Loan Amortization					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Installments	1.189,91	…	1.640,22	…	-
Interest	1.189,91	…	1.105,21	…	-
Principal	-	…	535,00	…	-
	-	…	-	…	-
Net Borrowing	**13.221,27**	…	**12.195,44**	…	**-**

Table 3.17. shows that the total financing amount is divided into equity and debt. Debt accounts for the majority of the funding, while equity constitutes a smaller portion. The interest rate is mentioned at 9%, and the loan maturity is set at 15 years. The total amount of financing remains at 18.887,53 million dollars. A grace period of 7 years is provided before regular payments commence.

Even though there are different financing methods to finance such a project, we assume that debt and equity financing is the probable option for this study. Interest rate, amount of principal and amortization, etc. represent the conditions under which an entity borrows funds. The project is financed by 70 % debt financing and 30 % equity financing and credit conditions are as follows:

Interest rate: 0,09

Loan maturity: 15 years

Total debt: 13,2 billion $

Grace period: 7 years

The first credit drawdown starts at the beginning of the project as of 01.01.2023 and ends by the end of 2037. The total interest to be paid is 18,56 billion $ within 15 years.

3.3. Cost of Services

Table 3.19. Cost of services of large plant project

Cost of Services *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Unit 1					
Fuel	-	…	81,98	…	258,54
Maintenance	-	…	54,65	…	172,36
Consumables	-	…	5,47	…	17,24
Outages	-	…	79,25	…	249,92
Insurance	-	…	19,13	…	60,33
Fuel storage	-	…	24,59	…	77,56
Unit 2					
Fuel	-	…	-	…	258,54
Maintenance	-	…	-	…	172,36
Consumables	-	…	-	…	17,24
Outages	-	…	-	…	249,92
Insurance	-	…	-	…	60,33
Fuel storage	-	…	-	…	77,56
Workmanship Costs	**-**	**…**	**43,72**	**…**	**137,89**
		…		**…**	
TOTAL Cost of Services	**-**	**…**	**308,80**	**…**	**1.809,78**

Cost of services include fuel, maintenance, consumables, outages, insurance, fuel storage, and workmanship costs.

Due to there being no operation in the construction period, the cost of services do not exist. On the other hand, when commercial operation starts, the cost of services starts to increase. Table 3.19. Shows that in 2031, cost of services is 308,80 million dollar and 43,72 million dollars of it workmanship cost and in 2089, total cost of services is 1809,78 million dollar.

One of the main proportions of the cost of services is fuel cost, whereas the minimum proportion is consumables.

3.4. Revenues

Table 3.20. Revenues of large reactor plant project

Revenue *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Total Generated Output in Operation					
Unit 1	-	…	13008600	…	13008600
Unit 2	-	…	0	…	13008600
Revenue					
Unit 1	-	…	2.518,92	…	6.204,90
Unit 2	-	…	-	…	6.204,90
TOTAL Revenue	**-**	**…**	**2.518,92**	**…**	**12.409,79**

After commercial operation started for the first reactor in 2030, it is planned that the NPP starts to generate electricity and generate cash from the commercial operation. The second reactor is planned to generate electricity in 2032. It is planned that the NPP will sell the generated electricity in the market. Therefore, the market price is considered at the beginning of the years 2030 and 2032.

Pricing

In order to determine what will affect the market price of electricity, we made a correlation analysis, and we see that the USD currency explains the change of approximately 58 % in electricity price. In this study, we use the average USD currency as a key indicator by estimating the market price.

Table 3.21. Correlation analysis results

Correlation			
	Electricity Price in USD	*GDP*	*Currency / USD*
Electricity Price in USD	1		
GDP	0,389775898	1	
Currency / USD	0,580820358	0,222054156	1

USD Data has been gathered from the Central Bank of the Turkish Republic and Electricity market prices from Energy Exchange Istanbul (EPİAS). By determining the 2023-year market price, the Trend formula is used with the following data in the financial model.

Table 3.22. Electricity market price and average TL/USD currency

	A	B	C
1	**Column1**	**Dependent**	**Independent**
2		Electricity Price in USD	Average Currency / USD
3	2012	83,4940	1,7922
4	2013	78,8584	1,9033
5	2014	75,0651	2,1865
6	2015	51,0504	2,7191
7	2016	46,3020	3,0181
8	2017	45,0011	3,6445
9	2018	47,4233	4,8301
10	2019	46,0332	5,6712
11	2020	40,1120	7,0034
12	2021	55,6001	8,8557
13	2022	141,7013 *	16,4610
14	2023	?	21,50

"=TREND (B3:B13;E3:E13;A14)

In 2022, energy costs have reached unprecedented levels, mainly due to Russia's unjust invasion of Ukraine and its manipulation of gas supplies as a tool of war.

*Wholesale electricity prices on the European Union's internal market are closely linked to gas prices, which are mainly imported. Russia's deliberate measures to reduce gas supplies are the major cause of the sharp increase in gas prices in the EU. This has affected the price of electricity produced at gas power plants and electricity prices in general and Türkiye as well. Due to gas imports, Türkiye faced a sharp increase in electricity prices in 2022 to 141 USD/MW. Turkey increased electricity and gas prices for industry by 50%.

While Türkiye was announcing it, the regulator in Türkiye linked the increase in electricity prices to rising energy prices, especially under the influence of the war in Ukraine.

We estimated that the market price would be 129,01 USD as of 2023, and we escalated with the escalation rate and calculated the market price as of 2030.

3.5. Incentives

Table 3.23. Incentive of the large reactor plant project

Fiscal Incentives *(Dollars in million)*					
	31.12.2023	...	31.12.2031	...	31.12.2089
	1.01.2023	...	1.01.2031	...	1.01.2089
Social Security Incentives	0	...	- 9,56	…	- 30,16
Withholding Tax Incentive	0	...	- 10,93	…	- 34,47
Training Support	0	...	- 0,55	…	- 1,72
Energy Support	0	...	- 0,33	…	- 1,03
Opex	**0**	**...**	**363,45**	**…**	**1.146,19**
Incentive	**0**	**...**	**- 21,37**	**…**	**- 67,39**
Net Opex	**0**	**...**	**342,08**	**…**	**1.078,80**

As a strategic investment, incentives are widely used in the nuclear sector. There are various incentives which are not only for capital expenditures but also operational expenditures in Türkiye. The nature of the business of nuclear projects, which cost higher than 500 million Turkish Liras, most of the incentives take place in the financial model. In this study, the following incentives are used in the operational expenditures:

1. Social Security incentives,
2. Withholding tax incentive
3. Training support
4. Energy support

The amount that is subject to incentives has been deducted from the operational expenditures.

For capital expenditures, vat refunds, custom duty exemptions, and landscape allocation are calculated as strategic investment incentives by not adding their costs.

3.6. Financial Reports

Table 3.24. Income statement, Cash flow statement and Balance Sheet of the large reactor plant project

Financial Statements *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Income Statement					
Revenue	-	…	2.518,92	…	12.409,79
Cost of Services	-	…	308,80	…	1.809,78
Gross Profit	-	…	2.210,12	…	10.600,01
General Ad. Expenses	-	…	17,49	…	55,16
Incentives	-	…	21,37	…	67,39
EBITDA	-	…	2.171,26	…	10.477,46
Amortization and Depreciation	-	…	237,69	…	-
EBIT	-	…	1.933,57	…	10.477,46
Interest	1.189,91	…	1.105,21	…	-
EBT	- 1.189,91	…	828,36	…	10.477,46
CIT	-	…	828,36	…	10.477,46
Carry for Loss	-	…	- 4.344,62	…	10.477,46
Tax	-	…	-	…	2.409,82
Net Profit	**- 1.189,91**	…	**828,36**	…	**8.067,65**

Cash Flow Statement					
Net Profit	- 1.189,91	…	828,36	…	8.067,65
Operating Activities	-	…	-	…	-
Amortization and Depreciation	-	…	237,69	…	-
Change in VAT	-	…	2,90	…	3,19
Cash Flow from Operating Activities	- 1.189,91	…	1.068,95	…	8.070,83
		…		…	
Investing Activities	-	…	-	…	-
CAPEX	**-**	…	**-**	…	**-**

Share Holder's Equity	-	…	-	…	-
Cash Flow from Investing Activities	-	…	-	…	-
		…		…	
Free Cash Flow	-1.189,91	…	1.068,95	…	8.070,83
Financing Activities	-	…	-	…	-
Debt Repayment	-	…	535,00	…	-
Net Borrowing	-	…	-	…	-
Cash Flow From Financing Activities	-	…	-535,00	…	-
Net Cash Flow	**-1.189,91**	…	**533,95**	…	**8.070,83**

Balance Sheet					
Assets	-	…	-	…	-
Cash and Cash Equivalents	17.697,62	…	2.157,55	…	264.482,23
VAT Receivable	-	…	-	…	-
Fixed Assets	-	…	9.507,76	…	18.887,53
Accumulated Depreciation and Amortization	-	…	-491,39	…	-18.887,53
TOTAL ASSETS	**17.697,62**	…	**11.173,92**	…	**264.482,23**
Liabilities	-	…	-	…	-
VAT Payable	-	…	38,27	…	185,86
Short-term liabilities	-	…	-	…	-
Long-term Liabilities	13.221,27	…	12.195,44	…	-
Tax Payables	-	…	-	…	-
Equity	-	…	-	…	-
Common Stock	5.666,26	…	5.666,26	…	5.666,26
Retained Earnings	-1.189,91	…	-6.726,05	…	258.630,11
				…	
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	**17.697,62**	…	**11.173,92**	…	**264.482,23**
Balance Check	-	…	-	…	-

Financial statements include the income statement, cash flow statement and balance sheet from the project commencing 2023. To calculate net profit in the income statement, the carry for loss is five years, per the 5520 Numbered Corporate Tax Law (5520 Numbered Corporate Income Tax).

The cash flow statement consists of three main parts, which are cash flow from operating activities, cash flow from financing activities and cash flow from investments. The cash flow statement is used for project valuation by discounting the projected cash flow.

We discounted the cash flows using a discount rate calculated in the next sections in this study.

The balance sheet consists of assets, liabilities, and equity and accounts have been shown with primary accounts. In order to check the financial statements, we placed a balance check on the timeline.

All financial statements are prepared in compliance with the International Financial Reporting Standards.

To analyze the financial statements, general administrative expenses increase gradually but remain relatively low compared to gross profit. Incentives also grow gradually but remain manageable. Earnings Before Interest, Taxes, Depreciation, and Amortization grow substantially, reaching 2,171.26 million dollars by 1.01.2031 and 10,477.46 million dollars by 1.01.2089. Net profit follows a similar trend to EBT, becoming positive and growing to 8,067.65 million dollars by 1.01.2089.

3.7. Dividends

Table 3.25. Dividend distribution of the large reactor plant project

Dividend Distributions *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Paid-in Capital	5.666,26	…	5.666,26	…	5.666,26
Legal Reserve I	-	…	-	…	-
Legal Reserve Limit	1.133,25	…	1.133,25	…	1.133,25
Profit before tax	- 1.189,91	…	828,36	…	10.477,46
Taxes	-	…	-	…	2.409,82
Net Profit	**- 1.189,91**	**…**	**828,36**	**…**	**8.067,65**
Accumulated Loss	-	…	- 7.554,40	…	-
Distributable Profit	-	…	-	…	8.067,65

Legal Reserve I	-	…	-	…	403,38
Legal Reserve Check	-	…	-	…	-
Net distributable profit	**-**	**…**	**-**	**…**	**7.664,26**
First Dividend (80%)	-	…	-	…	6.131,41
Legal Reserve II	-	…	-	…	613,14
Declared dividend	-	…	-	…	5.518,27
Retained Earnings	-	…	-	…	1.532,85
Total Reserves	**-**	**…**	**-**	**…**	**1.016,52**
Checks for Distributable Profit	**-**	**…**	**-**	**…**	**-**

Shareholders must keep the legal reserves amounting to 5% of the company's net profit each year until that 20% of the capital share amount is reserved as a legal reserve, which is stipulated in the numbered 6102 Turkish Commercial Law (6102 numbered Turkish Commercial Law).

We distributed 80% of the net profit to the shareholders in cash, not in kind, and the remaining 20% is planned for funding for decommissioning and waste management by the end of the commercial operation.

The paid-in capital remains constant at 5.666,26 million dollars, there is no extra paid-in capital injection throughout the specified time periods. The legal reserve limit is consistent at 1.133,25 million dollars throughout the specified time periods. Net profit is negative in the earlier project, varying from -1.189,91 million dollars at the beginning to 8.067,65 million dollars by 1.01.2089.

3.8. Financial Analysis

Table 3.26. Financial statement analyses of the large reactor plant project

Vertical Analysis	31.12.2023	…	31.12.2031	…	31.12.2089
Income Statement	1.01.2023	…	1.01.2031	…	1.01.2089
Revenue	N/A	…	100%	…	100%
Cost of Services	N/A	…	12%	…	15%
Gross Profit	N/A	…	88%	…	85%
General Ad. Expenses	N/A	…	1%	…	0%
Incentives	N/A	…	1%	…	1%
EBITDA	N/A	…	86%	…	84%
Amortization and Depreciation	N/A	…	9%	…	0%
EBIT	N/A	…	77%	…	84%

Interest	N/A	…	44%	…	0%
EBT	N/A	…	33%	…	84%
CIT		…		…	
Carry for Loss		…		…	
Tax	N/A	…	0%	…	19%
Net Profit	N/A	…	33%	…	65%

Vertical Analysis					
Balance Sheet					
Assets					
Cash and Cash Equivalents	100%	…	19%	…	100%
Fixed Assets	0%	…	85%	…	7%
Accumulated Depreciation and Amortization	0%	…	-4%	…	-7%
		…		…	
TOTAL ASSETS	100%	…	100%	…	100%
Liabilities					
Short-term liabilities	0%	…	0%	…	0%
Long-term Liabilities	75%	…	109%	…	0%
Equity					
Common Stock	32%	…	51%	…	2%
Retained Earnings	-7%	…	-60%	…	98%
		…		…	
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	100%	…	100%	…	100%

Horizontal Analysis					
Income Statement					
Revenue		…	0%	…	2%
Cost of Services		…	2%	…	2%
Gross Profit		…	0%	…	2%
General Ad. Expenses		…	2%	…	2%
Incentives		…	2%	…	2%
EBITDA		…	0%	…	2%
Amortization and Depreciation		…	0%	…	#DIV/0!
EBIT		…	0%	…	2%
Interest		…	-4%	…	#DIV/0!
EBT		…	5%	…	2%
CIT		…		…	
Carry for Loss		…		…	
Tax		…	#DIV/0!	…	2%

Net Profit		…	5%	…	2%

Horizontal Analysis		…		…	
Balance Sheet		…		…	
Assets		…		…	
Cash and Cash Equivalents		…	33%	…	3%
Fixed Assets		…	0%	…	0%
Accumulated Depreciation and Amortization		…	94%	…	0%
		…		…	
TOTAL ASSETS		…	3%	…	3%
Liabilities		…		…	
Short-term liabilities		…	#DIV/0!	…	#DIV/0!
Long-term Liabilities		…	-4%	…	#DIV/0!
Equity		…		…	
Common Stock		…	0%	…	0%
Retained Earnings		…	-11%	…	3%
		…		…	
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES		…	3%	…	3%
Ratio Analysis					
Debt Services Coverage Ratio	-	…	1,32	…	#DIV/0!
Current Ratio	1,34	…	0,18	…	#DIV/0!
Financial Leverage Ratio	75%	…	109%	…	0%

We use various techniques to analyze the financial statements that allow the building of a more detailed and nuanced financial profile and the project's financial health. Horizontal, vertical, and ratio analyses have been used in this section.

We calculated the debt service coverage ratio to analyze the meeting's financial liabilities. There is no debt service coverage ratio less than 0,97 in the ratio analysis part throughout the years, which could be ok for such a project.

The provided financial statement analysis includes vertical analysis, horizontal analysis, and ratio analysis. Here's an interpretation of the key findings:

Revenue remains at 100% of the total throughout the specified time periods, indicating consistent top-line growth.

Cost of Services is at 12% in 31.12.2031, increasing to 15% by 1.01.2089.

Gross Profit remains strong, with a slight decrease from 88% to 85%.

EBITDA decreases from 86% to 84%.

Amortization and Depreciation decrease from 9% to 0%.

EBIT varies from 77% to 84%.

Interest decreases from 44% to 0%.

EBT increases from 33% to 84%.

CIT (Corporate Income Tax) and Carry for Loss are not provided in the vertical analysis.

Taxes increase from 0% to 19%.

Net Profit increases from 33% to 65%.

Cash and Cash Equivalents remain significant, increasing from 19% to 100%.

In terms of fixed assets, fixed assets are the highest cost of the balance sheet, whereas fixed assets decrease from 85% to 7% throughout the years in balance sheet proportions.

Project finance has been used for financing the project. Therefore, long-term liabilities increase from 75% to 109%.

Revenue grows by 2% from 31.12.2031 to 1.01.2089.

Most expense items also increase by 2% during the same period.

Interest decreases by 4% from 31.12.2031 to 1.01.2089.

Net Profit grows by 5% from 31.12.2031 to 1.01.2089.

Cash and Cash Equivalents increase by 33% from 31.12.2031 to 1.01.2089.

Long-term Liabilities decrease by 4%.

Common Stock and Retained Earnings exhibit minimal changes.

The current Ratio decreases significantly from 1.34 to 0.18.

Financial Leverage Ratio increases from 75% to 109% and then drops to 0%.

3.9. Valuation

Table 3.27. Valuation results of the large plant project

IRR	
Project IRR	10,53%
Equity IRR	11,10%
Net Present Value and Payback Period	
Project NPV	2.564.273.115
Equity NPV	2.505.329.509
Payback Period	16 years

LCOE Calculation	
Total OPEX	38.735.796.823
Total CAPEX	18.887.529.412
Total Generated Output	1.562.101.200
LCOE	36,89

There is no one formula to determine or calculate the company valuation. Different formulas are used to calculate a company valuation under different company valuation methods. In this study, we use the Discounted Cash Flow (DCF) model to evaluate the project's financial feasibility.

The discounted cash flow is calculated by dividing the current value of the future cash flows by discounting them at an appropriate rate. Where:

Discounted cash flow = 1st-year cash flow/(1+r)^1 + 2nd-year cash flow/(1+r)^2 + ……… + nth year cash flow/(1+r)^n

In the formula above, we use r as a discount rate by using weighted average cost of capital as shown in its formula below.

$$WACC = \left(\frac{E}{V}\ x\ \ Re\right) + (\frac{D}{V}\ x\ Rd\ x\ (1 - Tax\ Rate)$$

where:

E=Market value of the firm's equity

D=Market value of the firm's debt

V=E+D

Re=Cost of equity

Rd=Cost of debt

Table 3.28. Calculation of cost of equity

Calculation of Cost of Equity		
Türkiye Eurobond 20 Years Yield	a	9,00%
Türkiye Credit Default Swap	b	5,85%
Cost of Equity (Ke)	a+b	14,85%

We use Turkey Eurobond 20 years yield as debt ratio while calculating the cost of equity. We added 9% Türkiye Eurobond 20 years yield to Türkiye Credit Default Swap.

Source: https://www.bloomberght.com/eurobond/tr-eurobond-20-yil

Table 3.29. Calculation of the Discount rate by using WACC Formula

	TOTAL	Weight of Equity = Equity/(Equity+Debt)	Weight of Debt = Debt/(Equity+Debt)
	18.887.529.412	5.666.258.824	13.221.270.588
Weights		30,00%	70,00%
		0,04455	0,04851
		x	y
Weighted Average Cost of Capital (x + y)		0,04455+0,04851	0,09306

In Table 3.29. We use the weighted average cost of capital formula to calculate the discount rate by using the debt and equity ratio in the project and corporate tax rate in Türkiye.

3.10. Scenarios

The financial model of the large reactor plant has been stressed with different scenarios, as shown below. The market price for the first year, PPA price, PPA period, interest rate, equity and debt ratio and yearly escalation rate are considered scenario parameters. It has been tested that which option could be more beneficial for investors, whether it is a government or a lender for the investment. We used three scenarios in total, and one of them is the most realistic (baseline) that is based on expert judgements, professional experiences, and official announcements in the press.

Table 3.30. Base-case and different scenarios

	Best	Normal (Baseline)	Worst
Market Price	160	129,09	120
Interest Rate	7%	9%	11%
Equity	0,3	0,3	0,3
Debt	0,7	0,7	0,7
Inflation Rate	0,04	0,02	0,01
Discount Rate	8%	9%	10%

4. CHAPTER: A FINANCIAL MODEL OF A SMALL MODULAR REACTOR TECHNOLOGY

As mentioned earlier, we assume that we have deployed eleven reactors of SMR and settled in a certain place technically determined earlier. The technical evaluation is excluded in this study.

As one of the most mature SMR designs, Candu SMR from Canada, which has 300 MW(e) reactor capacity, is considered for the comparison in this study.

The reason why we have placed eleven reactors is to equalize the capacity up to 3300 MW with the large reactor model. Nevertheless, we have not determined the exact generated output capacity due to not having an existing SMR plant worldwide.

To eliminate some uncertainties in the model, at the least, some of assumptions considered in the financial model are based on the technical papers and official announcements in the press. On the other hand, some assumptions are based on expert judgements to provide a real experience to evaluate a nuclear plant selection in terms of financial feasibility.

In the created financial model for small modular reactor, we evaluated the investment on a base-case scenario and then put different scenarios into effect using Microsoft Excel Tools.

4.1. Inputs and Assumptions

In the financial model for the small modular reactor project, it is benefited from several inputs and assumptions to interpret the results accurately. Assumptions include inflation rates or market conditions. Inputs include economic lifetime, capital, financing structure, etc. However, some inputs and assumptions are based on the estimation calculated in this study to enforce the impact of the study. Both inputs and assumptions play a vital role in ensuring the accuracy and reliability of the results.

4.1.1. Inputs

Although we have not determined the technical criteria set for the reactor selection, we have paid attention to the maturity of the reactor type in terms of implementation easiness and having technical parameters publicly available for calculation in the financial model.

The main assumptions in the financial model are the reactor tech and its capacity because of generated output and its lifetime.

In order to make a more accurate comparison, we placed eleven small modular reactor plants in the study. According to the plan, each unit is placed every three years, whereas seven years in large plants.

Table 4.1. Reactor Tech information, its lifetime and currency to be used for the financial evaluation for SMRs

	Reactor Tech Info	*Unit*	**SMR**
1	Number of Reactor	*Number*	11
2	Lifetime	*Years*	60
3	Reactor Tech	*Text*	Candu
4	Currency	*Text*	USD
5	Start Date	*Date*	1.01.2023
6	End Date	*Date*	1.01.2083

Table 4.2. Market assumptions (market price and PPA Price)

	Electricty Price		
7	Market Price	*Amount*	129,09
8	PPA Price	*Amount*	193,6
9	PPA Period		Based on different scenarios.

Once we started to create the financial model, the current electric price in the market was 129,09 USD/KW. We checked the power purchase agreement of Akkuyu NPP in late 2012, and the PPA price was increased by approximately 50 % of the market price.

We used the same formula that mentioned in the 3.1.1 Input sections.

Table 4.3. Amortization and depreciation for CAPEX in the financial model for SMRs

10	**Amortization & Depreciation**	*Years*	40

Table 4.4. Financing assumptions and inputs for the SMR financial model

	Financing		
11	Interest Rate	*%*	0,09
12	Loan Maturity	*Years*	15
14	Decommissioning Fund	*Per KW*	0,15
15	Operation Period	*Years*	60
16	Equity	*%*	0,3
17	Debt	*%*	0,7

We use similar financing assumptions and inputs for both models to evaluate the feasibility of large and small modular plants.

In the financial model, we assume the project is financed with equity and debt by lending a 9 % interest rate and 15 years of credit payback. 30 % of the initial investment is financed by the shareholders, and the lenders finance 70 % of it. Table 3.28. shows the credit conditions for financing the project.

Table 4.5. Reactor capacity for SMR

	Capacity		
18	Capacity	*MW*	300
19	Installed capacity	*%*	90%
20	Total Capacity (Two reactors)	*MW*	300 x 11 Reactors
	Net Capacity *		2970

CANDU SMRS's net power output is 300 MW and its installed capacity is 90 %.

$$Net\ Capacity = Total\ Capacity\ x\ Available\ Capacity\ (\%)$$

In the model, we calculated the net generated output as follows:

*300 x (11 Reactors) x 0,90 = 2970 MW

Table 4.6. Construction and commercial operation timeline for SMRs

Lifetime Schedule	***Column2***	**Reactor 1 and Reactor 2**

21	Construction Start Date	*Date*	1.01.2023
22	Operation Start Date	*Date*	1.01.2026
	Construction Timeline		Reactor 3 and Reactor 4
23	Construction Start Date	*Date*	1.01.2025
24	Operation Start Date	*Date*	1.01.2028
			Reactor 5 and Reactor 6
25	Construction Start Date	*Date*	1.01.2027
26	Operation Start Date	*Date*	1.01.2030
			Reactor 7 and Reactor 8
27	Construction Start Date	*Date*	1.01.2029
28	Operation Start Date	*Date*	1.01.2032
			Reactor 9, Reactor 10 and Reactor 11
29	Construction Start Date	*Date*	1.01.2030
30	Operation Start Date	*Date*	1.01.2033

Table 4.6. shows the reactors' construction and operation start date. Two reactors construction is started simultaneously for each of the two reactors apart from the last three.

Table 4.7. Dividend distributions for SMRs

	Dividend Distribution		
	Dividend		80%
31	Legal reserve I as % of capital	%	20%
32	Legal reserve I as % of net income	%	5%
33	First dividend as % of capital	%	5%
34	Legal reserve II / 2nd dividend	%	10%
35	Legal reserve II as % of capital	%	30%

The dividend distribution policy of the project is under Turkish Tax Law that shows in the Table 4.7.

Table 4.8. Taxing for SMRs

	Taxing		
36	CIT Rate	%	23%
37	Tax carry loss year	*Year*	5

Corporate income tax is calculated over 23 %, and the tax carry for loss year is five years.

Table 4.9. Fiscal Incentives for SMRs

	Incentives (Non-refundable)		
38	Tax Incentive for CIT	*%*	90%
39	Social Security Incentives	*%*	17,5%
40	Withholding Tax Incentive	*%*	20%
41	Interest support	*Basis point*	0,05
42	Energy Support		5%
43	Training Support		5%

All related fiscal incentives in the Turkish Fiscal Incentive program exist in the financial model for SMRs.

Table 4.10. CAPEX breakdown for SMRs

	Capex Breakdown Per Reactor		
44	Nuclear Island	32,7%	452.525.253
45	Turbine Island	16,0%	177.777.778
46	EC&I	21,0%	290.909.091
47	Civils	30,0%	689.131.313
48	Licensing	0,3%	64.000.000

Table 4.11. OPEX breakdown for SMRs

	Plant Operating Cost		
49	Fuel	15,0%	$137.197.500
50	Maintenance	20,0%	$119.877.818
51	Personnel	10,0%	$91.906.327
52	Consumables	2,0%	$15.983.709
53	Outages	29,0%	$242.153.193
54	Insurance	7,0%	$55.942.982
55	Corporate overhead	8,0%	$63.934.836
56	Fuel storage	9,0%	$71.926.691

As it seems in Table 4.11., outages and maintenance significantly affect the total operating cost. The total operating cost of eleven small modular reactors is 798 million USD.

The fiscal incentives that are subject to OPEX are deducted from the OPEX tab in the financial model.

4.1.2. Capital expenditures & amortization

Table 4.12.Capital Expenditures and Depreciations of the SMRs

Capital Expenditures and Amortization *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Capex 1st Reactor					
Nuclear Island	-	…	11,31	…	-
Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 2nd Reactor					
Nuclear Island	-	…	11,31	…	-
Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 3rd Reactor					
Nuclear Island	-	…	11,31	…	-
Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 4th Reactor					
Nuclear Island	-	…	11,31	…	-

Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 5th Reactor	**-**	**…**	**-**	**…**	**-**
Nuclear Island	-	…	11,31	…	-
Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 6th Reactor					
Nuclear Island	-	…	11,31	…	-
Turbine Island	-	…	4,44	…	-
EC&I	-	…	7,27	…	-
Civils	-	…	17,23	…	-
Licensing	-	…	1,60	…	-
Capex 7th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Capex 8th Reactor	**-**	**…**	**-**	**…**	**-**
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-

EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Capex 9th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Capex 10th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Capex 11th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	1,60	…	-
Total Depreciation and Amortization	**-**	**…**	**83,72**	**…**	**-**
Accumulated Depreciation and Amortization	**-**	**…**	**508,70**	**…**	**3.348,69**
CAPEX					

Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 2nd Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 3rd Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 4th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 5th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-

EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 6th Reactor	**-**	**…**	**-**	**…**	**-**
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 7th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 8th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	-	…	-
Capex 9th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-

Licensing	-	…	64,00	…	-
Capex 10th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	64,00	…	-
Capex 11th Reactor					
Nuclear Island	-	…	-	…	-
Turbine Island	-	…	-	…	-
EC&I	-	…	-	…	-
Civils	-	…	-	…	-
Licensing	-	…	64,00	…	-
TOTAL Capex Cash Outflow	**-**	**…**	**192,00**	**…**	**-**
TOTAL Accumulated Capex	**-**	**…**	**10.366,06**	**…**	**18.417,78**

Table 4.12. shows the capital expenditures (Capex) for various components of eleven reactors. These components include Nuclear Island, Turbine Island, EC&I (which might stand for Electrical, Control, and Instrumentation), Civils (Civil construction), and Licensing. For each of these components, values are listed for specific years, such as 31.12.2023, and 31.12.2031, respectively. Because of the construction period, no capital expenditures exist.

Capital expenditures include nuclear island, turbine island, electrical control and instrumentation, civils and licensing that cost 1,67 Billion USD/reactor. The facility's office equipment, furniture, and tools have been excluded from the financial model due to not impacting the financial statement significantly.

The total amount is depreciated for forty years, and its amortization method is straight-line.

The first two reactors are depreciated after being ready to operate in 2026. The third and fourth reactors started to be depreciated in 2028, the fifth and sixth started to be depreciated in 2030, and the seventh and eighth started to be depreciated in 2032. Finally, the last three reactors are depreciated after being ready to operate in 2033.

4.1.3. Operation and maintenance expenditures

Table 4.13. Operating Expenditures of the SMRs

Operating Expenditures *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Operating Costs					
0					
Unit 1					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 2					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 3					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 4					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-

Unit 5					
Fuel	-	…	14,91	…	47,01
Maintenance	-	…	13,02	…	41,07
Consumables	-	…	1,74	…	5,48
Outages	-	…	26,31	…	82,97
Insurance	-	…	6,08	…	19,17
Fuel storage	-	…	7,81	…	24,64
Unit 6					
Fuel	-	…	14,91	…	47,01
Maintenance	-	…	13,02	…	41,07
Consumables	-	…	1,74	…	5,48
Outages	-	…	26,31	…	82,97
Insurance	-	…	6,08	…	19,17
Fuel storage	-	…	7,81	…	24,64
Unit 7					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 8					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 9					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 10					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64

Unit 11					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64

Operational expenditures include various costs such as maintenance, consumables, outages, insurance and fuel storage. General expenses are excluded during the construction period. Incentives subject to operational expenditures, which are social security incentives, withholding tax incentives, training support, and energy support, are calculated by deducting from expenses yearly.

Table 4.13. lists operating expenditures for different components of eleven power generation units (Unit 1 to Unit 11). The components include Fuel, Maintenance, Consumables, Outages, Insurance, and Fuel storage. Expenditures for these components are provided for specific years. Operating expenditures start with the commercial operation of each reactor.

4.1.4. Fuel costs

Table 4.14. shows the fuel costs for each unit in millions of dollars for the specified years. The numbers are the expenses associated with purchasing fuel for each unit in the given years. Table 4.14. also provides the total fuel costs for all units combined for each year. For example, the total fuel cost for 31.12.2031 is 87.68 million dollars, and for 31.12.2089, it's 322.60 million dollars.

Table 4.14. Fuel costs of the SMRs

Fuel Costs *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
Fuel Costs	1.01.2023	…	1.01.2031	…	1.01.2089
Unit 1	-	…	14,61	…	-
Unit 2	-	…	14,61	…	-
Unit 3	-	…	14,61	…	-
Unit 4	-	…	14,61	…	-
Unit 5	-	…	14,61	…	46,09
Unit 6	-	…	14,61	…	46,09

Unit 7	-	…	-	…	46,09
Unit 8	-	…	-	…	46,09
Unit 9	-	…	-	…	46,09
Unit 10	-	…	-	…	46,09
Unit 11	-	…	-	…	46,09
Total Fuel Costs	**-**	**…**	**87,68**	**…**	**322,60**

Uranium is the most commonly used fuel in nuclear power plants in the nuclear industry. A specific type of uranium (U-235) is used as fuel in nuclear power plants because the atoms are easily split apart.

According to a technical paper by The UX Consulting Company in 2016, a typical 1000 MW capacity needs only about 25000 kg of fuel annually (The Ux Consulting Company, 2016). In this study, we calculate the fuel requirement for a 1650 MW reactor with the following formula.

25000 kg / 1000 MW x 1650 MW = 41250 kg fuel in a year.

Table 4.15. Approximate costs of a nuclear reactor fuel

Process	Amount required x price	Cost	Propotion of Total
Uranium	8,9 kg x 94,6 $	842 $	51%
Conversion	7,5 kg x 16 $	120 $	7%
Enrichment	7,3 SWU x 55 $	401 $	24%
Fuel fabrication	per kg	300 $	18%
Total		**1663 $**	

Table 4.15. shows the approximate costs to get 1 Kg uranium as nuclear reactor fuel. In this study, the cost of yearly consumption is calculated by using the following formula:

25000 kg / 1000 MW x 300 MW x 1663 $

A 2 % price increment has been considered each year to make a more accurate valuation.

4.2. Financing and Funding of SMR

Table 4.16. Financing mechanism of the SMRs

Financing and Funding *(Dollars in million)*	
Equity	30%
Debt	70%
Interest Rate	9%
Loan maturity	15

Grace Period	3 years
TOTAL	12.892.44
Debt	12.892
Equity	5.525
	-
TOTAL	18.417

Table 4.17. Loan amortization of the SMRs

Loan Amortization Table *(Dollars in million)*					
	31.12.2023	**…**	**31.12.2031**	**…**	**31.12.2089**
	1.01.2023	**…**	**1.01.2031**	**…**	**1.01.2089**
Financing					
Installments	1.599,42	-	1.599,42	-	-
Interest	1.160,32	-	1.599,42	-	-
Principal	-	-	1.599,42	-	-
	-	-	-	-	-
Net Borrowing	**12.892,44**	**-**	**1.599,42**	**-**	**-**

Equity is 30% of the total financing, which amounts to $5.525 million. Debt is 70% of the total financing, which amounts to $12.892 million. The interest rate on the debt is 9%. The loan has a maturity period of 15 years. A grace period of 3 years is provided before regular payments commence.

Even though there are different financing methods to finance such a project, we assume that debt and equity financing is the probable option for this study. Interest rate, amount of principal and amortization, etc. represent the conditions under which an entity borrows funds. The project is financed by 70 % debt financing and 30 % equity financing and credit conditions are as follows:

Interest rate: % 9

Loan maturity: 15 years

Total debt: 12,89 billion $

Grace period: 3 years

The first credit drawdown starts at the beginning of the project as of 01.01.2023 and ends by the end of 2037. The total interest to be paid is 13,03 billion $ within 15 years.

4.3. Cost of Services of SMR

Table 4.18. Cost of services of the SMRs

Cost of Services in 1 million USD					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
Cost of Services					
Unit 1					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 2					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 3					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 4					
Fuel	-	…	14,91	…	-
Maintenance	-	…	13,02	…	-
Consumables	-	…	1,74	…	-
Outages	-	…	26,31	…	-
Insurance	-	…	6,08	…	-
Fuel storage	-	…	7,81	…	-
Unit 5					
Fuel	-	…	14,91	…	47,01
Maintenance	-	…	13,02	…	41,07
Consumables	-	…	1,74	…	5,48
Outages	-	…	26,31	…	82,97
Insurance	-	…	6,08	…	19,17
Fuel storage	-	…	7,81	…	24,64
Unit 6					
Fuel	-	…	14,91	…	47,01
Maintenance	-	…	13,02	…	41,07
Consumables	-	…	1,74	…	5,48

Outages	-	…	26,31	…	82,97
Insurance	-	…	6,08	…	19,17
Fuel storage	-	…	7,81	…	24,64
Unit 7					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 8					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 9					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 10					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Unit 11					
Fuel	-	…	-	…	47,01
Maintenance	-	…	-	…	41,07
Consumables	-	…	-	…	5,48
Outages	-	…	-	…	82,97
Insurance	-	…	-	…	19,17
Fuel storage	-	…	-	…	24,64
Workmanship Costs	**-**	**…**	**87,87**	…	-
TOTAL Cost of Services	**-**	**…**	**507,07**	**…**	**1.542,35**

Cost of services include fuel, maintenance, consumables, outages, insurance, fuel storage, and workmanship costs. Table 4.18. outlines the costs associated with various services and components for different units and years.

The cost of services data is divided into seven sections.

Fuel: The cost of fuel for operating the unit. There are no fuel costs in some years because of the ongoing construction period. Maintenance is the expense related to maintenance for the unit. Consumables are the costs associated with consumable items used in the unit's operation. Outages are the expenses for managing outages and downtime. Insurance is the cost of insurance for each unit. Fuel storage is the expense related to fuel storage.

The total cost of services is summarized, indicating the overall cost of operating these units each year. It is highest later, reaching $1.542 billion in 1.01.2089.

4.4. Revenues of SMR

Table 4.19. Revenues of the SMRs

Revenue *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
Revenue	1.01.2023	…	1.01.2031	…	1.01.2089
Unit 1	-	…	457,99	…	-
Unit 2	-	…	457,99	…	-
Unit 3	-	…	457,99	…	-
Unit 4	-	…	457,99	…	-
Unit 5	-	…	457,99	…	1.128,16
Unit 6	-	…	457,99	…	1.128,16
Unit 7	-	…	-	…	1.128,16
Unit 8	-	…	-	…	1.128,16
Unit 9	-	…	-	…	1.128,16
Unit 10	-	…	-	…	1.128,16
Unit 11	-	…	-	…	1.128,16
TOTAL Revenue	**-**	**…**	**2.747,91**	**…**	**7.897,14**

Table 4.19. provides a breakdown of revenue generated by eleven units over the years, focusing on three specific time points: 31.12.2023, 31.12.2031, and 31.12.2089. It also shows that reactors only generate revenue under commercial operation. The financial model

of SMR provides that each reactor unit starts generating revenue as soon as it gets involved in commercial operation.

After commercial operation started for the first reactor in 2026, it is planned that the NPP starts to generate electricity and generate cash from the commercial operation.

Pricing

In section 3.4. we calculated the market price and used the same assumption in the financial model for SMRs. We estimated that the market price would be 129,01 USD as of 2023, and we escalated with the escalation rate and calculated the market price as of 2030.

4.5. Incentives of SMR

Table 4.20. Incentives of the SMRs

Fiscal Incentives *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
	1.01.2023	…	1.01.2031	…	1.01.2089
In the scope of Incentive	-	…	-	…	-
Personnel	-	…	109,84	…	-
Training Cost	-	…	21,97	…	-
Corporate overhead	-	…	76,41	…	-
Energy Cost	-	…	11,46	…	-
TOTAL Cost of Services	**-**	**…**	**292,55**	**…**	**-**
TOTAL General Ad. Expenses	**-**	**…**	**33,43**	**…**	**-**
		…	-	…	-
TOTAL Costs	**-**	**…**	**325,98**	**…**	**-**
Incentives Subject to Opex	-	…	-	…	-
Social Security Incentives	-	…	- 19,22	…	-
Withholding Tax Incentive	-	…	- 21,97	…	-
Training Support	-	…	- 1,10	…	-
Energy Support	-	…	- 0,57	…	-
Opex	**-**	**…**	**256,11**	**…**	**-**
Incentive	**-**	**…**	**- 42,86**	**…**	**-**
Net Opex	**-**	**…**	**213,25**	**…**	**-**

As mentioned earlier, SMRs are very new in the nuclear industry. Thanks to its initial investment amount and diminishing the Türkiye’s energy dependency, it is considered as a strategic investment, which are widely used in the nuclear sector. There are various incentives which are not only for capital expenditures but also operational expenditures in Türkiye. More than 50% of the supply deficit in the production of goods and intermediates, which is a key prerequisite for supporting the strategic investments, means that the total annual domestic production capacity for a specific good is less than the total import of this good for the same period. In this study, the following incentives are used in the operational expenditures:

Social Security incentives,

Withholding tax incentive

Training support

Energy support

The amount that is subject to incentives has been deducted from the operational expenditures.

For capital expenditures, vat refunds, custom duty exemptions, and landscape allocation are calculated as strategic investment incentives by not adding their costs.

4.6. Financial Reports of SMR

Table 4.21. Income statements, cash flow statements and balance sheets of the SMRs

Financial Statements *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
Income Statement	1.01.2023	…	1.01.2031	…	1.01.2089
Revenue	-	-	2.747,91	-	7.897,14
Cost of Services	-	-	507,07	-	1.542,35
Gross Profit	**-**	**-**	**2.240,84**	**-**	**6.354,79**
General Ad. Expenses	-	-	33,43	-	-
Incentives	-	-	42,86	-	-
EBITDA	**-**	**-**	**2.164,55**	**-**	**6.354,79**
Amortization and Depreciation	-	-	83,72	-	-
EBIT	**-**	**-**	**2.080,83**	**-**	**6.354,79**
Interest	1.160,32	-	863,00	-	-
EBT	**- 1.160,32**	**-**	**1.217,83**	**-**	**6.354,79**

CIT	-	-	1.217,83	-	6.354,79
Carry for Loss	-	-	779,42	-	6.354,79
Tax	-	-	179,27	-	1.461,60
Net Profit	**-1.160,32**	**-**	**1.038,56**	**-**	**4.893,19**

Cash Flow Statement					
Net Profit	**-1.160,32**	**-**	**1.038,56**	**-**	**4.893,19**
Operating Activities	-	-	-	-	-
Amortization and Depreciation	-	-	83,72	-	-
Change in VAT	-	-	1,12	-	-0,48
Cash Flow from Operating Activities	-1.160,32	-	1.123,40	-	4.892,70
Investing Activities	-	-	-	-	-
CAPEX	-	-	192,00	-	-
Share Holder's Equity	-	-	-	-	-
Cash Flow from Investing Activities	-	-	-192,00	-	-
Free Cash Flow	**-1.160,32**	**-**	**931,40**	**-**	**4.892,70**
Financing Activities	-	-	-	-	-
Debt Repayment	-	-	736,42	-	-
Net Borrowing	-	-	-	-	-
Cash Flow From Financing Activities	-	-	-736,42	-	-
Net Cash Flow	**-1.160,32**	**-**	**194,98**	**-**	**4.892,70**

Balance Sheet					
Assets					
Cash and Cash Equivalents	17.257,46	-	3.279,17	-	233.810,65
VAT Receivable	-	-	-	-	-
Fixed Assets	-	-	10.366,06	-	18.417,78
Accumulated Depreciation and Amortization	-	-	-508,70	-	-3.348,69

TOTAL ASSETS	**17.257,46**	**-**	**13.136,53**	**-**	**248.879,74**
Liabilities					
VAT Payable	-	-	43,26	-	129,27
Short-term liabilities	-	-	-	-	-
Long-term Liabilities	12.892,44	-	9.291,62	-	-
Tax Payables	-	-	-	-	-
Equity					
Common Stock	5.525,33	-	5.525,33	-	5.525,33
Retained Earnings	- 1.160,32	-	- 1.723,69	-	243.225,14
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	**17.257,46**	**-**	**13.136,53**	**-**	**248.879,74**
Balance Check	-	-	-	-	-

Financial statements include the income statement, cash flow statement and balance sheet from the project commencing 2023. To calculate net profit in the income statement, the carry for loss is five years, per the 5520 Numbered Corporate Tax Law (5520 Numbered Corporate Income Tax).

The cash flow statement consists of three main parts, which are cash flow from operating activities, cash flow from financing activities and cash flow from investments. The cash flow statement is used for project valuation by discounting the projected cash flow.

We discounted the cash flows using a discount rate calculated in the next sections in this study.

The balance sheet consists of assets, liabilities, and equity and accounts have been shown with primary accounts. In order to check the financial statements, we placed a balance check on the timeline.

All financial statements are prepared in compliance with the International Financial Reporting Standards.

The project is expected to generate revenue starting in the year of first commercial operation in 2026, with an increasing trend over time, reaching $7.89 million by 2089. The cost of services is also expected to increase over time, reaching $1.54 million by 2089. Cash flow from operating activities is expected to be positive and increase over time. The project plans to invest in fixed assets, which results in negative cash flow from investment activities in the earlier investment period. After accounting for operating and investing activities, free cash flow is expected to be positive and increase. The project has debt repayment activities, resulting in negative cash flow from financing activities.

4.7. Dividends of SMR

Table 4.22. Profit Distributions of the SMRs

Dividend Distributions *(Dollars in million)*					
	31.12.2023	…	31.12.2031	…	31.12.2089
Dividend Distributions	1.01.2023	…	1.01.2031	…	1.01.2089
Paid-in Capital	5.525,33	…	5.525,33	…	5.525,33
Legal Reserve I	-	…	-	…	-
Legal Reserve Limit	1.105,07	…	1.105,07	…	1.105,07
Profit before tax	**- 1.160,32**	**…**	**1.217,83**	**…**	**6.354,79**
Taxes	-	…	179,27	…	1.461,60
Net Profit	- 1.160,32	…	1.038,56	…	4.893,19
Accumulated Loss	-	…	- 2.762,25	…	-
Distributable Profit	**-**	**…**	**-**	**…**	**4.893,19**
Legal Reserve I	-	…	-	…	244,66
Legal Reserve Check	-	…	-	…	-
Net distributable profit	**-**	**…**	**-**	**…**	**4.648,53**
First Dividend (80%)	-	…	-	…	3.718,82
Legal Reserve II	-	…	-	…	371,88
Declared dividend	-	…	-	…	3.346,94
Retained Earnings	-	…	-	…	929,71
Total Reserves	**-**	**…**	**-**	**…**	**616,54**
Checks for Distributable Profit	**-**	**…**	**-**	**…**	**-**

Shareholders must keep the legal reserves amounting to 5% of the project's net profit each year until that 20% of the capital share amount is reserved as a legal reserve, which is stipulated in the numbered 6102 Turkish Commercial Law (6102 numbered Turkish Commercial Law).

We distributed 80% of the net profit to the shareholders in cash, not in kind, and the remaining 20% is planned for funding for decommissioning and waste management by the end of the commercial operation.

Paid-in Capital remains constant at 5.525,33 million dollars over the years, indicating no changes in the paid-in capital. The project does not require an additional paid-in capital injection over time. The profit before tax varies over the years, ranging from 1.160,32 million dollars to 6.354,79 million dollars. Table 4.22 show the taxes the company needs to pay, and it increases from 179,27 million dollars to 1.461,60 million dollars over time. After deducting taxes from the profit before tax, the net profit ranges from 1.038,56 million dollars to 4.893,19 million dollars. The actual dividend amount declared to shareholders is calculated after considering legal reserves. It ranges from 3.346,94 million dollars to zero.

4.8. Financial Analysis of SMR

Table 4.23. Financial Statement Analyses of the SMRs

	31.12.2023	**…**	**31.12.2031**	**…**	**31.12.2089**
Vertical Analysis	1.01.2023	…	1.01.2031	…	1.01.2089
Income Statement					
Revenue	N/A	…	100%	…	100%
Cost of Services	N/A	…	18%	…	20%
Gross Profit	N/A	…	82%	…	80%
General Ad. Expenses	N/A	…	1%	…	0%
Incentives	N/A	…	2%	…	0%
EBITDA	N/A	…	79%	…	80%
Amortization and Depreciation	N/A	…	3%	…	0%
EBIT	N/A	…	76%	…	80%
Interest	N/A	…	31%	…	0%
EBT	N/A	…	44%	…	80%
CIT	0%	…	0%	…	0%
Carry for Loss	0%	…	0%	…	0%
Tax	N/A	…	7%	…	19%
Net Profit	N/A	…	38%	…	62%
Vertical Analysis					
Balance Sheet					
Assets					
Cash and Cash Equivalents	100%	…	25%	…	94%
Fixed Assets	0%	…	79%	…	7%
Accumulated Depreciation and Amortization	0%	…	-4%	…	-1%
TOTAL ASSETS	100%	…	100%	…	100%
Liabilities					
Short-term liabilities	0%	…	0%	…	0%

Long-term Liabilities	75%	…	71%	…	0%
Equity					
Common Stock	32%	…	42%	…	2%
Retained Earnings	-7%	…	-13%	…	98%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	**100%**	**…**	**100%**	**…**	**100%**
Horizontal Analysis					
Income Statement					
Revenue	0%	…	0%	…	2%
Cost of Services	0%	…	2%	…	2%
Gross Profit	0%	…	0%	…	2%
General Ad. Expenses	0%	…	2%	…	#DIV/0!
Incentives	0%	…	2%	…	#DIV/0!
EBITDA	0%	…	-1%	…	2%
Amortization and Depreciation	0%	…	0%	…	#DIV/0!
EBIT	0%	…	-1%	…	2%
Interest	0%	…	-7%	…	#DIV/0!
EBT	0%	…	4%	…	2%
CIT	0%	…	0%	…	0%
Carry for Loss	0%	…	0%	…	0%
Tax	0%	…	#DIV/0!	…	2%
Net Profit	0%	…	-11%	…	2%
Horizontal Analysis					
Balance Sheet					
Assets					
Cash and Cash Equivalents	0%	…	6%	…	2%
Fixed Assets	0%	…	2%	…	0%
Accumulated Depreciation and Amortization	0%	…	20%	…	0%
TOTAL ASSETS	0%	…	2%	…	2%
Liabilities					
Short-term liabilities	0%	…	#DIV/0!	…	#DIV/0!
Long-term Liabilities	0%	…	-7%	…	#DIV/0!
Equity					
Common Stock	0%	…	0%	…	0%
Retained Earnings	0%	…	-38%	…	2%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	0%	…	2%	…	2%

Ratio Analysis	0%	…	0%	…	0%
Debt Services Coverage Ratio	0%	…	135%	…	#DIV/0!
Current Ratio	134%	…	35%	…	#DIV/0!
Financial Leverage Ratio	75%	…	71%	…	0%

We use various techniques to analyze the financial statements that allow the building of a more detailed and nuanced financial profile and the project's financial health. Horizontal, vertical, and ratio analyses have been used in this section.

We calculated the debt service coverage ratio to analyze the meeting's financial liabilities. There is no debt service coverage ratio less than 0,23 in the ratio analysis part throughout the years, which is getting increase within the following years.

4.9. Valuation of SMRs

Table 4.24. Valuation results of SMRs

IRR	
Project IRR	10,86%
Equity IRR	12,29%
Net Present Value and Payback Period	
Project NPV	2.948.281.832
Equity NPV	3.889.083.347
Payback Period	14 years
LCOE Calculation	
Total OPEX	22.028.926.803
Total CAPEX	18.417.777.778
Total Generated Output	1.562.101.200
LCOE	25,89

There is no formula to determine or calculate the project valuation. Different formulas are used to calculate a company valuation under different company valuation methods. In this study, we use the Discounted Cash Flow (DCF) model to evaluate the project's financial feasibility.

The discounted cash flow is calculated by dividing the current value of the future cash flows by discounting them at an appropriate rate. Where:

Discounted cash flow = 1st-year cash flow/(1+r)^1 + 2nd-year cash flow/(1+r)^2 + ……… + nth year cash flow/(1+r)^n

In the formula above, we use r as a discount rate by using weighted average cost of capital as shown in its formula below.

$$WACC = \left(\frac{E}{V}\ x\ \ Re\right) + (\frac{D}{V}\ x\ Rd\ x\ (1 - Tax\ Rate)$$

where:

E=Market value of the firm’s equity

D=Market value of the firm’s debt

V=E+D

Re=Cost of equity

Rd=Cost of debt

Table 4.25. Calculation of cost of equity

Calculation of Cost of Equity		
Türkiye Eurobond 20 Years Yield	a	9,00%
Türkiye Credit Default Swap	b	5,85%
Cost of Equity (Ke)	a+b	14,85%

We use Turkey Eurobond 20 years yield as debt ratio while calculating the cost of equity. We added 9% Türkiye Eurobond 20 years yield to Türkiye Credit Default Swap.

Source: https://www.bloomberght.com/eurobond/tr-eurobond-20-yil

Table 4.26. Calculation of the Discount rate by using WACC Formula

	TOTAL	**Weight of Equity = Equity/(Equity+Debt)**	**Weight of Debt = Debt/(Equity+Debt)**
	18.417.777.778	5.525.333.333	12.892.444.444
Weights		30,00%	70,00%
		0,04455	0,04851
		x	y

Weighted Average Cost of Capital (x + y)	0,04455+0,04851	0,09306

In Table 4.26. We use the weighted average cost of capital formula to calculate the discount rate by using the debt and equity ratio in the project and corporate tax rate in Türkiye. We use the same discount rate in the large reactor's financial model to equalize the feasibility.

Project IRR is 10.86%. That represents the internal rate of return for the entire project, which measures the project's potential profitability. An IRR of 10.86% suggests that the project is expected to generate a return of 10.86% on the initial investment.

Equity IRR is 12.29%

Equity IRR focuses on the return specifically for the equity investors in the project. An IRR of 12.29% indicates the expected return for the equity investors. Project NPV is $2,948,281,832

Equity NPV is $3,889,083,347

The payback period is 14 years. It shows that the project will recover itself in 14 years.

An LCOE of $25.89 indicates the cost per unit of electricity generated, which is typically measured in dollars per megawatt-hour. It reflects the total costs (both operating and capital) spread out over the total generated output.

4.10. Scenarios of SMR

The financial model of the SMR plant has been stressed with different scenarios, as shown below. The market price for the first year, PPA price, PPA period, interest rate, equity and debt ratio and yearly escalation rate are considered scenario parameters. It has been tested that which option could be more beneficial for investors, whether it is a government or a lender for the investment. We used three scenarios in total, and one of them is the most realistic (base-case) that is based on expert judgements, professional experiences, and official announcements in the press.

Table 4.27. Scenarios for SMR

	Best	**Normal (Baseline)**	**Worst**
Market Price	160	129,09	120
Interest Rate	7%	9%	11%
Equity	0,3	0,3	0,3

Debt	0,7	0,7	0,7
Inflation Rate	0,04	0,02	0,01
Discount Rate	8%	9%	10%

5. CHAPTER: THE COMPARISONS of SOME SOCIAL ASPECTS AND THE FINANCIAL MODELS of A LARGE REACTOR AND SMALL MODULAR REACTOR TECHNOLOGIES

In this chapter, it is evaluated and compared implementation options for small modular reactors and large nuclear power plants in Türkiye. The assessment uses comprehensive analysis that considers both quantitative and qualitative factors. Key factors examined include net present value, internal rate of return, break-even point, payback period, and levelized electricity costs. These metrics provide insight into each implementation option's economic viability and long-term sustainability. Quantitative variables such as net present value and internal rate of return evaluate financial profitability, helping to determine the option with the best potential for a stable ROI. Additionally, levelized unit electricity costs are calculated to understand long-term operating costs, helping to determine the most sustainable and cost-effective solution for Türkiye's energy needs. The study's findings will guide policymakers, energy experts and investors to make informed decisions to support the development of Türkiye's energy infrastructure.

5.1. Methodology of the Comparison

In this study, our main objective is to assess and compare the small modular reactor and large reactor plants deployment options to determine which one is the most suitable in Türkiye. We have employed a comprehensive analysis incorporating quantitative and qualitative variables to achieve this.

Our assessment is based on several key factors, including net present value, internal rate of return, breakeven point, payback period, and levelized cost of electricity. By leveraging these metrics, we can gain a clear and in-depth understanding of each deployment option's economic viability and long-term sustainability.

Quantitative variables such as net present value and internal rate of return allow us to evaluate the financial profitability of each nuclear power plant deployment option. These indicators will help us discern which option offers the best potential for generating consistent and favourable returns on investment.

Furthermore, we have calculated the levelized cost of electricity, which helps us understand the long-term operational costs associated with each nuclear power plant option.

This analysis is crucial in identifying the most cost-effective and sustainable solution for meeting Türkiye's growing energy demands.

Our findings will provide important guidance for policymakers, energy professionals and investors to make informed decisions to meet Türkiye's crucial energy needs and ambitions. Ultimately, our goal is to contribute to the further development of Türkiye's reliable, efficient, and green energy infrastructure.

5.1.1. The classic comparison parameters

5.1.1.1. Net present value

Table 5.1. Net Present Values of large plant and SMR

Net Present Value	Large Plant	SMR
Project NPV	2.564.273.115	2.948.281.832

Both the "Large Plant" and "SMR" projects have positive Net Present Values, suggesting that they are financially viable and expected to generate positive returns. However, the "SMR" project has a higher NPV compared to the "Large Plant" project, indicating that it is expected to generate more additional value or profit, making it a potentially more attractive investment based on the given data.

5.1.1.2. Internal Rate of Return

Table 5.2. Net Present Values of large plant and SMR

Internal Rate of Returns	Large Plant	SMR
Project IRR	10,53%	10,86%
Equity IRR	11,10%	12,29%

The Equity IRR figures are higher than the Project IRR figures for both projects. This means that after considering the costs of financing for these projects and the structure of the project's financing, shareholders in both projects can expect even higher returns on their investments.

5.1.1.3. Breakeven analysis

Table 5.3. Breakeven points

Breakeven Point	Large Plant	SMR
QTY KW	51.772.327	44.488.618

A financial breakeven point analysis has been conducted for these projects in order to have a better understanding of the project payback period. The financial breakeven point indicates the level of production or sales at which a project neither makes a profit nor incurs a loss. For the "Large Plant" project, this point is reached at 51,772,327 KW, while for the "SMR" project, it occurs at 44,488,618 KW. Meeting or surpassing these production levels is vital for these projects to become financially self-sustaining and eventually generate profits beyond the breakeven point.

5.1.1.4.Payback period

Table 5.4. Payback periods

Payback Period	Large Plant	SMR
Years	16	14

In this case, the "SMR" project is expected to recover its initial investment faster (in 14 years) compared to the "Large Plant" project (in 16 years). A shorter payback period is often considered more favourable as it implies a quicker recovery of the initial investment, reducing financial risk and potentially providing a faster return on the investment.

5.1.1.5.Levelized unit electricity cost

Table 5.5. Levelized Cost of Unit Electricity

Levelized Cost of Unit Electricity	Large Plant	SMR
LCOE in USD	36,888	25,892

The LCOE is a vital metric in the energy industry, as it provides an estimate of the per-unit cost of producing electricity. The SMR project has a lower LCOE of $25,89 compared to the Large Plant project, which is $36,89, indicating that the SMR project is expected to produce electricity at a lower cost per unit. This suggests that the SMR project may be more cost-effective in terms of electricity generation, which can be a significant factor when evaluating and comparing energy projects.

5.1.2. Similar structural issue comparison

A lack of knowledge about implementing a new modular design can lead to delays and loss of investor confidence, which highlights the importance of design maturity. Uncertainties surrounding the pre-construction and construction phases can negatively impact initial capital and levelized cost of electricity (LCOE). Standardization can reduce cost uncertainty in design and construction, but Türkiye also needs a skilled nuclear workforce and a strong industrial base to diversify nuclear energy successfully. Study recommendations include developing nuclear power plans as part of energy planning, ensuring regulatory independence, establishing long-term nuclear workforce development programs, planning for early use of used fuel storage and waste treatment, implementing transparent supplier selection criteria, and signing international safety agreements and liability agreements, and engage domestic stakeholders in the development of nuclear power programs.

Over the past five years, Türkiye has faced economic challenges marked by a significant devaluation of the Turkish lira, rising inflation, rising borrowing costs and rising default rates, mainly due to a significant current account deficit and significant foreign private capital. Electricity prices are tied to the dollar because they closely track dollar fluctuations because the raw materials needed to produce electricity are imported.

5.1.2.1. Lack of knowledge and well-educated people in the nuclear industry

The rollout of a new nuclear power generation will inevitably lead to legal, financial, and commercial disputes to be solved; however, as it was in the past, that needs political support and some time to mature the design and other structural problems.

On the other hand, some research indicates that lack of knowledge is still an issue about deploying a new modular design. According to a study by Agar, immature design requires more change-request and may cause delays and loss of the investors' trust. Therefore, the need for a more mature design may be the point of abstaining from investors (Agar, 2019).

According to a study by Harris et al., upfront capital and LCOE are affected negatively by the uncertainties of the duration of the pre-construction and construction phase. The site works, and construction are depend on technology, construction, experience and site-specific costs, which may cause a significant effect on increasing the upfront capital (Harris et al. 2013).

To get confidence in the estimate and evaluate the projects with more accurate assumptions, a standardization approach can mitigate the cost uncertainty from the aspect of designs and construction. Nevertheless, nuclear facilities have similar technical disciplines, which can be a sample for SMRs.

Specific to Türkiye, two universities have a department of nuclear energy engineering. Graduates have not had an opportunity to work in nuclear energy plants because of no existing plants until 2013. Although some students have an opportunity to go abroad, get an education and get experience in nuclear power plants, they still need a sufficient nuclear facility to implement what they have learnt and experienced.

A good energy diversification strategy may be a better solution against its energy dependency on Türkiye. Türkiye has plans to build more than one nuclear energy plant rather than Akkuyu, the Ministry of Energy says. However, the successful implementation needs more plans, such as a skilled workforce with a strong educational background in nuclear science, engineering, and related fields and a robust industry platform.

According to a study conducted by Ebinger et al., the study suggested several recommendations to recover the lack of well-educated and skilled workforce in United Arab Emirates, Jordan, Türkiye, Egypt, Saudi Arabia, Kuwait, Qatar, and Oman which have similar characteristic and problems (Ebinger et al.,2011).

Those recommendations are as follows:

The countries to be build nuclear plant for the first time should consider developing civil nuclear power plans in the form of policy statements and as part of broader energy planning,

Regulator bodies should pursue independence from plant operators both administratively and operationally,

Countries should create a longterm nuclear workforce development program to ensure the sustainability of their nuclear power programs,

Countries has to plan their spent-fuel storage and waste disposal at the beginning of their nuclear program,

In order to prevent the political intervention, a set of clear, transparent criteria should be put in place for vendor selection by the nuclear decision-makers, Any country with a serious civilian program for nuclear power should sign and ratify all major international safety and liability conventions,

Countries should create a solid domestic stakeholder engagement into the nuclear power-program development.

5.1.2.2. Uncertainties (the price of the input fuels, electricity price, cost of transporting the imported fuel)

Türkiye has been struggling with the currency crisis and inflation over the past 5 years. The USD currency and EUR have been dramatically increasing since 2018. It is characterized by the Turkish lira plunging in value, high inflation, rising borrowing costs, and correspondingly rising loan defaults. The crisis was caused by the Turkish economy's excessive current account deficit and large amounts of private foreign-currency denominated debt.

After the detention of American pastor Andrew Brunson, who was charged with espionage after failed 2016 military coup in Türkiye, the Trump administration announced further sanctions against Türkiye. The sanction doubled the tariffs on Türkiye, as imported steel rose up to 50% and on aluminum to 20%. Consequently, Turkish steel was priced out of the US market, which previously amounted to 13% of Türkiye's total steel exports.

Not only electricity price but also many products in Türkiye denominated in the dollar, and their prices in the market are affected by the US Dollar.

Table 5.6. Correlation Table

Correlation				
	Electricity Price in USD	*GDP*	*Inflation Rate*	*Currency / USD*
Electricity Price in USD	1			
GDP	0,389775898	1		
Inflation Rate	**0,757645832**	0,170890595	1	
Currency / USD	0,580820358	0,222054156	**0,920763841**	1

Table 5.6. shows the correlations between electricity price, GDP, inflation rate, and USD currency. The inflation rate is highly affected by the foreign currency USD.

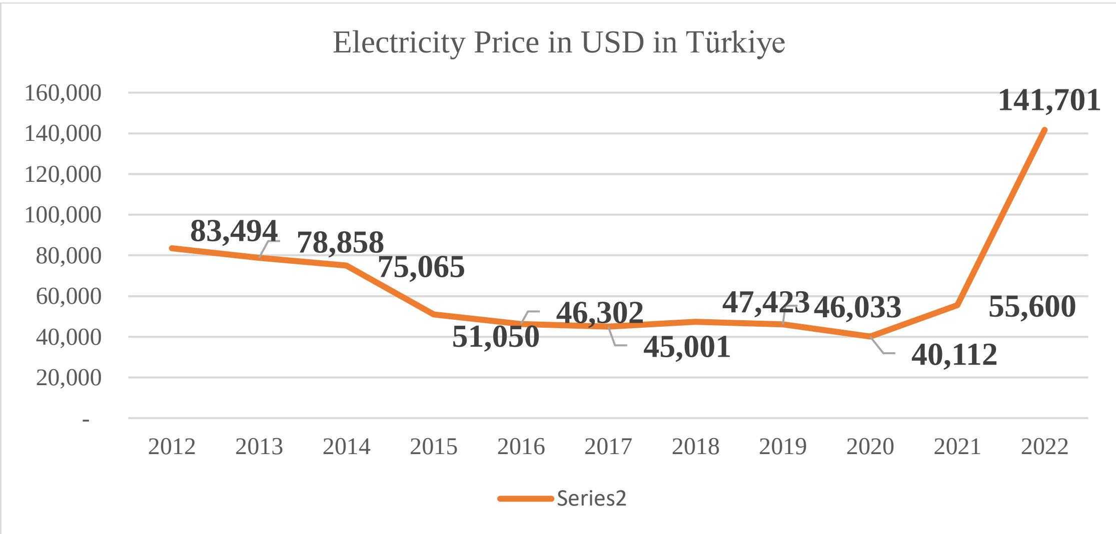

Figure 5.1Electricity prices in Türkiye (2012-2022)

Electricity price is denominated in the dollar, and it has similar movements with the dollar because the raw materials are imported to generate electricity. The following Figure 5.2. shows the trends of the USD/TL, which also reflects the similarity of the US/TL Parity and Electricity price.

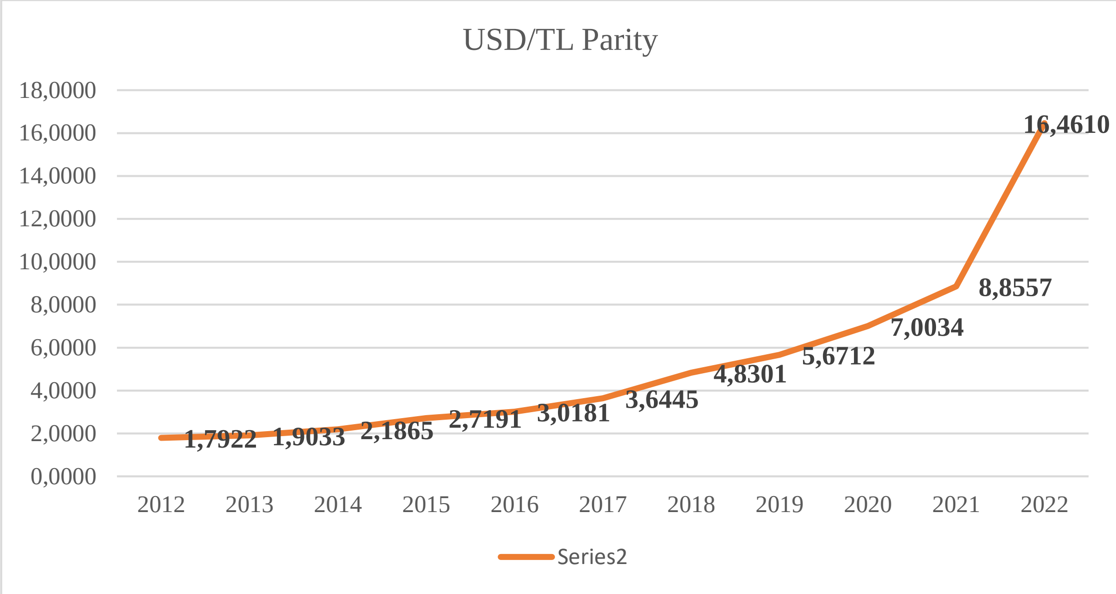

Figure 5.2. USD/TL Parity (2012-2022)

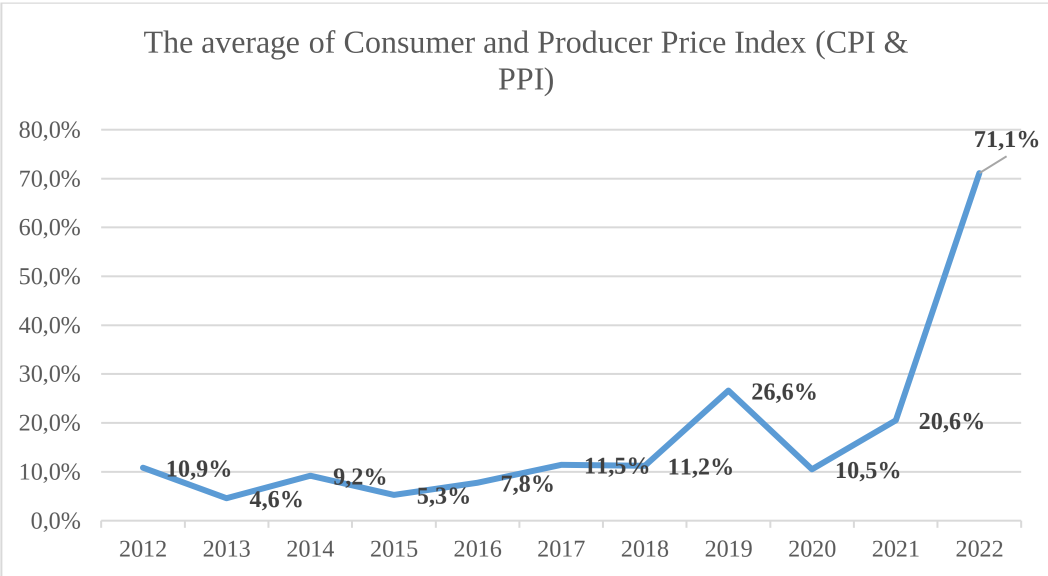

Figure 5.3.The average of Consumer and Producer Price Index (2012-2022)

Investment decisions are based on economic data to achieve more realistic and better results. Large fluctuations in economic parameters should be taken into account better when evaluating investments. Over the past five years, fluctuations in economic indicators have made it challenging to evaluate investments in Türkiye for several reasons. Economic indicators` fluctuations make it increasingly difficult to estimate projected cash flows and make accurate assumptions. According to World Bank statistics, Türkiye's foreign direct investment peaked at US$22.04 billion and declined by US$12.8 billion in 2022 (World

Investment Report, 2023). The decline in foreign direct investments is seen because of the unstable economic environment.

Deployment of a nuclear power plant is such a long-term project, which requires high upfront capital, a long build schedule, funding, and financing issues, whether it is a small modular or large reactor plant. As long as the project's duration strings out, so do uncertainties, and project evaluation becomes difficult. That is why a nuclear program needs a more stable economic environment to encourage the stakeholders at the project's outset.

5.1.3. Application

The cost of grid connections and installed capacity are vital costs in nuclear power plant deployment, which is also influenced by factors like land conditions, distance to the grid, and reactor’s type. The study assumes similar land conditions for both reactor types, but it acknowledges that the cost of grid infrastructure could impact the SMR market size. However, a detailed study of these costs is not included in the study.

We have placed eleven SMR reactors to equalize the capacity up to 3300 MW with the large reactor model to have a similar generated output to calculate financial results.

5.1.3.1. Installed capacity

Table 5.7. Comparison of the installed capacities

Design	Output MW(e)	Type	Designer	Country	Status
EPR	1650	PWR	EDF, Framatome and Siemens	France and Germany	In operation
CANDU SMRTM	300	PHWR	Candu Energy Inc.	Canada	Conceptual Design

EPR is a French-made third-generation pressurized water reactor designed and developed by Framatome company, a subsidiary of Électricité de France (EDF), and by Siemens. Its international name was the "Evolutionary Power Reactor" and is now shortly called the "EPR"(International Conference Nuclear Energy for New Europe, 2004).

The main goal of the third-generation EPR design was to improve upon previous pressurized water reactor designs to improve safety while making them more economically competitive. The 4500 MW thermal output was scaled up to about 1650 MWe (net).

The reactor can run on different fuel types, like 5% enriched uranium oxide, recycled uranium, or a mix of uranium and plutonium oxide, all covered in a special zirconium alloy by Areva. The EPR is like the upgraded version of the Framatome N4 and Convoy reactors. However, Siemens stopped doing nuclear activities in 2011. The EPR was made to use uranium better than the older Generation II reactors, needing about 17% less uranium to make the same amount of electricity (Office for Nuclear Regulation, HSE Nuclear Directorate, 2011).

The design went through many iterations. The 1994 concept design was rated at 1450 MWe, which was the same as the Framatome N4, but it had Siemens Convoy-derived equipment and a new core catcher safety system. In 1995, concerns arose that the cost per MW was too high. As a result, the capacity was initially increased to 1800 MWe in the design built in 1997, but it was later reduced to 1650 MWe in the final qualified design (Forsythe, 2009).

Candu Small Modular Reactor is developed 100 % in Canada, and it is the most mature design available today. It has a 300 MW(e) installed capacity and modular design. This study examines eleven 300 MW(e) to compare the two EPR with 1650 MW(e).

5.1.3.2. Cost of grid connections

The cost of grid connection is based on several factors, such as land conditions and distance to the grid. A detailed study of the cost of grid infrastructure is beyond the scope of this study, but this may have a significant effect on the final size of the SMR market. In this study, it is assumed that both plant types would be deployed in similar land conditions (National Nuclear Laboratory, 2014)

6. CHAPTER: SELECTION OF SERVICE SUPPLY METHOD: VALUE FOR MONEY ASSESSMENT FOR THE ELEVEN SMR DEPLOYMENT IN TÜRKİYE

In the initial five chapters of this study, we conducted a detailed comparative analysis between small modular reactor (SMR) projects and large reactor projects. To facilitate this analysis, we have developed two separate financial models for each type of project, allowing a comprehensive examination of their financial aspects.

In this chapter, we now focus on undertaking a comprehensive value-for-money assessment specifically aimed at assessing the project's potential benefits from the government's perspective. To achieve this, we used comprehensive value-for-money analysis, which is an important tool that helps governments determine the optimal approach to project implementation.

Through value-for-money assessment, we aim to make an informed decision on whether it would be beneficial for the government to involve the private sector in project development or whether it would be beneficial to implement the project independently. This assessment takes into account a variety of factors, including financial considerations, risk assessment and overall project feasibility, with the ultimate aim of ensuring that government resources are allocated in the most efficient and cost-effective way.

6.1. Value-for-money assessment

Value-for-money assessment: Governments carry out the value-for-money assessment to compare the costs and benefits in order to make the best choice among various alternatives for financing the project. However, this analysis has no standardized approach due to differences in government policies and administrative processes in various countries (EPEC, 2015).

Investment value generally consists of two analysis parts named qualitative and quantitative. While quantitative analysis includes numerical factors, qualitative focuses more on social and environmental aspects (Morallos and Amekudzi 2008).

According to Kucukkocaolgu and Kulaksiz, in Build Operate Transfer (BOT) projects, calculating the value of the investment before its implementation should be prioritized for the preservation of public interest. The value-for-money assessment for BOT projects is considered more of an art than a science due to the need to consider highly complex processes and limitations and the requirement to choose from various approaches and make sound evaluations, which form the basis of the analysis (Kucukkocaoglu and Kulaksiz, 2019).

Kucukkocaolgu and Kulaksiz indicated that value-for-money assessment is a preliminary analysis before investing, essential to protect the public interest. Because of paying attention to limited complex processes and selecting from different approaches, value-for-money assessment is an art rather than a scientific approach for public-private partnership projects (Kucukkocaoglu and Kulaksiz, 2019:200).

6.2. Value-for-money analysis for the SMR Project

Prior to selecting the Public-Private Partnership (PPP) method, the public sector must ensure that it will provide the best Value-for-Money compared to traditional methods of financing. In this regard, the Public Sector Comparator (PSC) assists the public side in deciding between traditional procurement or Public-private partnership methods for selecting the funding source for a project (OECD 2008). The hypothetical risk-adjusted benchmark cost of providing the identified service through traditional procurement is defined as the public sector comparator (Grimsey and Lewis, 2004). The PSC is based on a hypothetical scenario in which the public sector carries out the project through traditional procurement, and it compares this with a Special Bid (SB) generated by estimating all costs, revenues, and risks by the public side when financing is done through the PPP method, representing the best offer that could be obtained from the private sector (Kucukkocaoglu and Kulaksiz, 2019).

6.3. Comparison of Public Side Comparator and PPP

While determining the financing method before investing, value-for-money assessment helps us to understand traditional procurement or public-private partnership is the optimum choise for protecting benefits of public.

By calculating the Net Present Value (NPV) of Public Side Comparator components and summing them up, the risk-adjusted total cost for the traditional procurement method is determined. Costs associated with the main Public Side Comparator component and risks assumed by the private sector partner are collected from the government as an availability payment in exchange for providing the facility/service. Therefore, in the investment value analysis of the PPP method, projected cash flows based on the assumed risks and usage fees to be paid to the private sector for providing the facility/service are discounted to their present value to perform cost calculations. The difference between PSC and PPP costs will yield the value of the investment. After quantitative calculations, qualitative evaluation is conducted on non-quantifiable aspects, such as the reputation, capacity, and benefits offered by the private sector bidder, to decide on the method to proceed within the procurement process. If quantitative evaluation results among alternatives are very close and there is significant uncertainty regarding the variables used in quantitative evaluation, qualitative assessment can influence the decision. Qualitative evaluation can be conducted at different stages of the bidding process in different countries (Morallos & Amekudzi, 2008).

The investment decision of the project briefly based on the following:

If the NPV of Public private partnership is higher than the NPV of PSC, the financing method is traditional financing method.

If the NPV of Public private partnership is lower than the NPV of PSC, the financing method is PPP.

In order to calculate PSC, it is important to calculate The Public Sector Comparator generally that consists of four components:

Raw PSC which has direct cost, indirect cost and expected third party revenue, component (raw public sector comparator),

Competitive neutrality that has government rent, taxes, duties, fees, and charges accommodation costs,

Transferable risks,

Retained risk (Kharizam, 2012).

The formula of PSC:

Raw PSC + Competitive neutrality + Transferable risks + Retained risk

Although each country has a different approach to financing, the primary purposes are very similar.

For instance, the purposes of Hong Kong as deciding the method are to ensure the fundamental comparison between the PPP and the Public sector financing methods and to provide a comparison of what the government believes is a suitable return on investment. On the other hand, the purpose of Australia is to provide the government with a quantitative measure of value-for-money. It helps the government to have a rough measure of the range of results. It comes with qualitative reflection, sensitivity testing and scenario analysis (Kharizam, 2012).

It should be a reasonable explanation to reduce public reaction against the project execution in terms of being a quantitative analysis.

Calculation of delay risk

Table 6.1. Historical NPP construction delay tata and risk calculations

	Historical Data of NPP Construction Delays	**Number of Delays (d)**	**Poss. (p = d/t)**	**Cost (c=Assumption)**	**Risk (r = pxc)**	**Cumulative Risk**
< 1	No delay	399	70%	0	0,0%	0,0%
1,1	1 Year Delay	46	8%	10%	0,8%	0,8%
1,3	2 Years Delay	61	11%	20%	2,1%	2,9%
1,4	3 Years Delay	33	6%	30%	1,7%	4,7%
1,5	4 Years Delay	20	3%	40%	1,4%	6,1%
1,7	5 Years Delay	13	2%	50%	1,1%	7,2%
> 1,7	More than 5 years delay	0	0%			
	Total (t)	**572**				

It is assumed that each delay year has 10 % marginal cost that has shown in the Cost column. Table 5.8. shows the historical data of construction delays of NPPs'.

Formula of risk = Cost x Possibility

Table 6.2. The SMR Project's information

Project information	
Total investment	18.417.777.778
Investment duration (Years)	60
Equity ratio (e)	25%
Debt ratio (d)	75%
Interest rate	9%
Loan period (Years)	15
Return on Investment (Ri)	14,85
Corporate Tax rate	25 %

To calculate the discount rate for discounting the project cash flow, the Weighted average cost of capital must be calculated by using formula below.

WACC= (e/v*cost of equity) + (d/v*cost of debt*(1-corporate tax rate))

= (0,25*14,85) + (0,75*0,09*(1-0,25))

= 9,31 % will be calculated as a discount rate in discounting the cash flow.

While calculating the Ri, the sum of the following is taken into account

Türkiye Eurobond 20 Years Yield 9,00 %

Türkiye Credit Default Swap 5,85 %

Total of sum of above 14,85 %

Results

If the present value of the Public Side Comparator is less than the present value of the special bid (SB) or PPP offer large, excluding qualitative considerations, the best option for the public sector is that the project's PPP performed with the model.

Table 6.3. The results of the value-for-money assessment

		No delay	**1 Year Delay**	**2 Years Delay**	**3 Years Delay**	**4 Years Delay**	**5 Years Delay**
WACC	**NPVs for PPP**	18.417.777.778	18.565.892.774	18.958.719.503	19.277.488.733	19.535.080.031,1	19.744.372.960,4
0,11	23.516.386.460	PSC	PSC	PSC	PSC	PSC	PSC
0,12	20.909.401.340	PSC	PSC	PSC	PSC	PSC	PSC
0,13	18.647.440.246	PSC	PSC	PPP	PPP	PPP	PPP

Table 5.10. shows that in case of at least 2-year delays in the construction and % 13 WACC, it becomes more advantageous to have the projects built by the private sector. For other scenarios, it seems to need public power to build a project requiring sizeable upfront capital.

7. CHAPTER: TÜRKİYE'S PROBLEM of ENERGY DEFICIT AND MACROECONOMIC IMPACT ASSESSMENT of SMALL MODULAR REACTOR TECHNOLOGY

This section focuses on examining the financial and economic aspects of deploying eleven CANDU small modular reactors in Türkiye, with particular emphasis on assessing their macroeconomic impact.

Türkiye's nuclear energy policy aims to meet several key objectives. These include reducing the environmental impact of energy production, meeting growing energy demand and reducing dependence on energy imports. Nuclear power plant (NPP) safety measures comply with international standards set by the International Atomic Energy Agency. Notably, according to a report by the Ministry of Energy of the Republic of Türkiye in 2023, there are plans to build nuclear power plants in the Sinop and Thrace regions. Türkiye's nuclear power projects include important milestones, such as the Intergovernmental Cooperation Agreement on the Akkuyu Nuclear Power Plant with Russia in 2010. Then, a project company named Akkuyu Nükleer A.Ş. was established, the environmental impact assessment was approved, and the power generation license was issued. The aim is to operate the first unit of the Akkuyu nuclear power plant in 2023.

Türkiye also signed an intergovernmental agreement with Japan on the Sinop nuclear power plant in 2013. However, the status of the project changed following an announcement by President Recep Tayyip Erdoğan during his visit to Japan. However, Türkiye continues to implement this project. The country plans to operate two nuclear power plants by 2023 and begin construction on a third to meet growing energy demand and reduce import risks.

It is important to note that nuclear power plants are not only considered as electricity producers; they are also expected to add value to Turkish industry by creating jobs and promoting workforce development.

The emphasis on human resource development is evident, with Turkish students playing important roles in various areas of the Akkuyu Nuclear Power Plant project, from engineering to management positions.

Regarding Türkiye's energy infrastructure, total annual electricity consumption in 2022 decreased slightly compared to the previous year, while electricity production also decreased. Forecasts from Türkiye's National Energy Plan predict that electricity consumption will increase in the coming years. The allocation of resources in electricity generation in 2022 shows a mix of sources, with charcoal, natural gas, hydropower, wind, solar, geothermal and other sources contributing to electricity production in the country's capabilities.

7.1. Deployment Of The Eleven Small Modular Reactor Plant In Türkiye

In this section, it is financially and economically examined that eleven CANDU small modular reactor would be deployed in Türkiye and be evaluated its macroeconomic impacts.

7.2. Turkey’s Nuclear Energy Policy

Türkiye aims to incorporate nuclear power into its energy portfolio to mitigate the adverse environmental impacts of energy production, cater to the increasing energy demand, and reduce its reliance on energy imports. The safety measures of Nuclear Power Plants (NPPs) align with the standards set by the International Atomic Energy Agency. Additionally, there are plans for constructing NPPs in the Sinop and Thrace regions(Ministry of Energy of the Republic of Türkiye,2023).

Türkiye aims to add nuclear power plants into its energy portfolio to mitigate the adverse impact of energy dependency and struggle with the increasing energy demand. There are plans for constructing nuclear power plants in Sinop and Thrace regions whose safety standards are stipulated by International Atomic Energy Agency (Ministry of Energy of the Republic of Türkiye,2023).

One of the most significant milestones is the Intergovernmental Agreement on Cooperation on the Establishment and Operation of the Akkuyu Nuclear Power Plant between the Turkish Government and the Russian Federation on May 12, 2010. As part of this agreement, the Project Company, known as Akkuyu Nükleer A.Ş., was established in Ankara on December 13, 2010. Subsequently, the Ministry of Environment and Urban Planning granted a favourable decision on the Environmental Impact Assessment (EIA) report in December 2014, and the Energy Market Regulatory Authority issued a 36-month electricity production license. The Site Parameters Report, prepared by Akkuyu Nükleer A.Ş., was submitted and approved by the Nuclear Regulatory Authority (NRA). Following this approval, the application for the construction license, a prerequisite for building the Akkuyu Nuclear Power Plant, was submitted to the NRA. The ultimate objective is to commission the first unit of the Akkuyu Nuclear Power Plant by 2023 (Ministry of Energy of the Republic of Türkiye,2023).

On May 3, 2013, Türkiye signed one more Intergovernmental Agreement with Japan for the construction and cooperation of the Sinop Nuclear Power Plant, the country's second nuclear power plant project. However, president Recep Tayyip Erdoğan officially announced that Türkiye part would not move forward with this project once his visit to Japan. Afterwards, Türkiye continued its efforts on the project (Ministry of Energy of the Republic of Türkiye,2023).

To meet the rapidly increasing demand for electric power and decrease import risks, Türkiye plans to commission two nuclear power plants by 2023 and initiate the construction of a third power plant (Ministry of Energy of the Republic of Türkiye,2023).

It is important to recognize that nuclear power plants go beyond being mere electricity generation facilities. The Akkuyu Nuclear Power Plant project, consisting of approximately 550 thousand components and equipment, will bring added value to Türkiye's industry and create a dynamic industry platform and strong workforce development (Ministry of Energy of the Republic of Türkiye,2023).

Moreover, there is a strong emphasis on human resource development. To address the demand for engineers at Akkuyu, 291 out of the 317 students sent to study in Russia have recently graduated and begun working within the Akkuyu Nuclear Power Plant Project. Turkish students will play key roles in different fields, ranging from engineering to managerial positions, within the Akkuyu Nuclear Power Plant Project (Ministry of Energy of the Republic of Türkiye,2023).

7.3. Nuclear Energy In Türkiye As Part Of Türkiye’s Energy Mix

According to the latest information published on the website of the Department of Energy and without the binding specification of official documents, the total annual electricity consumption in 2022 has decreased by 1.2% to 328.9 TWh compared to the previous year. Electricity production reached 326.2 TWh, down 2.5% (Ministry of Energy of the Republic of Türkiye,2023).

According to the results of the National Energy Plan of Türkiye, the electricity consumption is expected to be 380,2 TWh in 2025, 455,3 TWh in 2030, and 510,5 TWh in 2035 (Ministry of Energy of the Republic of Türkiye,2023).

The proportion of resources in electricity production in 2022 is as follows:

Charcoal: 34.6%,

Natural Gas: 22.2%,

Hydropower: 20.6%,

Wind: 10.8%,

Solar energy: 4.7%

Geothermal: 3.3%,

Other sources: 3.7%.

At the end of June 2023, Türkiye’s installed capacity reached 104,904 MW. At the end of June 2023, the breakdown of installed capacity by resource is as follows:

30.1% hydro, 24.2% natural gas, 20.8% coal, 11% wind, 9.7% solar, 1.6% geothermal and 2.6% others.

Moreover, by the end of June 2023, the number of power plants in our country reached 12,144 (including unlicensed). The distribution of vegetation by resources is as follows:

751 hydropower, 67 coal, 362 wind, 63 geothermal, 346 natural gas, 10,064 solar and 491 other power plants (Ministry of Energy of the Republic of Türkiye,2023).

7.4. Problem Of Available Site For Smrs

Türkiye has been considering an option for deploying Small Modular Reactors (SMRs) as part of its nuclear energy strategy.

One of the primary challenges for deploying SMRs in Türkiye, or any country, is finding suitable sites to deploy these reactors. Several factors need to be carefully considered when selecting a site for SMRs:

Safety and Security: Safety is of utmost importance when siting any nuclear facility. The selected site should be geologically stable and away from areas prone to natural disasters like earthquakes or flooding. Security measures must also be considered to protect the facility from potential threats.

Environmental Impact: The site's environmental impact needs to be assessed thoroughly, considering factors such as the potential impact on nearby ecosystems, water sources, and air quality.

Land Availability**:** SMRs require a smaller footprint than traditional nuclear reactors, but sufficient land space is still essential. Identifying and securing appropriate land for the SMR facility is crucial.

Closeness to Population Centers: While SMRs are generally considered to be safer due to their inherent design features, it's still essential to locate them at a safe distance from densely populated areas.

Infrastructure and Accessibility: Access to transportation networks, water supply, and other necessary infrastructure is vital for the construction and operation of an SMR facility.

Regulatory Approval: The site must meet the stringent regulatory requirements of the country's nuclear regulatory body.

Finding a suitable site meeting all these criteria can be challenging. Identifying and assessing potential sites involves comprehensive studies, environmental impact assessments, safety analyses, and engagement with local communities to address any concerns.

7.5. Electricity Market In Türkiye

The electricity market in Türkiye has undergone significant changes and developments in recent years.

In Türkiye, electricity prices are determined hourly based on supply and demand curves, with the market clearing price (MCP) set at their intersection. The equilibrium price depends on the shortage or surplus of energy. In the case of a shortage, the system marginal price (SMP) is equal to the hourly maximum supply price, while a surplus sets the SMP at the minimum accepted supply level. Electricity prices in Türkiye are influenced by factors such as power plant availability, weather conditions, economics, geopolitics and commodity prices. Demand-side management (DSM) has become vital because it helps manage changing energy demand, especially during peak periods, by dynamically distributing consumer consumption. DSM aims to improve network management, reduce losses, improve efficiency and reduce emissions and costs. It allows consumers to respond flexibly to network signals.

The Turkish electricity market continues to evolve to adapt to changing energy needs and global energy trends. The government's focus on diversifying the energy mix, increasing competition and encouraging investment in renewable energy underlines its commitment to a more sustainable and secure energy future.

7.5.1. Instant electricity pricing in Türkiye

In Türkiye, electricity prices are determined hourly using a supply curve, which consists of price-quantity pairs arranged in ascending order and combined into a single supply. The demand curve is built in a similar way. The point where the supply and demand curves intersect represents the market clearing price (MCP) for that particular hour. The equilibrium price in the market depends on whether there is a deficit or surplus of energy in the system. In the event of an energy shortage, the system marginal price (SMP) is set as the hourly maximum supply price. In contrast, during a surplus, the SMP is determined by the minimum accepted bid. Electricity prices in Türkiye are influenced by many factors such as the availability of power plants, weather conditions and economic and geopolitical aspects. However, they are also very sensitive to changes in commodity prices, adjusting quickly to these fluctuations (TSKB, 2021).

Demand-Side Management

Existing energy systems and infrastructure are developed with the aim of meeting consumer needs that are ever-changing and evolving because of technological developments such as smart grids, artificial intelligence, and the Internet of Things. This change and evolution have been gradually increasing in importance and impact in today's world, where electrification has been expanding rapidly in every sector.

To meet the increasing demand of energy consumers, especially the peak demand, Demand-Side Management (DSM) became an alternative solution compared to meeting conventional electricity supply by applying different methods.

DSM aims to benefit both sides of the network by flexibly spreading consumer consumption during peak hours of the day, reducing technical losses inside the network, increasing energy efficiency, and reducing chemical emissions and utility cost. In brief, DSM aims for better network management, faster response, more flexibility, and more cost savings. The goal of DSM is to ensure that consumers can respond to signals from their network operator and can move their needs dynamically through the signal (TSKB, 2021).

7.5.2. Energy consumption in Türkiye

7.5.2.1. Energy consumption by sector

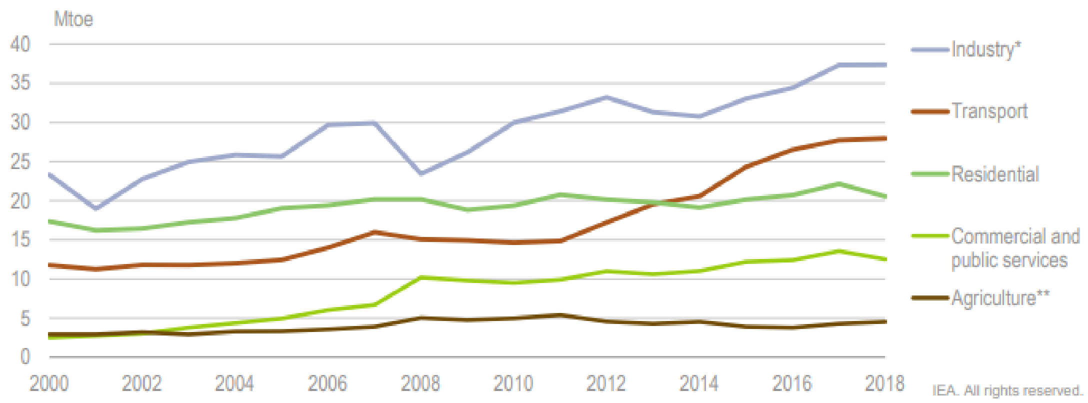

Figure 7.1. Energy consumption by sector, Türkiye, 2000-18 (IAE Energy Policy Review Türkiye, 2021)

The industry sector is the primary energy consumer in Türkiye, with 36 %. The second largest consuming sector is transport, with 27 %, and the following is residential, with 20 %. The total proportion of commercial, public and agriculture is less than 15 %. Over the past 18 years, energy consumption in Türkiye has increased dramatically by at least 50 %.

7.6. Economic impacts of deploying of SMRs in Türkiye

Investment in nuclear energy refers to financial commitments made by governments, private companies, and other entities to develop, construct, operate and maintain nuclear power plants as well as related infrastructure. Investing in nuclear energy has significant impacts on the economic environment of the country.

In this study, the impact of deploying eleven SMR projects in Türkiye is analyzed across various aspects, which are Türkiye's energy dependency and deficit, Türkiye's nuclear workforce, unemployment rate, supply chain of the nuclear industry, localization, and GDP.

7.6.1. Project Incomes

In the context of this project, there are two types of incomes: project direct incomes and project indirect incomes. The project's financial performance primarily relies on its direct income from electricity production, and there are no other sources of indirect income taken into account in this analysis.

7.6.1.1. Project direct incomes

Project direct income has been calculated in the revenue line in the income statement throughout the years (also see the income statement in the financial model).

7.6.1.2. Project indirect incomes

Project does not have indirect income rather than the generating income from electricity production.

7.6.2. Impact on Türkiye’s energy dependency and deficit

According to the World Bank’s statistics, the net energy use of Türkiye has been meeting by 75 % from imports (World Bank, 2015). Türkiye has limited domestic energy resources, and as a result, it heavily relies on fossil fuels and natural gas imports to meet its energy demands.

According to the published information by the Ministry of Energy of the Republic of Türkiye, the energy mix in Türkiye looked roughly like the following figures.

By end of June 2023, Türkiye’s installed capacity reached 104,904 MW.

At the end of June 2023, breakdown of installed capacity by resource is as follows:

30.1% hydro, 24.2% natural gas, 20.8% coal, 11% wind, 9.7% solar, 1.6% geothermal and 2.6% others.

Moreover, by the end of June 2023, the number of power plants in our country reached 12,144 (including unlicensed power plants). The distribution of power by resources is as follows:

751 hydropower, 67 coal, 362 wind, 63 geothermal, 346 natural gas, 10,064 solar and 491 other power plants.

Table 7.1. Impact on installed capacity

	Current	2026	2028	2030	2032	2033
		Reactor 1 and 2	Reactor 3 and 4	Reactor 5 and 6	Reactor 7 and 8	Reactor 9, 10 and 11
Installed Capacity	104,904	+600 MW	+600 MW	+600 MW	+600 MW	+900 MW
TOTAL Installed Capacity						+3300 MW

By the end of 2033, Türkiye will be planning to have more 3300 MW installed capacity in its energy portfolio in case of deploying the eleven SMR projects (Ceteris Paribus).

7.6.3. Impact on Türkiye's nuclear workforce (Industry Professional and Expatriates)

New challenges in nuclear training and education call for the restructuring of existing National Nuclear Institutes and Faculties to focus on competency-based nuclear education through collaborative efforts. Türkiye needs to assess future NPP program human resource requirements, identify competency gaps, and implement necessary activities. The Department of Ministry of Energy and Natural Sources (NEPUD) has been addressing these gaps since 2011 and can play a vital role in preserving nuclear knowledge and managing NPP projects. Apart from academic institutions, regulatory bodies and research centers also play a crucial role in maintaining high levels of nuclear safety and security.

Nuclear education activities can be organized into four pillars: higher education with academic courses and special activities for students, vocational training for young professionals in the nuclear sector, user access programs for research opportunities, and nuclear information centers for providing independent information to the public.

As Türkiye's reliance on fossil fuels decreases, nuclear energy will become a vital option for meeting electricity demand. Consequently, the country must develop comprehensive programs to harmonize nuclear skills and competencies, promote nuclear education, training, and knowledge management. Competency-based education should inspire confidence in the younger generation about the responsible use of nuclear technology, including nuclear safety and security culture. Modern methods and tools can preserve and disseminate nuclear knowledge, enhance safety and security culture, and boost competitiveness in the nuclear energy sector.

Nuclear education also requires knowledge management and networking mechanisms to pool, analyze, and share nuclear safety and security knowledge and experiences at the national level. Collaborations within the international community will help Türkiye tackle the challenges and overcome difficulties in higher nuclear education programs.

Furthermore, providing on-the-job training can be an effective approach to support employees during the construction of the power plant. To address technical training needs in nuclear power plants, industry experts and experienced professionals from other countries can be considered as a viable solution.

Table 7.2. Impact on nuclear workforce

	Current	2026	2028	2030	2032	2033
		Reactor 1 and 2	Reactor 3 and 4	Reactor 5 and 6	Reactor 7 and 8	Reactor 9, 10 and 11
Foreign Nuclear Workforce	5000 *	625	625	625	625	937
TOTAL Foreign Nuclear Workforce						+3437 Foreign Professionals

The formula for calculating the expected number of foreign workforce

300 MW for SMR /4800 MW for Akkuyu * 5000(Number of Expatriate in Akkuyu) = 312,5 Expatriates for one unit

**According to the Ministry of Energy and Natural Resources public announcement, “The Akkuyu NGS Project is the most significant investment in our country in a single item. Approximately 25,000 people, 80% Turkish citizens, are employed in constructing the Akkuyu NGS (Nuclear Power Plant). The remaining 20 % is considered as expatriates who work in the plant. Therefore, the total number of expatriates has been calculated by multiplying 20 % by 25000.

7.6.4. Impact on unemployment rate

A study by IAEA 1998, named "Nuclear power plant organization and Staffing for improved performance: lessons learned", mentioned that the average number of staff in SMRs was higher than in large plants. Nevertheless, the staff per MW for SMRs is higher than those for larger plants. In terms of economic competitiveness, the cost of staffing becomes vital in evaluating the macroeconomic impact.

Instead of conducting a staffing survey, we analyzed the average number of staff during construction and commercial operation. However, we excluded the average number of staff during the decommissioning and waste management period. In this study, we examined the existing power plant's number of staff per MW and calculated the expected number of staff for the projected SMRs. Finally, we added the new workforce to the currently employed people in Türkiye.

Estimated staff levels for new SMRs

Table 7.3. Estimated staff levels for new SMRs (Source: Staffing requirements for future small and medium reactors (SMRs) based on operating experience and projections, IAEA, 2001)

Estimated staff levels for new SMRs during the commercial operation

Units	1	1	2	2	1	
AP600 Plant Staff/MW(e)	0,67	0,39	0,46	0,48	0,31	

Units	1	1	1	2		
CANDU-6 Staff/MW(e)	0,72	0,7	0,46	0,58		

Units	4	2				
Russian SMRs Staff/MW(e)	2	1				

Units	1					
New SMRs Staff/MW(e)	0,8					

Units	1	1	1	1	1	4
Other Russian SMRs Staff/MW(e)	0,47	0,43	0,81	8,5	0,63	0,23

Units	1	10	20			
PBMR (GCR 110 MW(e) module) Staff/MW(e)	0,48	0,07	0,06			

Average Staff/MW(e)	**0,96**

The average number of staff during the construction were collected from several existing power plant projects around the globe. However, the shared number of staff is still an approximate figure that is announced on the company's website.

The information shared on the EDF’s website indicated that around 22.000 people were working in the Hinkley Point C plant in the UK (Source: https://www.edfenergy.com/media-centre/news-releases/five-years-22000-workers-britain-are-work-hinkley-point-c). Furthermore, the Akkuyu Nuclear Power Plant (NPP) project, which involves over 25,000 workers at its highest construction phase, according to the public information on the Akkuyu NPP’s website (Source http://www.akkuyu.com/social-s. Another existing power plant still in the construction period has around 25000 staff, according to the information shared on the United Arab Emirates Nuclear Energy Corporation Website Source: https://www.enec.gov.ae/barakah-plant/industrial-safety/.

Table 7.4. Number of staff during the construction period for the existing ones

Shared number of staff during the construction period for the existing ones.			
NPPs	**Installed Capacity MW(e)**	**Number of Staff**	**Staff per MW**
Barakah	5.380	25.000	4,6
Akkuyu	4.800	25.000	5,2
Hinkley Point C	3.260	22.000	6,7
Rooppur	2.160	12.500	5,8
Vogtle	2.302	9.000	3,9
Average			5,3

Table 7.5. Estimated Employment Figures Based on the SMR Projects to be deployed in Türkiye

Estimated Employment Figures Based on the SMR Projects to be deployed in Turkey												
Years	Current	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
					Reactor 1 and 2		Reactor 3 and 4		Reactor 5 and 6		Reactor 7 and 8	Reactor 9, 10 and 11
Installed Capacity					600		600		600		600	900
Number of Staff during the commercial operation					579		579		579		579	868
Number of staff during the construction period	25.000	3.156	3.156	3.156	3.156	3.156	3.156	3.156	3.156	4.734	4.734	4.734

Average staff per MW for the existing plants in Table 7.4. (5,3) multiplied by the 600 MW for two units to be deployed in Türkiye to calculate the estimated number of staff during the construction period.

The following formula is for calculation the number of staff during the construction period

600 MW(e) (two unit to be deployed) x Average Number of Staff Per MW

7.6.5. Impact on the supply chain of the nuclear industry

Nuclear facilities necessitate a dependable and cohesive supply chain to advance power plant operations. It's crucial to establish a robust system of overseeing the worldwide nuclear supply chain, encompassing all stages of a reactor's lifecycle, for both new nuclear construction and operational sites.

In the process of negotiating contracts with nuclear operators, the involvement of all stakeholders and industry partners is paramount. This collaborative approach creates an effective industry platform for supplying services and products to these facilities. With governmental leadership, a Special Purpose Vehicle (SPV) should establish an organization to inform and engage all stakeholders and industry partners. A communication tool, such as a dedicated department or even a new entity akin to the procurement department of the SPV, should be devised to connect all facets of the platform. The International Atomic Energy Agency (IAEA) suggests that a functional-based structure encompassing engineering, construction, manufacturing, site services, operation & maintenance, and human resources plays a pivotal role in shaping an efficient industry platform, significantly influencing the nuclear supply chain (IAEA, 2016).

The establishment of a nuclear industry platform also holds immense significance in attracting foreign manufacturing or service companies to invest in Türkiye, thus diversifying beyond local industry partners. This localization strategy will inherently impact the procurement scope outlined in the Engineering, Procurement, and Construction (EPC) contract, along with any stipulations pertaining to vendor incentives or requirements. A comprehensive grasp of these contracts will lay the foundation for the industry platform's structure.

The actions required to establish this industry platform are expected to yield several impacts on the supply chain, as detailed below:

-Maximizing economic activities and growth within Türkiye 's nuclear sector at the local level, encompassing employment opportunities and business prospects for the domestic supply chain.

-Bolstering the sustainability of the domestic nuclear market, fostering a thriving UK civil nuclear industry, and leveraging this foundation to access export avenues.

-Strengthening and enriching a dynamic network of resources that encompass critical skills, aiming to establish a secure, innovative, and economically efficient process for decommissioning existing facilities. This endeavor also entails harnessing the advantages of collaboration with newly constructed facilities.

-The primary objective is to heighten awareness within the nuclear sector's supply chain about potential opportunities. This encompasses acknowledging barriers that impede access to these opportunities and formulating strategies, both governmental and industry-driven, to empower the supply chain to compete more effectively for these prospects (The Department of Energy and Climate Change of the UK, 2012).

7.6.6. Impact on localization

As it is known, three different cost and expense items are needed to produce a product. The first one is the first raw material, the second one is labour, and the third is other manufacturing costs used in production. While these cost and expense items used in the production of the relevant product are currently supplied from foreign sources, providing them from domestic sources within the framework of a particular program is called localization or localization, and the path followed here is called localization or localization strategy.

Certain regions in the world have specific natural resources. For example, Russia is rich in natural gas but is relatively poor in oil resources compared to African countries. However, in terms of raw iron and steel production, while China has an overwhelming advantage in the world, the total production of Russia, America, Japan and India is much less than the production of China. As it is not expected that every country will have all kinds of resources, it is pretty utopian to localize every product 100%. The factor that emerges at this point is the localization rate. The localization rate is a mathematical ratio that shows how the product produced in the country is produced from there using domestic resources. Therefore, in order for a product to be considered domestic, the resources used in production are not expected to be entirely domestic. A product with a certain localization rate can be considered a domestic product.

According to Dayday, a successful technology transfer based on 14 rules.

They are:

1. Determining the NPP reactor type, taking into account the country's future vision, human and raw material resources (uranium, thorium, etc.), scientific and technological infrastructure, ease of localization and development,

2. Identification of nuclear fuel cycle facilities and transfer of related technologies,

3. Determination of nuclear waste management strategy and transfer of related technologies,

4. Ensuring standardization in NGS installation,

5. Planning, implementation and regulation of education and training activities in order to provide the highly qualified human resources needed in nuclear technology,

6. Determination of scientific and technological research and development activities to be carried out in the nuclear field, development of science and technology centers conducting research in this context, the establishment of new ones,

7. Establishing the legal, institutional infrastructure and implementation system regarding nuclear safety and quality assurance,

8. Immediate implementation of an autonomous 'Nuclear Security Regulation and Supervision Agency,

9. Establishing a quality safety culture that puts nuclear safety first,

10. Determining the standards, certifications, and codes to be used in every phase of the nuclear field, including design,

11. Making public regulations that will gradually increase the domestic contribution (fuel, materials, engineering, contracting, design, workmanship) at every stage,

12. On issues that the public is sensitive to; Establishment of systems and methods of interaction with the public and non-governmental organizations with as open publicity and information as possible,

13. Effective participation of our experts in the development of international new generation reactor technologies,

14. Compliance works with international conventions to which we are a party (Dayday, 2013).

Nuclear Industry Association's president Alikaan Ciftci reported that the industry partners' contributions to the Akkuyu nuclear power plant reached 40% in a conference arranged by Association on 8-9 Jube 2022 (Nuclear Power Plants İstanbul Summit, 2022). In this study, we use the 40% mentioned in the summit as a localization ratio to calculate the contributions to the Turkish economy.

Localization Ratio Calculation

We use the following formula for calculating the localization ratio:

Localization Ratio =

% of Total Domestic Costs / (% of Total Domestic Costs + % of Total Foreign Costs)

Table 7.6. Domestic contributions to the Turkish Economy

Cost Category	Cost Items	Costs in USD	Localization Ratio	Domestic Contributions (Costs x Localization Ratio)
Opex	Fuel	13.500.635	40%	5.400.254
Opex	Maintenance	11.796.328	40%	4.718.531
Opex	Consumables	1.572.844	40%	629.137
Opex	Outages	23.828.582	40%	9.531.433
Opex	Insurance	5.504.953	40%	2.201.981
Opex	Fuel storage	7.077.797	40%	2.831.119
Opex	Workmanship	79.585.892	40%	31.834.357
Capex	Nuclear Island	452.525.253	40%	181.010.101
Capex	Turbine Island	177.777.778	40%	71.111.111
Capex	EC&I	290.909.091	40%	116.363.636
Capex	Civils	689.131.313	40%	275.652.525
Capex	Licensing	64.000.000	40%	25.600.000
Total Domestic Contributions for one unit				**726.884.186 USD**
Total Domestic Contributions for eleven units				**7.995.726.044 USD**

Table 7.6. shows that 92 % of total contributions come from capital expenditures, which is a significant part of the technology transfer, and the remaining 8 % is a minor part that comes from operational expenditures.

7.6.7. Impact on GDP

Gross Domestic Product (GDP) is a measure used to represent economic performance and a country's economic size. GDP calculates the total value of all goods and services produced within a country during a specific period, usually a year.

GDP can be calculated in three main ways:

Production method (Value added method):

This method calculates GDP by adding value added at each economic production stage. It avoids double counting by only including the value added at each production stage.

Income method:

This method calculates GDP by adding up all income earned in an economy, including wages, rents, profits, and taxes (minus subsidies). It holds that the total income generated by production must equal the total value of production.

Final Demand (Expenditure method):

This method calculates GDP by adding up all the costs or expenditures of the economy. It is usually expressed as total consumption, investment, government spending, and net exports (exports minus imports) (Landefeld et. al, 2008).

In this study, we use the expenditure method with the following formula.

$$GD = C + I + G + X - M$$

Where:

C: Consumer expenditures

I: Business investment

G: Government spending

X: Exports of goods and services

I: Import of goods and services

Table 7.7. Change in Gross Domestic Products

Impact on GDP		**Calculation for 1 Unit**	**Base Amount**
Consumer Spending	C	79.585.892 USD	Workmanship Cost
Business Investments	I	1.674.343.434 USD	CAPEX
Government Spending	G	8.819.749 USD	Fiscal Incentive
Export	X		
Import	M	(13.235.917) USD	Fuel Cost
Change in GDP		1.779.513.158 USD	

We calculated the change in GDP with several assumptions. First assumption is that personnels spend their salary income as consumer spending. The second is that the whole CAPEX investment is considered as a business investment. The third assumption is that fiscal incentives is the government spending because it is assumed that the government renounced from its income and the final assumption is that fuel is entirely imported goods.

79.585.892 USD + 1.674.343.434 USD + 8.819.749 USD - 13.235.917 USD

= 1.779.513.158 USD

We calculated the change in GDP of app. 1,8 billion by using the formula above.

7.6.8. Scenario analyses of SMRs

Scenario analysis is a method used to explore different possible future outcomes based on a range of assumptions and variables. It is a strategic planning tool that helps organizations prepare for uncertainty by considering and analyzing different hypothetical scenarios. By doing so, they can make more informed decisions, manage risk, and develop strategies that adapt to different possible futures.

This study uses six scenarios to evaluate the SMR investment and provide more accurate decision-support to decision-makers. We showed all the scenarios with their results below. We use seven parameters in scenario analyses, including market price, PPA price, PPA period, interest rate, PPA price, equity/debt ratio, and escalation rate, to show the inflation effect on the financial model. However, the base scenario is more realistic in the financial model. It even shows that SMR investment in financial aspects is doable and feasible in Türkiye.

Table 7.8. Base scenario and results

	Normal (Baseline)
Market Price	129,09
Interest Rate	9%
Equity	0,3
Debt	0,7
Inflation Rate	0,02
Discount Rate	9%
Results	
Project NPV ($)	2.948.281.832
Project IRR	10,86 %
Payback Period	14 years
LCOE ($)	25,89

Based on the scenario and the results provided in Table 7.8., the project appears financially feasible. It has a positive NPV, an IRR above the discount rate, and a reasonable payback period. The levelized electricity cost shows that the cost of electricity produced by the project is 25.89 USD/unit. However, for a full assessment, it is essential to consider the project's risk profile, sensitivity analysis, and any other relevant factors.

Table 7.9. Best Scenario and results

	Best
Market Price	160
Interest Rate	7%
Equity	0,3
Debt	0,7
Inflation Rate	0,04
Discount Rate	8%
Results	
Project NPV ($)	8.798.680.925
Project IRR	15,01%
Payback Period	13
LCOE ($)	43,59

The best-case scenario and results in Table 7.9. presents much more favourable financial results for the project compared to the baseline scenario. The higher market price, lower interest rate, and higher inflation rate contribute to a significantly higher net present value and internal rate of return. The project also recovers its initial investment faster, with a shorter payback period.

Table 7.10. Worst Scenario and results

	Worst
Market Price	120
Interest Rate	11%
Equity	0,3
Debt	0,7
Inflation Rate	0,01
Discount Rate	10%
Results	
Project NPV ($)	(1.041.744.188)
Project IRR	8,63 %
Payback Period	N/A
LCOE ($)	21,50

The worst-case scenario and results are in Table 7.10. show a less favourable financial result for the project compared to the baseline scenario. The lower market price, higher interest rate, and lower inflation rate conclude a negative NPV and a lower IRR, indicating potential financial losses and reduced investment attractiveness. The project may not recover its initial investment in the worst-case scenario.

CONCLUSIONS

As global demand for sustainable and reliable energy sources increases, nuclear energy is emerging as an important factor in the global energy mix. This research delves deeper into nuclear energy, specifically focusing on small modular reactor (SMR) technology versus traditional large reactor technology as an energy source. The overarching goal is to shed light on SMR's potential to revolutionize the future of nuclear power, raising the question of whether SMR technology could eventually replace its larger counterparts.

Small Modular Reactors (SMRs) represent an innovative nuclear energy approach, albeit with historical roots dating back to the mid-20th century. However, despite their promise, challenges remain, particularly in securing funding for SMR projects. As of now, there are not globally approved SMR designs that have received full financial backing. The financial sector must grapple with managing funds while considering time, resources, and associated risks.

The analyzes and financial models carried out within the scope of this thesis draw a vital roadmap for the future development of Türkiye 's energy infrastructure. In this thesis, different types of nuclear power plants in Türkiye were evaluated financially, and a value-for-money analysis was conducted to determine whether the public should make the result with the traditional purchasing method or with the cooperation of the public-private sector. Levelized Unit Electricity Cost (LUEC) was compared as the most fundamental parameter in financial comparison.

A multifaceted approach was used in this study. It is built into two separate financial models, meticulously assessing the feasibility of SMR and large reactor projects. The goal is to identify the most financially viable option among them. The study then examines the relevance of government and private participation in these projects, performing a value-for-money analysis to determine decisions. The underlying assumptions of the financial model are carefully drawn from technical documents and official press releases. However, it is important to note that technical considerations such as site preparation and technology selection are intentionally excluded from this analysis, which focuses solely on the financial aspects.

Although this study is primarily based on financial factors, it highlights that a comprehensive technical assessment is necessary to provide informed recommendations for the implementation of new SMR projects. In particular, he emphasized that a comprehensive analysis, including financial and technical aspects, is mandatory to evaluate the feasibility of implementing SMR projects in a country like Türkiye. The study highlights the attractive potential that the levelized cost of energy (LCOE) for SMR projects could be competitive with large reactors, depending on the right decisions and exemplary implementation by all parties involved in the project. According to the value-for-money assessment that was conducted in this study, in case of at least 2-year delays in the construction and % 13 WACC, it becomes more advantageous to have the projects built by the private sector. For other scenarios, it seems to need public power to build a project requiring sizeable upfront capital.

This study takes a comprehensive approach, using three distinct scenarios, to assess the feasibility of investing in small modular reactors (SMRs) and provide valuable insights for decision-makers. In our scenario analysis, we take into account seven important parameters that influence the financial model, which are the market price, the price of the power purchase agreement (PPA), the term of the PPA, the interest rate, equity/debt ratio and index ratio. These parameters are carefully chosen to account for the impact of inflation on the financial model, allowing us to have the potential financial impact of SMR investments.While these scenarios provide valuable information, it should be emphasized that the baseline scenario is the most realistic representation of the financial model. This scenario not only offers a realistic perspective but also highlights the feasibility and viability of SMR investments in Türkiye's energy landscape from a financial perspective.

In summary, this study's multifaceted approach, integrating various scenarios and parameters, enriches our understanding of the financial dynamics surrounding SMR investments. In particular, the base case builds confidence in the potential of SMR as a viable energy solution for Türkiye, providing decision-makers with a solid basis for their choices and insight into the field of nuclear energy.

Eleven CANDU Small Modular Reactor (SMR) and two EPR large plant nuclear power plants were compared financially in detail. The results show that the CANDU SMR project stands out with its low Levelized Unit Electricity Cost (LUEC). In this context, while the LUEC value calculated for the SMR was 25.89 USD, the LUEC value calculated for the French EPR project was 36.89 USD. These differences support the arguments that the SMR project can meet Türkiye's energy needs more economically.

In addition, selecting the project execution model is of particular importance. In this context, value-for-money analysis was performed for the SMR project. Value-for-money analysis demonstrates the advantages and disadvantages of both approaches by comparing Public-private partnership execution with private-sector involvement. As a result, it shows that direct project execution by the public is a more viable and sustainable option than private sector participation. In public projects, project costs can be reduced by transferring certain risks to the private sector, and higher economic returns can be obtained in the long run.

The results of this study contribute significantly to Türkiye's energy policy considerations, aligning them with the goals of sustainable energy production, zero-carbon emissions, cost efficiency, and energy security—long-term quantity. As the world deals with the required transition to clean energy sources, the lessons from this research provide valuable guidance for policymakers in shaping the future of Türkiye's energy.

REFERENCES

Agara, A. S., Goodfellow, M. J., Goh, Y. M., and Newnes, L. B. (2019). Stakeholder perspectives on the cost requirements of Small Modular Reactors. *Progress in Nuclear Energy*, 112 51-62

Dayday, N. (2013, 30 January). *Nükleer Teknoloji Transferi Ve Milli Nükleer Güç Programı.*TASAM. Retrieved from https://tasam.org/tr-TR/Icerik/4960/nukleer_teknoloji_transferi_ve_milli_nukleer_guc_programi_

Duda, G. (2022, 8 July). Firmalarımız Akkuyu NGS'den 6.5 milyar dolarlık pay alacaklar. *Sanayici Dergisi*. Retrieved from 'Firmalarımız Akkuyu NGS'den 6.5 milyar dolarlık pay alacaklar' (sanayicidergisi.com.tr)

Ebinger, C., Banks, J., Massy, K., and Avasarala, G. (2011). *Models for Aspirant Civil Nuclear Energy Nations in the Middle East*. Energy Security Initiative. The Brookings Institution, 71-73.

European PPP Expertise Centre. (2015). *Value for Money Assessment Review of approaches and key concepts.* European Investment Bank

Forsythe, J. (2009). 3 R's of Nuclear Power: Reading, Recycling, and Reprocessing: Making a Better Tomorrow for Little Joe Hardcover. Indiana: Author House

Grimsey, D. and Lewis M. K. (2004). *Public Private Partnerships: The Worldwide Revolution in Infrastructure Provision and Project Finance*, Edward Elgar Publishing.

Harris, G., Heptonstall, P., Gross, R., and Handley, D. (2013). *Cost estimates for nuclear power in the UK*. Energy Policy, 62, 431-442.

International Atomic Energy Agency. (2016). *Industrial Involvement to Support A National Nuclear Power Program*

International Atomic Energy Agency. (2016). *Small Modular Reactors: A new nuclear energy paradigm*

International Atomic Energy Agency. (2020). *Nuclear Power and the Clean Energy Transition*

International Atomic Energy Agency. (2022). *Advances in Small Modular Reactor Technology Developments*. Vienna: Nuclear Power Technology Development Section (NPTDS) Division of Nuclear Power IAEA Department of Nuclear Energy

International Energy Agency. (2021). *Key World Energy Statistics*

Kavak K., Hakyemez, C., Şentürk Z., Arıkan E., Çelen, E., Kardeş, Y., and Emecan M. (2022). *Energy Outlook 2022*. Türkiye Sınai Kalkınma Bankası

Kharizam, İ, Takim, R., and Nawavi, A. (2012). A Public Sector Comparator (PSC) for Value for Money (VFM) Assessment Tools, *Asian Social Science 8, 7*

Kulaksız, S. ve Küçükkocaoğlu, G. (2019). *Analysis Of the Public Private Partnership Model and Traditional Procurement Method On A Healthcare Investment Project In Determining Public Service Procurement Method*, Muhasebe Bilim Dünyası Dergisi, 21(1), 197-227.

Landefeld, J. S., Seskin, E. P., and Fraumeni, B. M. (2008). Taking the Pulse of the Economy: Measuring GDP. *Journal of Economic Perspectives* 22, 193–216

Leverenz, R., Gerhard, L., and Göbel, A. (2004). *The European Pressurized Water Reactor:A Safe and Competitive Solution for Future Energy Needs*. International Conference Nuclear Energy for New Europe, Nuclear Society of Slovenia Ljubljana

Lewis, C., MacSweeney, R., Josten, W., Roulstone, T., and Locatelli G. (2016). *Small modular reactors Can building nuclear powerbecome more cost-effective?* London: Ernst & Young LLP

Lloyd, C. A. (2019). *Modular Manufacture and Construction of Small Nuclear Power Generation Systems* (Published PhD Thesis). University of Cambridge, Cambridge

Locatelli, G., Bingham, C., and Mancini, M. (2014). Small modular reactors: A comprehensive overview of their economics and strategic aspects. *Progress in Nuclear Energy*, 73, 74-85

Ministry of Energy of the Republic of Türkiye. (2023 21 July). Retrieved from https://enerji.gov.tr/bilgi-merkezi-enerji-nukleer-enerji-en

Morallos, D. and Amekudzi A. (2008). The State of the Practice of Value for Money Analysis in Comparing Public Private Partnerships to Traditional Procurements. *Public Works Management & Policy*, 13, 114-125.

National Nuclear Laboratory. (2014). *Small Modular Reactors (SMR) Feasibility Study*

Natural Gas Prices - Historical Chart. (n.d.). MacroTrends. Retrieved from https://www.macrotrends.net/2478/natural-gas-prices-historical-chart

Nuclear Energy Agency. (2016). *Small Modular Reactors: Nuclear Energy Market Potential for Near-term Deployment*

Nuclear Energy Agency. (2021). *Small Modular Reactors: Challenges and Opportunities*

Nuclear Energy Institute. (2022 17 Feb). Retrieved from https://www.nei.org/advanced-nuclear-energy/advanced-nuclear-101

Office for Nuclear Regulation, HSE Nuclear Directorate. (2011). Generic Design Assessment – New Civil Reactor Build Step 4 Fuel and Core Design Assessment of the EDF and AREVA UK EPR™ Reactor. (2023, 13 May) Retrieved from https://www.onr.org.uk/new-reactors/reports/step-four/technical-assessment/ukepr-fcd-onr-gda-ar-11-021-r-rev-0.pdf

Rasti, M. (2020). *Nuclear Small Modular Reactors: An Analysis of Projected Cost Estimates and Economic Competitiveness.* (Published PhD Thesis). The University of Texas. Austin

The Department of Energy and Climate Change of the UK. (2012). *The Nuclear Supply Chain Action Plan*

The Ux Consulting (UxC) .(2019). UxC Nuclear Fuel Price Indicators. Retrieved from https://www.uxc.com/p/prices/UxCPrices.aspx.

The World Bank. (2014). *Energy imports, net (% of energy use) – Türkiye* Retrieved from *https://data.worldbank.org/indicator/EG.IMP.CONS.ZS?locations=TR*

The World Bank. (2014). *Foreign direct investment, net inflows (% of GDP) – Türkiye* Retrieved from *https://data.worldbank.org/indicator/EG.IMP.CONS.ZS?locations=TR*

Toure, A., Piette, C., and Monette P. (2020). *The rise of nuclear technology 2.0.* Tractebel Engineering S.A.

Vujic, J., Bergmann, R., Skoda, R., and Miletic, M. (2012). Small modular reactors: Simpler, safer, cheaper? *Energy* 45, 288-295

World Nuclear Association. (2016). *World Nuclear Performance Report*

World Nuclear Association. (2020). *World Nuclear Performance Report*

World Nuclear Association. (2021). *World Nuclear Performance Report*

World Nuclear Association. (2022). *World Nuclear Performance Report*

Zohuri, B. (2019). *Small Modular Reactors as Renewable Energy Sources*. Springer Retrieved from https://link.springer.com/book/10.1007/978-3-319-92594-3

APPENDICIES

1. Current Status of SMR Projects worldwide

Design	Output MW(e)	Type	Designer	Country	Status
WATER COOLED SMALL MODULAR REACTORS (LAND BASED)					
CAREM	30	Integral PWR	CNEA	Argentina	Under construction
ACP100	125	Integral PWR	CNNC/NPIC	China	Under construction
CANDU SMRTM	300	PHWR	Candu Energy Inc.	Canada	Conceptual Design
CAP200	> 200	PWR	SPIC/SNERDI	China	Basic Design
DHR400	400 MW(t)	PWR (pool type)	CNNC	China	Basic Design
HAPPY200	200 MW(t)	PWR	SPIC	China	Detailed Design
NHR200-II	200 MW(t)	Integral PWR	Tsinghua University and CGN	China	Basic Design
TEPLATORTM	< 150 MW(t)	HWR	UWB Pilsen & CIIRC CTU	Czech Republic	Conceptual Design
NUWARDTM	2 × 170	Integral PWR	EDF	France	Conceptual Design
IMR	350	PWR	MHI	Japan	Conceptual Design Completed
i-SMR	170	Integral PWR	KHNP and KAERI	Republic of Korea	Conceptual design
SMART	107	Integral PWR	KAERI and K.A.CARE	Republic of Korea and Saudi Arabia	Detailed Design
RITM-200N	55	Integral PWR	JSC Afrikantov OKBM, Rosatom	Russian Federation	Detailed Design Completed
VK-300	250	BWR	NIKIET	Russian Federation	Detailed Design
KARAT-45	45 – 50	BWR	NIKIET	Russian Federation	Conceptual design
KARAT-100	100	BWR	NIKIET	Russian Federation	Conceptual design
RUTA-70	70 MW(t)	PWR (pool type)	NIKIET	Russian Federation	Conceptual Design

STAR	10	LWR (pressure tube)	STAR ENERGY SA	Switzerlan d	Basic design
Rolls-Royce SMR	470	PWR	Rolls-Royce SMR Ltd.	UK	Detailed Design
VOYGRTM	4/6/12 × 77	Integral PWR	NuScale Power Corporation	USA	Equipment Manufacturin g in progress
BWRX-300	270 – 290	BWR	GE-Hitachi Nuclear Energy and Hitachi-GE Nuclear Energy	USA and Japan	Detailed Design
SMR-160	160	PWR	Holtec International	USA	Preliminary Design Completed
Westinghouse	SMR > 225	Integral PWR	Westinghouse Electric Company LLC	USA	Conceptual Design Completed
mPower	2 × 195	Integral PWR	BWX Technologies, Inc	USA	Conceptual Design
OPEN20	22	PWR	Last Energy Inc.	USA	Detailed Design
WATER COOLED SMALL MODULAR REACTORS (MARINE BASED)					
KLT-40S	2 × 35	PWR	JSC Afrikantov OKBM	Russian Federation	In Operation
ACPR50S	50 PWR (loop type)		CGNPC	China	Detailed Design
ACP100S	125 Integral	PWR	CNNC/NPIC	China	Basic Design
BANDI-60	60	PWR	KEPCO E&C	Republic of Korea	Conceptual Design
ABV-6E	6 – 9	PWR	JSC Afrikantov OKBM Rosatom	Russian Federation	Final design
RITM-200M	50	Integral PWR	JSC Afrikantov OKBM, Rosatom	Russian Federation	Basic Design Completed
VBER-300	325	Integral PWR	JSC Afrikantov OKBM, Rosatom	Russian Federation	Licensing Stage

SHELF-M	up to 10	Integral PWR	NIKIET	Russian Federation	Basic Design
HIGH TEMPERATURE GAS COOLED SMALL MODULAR REACTORS					
HTR-PM	210	HTGR (pebble bed)	INET, Tsinghua University	China	In operation
STARCORE	14/20/60	HTGR (prismatic)	StarCore Nuclear	Canada	Pre-Conceptual Design
JIMMY	10 – 20 MW(t)	HTGR (prismatic)	JIMMY ENERGY SAS	France	Detailed Design
GTHTR300	100 – 300	HTGR (prismatic)	JAEA Consortium	Japan	Basic design
GT-MHR	288	HTGR (prismatic)	JSC Afrikantov OKBM	Russian Federation	Preliminary Design Completed
MHR-T	4 × 205.5	HTGR	JSC Afrikantov OKBM	Russian Federation	Conceptual Design
MHR-100	25 – 87	HTGR	JSC Afrikantov OKBM	Russian Federation	Conceptual Design
AHTR-100	50	HTGR (pebble bed)		South Africa	Conceptual Design Completed
PBMR-400	165	HTGR (pebble bed)	PBMR SOC Ltd.	South Africa	Preliminary Design Completed
HTMR100	35	HTGR (pebble bed)	STL Nuclear (Pty) Ltd.	South Africa	Basic Design
EM2	265	GFR	General Atomics	USA	Conceptual Design
FMR	50	GFR	General Atomics	USA	Conceptual Design
Xe-100	82,5	HTGR (pebble bed)	X-Energy LLC	USA	Basic Design
SC-HTGR	272	HTGR (prismatic)	Framatome, Inc.	USA	Preliminary Design
PeLUIt / RDE	40 MW(t)	HTGR (pebble bed)	BRIN	Indonesia	Conceptual Design
HTR-10	2.May	HTGR (pebble bed)	INET, Tsinghua University	China	Operable
HTTR	30 MW(t)	HTGR (prismatic)	JAEA	Japan	In operation
LIQUID METAL COOLED FAST NEUTRON SPECTRUM SMALL MODULAR REACTORS					
BREST-OD-300	300	LMFR (pool type)	NIKIET	Russian Federation	Under Construction
ARC-100	100	LMFR (pool type)	ARC Clean Energy	Canada	Preliminary Design

4S	10	LMFR (pool type)	Toshiba Energy Systems & Solutions Corporation	Japan	Detailed Design
MicroURANUS	20	LBE-cooled Reactor	UNIST	Republic of Korea	Conceptual Design
LFR-AS-200	200	LMFR	newcleo srl	Italy	Conceptual Design
SVBR	100	LMFR	JSC AKME Engineering	Russian Federation	Detailed Design
SEALER-55	55	LMFR	LeadCold	Sweden	Conceptual Design
Westinghouse LFR	450	LMFR (pool type)	Westinghouse Electric Company, LLC.	USA	Conceptual Design
MOLTEN SALT SMALL MODULAR REACTORS					
IMSR400	2 × 195	MSR	Terrestrial Energy Inc.	Canada	Detailed Design
SSR-W	300	MSR (static fuelled)	Moltex Energy	Canada	Conceptual Design
smTMSR-400	168	MSR	CAS/SINAP	China	Pre-Conceptual Design
CMSR	100	MSR	Seaborg Technologies ApS	Denmark	Conceptual Design
Copenhagen Atomics Waste Burner	20 MW(t)	MSR	Copenhagen Atomics	Denmark	Detailed Design
FUJI	200	MSR	ITMSF	Japan	Preliminary Design Completed
THORIZON	40 – 120	MSR	THORIZON	Netherlands	Conceptual Design
SSR-U	16	MSR	Moltex Energy	UK	Basic Design
KP-FHR	140	FHR	KAIROS Power, LLC.	USA	Conceptual Design
Mk1 PB-FHR	100	FHR	UC Berkeley	USA	Pre-Conceptual Design
MCSFR	50 / 200 / 400 / 1200	MSR (fast spectrum)	Elysium Industries	USA	Conceptual Design
LFTR	250	MSR	Flibe Energy, Inc.	USA	Conceptual Design
ThorCon	250	MSR	ThorCon International	USA and Indonesia	Preliminary Design Completed
MICROREACTORS					
Energy Well	8	FHTR	Centrum výzkumu Řež	Czech RepubliC	Pre-Conceptual Design

MoveluX	3-4	Heat Pipe (sodium)	Toshiba Energy Systems & Solutions Corporation	Japan	Conceptual Design
ELENA	0.068	PWR	National Research Centre “Kurchatov Institute”	Russian Federation	Conceptual Design
UNITHERM	6,6	PWR	NIKIET	Russian Federation	Conceptual Design
AMR	3	HTGR (prismatic)	STL Nuclear (Pty) Ltd.	South Africa	Pre-conceptual design
LFR-TL-30	30	LMFR	newcleo Ltd.	UK	Conceptual Design
U-Battery	4	HTGR	Urenco	UK	Conceptual Design
Aurora	1.5 – 50	LMFR	OKLO, Inc.	USA	Detailed Design
HOLOS-QUAD	10	HTGR	HolosGen LLC	USA	Detailed Design
MARVEL	0.015 – 0.027	LMFR	Idaho National Laboratory	USA	Equipment manufacturing in progress
MMRTM	> 5 and > 10	HTGR	Ultra Safe Nuclea	USA	Basic Design
Westinghouse eVinciTM	2 – 3.5	Heat Pipe	Westinghouse Electric Company, LLC.	USA	Conceptual Design Completed

2. Construction durations of existing nuclear power plants in the world

Country	**Name**	**No**	**Type**	**Model**	**Status**	**Constr. Start**	**Comm. Op.**	**Constr. Dur.**
Armenia	Metsamor	1	PWR	VVER-440 V-270	Shut down	1969	1977	8
Armenia	Metsamor	2	PWR	VVER-440 V-270	Operational	1975	1980	5
Belarus	Ostrovets	1	PWR	VVER-1200 V-491	Operational	2013	2021	8
Belgium	SCKOCEN	1	PWR	Westinghouse (WH) BR-3	Decommissioned	1957	1962	5
Belgium	Doel	1	PWR	WH 2 loops	Operational	1969	1975	6
Belgium	Doel	2	PWR	WH 2 loops	Operational	1971	1975	4

Belgium	Doel	3	PWR	Framatome 3 loops	Shut down	1975	1982	7
Belgium	Doel	4	PWR	Belgian firms plus WH 3 loops	Operational	1978	1985	7
Belgium	Tihange	1	PWR	Framatome 3 loops	Operational	1970	1975	5
Belgium	Tihange	2	PWR	Framatome 3 loops	Shut down	1976	1983	7
Belgium	Tihange	3	PWR	Belgian firms plus WH 3 loops	Operational	1978	1985	7
Brazil	Angra	1	PWR	WH 2 loops	Operational	1971	1985	14
Brazil	Angra	2	PWR	Pre-Konvoi	Operational	1976	2001	
Bulgaria	Kozloduy	1	PWR	VVER-440/V-230	Shut down	1970	1974	4
Bulgaria	Kozloduy	2	PWR	VVER-440/V-230	Shut down	1970	1975	5
Bulgaria	Kozloduy	3	PWR	VVER-440/V-230	Shut down	1973	1981	8
Bulgaria	Kozloduy	4	PWR	VVER-440/V-230	Shut down	1973	1982	9
Bulgaria	Kozloduy	5	PWR	VVER-1000/V-320	Operational	1980	1988	8
Bulgaria	Kozloduy	6	PWR	VVER-1000/V-320	Operational	1982	1993	11
China	Changjiang	I-1	PWR	CNP-600	Operational	2010	2015	5
China	Changjiang	I-2	PWR	CNP-600	Operational	2010	2016	6
China	Daya Bay	1	PWR	M-310	Operational	1987	1994	7
China	Daya Bay	2	PWR	M-310	Operational	1988	1994	6
China	Fangchenggang	1	PWR	CPR-1000	Operational	2010	2015	5
China	Fangchenggang	2	PWR	CPR-1000	Operational	2010	2016	6
China	Fangchenggang	3	PWR	Hualong One	Operational	2015	2023	8
China	Fangjiashan	1	PWR	CPR-1000	Operational	2008	2014	6
China	Fangjiashan	2	PWR	CPR-1000	Operational	2009	2015	6
China	Fuqing	1	PWR	CPR-1000	Operational	2008	2014	6
China	Fuqing	2	PWR	CPR-1000	Operational	2009	2015	6
China	Fuqing	3	PWR	CPR-1000	Operational	2010	2016	6
China	Fuqing	4	PWR	CPR-1000	Operational	2012	2017	5
China	Fuqing	5	PWR	Hualong One	Operational	2015	2021	6
China	Fuqing	6	PWR	Hualong One	Operational	2015	2022	7
China	Haiyang	1	PWR	AP1000	Operational	2009	2018	9

China	Haiyang	2	PWR	AP1000	Operational	2010	2019	9
China	Hongyanhe	1	PWR	CPR-1000	Operational	2007	2013	6
China	Hongyanhe	2	PWR	CPR-1000	Operational	2008	2014	6
China	Hongyanhe	3	PWR	CPR-1000	Operational	2009	2015	6
China	Hongyanhe	4	PWR	CPR-1000	Operational	2009	2016	7
China	Hongyanhe	5	PWR	ACPR-1000	Operational	2015	2021	6
China	Hongyanhe	6	PWR	ACPR-1000	Operational	2015	2022	7
China	Ling Ao	1	PWR	M-310	Operational	1997	2002	5
China	Ling Ao	2	PWR	M-310	Operational	1997	2003	6
China	Ling Ao	3	PWR	CPR-1000	Operational	2005	2010	5
China	Ling Ao	4	PWR	CPR-1000	Operational	2006	2011	5
China	Ningde	1	PWR	CPR-1000	Operational	2008	2013	5
China	Ningde	2	PWR	CPR-1000	Operational	2008	2014	6
China	Ningde	3	PWR	CPR-1000	Operational	2010	2015	5
China	Ningde	4	PWR	CPR-1000	Operational	2010	2016	6
China	Qinshan	I-1	PWR	CNP-300	Operational	1985	1994	9
China	Qinshan	II-1	PWR	CNP-600	Operational	1996	2002	6
China	Qinshan	II-2	PWR	CNP-600	Operational	1997	2004	7
China	Qinshan	II-3	PWR	CNP-600	Operational	2006	2010	4
China	Qinshan	II-4	PWR	CNP-600	Operational	2007	2011	4
China	Sanmen	1	PWR	AP1000	Operational	2009	2018	9
China	Sanmen	2	PWR	AP1000	Operational	2009	2018	9
China	Taishan	1	PWR	EPR	Operational	2009	2018	9
China	Taishan	2	PWR	EPR	Operational	2010	2019	9
China	Tianwan	1	PWR	VVER-1000	Operational	1999	2007	8
China	Tianwan	2	PWR	VVER-1000	Operational	2000	2007	7
China	Tianwan	3	PWR	VVER-1000	Operational	2012	2018	6
China	Tianwan	4	PWR	VVER-1000	Operational	2013	2018	5
China	Tianwan	5	PWR	ACPR-1000	Operational	2015	2020	5
China	Tianwan	6	PWR	ACPR-1000	Operational	2016	2021	5
China	Yangjiang	1	PWR	CPR-1000	Operational	2008	2014	6
China	Yangjiang	2	PWR	CPR-1000	Operational	2009	2015	6
China	Yangjiang	3	PWR	CPR-1000+	Operational	2010	2016	6
China	Yangjiang	4	PWR	CPR-1000+	Operational	2012	2017	5
China	Yangjiang	5	PWR	ACPR-1000	Operational	2013	2018	5

China	Yangjiang	6	PWR	ACPR-1000	Operational	2013	2019	6
Czech Republic	Dukovany	1	PWR	VVER-440 V-213	Operational	1979	1985	6
Czech Republic	Dukovany	2	PWR	VVER-440 V-213	Operational	1979	1986	7
Czech Republic	Dukovany	3	PWR	VVER-440 V-213	Operational	1979	1986	7
Czech Republic	Dukovany	4	PWR	VVER-440 V-213	Operational	1979	1987	8
Czech Republic	Temelín	1	PWR	VVER-1000	Operational	1987	2002	15
Czech Republic	Temelín	2	PWR	VVER-1000	Operational	1987	2003	16
Finland	Loviisa	1	PWR	VVER-440/V-213	Operational	1980	1990	10
Finland	Loviisa	2	PWR	VVER-440/V-213	Operational	1972	1981	9
Finland	Olkiluoto	3	PWR	EPR	Operational	2005	2023	18
France	Belleville	1	PWR	P4 REP 1300	Operational	1980	1988	8
France	Belleville	2	PWR	P4 REP 1300	Operational	1980	1989	9
France	Blayais	1	PWR	CP1	Operational	1977	1981	4
France	Blayais	2	PWR	CP1	Operational	1977	1983	6
France	Blayais	3	PWR	CP1	Operational	1978	1983	5
France	Blayais	4	PWR	CP1	Operational	1978	1983	5
France	Bugey	2	PWR	CP0	Operational	1972	1979	7
France	Bugey	3	PWR	CP0	Operational	1973	1979	6
France	Bugey	4	PWR	CP0	Operational	1974	1979	5
France	Bugey	5	PWR	CP0	Operational	1974	1980	6
France	Cattenom	1	PWR	P4 REP 1300	Operational	1979	1987	8
France	Cattenom	2	PWR	P4 REP 1300	Operational	1980	1988	8
France	Cattenom	3	PWR	P4 REP 1300	Operational	1982	1991	9
France	Cattenom	4	PWR	P4 REP 1300	Operational	1983	1992	9
France	Chinon	B-1	PWR	CP2	Operational	1977	1984	7
France	Chinon	B-2	PWR	CP2	Operational	1977	1984	7
France	Chinon	B-3	PWR	CP2	Operational	1980	1987	7
France	Chinon	B-4	PWR	CP2	Operational	1981	1988	7
France	Chooz	A-1	PWR	CHOOZ-A	Decommissioned	1962	1967	5
France	Chooz	B-1	PWR	N4 REP 1450	Operational	1984	2000	16

France	Chooz	B-2	PWR	N4 REP 1450	Operational	1984	2000	16
France	Civaux	1	PWR	N4 REP 1450	Operational	1988	2002	14
France	Civaux	2	PWR	N4 REP 1450	Operational	1991	2002	11
France	Cruas	1	PWR	CP2	Operational	1978	1984	6
France	Cruas	2	PWR	CP2	Operational	1978	1985	7
France	Cruas	3	PWR	CP2	Operational	1979	1984	5
France	Cruas	4	PWR	CP2	Operational	1979	1985	6
France	Dampierre	1	PWR	CP1	Operational	1975	1980	5
France	Dampierre	2	PWR	CP1	Operational	1975	1981	6
France	Dampierre	3	PWR	CP1	Operational	1975	1981	6
France	Dampierre	4	PWR	CP1	Operational	1975	1981	6
France	Fessenheim	1	PWR	CP0	Shut down	1971	1978	7
France	Fessenheim	2	PWR	CP0	Shut down	1972	1978	6
France	Flamanville	1	PWR	P4 REP 1300	Operational	1979	1986	7
France	Flamanville	2	PWR	P4 REP 1300	Operational	1980	1987	7
France	Golfech	1	PWR	P4 REP 1300	Operational	1982	1991	9
France	Golfech	2	PWR	P4 REP 1300	Operational	1984	1994	10
France	Gravelines	1	PWR	CP1	Operational	1975	1980	5
France	Gravelines	2	PWR	CP1	Operational	1975	1980	5
France	Gravelines	3	PWR	CP1	Operational	1975	1981	6
France	Gravelines	4	PWR	CP1	Operational	1976	1981	5
France	Gravelines	5	PWR	CP1	Operational	1979	1985	6
France	Gravelines	6	PWR	CP1	Operational	1979	1985	6
France	Nogent	1	PWR	P4 REP 1300	Operational	1981	1988	7
France	Nogent	2	PWR	P4 REP 1300	Operational	1982	1989	7
France	Paluel	1	PWR	P4 REP 1300	Operational	1977	1985	8
France	Paluel	2	PWR	P4 REP 1300	Operational	1978	1985	7
France	Paluel	3	PWR	P4 REP 1300	Operational	1979	1986	7
France	Paluel	4	PWR	P4 REP 1300	Operational	1980	1986	6
France	Penly	1	PWR	P4 REP 1300	Operational	1982	1990	8
France	Penly	2	PWR	P4 REP 1300	Operational	1984	1992	8
France	Saint-Alban	1	PWR	P4 REP 1300	Operational	1979	1986	7
France	Saint-Alban	2	PWR	P4 REP 1300	Operational	1979	1987	8

France	Saint-Laurent	B-1	PWR	CP2	Operational	1976	1983	7
France	Saint-Laurent	B-2	PWR	CP2	Operational	1976	1983	7
France	Tricastin	1	PWR	CP1	Operational	1974	1980	6
France	Tricastin	2	PWR	CP1	Operational	1974	1980	6
France	Tricastin	3	PWR	CP1	Operational	1975	1981	6
France	Tricastin	4	PWR	CP1	Operational	1975	1981	6
Germany	Biblis	1	PWR	Siemens-KWU	Shut down/in decommissioning	1970	1975	5
Germany	Biblis	2	PWR	KWU	Shut down/in decommissioning	1972	1977	5
Germany	Brokdorf	1	PWR	KWU	Shut down	1976	1986	10
Germany	Emsland	1	PWR	Konvoi (KWU)	Shut down	1982	1988	6
Germany	Grafenrheinfeld	1	PWR	KWU	Shut down	1975	1982	7
Germany	Greifswald	1	PWR	VVER-440 V-230	Shut down/in decommissioning	1970	1974	4
Germany	Greifswald	2	PWR	VVER V-230	Shut down/in decommissioning	1970	1975	5
Germany	Greifswald	3	PWR	VVER V-230	Shut down/in decommissioning	1972	1978	6
Germany	Greifswald	4	PWR	VVER V-230	Shut down/in decommissioning	1972	1979	7
Germany	Greifswald	5	PWR	VVER V-213	Shut down/in decommissioning	1976	1989	13
Germany	Grohnde	1	PWR	KWU	Shut down	1976	1985	9
Germany	Isar	2	PWR	Konvoi (KWU)	Shut down	1982	1988	6
Germany	Mülheim-Kärlich	1	PWR	B & W	Shut down/in decommissioning	1975	1987	12
Germany	Neckarwestheim	1	PWR	KWU	Shut down	1972	1976	4
Germany	Neckarwestheim	2	PWR	Konvoi (KWU)	Shut down	1982	1989	7

Germany	Obrigheim	1	PWR	Siemens	Shut down/in decommissioning	1965	1969	4
Germany	Philippsburg	2	PWR	KWU	Shut down	1977	1985	8
Germany	Rheinsberg	1	PWR	VVER-70	Shut down/in decommissioning	1960	1966	6
Germany	Stade	1	PWR	Siemens	Shut down/in decommissioning	1967	1972	5
Germany	Unterweser	1	PWR	KWU	Shut down/in decommissioning	1972	1979	7
Hungary	Paks	1	PWR	VVER-440 V-213	Operational	1974	1983	9
Hungary	Paks	2	PWR	VVER V-213	Operational	1974	1984	10
Hungary	Paks	3	PWR	VVER V-213	Operational	1979	1986	7
Hungary	Paks	4	PWR	VVER V-213	Operational	1979	1987	8
India	Kudankulam	1	PWR	VVER-1000	Operational	2002	2014	12
India	Kudankulam	2	PWR	VVER-1000	Operational	2002	2017	15
Iran	Bushehr	1	PWR	VVER-1000	Operational	1975	2013	
Italy	Enrico Fermi	1	PWR	WH 4-loop	Shut down/in decommissioning	1961	1965	4
Japan	Genkai	1	PWR	Mitsubishi (2-loop)	Shut down	1971	1975	4
Japan	Genkai	2	PWR	Mitsubishi (2-loop)	Shut down	1977	1981	4
Japan	Genkai	3	PWR	Mitsubishi (4-loop)	Operational	1988	1994	6
Japan	Genkai	4	PWR	Mitsubishi (4-loop)	Operational	1992	1997	5
Japan	Ikata	1	PWR	Mitsubishi (2-loop)	Shut down	1973	1977	4
Japan	Ikata	2	PWR	Mitsubishi (2-loop)	Shut down	1978	1982	4
Japan	Ikata	3	PWR	Mitsubishi (3-loop)	Operational	1990	1994	4
Japan	Mihama	1	PWR	Mitsubishi (2-loop)	Shut down	1967	1970	3
Japan	Mihama	2	PWR	Mitsubishi (2-loop)	Shut down	1968	1972	4

Japan	Mihama	3	PWR	Mitsubishi (3-loop)	Operational	1972	1976	4
Japan	Ōi	1	PWR	W (4-loop)	Shut down	1972	1979	7
Japan	Ōi	2	PWR	Westinghouse (4-loop)	Shut down	1972	1979	7
Japan	Ōi	3	PWR	Mitsubishi (4-loop)	Operational	1987	1991	4
Japan	Ōi	4	PWR	Mitsubishi (4-loop)	Operational	1988	1993	5
Japan	Sendai	1	PWR	Mitsubishi (3-loop)	Operational	1979	1984	5
Japan	Sendai	2	PWR	Mitsubishi (3-loop)	Operational	1981	1985	4
Japan	Takahama	3	PWR	Mitsubishi (3-loop)	Operational	1980	1985	5
Japan	Takahama	4	PWR	Mitsubishi (3-loop)	Operational	1981	1985	4
Netherlands	Borssele	1	PWR	KWU 2LP	Operational	1969	1973	4
Pakistan	Chashma	1	PWR	CNP-300	Operational	1993	2000	7
Pakistan	Chashma	2	PWR	CNP-300	Operational	2005	2011	6
Pakistan	Chashma	3	PWR	CNP-300	Operational	2011	2016	5
Pakistan	Chashma	4	PWR	CNP-300	Operational	2011	2017	6
Pakistan	Karachi	2	PWR	Hualong One	Operational	2013	2021	8
Pakistan	Karachi	3	PWR	Hualong One	Operational	2016	2022	6
Russia	Akademik Lomonosov	1	PWR	KLT-40S	Operational	2007	2019	12
Russia	Akademik Lomonosov	2	PWR	KLT-40S	Operational	2007	2019	12
Russia	Balakovo	1	PWR	VVER-1000	Operational	1980	1986	6
Russia	Balakovo	2	PWR	VVER-1000	Operational	1981	1988	7
Russia	Balakovo	3	PWR	VVER-1000	Operational	1982	1989	7
Russia	Balakovo	4	PWR	VVER-1000	Operational	1984	1993	9
Russia	Kalinin	1	PWR	VVER-1000	Operational	1977	1985	8
Russia	Kalinin	2	PWR	VVER-1000	Operational	1982	1987	5
Russia	Kalinin	3	PWR	VVER-1000	Operational	1985	2005	20
Russia	Kalinin	4	PWR	VVER-1000	Operational	1986	2012	
Russia	Kola	1	PWR	VVER-440 V-230	Operational	1970	1973	3
Russia	Kola	2	PWR	VVER-440 V-230	Operational	1970	1975	5

Russia	Kola	3	PWR	VVER-440 V-213	Operational	1977	1982	5
Russia	Kola	4	PWR	VVER-440 V-213	Operational	1976	1984	8
Russia	Leningrad II	1	PWR	VVER-1200	Operational	2008	2018	10
Russia	Leningrad II	2	PWR	VVER-1200	Operational	2010	2021	11
Russia	Novovoronezh	1	PWR	VVER-440 V-120	Shut down	1957	1964	7
Russia	Novovoronezh	2	PWR	VVER-440 V-120	Shut down	1964	1970	6
Russia	Novovoronezh	3	PWR	VVER-440 V-179	Shut down	1967	1972	5
Russia	Novovoronezh	4	PWR	VVER 440 V-179	Operational	1967	1973	6
Russia	Novovoronezh	5	PWR	VVER-1000	Operational	1974	1981	7
Russia	Novovoronezh II	1	PWR	VVER-1200	Operational	2008	2017	9
Russia	Novovoronezh II	2	PWR	VVER-1200	Operational	2009	2019	10
Russia	Rostov	1	PWR	VVER-1000	Operational	1981	2001	20
Russia	Rostov	2	PWR	VVER-1000	Operational	1983	2010	
Russia	Rostov	3	PWR	VVER-1000	Operational	2009	2014	5
Russia	Rostov	4	PWR	VVER-1000	Operational	2010	2018	8
Slovakia	Bohunice	1[103]	PWR	VVER-440 V-230	Shut down	1972	1980	8
Slovakia	Bohunice	2	PWR	VVER-440 V-230	Shut down	1972	1981	9
Slovakia	Bohunice	3	PWR	VVER-440 V-213	Operational	1976	1985	9
Slovakia	Bohunice	4	PWR	VVER-440 V-213	Operational	1976	1985	9
Slovakia	Mochovce	1	PWR	VVER-440 V-213	Operational	1983	1998	15
Slovakia	Mochovce	2	PWR	VVER-440 V-213	Operational	1983	2000	17
Slovenia	Krško	1	PWR	WH 2 loops	Operational	1975	1983	8
South Africa	Koeberg	1	PWR	CP1 (France)	Operational	1976	1984	8
South Africa	Koeberg	2	PWR	CP1 (France)	Operational	1976	1985	9
South Korea	Hanbit	1	PWR	WH F	Operational	1981	1986	5
South Korea	Hanbit	2	PWR	WH F	Operational	1981	1987	6

South Korea	Hanbit	3	PWR	OPR-1000	Operational	1989	1995	6
South Korea	Hanbit	4	PWR	OPR-1000	Operational	1990	1996	6
South Korea	Hanbit	5	PWR	OPR-1000	Operational	1997	2002	5
South Korea	Hanbit	6	PWR	OPR-1000	Operational	1997	2002	5
South Korea	Hanul	1	PWR	CP1 (France)	Operational	1983	1988	5
South Korea	Hanul	2	PWR	CP1 (France)	Operational	1983	1989	6
South Korea	Hanul	3	PWR	OPR-1000	Operational	1993	1998	5
South Korea	Hanul	4	PWR	OPR-1000	Operational	1993	1999	6
South Korea	Hanul	5	PWR	OPR-1000	Operational	1999	2004	5
South Korea	Hanul	6	PWR	OPR-1000	Operational	2000	2005	5
South Korea	Shin-Hanul	1	PWR	APR-1400	Operational	2012	2022	10
South Korea	Kori	1	PWR	WH 60	Shut down	1972	1978	6
South Korea	Kori	2	PWR	WH F	Operational	1977	1983	6
South Korea	Kori	3	PWR	WH F	Operational	1979	1985	6
South Korea	Kori	4	PWR	WH F	Operational	1980	1986	6
South Korea	Shin-Kori	1	PWR	OPR-1000	Operational	2006	2011	5
South Korea	Shin-Kori	2	PWR	OPR-1000	Operational	2007	2012	5
South Korea	Saeul	1	PWR	APR-1400	Operational	2008	2016	8
South Korea	Saeul	2	PWR	APR-1400	Operational	2009	2019	10
South Korea	Shin-Wolsong	1	PWR	OPR-1000	Operational	2007	2012	5
South Korea	Shin-Wolsong	2	PWR	OPR-1000	Operational	2008	2015	7
Spain	Almaraz	1	PWR	WH 3 loops	Operational	1973	1983	10
Spain	Almaraz	2	PWR	WH 3 loops	Operational	1973	1984	11
Spain	Ascó	1	PWR	WH 3 loops	Operational	1974	1984	10
Spain	Ascó	2	PWR	WH-3 loops	Operational	1975	1986	11
Spain	José Cabrera	1	PWR	WH 1 loop	Shut down/in decommissioning	1964	1969	5

Spain	Trillo	1	PWR	KWU 3 loops	Operational	1979	1988	9
Spain	Vandellòs	2	PWR	WH 3 loops	Operational	1980	1988	8
Sweden	Ringhals	2	PWR	Westinghouse 3-loops	Shut down/in decommissioning	1970	1975	5
Sweden	Ringhals	3	PWR	Westinghouse 3-loops	Operational	1972	1981	9
Sweden	Ringhals	4	PWR	Westinghouse 3-loops	Operational	1973	1983	10
Switzerland	Beznau	1	PWR	WH 2-loops	Operational	1965	1969	4
Switzerland	Beznau	2	PWR	WH 2-loops	Operational	1968	1971	3
Switzerland	Gösgen	1	PWR	KWU 3-loops	Operational	1973	1979	6
Taiwan	Maanshan	1	PWR	WH 312 3-loop	Operational	1978	1984	6
Taiwan	Maanshan	2	PWR	WH 312 3-loop	Operational	1979	1985	6
Ukraine	Khmelnytskyi	1	PWR	VVER-1000	Operational	1981	1988	7
Ukraine	Khmelnytskyi	2	PWR	VVER-1000	Operational	1985	2005	20
Ukraine	Rivne	1	PWR	VVER-440 V-213	Operational	1973	1981	8
Ukraine	Rivne	2	PWR	VVER-440 V-213	Operational	1973	1982	9
Ukraine	Rivne	3	PWR	VVER-1000	Operational	1980	1987	7
Ukraine	Rivne	4	PWR	VVER-1000	Operational	1986	2006	20
Ukraine	South Ukraine	1	PWR	VVER-1000	Operational	1976	1983	7
Ukraine	South Ukraine	2	PWR	VVER-1000	Operational	1981	1985	4
Ukraine	South Ukraine	3	PWR	VVER-1000	Operational	1984	1989	5
Ukraine	Zaporizhzhia	1	PWR	VVER-1000	Operational	1980	1985	5
Ukraine	Zaporizhzhia	2	PWR	VVER-1000	Operational	1981	1986	5
Ukraine	Zaporizhzhia	3	PWR	VVER-1000	Operational	1982	1987	5
Ukraine	Zaporizhzhia	4	PWR	VVER-1000	Operational	1983	1988	5
Ukraine	Zaporizhzhia	5	PWR	VVER-1000	Operational	1985	1989	4
Ukraine	Zaporizhzhia	6	PWR	VVER-1000	Operational	1986	1996	10

United Arab Emirates	Barakah	1	PWR	APR-1400	Operational	2012	2021	9
United Arab Emirates	Barakah	2	PWR	APR-1400	Operational	2013	2022	9
United Arab Emirates	Barakah	3	PWR	APR-1400	Operational	2014	2023	9
United Kingdom	Sizewell B	1	PWR	WH SNUPPS	Operational	1988	1995	7
United States	Arkansas Nuclear One	1	PWR	B & W (DRY-Cont)	Operational	1968	1974	6
United States	Arkansas Nuclear One	2	PWR	CE (DRY)	Operational	1968	1978	10
United States	Beaver Valley	1	PWR	WH 3-loop (DRY)	Operational	1970	1976	6
United States	Beaver Valley	2	PWR	WH 3-loop (DRY)	Operational	1974	1987	13
United States	Braidwood	1[134]	PWR	WH 4-loop (DRY)	Operational	1975	1988	13
United States	Braidwood	2[135]	PWR	WH 4-loop (DRY)	Operational	1975	1988	13
United States	Byron	1	PWR	WH 4-loop (DRY)	Operational	1975	1985	10
United States	Byron	2	PWR	WH 4-loop (DRY)	Operational	1975	1987	12
United States	Callaway	1	PWR	WH 4-loop (DRY)	Operational	1975	1984	9
United States	Calvert Cliffs	1	PWR	CE 2-loop (DRY)	Operational	1968	1977	9
United States	Calvert Cliffs	2	PWR	CE 2-loop (DRY)	Operational	1968	1977	9
United States	Catawba	1	PWR	WH 4-loop (ICECON D)	Operational	1974	1985	11
United States	Catawba	2	PWR	WH 4-loop (ICECON D)	Operational	1974	1986	12
United States	Comanche Peak	1	PWR	WH 4-loop (DRY)	Operational	1974	1990	16
United States	Comanche Peak	2	PWR	WH 4-loop (DRY)	Operational	1974	1993	19
United States	Connecticut Yankee	1	PWR	WH (DRY)	Shut down/dismantled	1964	1968	4
United States	Crystal River 3	1	PWR	B & W (DRY)	Shut down	1968	1977	9
United States	Davis-Besse	1	PWR	B & W (DRY)	Operational	1970	1978	8

United States	Diablo Canyon	1	PWR	WH 4-Loop (DRY)	Operational	1968	1985	17
United States	Diablo Canyon	2	PWR	WH 4-Loop (DRY)	Operational	1970	1986	16
United States	Donald C. Cook	1	PWR	WH 4-Loop (ICECON D)	Operational	1969	1975	6
United States	Donald C. Cook	2	PWR	WH 4-Loop (ICECON D)	Operational	1969	1978	9
United States	Fort Calhoun	1	PWR	CE 2-loop (WET)	Shut down	1968	1973	5
United States	Ginna	1	PWR	WH 2-loop (DRY)	Operational	1966	1970	4
United States	H. B. Robinson	1	PWR	WH 3-loop (DRY)	Operational	1967	1971	4
United States	Indian Point	1	PWR		Shut down	1956	1962	6
United States	Indian Point	2	PWR	WH 4-loop (DRY)	Shut down	1966	1974	8
United States	Indian Point	3	PWR	WH 4-loop (DRY)	Shut down	1968	1976	8
United States	Joseph M. Farley	1	PWR	WH 3-Loop (DRY)	Operational	1970	1977	7
United States	Joseph M. Farley	2	PWR	WH 3-Loop (DRY)	Operational	1970	1981	11
United States	Kewaunee	1	PWR	WH 2-loop (DRY)	Shut down	1968	1974	6
United States	Maine Yankee	1	PWR	WH (DRY)	Shut down/dismantled	1968	1972	4
United States	McGuire	1	PWR	WH 4-Loop (ICECON D)	Operational	1971	1981	10
United States	McGuire	2	PWR	WH 4-Loop (ICECON D)	Operational	1971	1984	13
United States	Millstone	2	PWR	CE 2-loop (DRY)	Operational	1969	1975	6
United States	Millstone	3	PWR	WH 4-Loop (DRY)	Operational	1974	1986	12
United States	North Anna	1	PWR	WH 3-Loop (DRY)	Operational	1971	1978	7

United States	North Anna	2	PWR	WH 3-Loop (DRY)	Operational	1971	1980	9
United States	Oconee	1	PWR	B & W (DRY)	Operational	1967	1973	6
United States	Oconee	2	PWR	B & W (DRY)	Operational	1967	1974	7
United States	Oconee	3	PWR	B & W (DRY)	Operational	1967	1974	7
United States	Palisades	1	PWR	CE 2-loop (DRY)	Shut down	1967	1971	4
United States	Palo Verde	1	PWR	CE80 2-loop (DRY)	Operational	1976	1986	10
United States	Palo Verde	2	PWR	CE80 2-loop (DRY)	Operational	1976	1986	10
United States	Palo Verde	3	PWR	CE80 2-loop (DRY)	Operational	1976	1988	12
United States	Point Beach	1	PWR	WH 2-loop (DRY)	Operational	1967	1970	3
United States	Point Beach	2	PWR	WH 2-loop (DRY)	Operational	1968	1972	4
United States	Prairie Island	1	PWR	WH 2-loop (DRY)	Operational	1968	1973	5
United States	Prairie Island	2	PWR	WH 2-loop (DRY)	Operational	1969	1974	5
United States	Rancho Seco	1	PWR	WH (DRY)	Decommissioned	1969	1975	6
United States	Salem	1	PWR	WH 4-loop (DRY)	Operational	1968	1977	9
United States	Salem	2	PWR	WH 4-loop (DRY)	Operational	1968	1981	13
United States	San Onofre	1	PWR	WH (DRY)	Shut down/dismantled	1964	1968	4
United States	San Onofre	2	PWR	CE (DRY)	Shut down	1974	1983	9
United States	San Onofre	3	PWR	CE (DRY)	Shut down	1974	1984	10
United States	Saxton	1	PWR		Decommissioned	1960	1961	1
United States	Seabrook Station	1	PWR	WH 4-Loop (DRY)	Operational	1976	1990	14
United States	Sequoyah	1	PWR	WH 4-Loop (ICECOND)	Operational	1970	1981	11
United States	Sequoyah	2	PWR	WH 4-Loop (ICECOND)	Operational	1970	1982	12

United States	Shearon Harris	1	PWR	WH 3-Loop (DRY)	Operational	1978	1987	9
United States	Shippingport	1	PWR	WH	Shut down/dismantled	1954	1958	4
United States	South Texas	1	PWR	WH 4-loop (DRY)	Operational	1975	1988	13
United States	South Texas	2	PWR	WH 4-loop (DRY)	Operational	1975	1989	14
United States	St. Lucie	1	PWR	CE (DRY)	Operational	1970	1976	6
United States	St. Lucie	2	PWR	CE (DRY)	Operational	1977	1983	6
United States	Surry	1	PWR	WH 3-loop (DRY)	Operational	1968	1972	4
United States	Surry	2	PWR	WH 3-loop (DRY)	Operational	1968	1973	5
United States	Three Mile Island	1	PWR	B & W (DRY)	Shut down	1968	1974	6
United States	Three Mile Island	2	PWR	B & W (DRY)	Core melt	1969	1978	9
United States	Trojan	1	PWR	WH (DRY)	Shut down/dismantled	1970	1976	6
United States	Turkey Point	1	PWR	WH 3-loop (DRY)	Operational	1967	1972	5
United States	Turkey Point	2	PWR	WH 3-loop (DRY)	Operational	1967	1973	6
United States	Virgil C. Summer	1	PWR	WH 3-Loop (DRY)	Operational	1973	1984	11
United States	Vogtle	1	PWR	WH 4-Loop (DRY)	Operational	1976	1987	11
United States	Vogtle	2	PWR	WH 4-Loop (DRY)	Operational	1976	1989	13
United States	Waterford	1	PWR	CE 2-loop (DRY)	Operational	1974	1985	11
United States	Watts Bar	1	PWR	WH 4-Loop (ICECOND)	Operational	1973	1996	
United States	Watts Bar	2	PWR	WH 4-Loop (ICECOND)	Operational	1973	2016	
United States	Wolf Creek	1	PWR	WH 4-Loop (DRY)	Operational	1977	1985	8
United States	Yankee Rowe	1	PWR	WH (DRY)	Shut down/dismantled	1957	1961	4

United States	Zion	1	PWR	WH (DRY)	Shut down/dismantled	1968	1973	5
United States	Zion	2	PWR	WH (DRY)	Shut down/dismantled	1968	1974	6

3. Inputs and Assumptions

a. Large Power Plant Project Input Set

	INPUTS and ASSUMPTIONS		
	Reactor Tech Info	***Unit***	**Large Plant**
1	Number of Reactor	*Number*	2
2	Lifetime	*Number*	60
3	Reactor Tech	*Text*	EPR
4	Currency	*Text*	USD
5	Start Date	*Date*	1.01.2023
6	End Date	*Date*	1.01.2083
	-		
	Electricity Price		
7	Market Price	*Amount*	129,09
8	PPA Price	*Amount*	193,6
9	PPA Period	*Years*	15
10	**A&D**	*Years*	40
	Financing		
11	Interest Rate	*%*	0,09
12	Loan Maturity	*Years*	15
14	Decommissioning Fund	*Per KW*	0,15
15	Operation Period	*Years*	60
	Financing		

16	Equity	*%*	0,3
17	Debt	*%*	0,7
	Capacity		
18	Capacity	*MW*	1.650
19	Installed capacity	*%*	90%
20	Total Capacity	*MW*	3.300
	Lifetime Schedule		Reactor 1
21	Construction Start Date	*Date*	1.01.2023
22	Operation Start Date	*Date*	1.01.2030
	Construction Timeline		Reactor 2
23	Construction Start Date	*Date*	1.01.2025
24	Operation Start Date	*Date*	1.01.2032
25	Construction Start Date	*Date*	
26	Operation Start Date	*Date*	
27	Construction Start Date	*Date*	
28	Operation Start Date	*Date*	
29	Construction Start Date	*Date*	
30	Operation Start Date	*Date*	
	Dividend		80%
31	Legal reserve I as % of capital	*%*	20%
32	Legal reserve I as % of net income	*%*	5%
33	First dividend as % of capital	*%*	5%
34	Legal reserve II / 2nd dividend	*%*	10%
35	Legal reserve II as % of capital	*%*	30%
	Taxing		
36	CIT Rate	*%*	23%
37	Tax carry loss year	*Year*	5
	Incentives (Non-refundable)		
38	Tax Incentive for CIT	*%*	90%

39	Social Security Incentives	%	17,5%
40	Withholding Tax Incentive	%	20%
41	Interest support	*Basis point*	0,05
42	Energy Support		5%
43	Training Support		5%
			9,4 Billion $ Per Reactor * 2 Reactor
	Capex Per Reactor		9.443.764.706
	Capex Breakdown Per Reactor	%	
44	Nuclear Island	33%	3.073.882.353
45	Turbine Island	16%	1.505.882.353
46	EC&I	21%	1.976.470.588
47	Civils	30%	2.823.529.412
48	Licensing	0%	64.000.000
	Plant Operating Cost		
49	Fuel	15,0%	68.598.750
50	Maintenance	20,0%	91.465.000
51	Personnel	10,0%	45.732.500
52	Consumables	2,0%	9.146.500
53	Outages	29,0%	132.624.250
54	Insurance	7,0%	32.012.750
55	Corporate overhead	8,0%	36.586.000
56	Fuel storage	9,0%	41.159.250
	Total Operating Cost		457.325.000,00

57	Decomissioning Fund		Yes
	Fuel Cost	*Nuclear Power Economics | Nuclear Energy Costs - World Nuclear Association (world-nuclear.org)*	
	Uranium	*Amount*	$ 842,00
	Conversion	*Amount*	$ 120,00
	Enrichment	*Amount*	$ 401,00
	Fuel Fabrication	*Amount*	$ 300,00
	Total		$ 1.663,00
		Fuel Consumption (25000 kg per 1000 Mw Reactor)	
58	Yearly Fuel Consumption		41.250,00
59	Escalation Rate		0,02
			5.665.968.000,00
60	VAT on Revenue		18%
61	VAT on OPEX		18%
62	VAT on CAPEX (Fiscal Inc. Included)		0%

b. Small Modular Reactor Project Input Set

	INPUTS		
	Reactor Tech Info	***Unit***	**SMR**
1	Number of Reactor	*Number*	11
2	Lifetime	*Number*	60
3	Reactor Tech	*Text*	CANDU SMR
4	Currency	*Text*	USD
5	Start Date	*Date*	1.01.2023
6	End Date	*Date*	1.01.2083

	Electricty Price		
7	Market Price	*Amount*	129,09
8	PPA Price	*Amount*	193,635
9	PPA Period	*Years*	15
10	**A&D**	*Years*	40
	Financing		
11	Interest Rate	*%*	0,09
12	Loan Maturity	*Years*	15
14	Decommissioning Fund	*Per KW*	Yes
15	Operation Period	*Years*	60
	Financing		
16	Equity	*%*	30%
17	Debt	*%*	70%
	Capacity		
18	Capacity	*MW*	300
19	Installed capacity	*%*	90%
20	Total Capacity	*MW*	3.300
	Lifetime Schedule		Reactor 1 and Reactor 2
21	Construction Start Date	*Date*	1.01.2023
22	Operation Start Date	*Date*	1.01.2026
	Construction Timeline		Reactor 3 and Reactor 4
23	Construction Start Date	*Date*	1.01.2025
24	Operation Start Date	*Date*	1.01.2028
			Reactor 5 and Reactor 6
25	Construction Start Date	*Date*	1.01.2027
26	Operation Start Date	*Date*	1.01.2030
			Reactor 7 and Reactor 8
27	Construction Start Date	*Date*	1.01.2029
28	Operation Start Date	*Date*	1.01.2032
			Reactor 9, Reactor 10 and Reactor 11
29	Construction Start Date	*Date*	1.01.2030
30	Operation Start Date	*Date*	1.01.2033

	Dividend		
31	Legal reserve I as % of capital	*%*	20%
32	Legal reserve I as % of net income	*%*	5%
33	First dividend as % of capital	*%*	5%
34	Legal reserve II / 2nd dividend	*%*	9%
35	Legal reserve II as % of capital	*%*	30%
	Taxing		
36	CIT Rate	*%*	23%
37	Tax carry loss year	*Year*	5
	Incentives (Non-refundable)		
38	Tax Incentive for CIT	*%*	90%
39	Social Security Incentives	*%*	17,5%
40	Withholding Tax Incentive	*%*	20%
41	Interest support	*Basis point*	0,05
42	Energy Support		5%
43	Training Support		5%
	https://world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power.aspx		1,6 Billion $ Per Reactor * 11 Reactor
	Capex Per Reactor		1.674.343.434
	Capex Breakdown Per Reactor	*%*	
44	Nuclear Island	33%	452.525.253
45	Turbine Island	16%	177.777.778
46	EC&I	21%	290.909.091
47	Civils	30%	689.131.313
48	Licensing	0%	64.000.000
	Plant Operating Cost		

49	Fuel	15,0%	$ 137.197.500
50	Maintenance	20,0%	$ 119.877.818
51	Personnel	10,0%	$ 91.906.327
52	Consumables	2,0%	$ 15.983.709
53	Outages	29,0%	$ 242.153.193
54	Insurance	7,0%	$ 55.942.982
55	Corporate overhead	8,0%	$ 63.934.836
56	Fuel storage	9,0%	$ 71.926.691
	TOTAL	*100,0%*	
	Total Operating Cost		798.923.057,57
57	Decomissioning Fund		
	Fuel Cost		
	Uranium	*Amount*	
	Conversion	*Amount*	
	Enrichment	*Amount*	
	Fuel Fabrication	*Amount*	
	Total		
		Fuel Consumption (25000 kg per 1000 Mw Reactor)	
58	Yearly Fuel Consumption		7.500,00
59	Escalation Rate		
60	VAT on Revenue		0,18
61	VAT on OPEX		0,18
62	VAT on CAPEX (Fiscal Inc. Included)		0%

4. Financial Models

CAPEX

		Economic Life Time	Yearly Depreciation	Depreciation Start Date	Depreciation End Date	Total Amortized	Control
Capex 1st Reactor							
Nuclear Island	3.073.882.353	40	76.847.059	1.01.2030	1.01.2070	3.073.882.353	-
Turbine Island	1.505.882.353	40	37.647.059	1.01.2030	1.01.2070	1.505.882.353	-
EC&I	1.976.470.588	40	49.411.765	1.01.2030	1.01.2070	1.976.470.588	-
Civils	2.823.529.412	40	70.588.235	1.01.2030	1.01.2070	2.823.529.412	-
Licensing	64.000.000	40	1.600.000	1.01.2024	1.01.2064	64.000.000	-
Capex 2nd Reactor							
Nuclear Island	3.073.882.353	40	76.847.059	1.01.2032	1.01.2072	3.073.882.353	-
Turbine Island	1.505.882.353	40	37.647.059	1.01.2032	1.01.2072	1.505.882.353	-
EC&I	1.976.470.588	40	49.411.765	1.01.2032	1.01.2072	1.976.470.588	-
Civils	2.823.529.412	40	70.588.235	1.01.2032	1.01.2072	2.823.529.412	-
Licensing	64.000.000	40	1.600.000	1.01.2026	1.01.2066	64.000.000	-
Total Depreciation and Amortization							
Accumulated Depreciation and Amortization							
CAPEX							Control
Nuclear Island	3.073.882.353						-
Turbine Island	1.505.882.353						-
EC&I	1.976.470.588						-
Civils	2.823.529.412						-
Licensing	64.000.000						-
Capex 2nd Reactor							
Nuclear Island	3.073.882.353						-
Turbine Island	1.505.882.353						-
EC&I	1.976.470.588						-
Civils	2.823.529.412						-
Licensing	64.000.000						-
TOTAL Capex Cash Outflow							
TOTAL Capex	18.887.529.412						

Timeline											
Number of days	365	366	365	365	365	366	365	365	365	366	
Number of Years	1	2	3	4	5	6	7	8	9	10	....
End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	....
Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	....
Capex 1st Reactor											
Nuclear Island	-	-	-	-	-	-	-	76.847.059	76.847.059	76.847.059	
Turbine Island	-	-	-	-	-	-	-	37.647.059	37.647.059	37.647.059	
EC&I	-	-	-	-	-	-	-	49.411.765	49.411.765	49.411.765	
Civils	-	-	-	-	-	-	-	70.588.235	70.588.235	70.588.235	
Licensing	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	
Capex 2nd Reactor											
Nuclear Island	-	-	-	-	-	-	-	-	-	76.847.059	
Turbine Island	-	-	-	-	-	-	-	-	-	37.647.059	
EC&I	-	-	-	-	-	-	-	-	-	49.411.765	
Civils	-	-	-	-	-	-	-	-	-	70.588.235	
Licensing	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	
Total Depreciation and Amortization	-	1.600.000	1.600.000	3.200.000	3.200.000	3.200.000	3.200.000	237.694.118	237.694.118	472.188.235	
Accumulated Depreciation and Amortization	-	1.600.000	3.200.000	6.400.000	9.600.000	12.800.000	16.000.000	253.694.118	491.388.235	963.576.471	
CAPEX											
Nuclear Island	-	-	-	-	-	-	-	3.073.882.353	-	-	
Turbine Island	-	-	-	-	-	-	-	1.505.882.353	-	-	
EC&I	-	-	-	-	-	-	-	1.976.470.588	-	-	
Civils	-	-	-	-	-	-	-	2.823.529.412	-	-	
Licensing	-	64.000.000	-	-	-	-	-	-	-	-	
Capex 2nd Reactor											
Nuclear Island	-	-	-	-	-	-	-	-	-	3.073.882.353	
Turbine Island	-	-	-	-	-	-	-	-	-	1.505.882.353	
EC&I	-	-	-	-	-	-	-	-	-	1.976.470.588	
Civils	-	-	-	-	-	-	-	-	-	2.823.529.412	
Licensing	-	-	-	64.000.000	-	-	-	-	-	-	
TOTAL Capex Cash Outflow	-	64.000.000	-	64.000.000	-	-	-	9.379.764.706	-	9.379.764.706	
TOTAL Capex	-	64.000.000	64.000.000	128.000.000	128.000.000	128.000.000	128.000.000	9.507.764.706	9.507.764.706	18.887.529.412	

Timeline										
Number of days	365	365	366	365	365	365	366	365	365	365
Number of Years	60	61	62	63	64	65	66	67	68	69
End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
Capex 1st Reactor										
Nuclear Island	-	-	-	-	-	-	-	-	-	-
Turbine Island	-	-	-	-	-	-	-	-	-	-
EC&I	-	-	-	-	-	-	-	-	-	-
Civils	-	-	-	-	-	-	-	-	-	-
Licensing	-	-	-	-	-	-	-	-	-	-
Capex 2nd Reactor										
Nuclear Island	-	-	-	-	-	-	-	-	-	-
Turbine Island	-	-	-	-	-	-	-	-	-	-
EC&I	-	-	-	-	-	-	-	-	-	-
Civils	-	-	-	-	-	-	-	-	-	-
Licensing	-	-	-	-	-	-	-	-	-	-
Total Depreciation and Amortization	-	-	-	-	-	-	-	-	-	-
Accumulated Depreciation and Amortization	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412
CAPEX										
Nuclear Island	-	-	-	-	-	-	-	-	-	-
Turbine Island	-	-	-	-	-	-	-	-	-	-
EC&I	-	-	-	-	-	-	-	-	-	-
Civils	-	-	-	-	-	-	-	-	-	-
Licensing	-	-	-	-	-	-	-	-	-	-
Capex 2nd Reactor										
Nuclear Island	-	-	-	-	-	-	-	-	-	-
Turbine Island	-	-	-	-	-	-	-	-	-	-
EC&I	-	-	-	-	-	-	-	-	-	-
Civils	-	-	-	-	-	-	-	-	-	-
Licensing	-	-	-	-	-	-	-	-	-	-
TOTAL Capex Cash Outflow	-	-	-	-	-	-	-	-	-	-
TOTAL Capex	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412

COST OF SERVICES		0	0	0	0	0	0	0	0	0	0	0	
	Number of days		365	366	365	365	365	366	365	365	365	366	
	Number of Years		1	2	3	4	5	6	7	8	9	10	....
Timeline	End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	....
	Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	....
Cost of Services													
Unit 1													
Fuel			-	-	-	-	-	-	-	80.374.369	81.981.856	83.621.493	
Maintenance			-	-	-	-	-	-	-	53.582.913	54.654.571	55.747.662	
Consumables			-	-	-	-	-	-	-	5.358.291	5.465.457	5.574.766	
Outages			-	-	-	-	-	-	-	77.695.223	79.249.128	80.834.110	
Insurance			-	-	-	-	-	-	-	18.754.019	19.129.100	19.511.682	
Fuel storage			-	-	-	-	-	-	-	24.112.311	24.594.557	25.086.448	
Unit 2													
Fuel			-	-	-	-	-	-	-	-	-	83.621.493	
Maintenance			-	-	-	-	-	-	-	-	-	55.747.662	
Consumables			-	-	-	-	-	-	-	-	-	5.574.766	
Outages			-	-	-	-	-	-	-	-	-	80.834.110	
Insurance			-	-	-	-	-	-	-	-	-	19.511.682	
Fuel storage			-	-	-	-	-	-	-	-	-	25.086.448	
Workmanship Costs			-	-	-	-	-	-	-	42.866.330	43.723.657	44.598.130	
TOTAL Cost of Services			-	-	-	-	-	-	-	302.743.456	308.798.326	585.350.454	

		0	0	0	0	0	0	0	0	0	0
	Number of days	365	365	366	365	365	365	366	365	365	365
	Number of Years	60	61	62	63	64	65	66	67	68	69
Timeline	End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
	Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
Cost of Services											
Unit 1											
Fuel		225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	258.539.980	-	-
Maintenance		150.049.741	153.050.735	156.111.750	159.233.985	162.418.665	165.667.038	168.980.379	172.359.986	-	-
Consumables		15.004.974	15.305.074	15.611.175	15.923.399	16.241.866	16.566.704	16.898.038	17.235.999	-	-
Outages		217.572.124	221.923.566	226.362.038	230.889.278	235.507.064	240.217.205	245.021.549	249.921.980	-	-
Insurance		52.517.409	53.567.757	54.639.113	55.731.895	56.846.533	57.983.463	59.143.133	60.325.995	-	-
Fuel storage		67.522.383	68.872.831	70.250.288	71.655.293	73.088.399	74.550.167	76.041.170	77.561.994	-	-
Unit 2											
Fuel		225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	258.539.980	263.710.779	268.984.995
Maintenance		150.049.741	153.050.735	156.111.750	159.233.985	162.418.665	165.667.038	168.980.379	172.359.986	175.807.186	179.323.330
Consumables		15.004.974	15.305.074	15.611.175	15.923.399	16.241.866	16.566.704	16.898.038	17.235.999	17.580.719	17.932.333
Outages		217.572.124	221.923.566	226.362.038	230.889.278	235.507.064	240.217.205	245.021.549	249.921.980	254.920.420	260.018.828
Insurance		52.517.409	53.567.757	54.639.113	55.731.895	56.846.533	57.983.463	59.143.133	60.325.995	61.532.515	62.763.165
Fuel storage		67.522.383	68.872.831	70.250.288	71.655.293	73.088.399	74.550.167	76.041.170	77.561.994	79.113.234	80.695.498
Workmanship Costs		120.039.792	122.440.588	124.889.400	127.387.188	129.934.932	132.533.630	135.184.303	137.887.989	137.887.989	137.887.989
TOTAL Cost of Services		1.575.522.276	1.607.032.721	1.639.173.375	1.671.956.843	1.705.395.980	1.739.503.899	1.774.293.977	1.809.779.857	990.552.842	1.007.606.139

DIVIDENDS

Number of days	0	365	366	365	365	365	366	365	365	365	366
Number of Years	0	1	2	3	4	5	6	7	8	9	10 ....
Timeline End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 ....
Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 ....
Dividend Distributions											
Paid-in Capital		5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824
Legal Reserve I		-	-	-	-	-	-	-	-	-	-
Legal Reserve Limit		1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765
Profit before tax		- 1.189.914.353	- 1.191.514.353	- 1.191.514.353	- 1.193.114.353	- 1.193.114.353	- 1.193.114.353	- 1.193.114.353	790.998.036	828.355.815	2.897.405.256
Taxes		-	-	-	-	-	-	-	-	-	-
Net Profit		- 1.189.914.353	- 1.191.514.353	- 1.191.514.353	- 1.193.114.353	- 1.193.114.353	- 1.193.114.353	- 1.193.114.353	790.998.036	828.355.815	2.897.405.256
Accumulated Loss		-	- 1.189.914.353	- 2.381.428.706	- 3.572.943.059	- 4.766.057.412	- 5.959.171.765	- 7.152.286.118	- 8.345.400.471	- 7.554.402.434	- 6.726.046.619
Distributable Profit		-	-	-	-	-	-	-	-	-	-
Legal Reserve I		-	-	-	-	-	-	-	-	-	-
Legal Reserve Check		-	-	-	-	-	-	-	-	-	-
Net distributable profit		-	-	-	-	-	-	-	-	-	-
First Dividend (80%)		-	-	-	-	-	-	-	-	-	-
Legal Reserve II		-	-	-	-	-	-	-	-	-	-
Declared dividend		-	-	-	-	-	-	-	-	-	-
Retained Earnings		-	-	-	-	-	-	-	-	-	-
Total Reserves		-	-	-	-	-	-	-	-	-	-
Checks for Distributable Profit		-	-	-	-	-	-	-	-	-	-

Number of days	365	365	366	365	365	365	366	365	365	365
Number of Years	60	61	62	63	64	65	66	67	68	69
Timeline End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
Dividend Distributions										
Paid-in Capital	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824
Legal Reserve I	-	-	-	-	-	-	-	-	-	-
Legal Reserve Limit	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765	1.133.251.765
Profit before tax	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564
Taxes	2.097.890.457	2.139.848.266	2.189.727.927	2.226.298.136	2.270.824.099	2.316.240.580	2.370.231.930	2.409.816.700	1.199.655.387	1.224.846.500
Net Profit	7.023.372.399	7.163.839.847	7.330.828.278	7.453.258.976	7.602.324.156	7.754.370.639	7.935.124.288	8.067.647.213	4.016.237.599	4.100.573.064
Accumulated Loss	-	-	-	-	-	-	-	-	-	-
Distributable Profit	7.023.372.399	7.163.839.847	7.330.828.278	7.453.258.976	7.602.324.156	7.754.370.639	7.935.124.288	8.067.647.213	4.016.237.599	4.100.573.064
Legal Reserve I	351.168.620	358.191.992	366.541.414	372.662.949	380.116.208	387.718.532	396.756.214	403.382.361	200.811.880	205.028.653
Legal Reserve Check	-	-	-	-	-	-	-	-	-	-
Net distributable profit	6.672.203.779	6.805.647.854	6.964.286.864	7.080.596.028	7.222.207.948	7.366.652.107	7.538.368.073	7.664.264.852	3.815.425.719	3.895.544.411
First Dividend (80%)	5.337.763.023	5.444.518.283	5.571.429.491	5.664.476.822	5.777.766.359	5.893.321.686	6.030.694.459	6.131.411.882	3.052.340.575	3.116.435.529
Legal Reserve II	533.776.302	544.451.828	557.142.949	566.447.682	577.776.636	589.332.169	603.069.446	613.141.188	305.234.057	311.643.553
Declared dividend	4.803.986.721	4.900.066.455	5.014.286.542	5.098.029.140	5.199.989.723	5.303.989.517	5.427.625.013	5.518.270.694	2.747.106.517	2.804.791.976
Retained Earnings	1.334.440.756	1.361.129.571	1.392.857.373	1.416.119.206	1.444.441.590	1.473.330.421	1.507.673.615	1.532.852.970	763.085.144	779.108.882
Total Reserves	884.944.922	902.643.821	923.684.363	939.110.631	957.892.844	977.050.701	999.825.660	1.016.523.549	506.045.937	516.672.206
Checks for Distributable Profit	-	-	-	-	-	-	-	-	-	-

FINANCIAL ANALYSIS

Vertical Analysis																			
Income Statement																			
Revenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	100%	100% ….	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cost of Services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12%	12%	12% ….	15%	15%	15%	15%	15%	15%	15%	16%	16%
Gross Profit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	88%	88%	88%	85%	85%	85%	85%	85%	85%	85%	84%	84%
General Ad. Expenses	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
Incentives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
EBITDA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	86%	86%	88%	84%	84%	84%	84%	84%	84%	84%	82%	82%
Amortization and Depreciation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9%	9%	9%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBIT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	77%	77%	78%	84%	84%	84%	84%	84%	84%	84%	82%	82%
Interest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	46%	44%	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31%	33%	57%	84%	84%	84%	84%	84%	84%	84%	82%	82%
CIT																			
Carry for Loss																			
Tax	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	0%	0%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Net Profit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31%	33%	57%	65%	65%	65%	65%	65%	65%	65%	63%	64%
Vertical Analysis																			
Balance Sheet																			
Assets																			
Cash and Cash Equivalents	100%	100%	100%	99%	99%	99%	99%	15%	19%	-33%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fixed Assets	0%	0%	0%	1%	1%	1%	1%	87%	85%	140%	9%	8%	8%	8%	8%	7%	7%	7%	7%
Accumulated Depreciation and Amortization	0%	0%	0%	0%	0%	0%	0%	-2%	-4%	-7%	-9%	-8%	-8%	-8%	-8%	-7%	-7%	-7%	-7%
TOTAL ASSETS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Liabilities																			
Short-term liabilities	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Long-term Liabilities	75%	80%	86%	94%	102%	113%	125%	117%	109%	86%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equity																			
Common Stock	32%	34%	37%	40%	44%	48%	54%	52%	51%	42%	3%	3%	2%	2%	2%	2%	2%	2%	2%
Retained Earnings	-7%	-14%	-23%	-34%	-46%	-61%	-79%	-69%	-60%	-28%	97%	97%	97%	98%	98%	98%	98%	98%	98%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Horizontal Analysis																			
Income Statement																			
Revenue		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0%	101%	2%	2%	2%	2%	2%	2%	2%	-49%	2%
Cost of Services		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	90%	2%	2%	2%	2%	2%	2%	2%	-45%	2%
Gross Profit		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0%	102%	2%	2%	2%	2%	2%	2%	2%	-50%	2%
General Ad. Expenses		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%
Incentives		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%
EBITDA		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0%	104%	2%	2%	2%	2%	2%	2%	2%	-50%	2%
Amortization and Depreciation		#DIV/0!	0%	100%	0%	0%	0%	7328%	0%	99%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBIT		#DIV/0!	0%	100%	0%	0%	0%	-60737%	0%	105%	2%	2%	2%	2%	2%	2%	2%	-50%	2%
Interest		0%	0%	0%	0%	0%	0%	-3%	-4%	-4%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBT		0%	0%	0%	0%	0%	0%	-166%	5%	250%	2%	2%	2%	2%	2%	2%	2%	-50%	2%
CIT																			
Carry for Loss																			
Tax		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	2%	2%	2%	2%	2%	-50%	2%
Net Profit		0%	0%	0%	0%	0%	0%	-166%	5%	250%	2%	2%	2%	2%	2%	2%	2%	-50%	2%
Horizontal Analysis																			
Balance Sheet																			
Assets																			
Cash and Cash Equivalents		-7%	-7%	-8%	-8%	-9%	-10%	-84%	33%	-304%	3%	3%	3%	3%	3%	3%	3%	1%	2%
Fixed Assets		#DIV/0!	0%	100%	0%	0%	0%	7328%	0%	99%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accumulated Depreciation and Amortization		#DIV/0!	100%	100%	50%	33%	25%	1486%	94%	96%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL ASSETS		-7%	-7%	-8%	-8%	-9%	-10%	3%	3%	21%	3%	3%	3%	3%	3%	3%	3%	1%	2%
Liabilities																			
Short-term liabilities		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Long-term Liabilities		0%	0%	0%	0%	0%	0%	-4%	-4%	-5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Equity																			
Common Stock		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retained Earnings		100%	50%	33%	25%	20%	17%	-9%	-11%	-43%	3%	3%	3%	3%	3%	3%	3%	2%	2%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES		-7%	-7%	-8%	-8%	-9%	-10%	3%	3%	21%	3%	3%	3%	3%	3%	3%	3%	1%	2%
Ratio Analysis																			
Debt Services Coverage Ratio	-	-	-	-	-	-	-	1,33	1,32	2,70	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Current Ratio	1,34	1,24	1,15	1,06	0,97	0,88	0,79	0,13	0,18 -	0,38	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Financial Leverage Ratio	75%	80%	86%	94%	102%	113%	125%	117%	109%	86%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FINANCIAL STATEMENTS

	0	1	2	3	4	5	6	7	8	9	10	60	61	62	63	64	65	66	67	68	69	70	71	72		
Number of days		365	366	365	365	365	366	365	365	365	366	365	365	366	365	365	365	366	365	365	365	366	365	365		
Number of Years	0	1	2	3	4	5	6	7	8	9	10	60	61	62	63	64	65	66	67	68	69	70	71	72		
Timeline End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092	31.12.2093	31.12.2094		
Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092	1.01.2093	1.01.2094		
Income Statement																										
Revenue		-	-	-	-	-	-	-	2.518.920.261	2.518.920.261	5.051.642.825	10.803.470.496	11.019.539.906	11.270.725.035	11.464.729.319	11.694.023.905	11.927.904.383	12.199.795.245	12.409.791.720	6.328.993.777	6.455.573.653	-	-	-		
Cost of Services		-	-	-	-	-	-	-	302.743.456	308.798.326	585.350.454	1.575.522.276	1.607.032.721	1.639.173.375	1.671.956.843	1.705.395.980	1.739.503.899	1.774.293.977	1.809.779.857	990.552.842	1.007.606.139	-	-	-		
Gross Profit		-	-	-	-	-	-	-	2.216.176.805	2.210.121.935	4.466.292.371	9.227.948.221	9.412.507.185	9.631.551.660	9.792.772.476	9.988.627.925	10.188.400.484	10.425.501.267	10.600.011.863	5.338.440.936	5.447.967.514	-	-	-		
General Ad. Expenses		-	-	-	-	-	-	-	17.146.532	17.489.463	17.839.252	48.015.917	48.976.235	49.955.760	50.954.875	51.973.973	53.013.452	54.073.721	55.155.196	55.155.196	55.155.196	-	-	-		
Incentives		-	-	-	-	-	-	-	20.950.919	21.369.937	21.797.336	58.669.449	59.842.838	61.039.694	62.260.488	63.505.698	64.775.812	66.071.328	67.392.755	67.392.755	67.392.755	-	-	-		
EBITDA		-	-	-	-	-	-	-	2.178.079.354	2.171.262.536	4.426.655.783	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564	-	-	-		
Amortization and Depreciation		-	1.600.000	1.600.000	3.200.000	3.200.000	3.200.000	3.200.000	237.694.118	237.694.118	472.188.235	-	-	-	-	-	-	-	-	-	-	-	-	-		
EBIT		-	-1.600.000	-1.600.000	-3.200.000	-3.200.000	-3.200.000	-3.200.000	1.940.385.236	1.933.568.418	3.954.467.547	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564	-	-	-		
Interest		1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.149.387.200	1.105.212.603	1.057.062.292	-	-	-	-	-	-	-	-	-	-	-	-	-		
EBT		-1.189.914.353	-1.191.514.353	-1.191.514.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	790.998.036	828.355.815	2.897.405.256	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564	-	-	-		
CIT		-	-	-	-	-	-	-	790.998.036	828.355.815	2.897.405.256	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564	-	-	-		
Carry for Loss				-1.191.514.353	-2.384.628.706	-3.577.743.059	-4.770.857.412	-5.963.971.765	-5.172.973.728	-4.344.617.913	-1.447.212.657	9.121.262.855	9.303.688.112	9.520.556.205	9.679.557.112	9.873.148.254	10.070.611.220	10.305.356.218	10.477.463.913	5.215.892.985	5.325.419.564	-	-	-		
Tax		-	-	-	-	-	-	-	-	-	-	2.097.890.457	2.139.848.266	2.189.727.927	2.226.298.136	2.270.824.099	2.316.240.580	2.370.231.930	2.409.816.700	1.199.655.387	1.224.846.500	-	-	-		
Net Profit		-1.189.914.353	-1.191.514.353	-1.191.514.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	790.998.036	828.355.815	2.897.405.256	7.023.372.399	7.163.839.847	7.330.828.278	7.453.258.976	7.602.324.156	7.754.370.639	7.935.124.288	8.067.647.213	4.016.237.599	4.100.573.064	-	-	-		
Cash Flow Statement																										
Net Profit		-1.189.914.353	-1.191.514.353	-1.191.514.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	-1.193.114.353	790.998.036	828.355.815	2.897.405.256	7.023.372.399	7.163.839.847	7.330.828.278	7.453.258.976	7.602.324.156	7.754.370.639	7.935.124.288	8.067.647.213	4.016.237.599	4.100.573.064	-	-	-		
Operating Activities																										
Amortization and Depreciation		-	1.600.000	1.600.000	3.200.000	3.200.000	3.200.000	3.200.000	237.694.118	237.694.118	472.188.235	-	-	-	-	-	-	-	-	-	-	-	-	-		
Change in VAT		-	-	-	-	-	-	-	35.372.573	2.899.490	35.674.629	3.139.235	3.232.555	3.761.665	2.942.535	3.398.009	3.499.021	4.071.747	3.185.095	-83.345.469	-5.204.984	-89.197.804	-7.433.150	-619.429		
Cash Flow from Operating Activities		-1.189.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	1.064.064.727	1.068.949.423	3.405.268.120	7.026.511.634	7.167.072.401	7.334.589.943	7.456.201.512	7.605.722.165	7.757.869.660	7.939.196.035	8.070.832.308	3.932.892.129	4.095.368.080	-89.197.804	-7.433.150	-619.429		
Investing Activities																										
CAPEX		-	64.000.000	-	64.000.000	-	-	-	9.379.764.706	-	9.379.764.706	-	-	-	-	-	-	-	-	-	-	-	-	-		
Share Holder's Equity	5.666.258.824																									
Cash Flow from Investing Activities		-	-64.000.000	-	-64.000.000	-	-	-	-9.379.764.706	-	-9.379.764.706	-	-	-	-	-	-	-	-	-	-	-	-	-		
Free Cash Flow		-1.189.914.353	-1.253.914.353	-1.189.914.353	-1.253.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	-8.315.699.979	1.068.949.423	-5.974.496.586	7.026.511.634	7.167.072.401	7.334.589.943	7.456.201.512	7.605.722.165	7.757.869.660	7.939.196.035	8.070.832.308	3.932.892.129	4.095.368.080	-89.197.804	-7.433.150	-619.429		
Financing Activities																										
Debt Repayment		-	-	-	-	-	-	-	490.828.857	535.003.454	583.153.765	-	-	-	-	-	-	-	-	-	-	-	-	-		
Net Borrowing	13.221.270.588																									
Cash Flow From Financing Activities		-	-	-	-	-	-	-	-490.828.857	-535.003.454	-583.153.765	-	-	-	-	-	-	-	-	-	-	-	-	-		
Net Cash Flow	18.887.529.412	-1.189.914.353	-1.253.914.353	-1.189.914.353	-1.253.914.353	-1.189.914.353	-1.189.914.353	-1.189.914.353	-8.806.528.836	533.945.969	-6.557.650.351	7.026.511.634	7.167.072.401	7.334.589.943	7.456.201.512	7.605.722.165	7.757.869.660	7.939.196.035	8.070.832.308	3.932.892.129	4.095.368.080	-89.197.804	-7.433.150	-619.429		
Balance Sheet																										
Assets																										
Cash and Cash Equivalents	18.887.529.412	17.697.615.059	16.443.700.706	15.253.786.353	13.999.872.000	12.809.957.647	11.620.043.294	10.430.128.941	1.623.600.105	2.157.546.074	-4.400.104.277	211.150.744.194	218.317.816.595	225.652.406.538	233.108.608.050	240.714.330.215	248.472.199.875	256.411.395.910	264.482.228.217	268.415.120.347	272.510.488.427	272.421.290.623	272.413.857.473	272.413.238.044		
VAT Receivable		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Fixed Assets		-	64.000.000	64.000.000	128.000.000	128.000.000	128.000.000	128.000.000	9.507.764.706	9.507.764.706	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412	18.887.529.412		
Accumulated Depreciation and Amortization		-	-1.600.000	-3.200.000	-6.400.000	-9.600.000	-12.800.000	-16.000.000	-253.694.118	-491.388.235	-963.576.471	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412	-18.887.529.412		
TOTAL ASSETS	18.887.529.412	17.697.615.059	16.506.100.706 -7%	15.314.586.353	14.121.472.000	12.928.357.647	11.735.243.294	10.542.128.941	10.877.670.694	11.173.922.545	13.523.848.665	211.150.744.194	218.317.816.595	225.652.406.538	233.108.608.050	240.714.330.215	248.472.199.875	256.411.395.910	264.482.228.217	268.415.120.347	272.510.488.427	272.421.290.623	272.413.857.473	272.413.238.044		
Liabilities																										
VAT Payable		-	-	-	-	-	-	-	35.372.573	38.272.063	73.946.691	161.766.521	164.999.076	168.760.741	171.703.276	175.101.285	178.600.306	182.672.053	185.857.148	102.511.679	97.306.695	8.108.891	675.741	56.312		
Short-term liabilities																										
Long-term Liabilities	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	12.730.441.731	12.195.438.278	11.612.284.513	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tax Payables																										
Equity																										
Common Stock	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824	5.666.258.824		
Retained Earnings		-1.189.914.353	-2.381.428.706	-3.572.943.059	-4.766.057.412	-5.959.171.765	-7.152.286.118	-8.345.400.471	-7.554.402.434	-6.726.046.619	-3.828.641.363	205.322.718.848	212.486.558.695	219.817.386.973	227.270.645.949	234.872.970.105	242.627.340.745	250.562.465.032	258.630.112.245	262.646.349.844	266.746.922.908	266.746.922.908	266.746.922.908	266.746.922.908		
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	18.887.529.412	17.697.615.059	16.506.100.706	15.314.586.353	14.121.472.000	12.928.357.647	11.735.243.294	10.542.128.941	10.877.670.694	11.173.922.545	13.523.848.665	211.150.744.193	218.317.816.594	225.652.406.538	233.108.608.049	240.714.330.214	248.472.199.874	256.411.395.909	264.482.228.217	268.415.120.346	272.510.488.426	272.421.290.623	272.413.857.472	272.413.238.043		
Balance Check	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0		
VAT																										
VAT Payable		-	-	-	-	-	-	-	453.405.647	453.405.647	909.295.708	1.944.624.689	1.983.517.183	2.028.730.506	2.063.651.277	2.104.924.303	2.147.022.789	2.195.963.144	2.233.762.510	1.139.218.880	1.162.003.258	-	-	-	-	
		-	-	-	-	-	-	-	453.405.647	453.405.647	909.295.708	1.944.624.689	1.983.517.183	2.028.730.506	2.063.651.277	2.104.924.303	2.147.022.789	2.195.963.144	2.233.762.510	1.139.218.880	1.162.003.258	-	-	-		
VAT Receivable		-	-	-	-	-	-	-	28.934.773	29.513.468	60.207.475	162.053.720	165.294.794	168.600.690	171.972.704	175.412.158	178.920.401	182.498.809	186.148.785	94.935.880	96.834.598	-	-	-	-	
Fuel		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Maintenance		-	-	-	-	-	-	-	9.644.924	9.837.823	10.034.579	27.008.953	27.549.132	28.100.115	28.662.117	29.235.360	29.820.067	30.416.468	31.024.798	-	-	-	-	-	-	
Consumables		-	-	-	-	-	-	-	964.492	983.782	1.003.458	2.700.895	2.754.913	2.810.012	2.866.212	2.923.536	2.982.007	3.041.647	3.102.480	-	-	-	-	-	-	-
Outages		-	-	-	-	-	-	-	13.985.140	14.264.843	14.550.140	39.162.982	39.946.242	40.745.167	41.560.070	42.391.271	43.239.097	44.103.879	44.985.956	-	-	-	-	-	-	-
Insurance		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel storage		-	-	-	-	-	-	-	4.340.216	4.427.020	4.515.561	12.154.029	12.397.110	12.645.052	12.897.953	13.155.912	13.419.030	13.687.411	13.961.159	-	-	-	-	-	-	-
Unit 2																										-
Fuel		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance		-	-	-	-	-	-	-	-	-	10.034.579	27.008.953	27.549.132	28.100.115	28.662.117	29.235.360	29.820.067	30.416.468	31.024.798	31.645.293	32.278.199	-	-	-	-	-
Consumables		-	-	-	-	-	-	-	-	-	1.003.458	2.700.895	2.754.913	2.810.012	2.866.212	2.923.536	2.982.007	3.041.647	3.102.480	3.164.529	3.227.620	-	-	-	-	-
Outages		-	-	-	-	-	-	-	-	-	14.550.140	39.162.982	39.946.242	40.745.167	41.560.070	42.391.271	43.239.097	44.103.879	44.985.956	45.885.676	46.803.389	-	-	-	-	-
Insurance		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel storage		-	-	-	-	-	-	-	-	-	4.515.561	12.154.029	12.397.110	12.645.052	12.897.953	13.155.912	13.419.030	13.687.411	13.961.159	14.240.382	14.525.190	-	-	-	-	-
Net VAT for the Period		-	-	-	-	-	-	-	-424.470.874	-423.892.179	-849.088.233	-1.782.570.970	-1.818.222.389	-1.860.129.816	-1.891.678.573	-1.929.512.145	-1.968.102.388	-2.013.464.335	-2.047.613.724	-1.044.282.999	-1.065.168.659	-	-	-	0	0
Opening		-	-	-	-	-	-	-	-	-35.372.573	-38.272.063	-158.627.286	-161.766.521	-164.999.076	-168.760.741	-171.703.276	-175.101.285	-178.600.306	-182.672.053	-185.857.148	-102.511.679	-97.306.695	-8.108.891	-675.741	-56.312	-4.693
VAT Receivable		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Payable		-	-	-	-	-	-	-	424.470.874	423.892.179	849.088.233	1.782.570.970	1.818.222.389	1.860.129.816	1.891.678.573	1.929.512.145	1.968.102.388	2.013.464.335	2.047.613.724	1.044.282.999	1.065.168.659	-	-	-	-	-
Closing		-	-	-	-	-	-	-	-35.372.573	-38.272.063	-73.946.691	-161.766.521	-164.999.076	-168.760.741	-171.703.276	-175.101.285	-178.600.306	-182.672.053	-185.857.148	-102.511.679	-97.306.695	-8.108.891	-675.741	-56.312	-4.693	-391
VAT Receivable to BS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Payable to BS		-	-	-	-	-	-	-	35.372.573	38.272.063	73.946.691	161.766.521	164.999.076	168.760.741	171.703.276	175.101.285	178.600.306	182.672.053	185.857.148	102.511.679	97.306.695	8.108.891	675.741	56.312	4.693	391
VAT Change to CF		-	-	-	-	-	-	-	35.372.573	2.899.490	35.674.629	3.139.235	3.232.555	3.761.665	2.942.535	3.398.009	3.499.021	4.071.747	3.185.095	83.345.469	5.204.984	89.197.804	7.433.150	619.429	51.619	4.302

FINANCING

Financing and Funding

Equity	30%		
Debt	70%		
Interest Rate	9%		
Loan maturity	15		
TOTAL	18.887.529.412		
Debt	13.221.270.588	Interest Only	1
Equity	5.666.258.824	How long?	7
TOTAL	18.887.529.412		

			1	2	3	4	5	6	7	8	9	10
			0	0	0	0	0	0	0	0	0	0
	Number of days		365	366	365	365	365	366	365	365	365	366
	Number of Years		1	2	3	4	5	6	7	8	9	10
Timeline	End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032
	Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032
		Total										
Installments		32.932.641.316	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.640.216.056	1.640.216.056	1.640.216.056
Interest		18.561.983.529	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.189.914.353	1.149.387.200	1.105.212.603	1.057.062.292
Principal		13.221.270.588	-	-	-	-	-	-	-	490.828.857	535.003.454	583.153.765
Net Borrowing		13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	13.221.270.588	12.730.441.731	12.195.438.278	11.612.284.513
		0										

		….	60	61	62	63	64	65	66	67	68	69
			0	0	0	0	0	0	0	0	0	0
	Number of days		365	365	366	365	365	365	366	365	365	365
	Number of Years	….	60	61	62	63	64	65	66	67	68	69
Timeline	End Date	….	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
	Start Date	….	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091

FUEL						Escalation Rate		0	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
						Number of days		365	366	365	365	365	366	365	365	365	366		365	365	366	365	365	365	366	365	365	365
						Number of Years		1	2	3	4	5	6	7	8	9	10	….	60	61	62	63	64	65	66	67	68	69
					Timeline	End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	….	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
						Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	….	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
					Years in Operation	Control																						
Unit 1	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	60		0	0	0	0	0	0	0	0	1	1	1		1	1	1	1	1	1	1	1	0	0
Unit 2	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	60		0	0	0	0	0	0	0	0	0	0	1		1	1	1	1	1	1	1	1	1	1
Fuel Consumption		**Yearly Consumption**																										
Unit 1	Ton	41250						41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250		41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250
Unit 2	Ton	41250						41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250		41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250	41.250
Fuel Cost		1663						1.663	1.696	1.730	1.765	1.800	1.836	1.873	1.910	1.948	1.987		5.349	5.456	5.565	5.677	5.790	5.906	6.024	6.145	6.268	6.393
Fuel Costs																												
Unit 1								-	-	-	-	-	-	-	78.798.401	80.374.369	81.981.856		220.661.383	225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	-	-
Unit 2								-	-	-	-	-	-	-	-	-	81.981.856		220.661.383	225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	258.539.980	263.710.779
Total Fuel Cost								-	-	-	-	-	-	-	78.798.401	80.374.369	163.963.713		441.322.766	450.149.222	459.152.206	468.335.250	477.701.955	487.255.994	497.001.114	506.941.136	258.539.980	263.710.779

OPEX

					Years in Operation	Control
Unit 1	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	60	0
Unit 2	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	60	0

Operating Costs

		First Year Costs		Reporting Classification	VAT
Unit 1					
Fuel		68.598.750	100%	Cost of Services	0%
Maintenance		45.732.500	100%	Cost of Services	18%
Consumables		4.573.250	100%	Cost of Services	18%
Outages		66.312.125	100%	Cost of Services	18%
Insurance		16.006.375	100%	Cost of Services	
Fuel storage		20.579.625	100%	Cost of Services	18%
Unit 2					
Fuel		68.598.750	100%	Cost of Services	
Maintenance		45.732.500	100%	Cost of Services	18%
Consumables		4.573.250	100%	Cost of Services	18%
Outages		66.312.125	100%	Cost of Services	18%
Insurance		16.006.375	100%	Cost of Services	
Fuel storage		20.579.625	100%	Cost of Services	18%
In the scope of Incentive					
Personnel		45.732.500	80%	Cost of Services	0%
	Training Cost		20%	General Ad. Expenses	18%
Corporate overhead		36.586.000	85%	General Ad. Expenses	18%
	Energy Cost		15%	General Ad. Expenses	18%
TOTAL		**525.923.750**			

Timeline	1	2	3	4	5	6	7	8	9	10
Escalation Rate	0	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Number of days	365	366	365	365	365	366	365	365	365	366
Number of Years	1	2	3	4	5	6	7	8	9	10 ….
End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 ….
Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 ….
Unit 1	0	0	0	0	0	0	0	1	1	1
Unit 2	0	0	0	0	0	0	0	0	0	1
Unit 1										
Fuel	-	-	-	-	-	-	-	80.374.369	81.981.856	83.621.493
Maintenance	-	-	-	-	-	-	-	53.582.913	54.654.571	55.747.662
Consumables	-	-	-	-	-	-	-	5.358.291	5.465.457	5.574.766
Outages	-	-	-	-	-	-	-	77.695.223	79.249.128	80.834.110
Insurance	-	-	-	-	-	-	-	18.754.019	19.129.100	19.511.682
Fuel storage	-	-	-	-	-	-	-	24.112.311	24.594.557	25.086.448
Unit 2										
Fuel	-	-	-	-	-	-	-	-	-	83.621.493
Maintenance	-	-	-	-	-	-	-	-	-	55.747.662
Consumables	-	-	-	-	-	-	-	-	-	5.574.766
Outages	-	-	-	-	-	-	-	-	-	80.834.110
Insurance	-	-	-	-	-	-	-	-	-	19.511.682
Fuel storage	-	-	-	-	-	-	-	-	-	25.086.448
In the scope of Incentive										
Personnel	-	-	-	-	-	-	-	53.582.913	54.654.571	55.747.662
Training Cost	-	-	-	-	-	-	-	*10.716.583*	*10.930.914*	*11.149.532*
Corporate overhead	-	-	-	-	-	-	-	42.866.330	43.723.657	44.598.130
Energy Cost	-	-	-	-	-	-	-	*6.429.950*	*6.558.549*	*6.689.719*
TOTAL										
TOTAL Cost of Services	-	-	-	-	-	-	-	339.179.837	345.963.434	623.258.865
TOTAL General Ad. Expenses	-	-	-	-	-	-	-	17.146.532	17.489.463	17.839.252
TOTAL Costs	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**356.326.369**	**363.452.896**	**641.098.117**
Incentives Subject to Opex										
Social Security Incentives	-	-	-	-	-	-	-	- 9.377.010	- 9.564.550	- 9.755.841
Withholding Tax Incentive	-	-	-	-	-	-	-	- 10.716.583	- 10.930.914	- 11.149.532
Training Support	-	-	-	-	-	-	-	- 535.829	- 546.546	- 557.477
Energy Support	-	-	-	-	-	-	-	- 321.497	- 327.927	- 334.486
Opex	-	-	-	-	-	-	-	356.326.369	363.452.896	370.721.954
Incentive	-	-	-	-	-	-	-	- 20.950.919	- 21.369.937	- 21.797.336
Net Opex	-	-	-	-	-	-	-	335.375.450	342.082.959	348.924.618

Timeline	60	61	62	63	64	65	66	67	68	69
Escalation Rate	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Number of days	365	365	366	365	365	365	366	365	365	365
Number of Years	60	61	62	63	64	65	66	67	68	69
End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
Unit 1	1	1	1	1	1	1	1	1	0	0
Unit 2	1	1	1	1	1	1	1	1	1	1
Unit 1										
Fuel	225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	258.539.980	-	-
Maintenance	150.049.741	153.050.735	156.111.750	159.233.985	162.418.665	165.667.038	168.980.379	172.359.986	-	-
Consumables	15.004.974	15.305.074	15.611.175	15.923.399	16.241.866	16.566.704	16.898.038	17.235.999	-	-
Outages	217.572.124	221.923.566	226.362.038	230.889.278	235.507.064	240.217.205	245.021.549	249.921.980	-	-
Insurance	52.517.409	53.567.757	54.639.113	55.731.895	56.846.533	57.983.463	59.143.133	60.325.995	-	-
Fuel storage	67.522.383	68.872.831	70.250.288	71.655.293	73.088.399	74.550.167	76.041.170	77.561.994	-	-
Unit 2										
Fuel	225.074.611	229.576.103	234.167.625	238.850.978	243.627.997	248.500.557	253.470.568	258.539.980	263.710.779	268.984.995
Maintenance	150.049.741	153.050.735	156.111.750	159.233.985	162.418.665	165.667.038	168.980.379	172.359.986	175.807.186	179.323.330
Consumables	15.004.974	15.305.074	15.611.175	15.923.399	16.241.866	16.566.704	16.898.038	17.235.999	17.580.719	17.932.333
Outages	217.572.124	221.923.566	226.362.038	230.889.278	235.507.064	240.217.205	245.021.549	249.921.980	254.920.420	260.018.828
Insurance	52.517.409	53.567.757	54.639.113	55.731.895	56.846.533	57.983.463	59.143.133	60.325.995	61.532.515	62.763.165
Fuel storage	67.522.383	68.872.831	70.250.288	71.655.293	73.088.399	74.550.167	76.041.170	77.561.994	79.113.234	80.695.498
In the scope of Incentive										
Personnel	150.049.741	153.050.735	156.111.750	159.233.985	162.418.665	165.667.038	168.980.379	172.359.986	172.359.986	172.359.986
Training Cost	*30.009.948*	*30.610.147*	*31.222.350*	*31.846.797*	*32.483.733*	*33.133.408*	*33.796.076*	*34.471.997*	*34.471.997*	*34.471.997*
Corporate overhead	120.039.792	122.440.588	124.889.400	127.387.188	129.934.932	132.533.630	135.184.303	137.887.989	137.887.989	137.887.989
Energy Cost	*18.005.969*	*18.366.088*	*18.733.410*	*19.108.078*	*19.490.240*	*19.880.045*	*20.277.645*	*20.683.198*	*20.683.198*	*20.683.198*
TOTAL										
TOTAL Cost of Services	1.677.556.099	1.711.107.221	1.745.329.366	1.780.235.953	1.815.840.672	1.852.157.485	1.889.200.635	1.926.984.648	1.107.757.632	1.124.810.930
TOTAL General Ad. Expenses	48.015.917	48.976.235	49.955.760	50.954.875	51.973.973	53.013.452	54.073.721	55.155.196	55.155.196	55.155.196
TOTAL Costs	**1.725.572.016**	**1.760.083.456**	**1.795.285.126**	**1.831.190.828**	**1.867.814.645**	**1.905.170.937**	**1.943.274.356**	**1.982.139.843**	**1.162.912.828**	**1.179.966.125**
Incentives Subject to Opex										
Social Security Incentives	- 26.258.705	- 26.783.879	- 27.319.556	- 27.865.947	- 28.423.266	- 28.991.732	- 29.571.566	- 30.162.998	- 30.162.998	- 30.162.998
Withholding Tax Incentive	- 30.009.948	- 30.610.147	- 31.222.350	- 31.846.797	- 32.483.733	- 33.133.408	- 33.796.076	- 34.471.997	- 34.471.997	- 34.471.997
Training Support	- 1.500.497	- 1.530.507	- 1.561.118	- 1.592.340	- 1.624.187	- 1.656.670	- 1.689.804	- 1.723.600	- 1.723.600	- 1.723.600
Energy Support	- 900.298	- 918.304	- 936.671	- 955.404	- 974.512	- 994.002	- 1.013.882	- 1.034.160	- 1.034.160	- 1.034.160
Opex	997.830.775	1.017.787.390	1.038.143.138	1.058.906.001	1.080.084.121	1.101.685.803	1.123.719.519	1.146.193.909	310.247.975	310.247.975
Incentive	- 58.669.449	- 59.842.838	- 61.039.694	- 62.260.488	- 63.505.698	- 64.775.812	- 66.071.328	- 67.392.755	- 67.392.755	- 67.392.755
Net Opex	939.161.326	957.944.552	977.103.444	996.645.512	1.016.578.423	1.036.909.991	1.057.648.191	1.078.801.155	242.855.221	242.855.221

							Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	
REVENUE						Escalation Rate	0	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	
						Number of days	365	366	365	365	365	366	365	365	365	366	
						Number of Years	1	2	3	4	5	6	7	8	9	10	....
					Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	....
						Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	....
Price Forecasts																	
PPA							193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	
Market							129,09	131,7	134,3	137,0	139,7	142,5	145,4	148,3	151,2	154,3	
Price							193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	
					Years in Operation	Control											
Unit 1	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	60	0	0	0	0	0	0	0	0	1	1	1	
Unit 2	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	60	0	0	0	0	0	0	0	0	0	0	1	
Unit 1							1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	
Unit 2							1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	
Installed Capacity							90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	
Installed Capacity																	
Unit 1							1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	
Unit 2							1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	
Daily Generation																	
Unit 1							35640	35640	35640	35640	35640	35640	35640	35640	35640	35640	
Unit 2							35640	35640	35640	35640	35640	35640	35640	35640	35640	35640	
Yearly Generation																	
Unit 1							13008600	13044240	13008600	13008600	13008600	13044240	13008600	13008600	13008600	13044240	
Unit 2							13008600	13044240	13008600	13008600	13008600	13044240	13008600	13008600	13008600	13044240	
Total Generated Output in Operation																	
Unit 1							0	0	0	0	0	0	0	13008600	13008600	13044240	
Unit 2							0	0	0	0	0	0	0	0	0	13044240	
Revenue																	
Unit 1							-	-	-	-	-	-	-	2.518.920.261,0	2.518.920.261,0	2.525.821.412,4	
Unit 2							-	-	-	-	-	-	-	-	-	2.525.821.412,4	
TOTAL Revenue							-	-	-	-	-	-	-	2.518.920.261,0	2.518.920.261,0	5.051.642.824,8	

	Y60	Y61	Y62	Y63	Y64	Y65	Y66	Y67	Y68	Y69
Escalation Rate	0,02									
Number of days	365	365	366	365	365	365	366	365	365	365
Number of Years	60	61	62	63	64	65	66	67	68	69
End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
PPA	-	-	-	-	-	-	-	-	-	-
Market	415,2	423,5	432,0	440,7	449,5	458,5	467,6	477,0	486,5	496,3
Price	415.2433965	423.5482645	432.0192298	440.6596144	449.4728066	458.4622628	467.631508	476.9841382	486.523821	496.2542974
Unit 1	1	1	1	1	1	1	1	1	0	0
Unit 2	1	1	1	1	1	1	1	1	1	1
Unit 1	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Unit 2	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Installed Capacity	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Installed Capacity Unit 1	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485
Installed Capacity Unit 2	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485
Daily Generation Unit 1	35640	35640	35640	35640	35640	35640	35640	35640	35640	35640
Daily Generation Unit 2	35640	35640	35640	35640	35640	35640	35640	35640	35640	35640
Yearly Generation Unit 1	13008600	13008600	13044240	13008600	13008600	13008600	13044240	13008600	13008600	13008600
Yearly Generation Unit 2	13008600	13008600	13044240	13008600	13008600	13008600	13044240	13008600	13008600	13008600
Total Generated Output in Operation Unit 1	13008600	13008600	13044240	13008600	13008600	13008600	13044240	13008600	0	0
Total Generated Output in Operation Unit 2	13008600	13008600	13044240	13008600	13008600	13008600	13044240	13008600	13008600	13008600
Revenue Unit 1	5.401.735.248,2	5.509.769.953,2	5.635.362.517,6	5.732.364.659,3	5.847.011.952,5	5.963.952.191,5	6.099.897.622,3	6.204.895.860,1	-	-
Revenue Unit 2	5.401.735.248,2	5.509.769.953,2	5.635.362.517,6	5.732.364.659,3	5.847.011.952,5	5.963.952.191,5	6.099.897.622,3	6.204.895.860,1	6.328.993.777,3	6.455.573.652,8
TOTAL Revenue	10.803.470.496,4	11.019.539.906,4	11.270.725.035,2	11.464.729.318,6	11.694.023.905,0	11.927.904.383,1	12.199.795.244,6	12.409.791.720,1	6.328.993.777,3	6.455.573.652,8

VALUATION

		Number of days	365	366	365	365	365	366	365	365	365	366		365	365	366	365	365	365	366	365	365	365
		Number of Years	1	2	3	4	5	6	7	8	9	10	....	60	61	62	63	64	65	66	67	68	69
	Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	....	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091
		Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	....	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091
Valuation																							
Cash Flow To the Project			- 1.189.914.353	- 1.253.914.353	- 1.189.914.353	- 1.253.914.353	- 1.189.914.353	- 1.189.914.353	- 1.189.914.353	- 8.315.699.979	###########	- 5.974.496.586		7.026.511.634	7.167.072.401	7.334.589.943	7.456.201.512	7.605.722.165	7.757.869.660	7.939.196.035	8.070.832.308	3.932.892.129	4.095.368.080
Equity Injection			- 5.666.258.824																				
Dividend			-	-	-	-	-	-	-	-	-	-		4.803.986.721	4.900.066.455	5.014.286.542	5.098.029.140	5.199.989.723	5.303.989.517	5.427.625.013	5.518.270.694	2.747.106.517	2.804.791.976
Cash Flow to the Shareholders			- 5.666.258.824	-	-	-	-	-	-	-	-	-		4.803.986.721	4.900.066.455	5.014.286.542	5.098.029.140	5.199.989.723	5.303.989.517	5.427.625.013	5.518.270.694	2.747.106.517	2.804.791.976
IRR																							
Project IRR	10,53%																						
Equity IRR	11,10%																						
Net Present Value																							
Project NPV	2.564.273.115																						
Equity NPV	2.505.329.509																						
			-	-	-	-	-	-	-	335.375.450	342.082.959	348.924.618		939.161.326	957.944.552	977.103.444	996.645.512	1.016.578.423	1.036.909.991	1.057.648.191	1.078.801.155	242.855.221	242.855.221
LCOE Calculation																							
			-	64.000.000	-	64.000.000	-	-	-	9.379.764.706	-	9.379.764.706		-	-	-	-	-	-	-	-	-	-
Total OPEX	38.735.796.823																						
			-	-	-	-	-	-	-	13.008.600	13.008.600	26.088.480		26.017.200	26.017.200	26.088.480	26.017.200	26.017.200	26.017.200	26.088.480	26.017.200	13.008.600	13.008.600
Total CAPEX	18.887.529.412																						
Total Generated Capacity	1.562.101.200																						
LCOE	36,89																						

WACC

Calculation of Cost of Equity	
Türkiye Eurobond 20 Years Yield	9,00%
Türkiye Credit Default Swap	5,85%
Ke	14,85%

WACC

		Cost of Equity	Cost of Debt
		ke	kd
		14,85%	9,00%
TOTAL		Weight of Equity	Weight of Debt
	18.887.529.412	5.666.258.824	13.221.270.588
		30,00%	70,00%
Weights		0,04	0,05
WACC		9,31%	

CAPEX

	Total Investment	Economic Life Time	Yearly Depreciation	Depreciation Start Date	Depreciation End Date	Total Amortized	Control	1	2	3	4	5	6	7	8	9	10	41	42	43	44	45	46	47	48	49	50
							Number of days	365	366	365	365	365	366	365	365	365	366	365	366	365	365	365	366	365	365	365	366
							Number of Years	1	2	3	4	5	6	7	8	9	10	41	42	43	44	45	46	47	48	49	50
						Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	31.12.2063	31.12.2064	31.12.2065	31.12.2066	31.12.2067	31.12.2068	31.12.2069	31.12.2070	31.12.2071	31.12.2072
							Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	1.01.2063	1.01.2064	1.01.2065	1.01.2066	1.01.2067	1.01.2068	1.01.2069	1.01.2070	1.01.2071	1.01.2072
Capex 1st Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2026	1.01.2066	452.525.253	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-	-	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2026	1.01.2066	177.777.778	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-	-	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2026	1.01.2066	290.909.091	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-	-	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2026	1.01.2066	689.131.313	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-	-	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2024	1.01.2064	64.000.000	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-	-	-	-	-
Capex 2nd Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2026	1.01.2066	452.525.253	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-	-	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2026	1.01.2066	177.777.778	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-	-	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2026	1.01.2066	290.909.091	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-	-	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2026	1.01.2066	689.131.313	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-	-	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2024	1.01.2064	64.000.000	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-	-	-	-	-
Capex 3rd Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2028	1.01.2068	452.525.253	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2028	1.01.2068	177.777.778	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2028	1.01.2068	290.909.091	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2028	1.01.2068	689.131.313	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2026	1.01.2066	64.000.000	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-	-	-
Capex 4th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2028	1.01.2068	452.525.253	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2028	1.01.2068	177.777.778	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2028	1.01.2068	290.909.091	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2028	1.01.2068	689.131.313	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2026	1.01.2066	64.000.000	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-	-	-
Capex 5th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2030	1.01.2070	452.525.253	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2030	1.01.2070	177.777.778	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2030	1.01.2070	290.909.091	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2030	1.01.2070	689.131.313	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2028	1.01.2068	64.000.000	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-
Capex 6th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2030	1.01.2070	452.525.253	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-	-	-
Turbine Island	177.777.778	40	4.444.444	1.01.2030	1.01.2070	177.777.778	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-	-	-
EC&I	290.909.091	40	7.272.727	1.01.2030	1.01.2070	290.909.091	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-	-	-
Civils	689.131.313	40	17.228.283	1.01.2030	1.01.2070	689.131.313	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-	-	-
Licensing	64.000.000	40	1.600.000	1.01.2028	1.01.2068	64.000.000	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-	-	-
Capex 7th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2032	1.01.2072	452.525.253	-	-	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-
Turbine Island	177.777.778	40	4.444.444	1.01.2032	1.01.2072	177.777.778	-	-	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-
EC&I	290.909.091	40	7.272.727	1.01.2032	1.01.2072	290.909.091	-	-	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-
Civils	689.131.313	40	17.228.283	1.01.2032	1.01.2072	689.131.313	-	-	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-
Licensing	64.000.000	40	1.600.000	1.01.2030	1.01.2070	64.000.000	-	-	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-
Capex 8th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2032	1.01.2072	452.525.253	-	-	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	-
Turbine Island	177.777.778	40	4.444.444	1.01.2032	1.01.2072	177.777.778	-	-	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	-
EC&I	290.909.091	40	7.272.727	1.01.2032	1.01.2072	290.909.091	-	-	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	-
Civils	689.131.313	40	17.228.283	1.01.2032	1.01.2072	689.131.313	-	-	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	-
Licensing	64.000.000	40	1.600.000	1.01.2030	1.01.2070	64.000.000	-	-	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-	-
Capex 9th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2033	1.01.2073	452.525.253	-	-	-	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131
Turbine Island	177.777.778	40	4.444.444	1.01.2033	1.01.2073	177.777.778	-	-	-	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444
EC&I	290.909.091	40	7.272.727	1.01.2033	1.01.2073	290.909.091	-	-	-	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727
Civils	689.131.313	40	17.228.283	1.01.2033	1.01.2073	689.131.313	-	-	-	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283
Licensing	64.000.000	40	1.600.000	1.01.2031	1.01.2071	64.000.000	-	-	-	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-
Capex 10th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2033	1.01.2073	452.525.253	-	-	-	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131
Turbine Island	177.777.778	40	4.444.444	1.01.2033	1.01.2073	177.777.778	-	-	-	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444
EC&I	290.909.091	40	7.272.727	1.01.2033	1.01.2073	290.909.091	-	-	-	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727
Civils	689.131.313	40	17.228.283	1.01.2033	1.01.2073	689.131.313	-	-	-	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283
Licensing	64.000.000	40	1.600.000	1.01.2031	1.01.2071	64.000.000	-	-	-	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-
Capex 11th Reactor																											
Nuclear Island	452.525.253	40	11.313.131	1.01.2033	1.01.2073	452.525.253	-	-	-	-	-	-	-	-	-	-	-	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131	11.313.131
Turbine Island	177.777.778	40	4.444.444	1.01.2033	1.01.2073	177.777.778	-	-	-	-	-	-	-	-	-	-	-	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444	4.444.444
EC&I	290.909.091	40	7.272.727	1.01.2033	1.01.2073	290.909.091	-	-	-	-	-	-	-	-	-	-	-	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727	7.272.727
Civils	689.131.313	40	17.228.283	1.01.2033	1.01.2073	689.131.313	-	-	-	-	-	-	-	-	-	-	-	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283	17.228.283
Licensing	64.000.000	40	1.600.000	1.01.2031	1.01.2071	64.000.000	-	-	-	-	-	-	-	-	-	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	1.600.000	-	-
Total Depreciation and Amortization								-	3.200.000	3.200.000	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	80.517.172	80.517.172	-	-	-	-	-	-	-
Accumulated Depreciation and Amortization								-	3.200.000	6.400.000	90.117.172	173.834.343	257.551.515	341.268.687	424.985.859	508.703.030	592.420.202	3.187.652.525	3.268.169.697	3.348.686.869	3.348.686.869	3.348.686.869	3.348.686.869	3.348.686.869	3.348.686.869	3.348.686.869	3.348.686.869
CAPEX							Control																				
Nuclear Island	452.525.253						-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 2nd Reactor																											
Nuclear Island	452.525.253						-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 3rd Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 4th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 5th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 6th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capex 7th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-
Capex 8th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	-	-	452.525.253	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	-	-	177.777.778	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	-	-	290.909.091	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	-	-	689.131.313	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-	-
Capex 9th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-
Capex 10th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-
Capex 11th Reactor																											
Nuclear Island	452.525.253						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbine Island	177.777.778						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EC&I	290.909.091						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Civils	689.131.313						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Licensing	64.000.000						-	-	-	-	-	-	-	-	-	64.000.000	-	-	-	-	-	-	-	-	-	-	-
TOTAL Capex Cash Outflow								-	128.000.000	-	3.348.686.869	-	3.348.686.869	-	3.348.686.869	192.000.000	3.220.686.869	-	-	-	-	-	-	-	-	-	-
TOTAL Capex	18.417.777.778							-	128.000.000	128.000.000	3.476.686.869	3.476.686.869	6.825.373.737	6.825.373.737	10.174.060.606	10.366.060.606	13.586.747.475	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778

COST OF SERVICES		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	365	366	365	365	365	366	365	365	365	366	0	365	366	365	365	365	366	365	365	365	366	365
		0	0	1	2	3	4	5	6	7	8	9	10	0	61	62	63	64	65	66	67	68	69	70	71
		0 Timeline	0.01.1900	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 ……		31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092	31.12.2093
		0	0.01.1900	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 ……		1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092	1.01.2093
Cost of Services																									
Unit 1																									
	1		-	-	-	-	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	-	-	-	-	-	-	-	-
	2		-	-	-	-	11.796.328	12.032.254	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	-	-	-	-	-	-	-	-
	3		-	-	-	-	1.572.844	1.604.301	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	-	-	-	-	-	-	-	-
	4		-	-	-	-	23.828.582	24.305.154	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	-	-	-	-	-	-	-	-
	5		-	-	-	-	5.504.953	5.615.052	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	-	-	-	-	-	-	-	-
	6		-	-	-	-	7.077.797	7.219.353	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	-	-	-	-	-	-	-	-
Unit 2																									
	1		-	-	-	-	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	-	-	-	-	-	-	-	-
	2		-	-	-	-	11.796.328	12.032.254	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	-	-	-	-	-	-	-	-
	3		-	-	-	-	1.572.844	1.604.301	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	-	-	-	-	-	-	-	-
	4		-	-	-	-	23.828.582	24.305.154	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	-	-	-	-	-	-	-	-
	5		-	-	-	-	5.504.953	5.615.052	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	-	-	-	-	-	-	-	-
	6		-	-	-	-	7.077.797	7.219.353	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	-	-	-	-	-	-	-	-
Unit 3																									
	1		-	-	-	-	-	-	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	-	-	-	-	-	-
	2		-	-	-	-	-	-	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	-	-	-	-	-	-
	3		-	-	-	-	-	-	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	-	-	-	-	-	-
	4		-	-	-	-	-	-	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	-	-	-	-	-	-
	5		-	-	-	-	-	-	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	-	-	-	-	-	-
	6		-	-	-	-	-	-	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	-	-	-	-	-	-
Unit 4																									
	1		-	-	-	-	-	-	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	-	-	-	-	-	-
	2		-	-	-	-	-	-	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	-	-	-	-	-	-
	3		-	-	-	-	-	-	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	-	-	-	-	-	-
	4		-	-	-	-	-	-	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	-	-	-	-	-	-
	5		-	-	-	-	-	-	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	-	-	-	-	-	-
	6		-	-	-	-	-	-	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	-	-	-	-	-	-
Unit 5																									
	1		-	-	-	-	-	-	-	-	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	-	-	-	-
	2		-	-	-	-	-	-	-	-	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	-	-	-	-
	3		-	-	-	-	-	-	-	-	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	-	-	-	-
	4		-	-	-	-	-	-	-	-	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	-	-	-	-
	5		-	-	-	-	-	-	-	-	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	-	-	-	-
	6		-	-	-	-	-	-	-	-	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	-	-	-	-
Unit 6																									
	1		-	-	-	-	-	-	-	-	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	-	-	-	-
	2		-	-	-	-	-	-	-	-	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	-	-	-	-
	3		-	-	-	-	-	-	-	-	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	-	-	-	-
	4		-	-	-	-	-	-	-	-	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	-	-	-	-
	5		-	-	-	-	-	-	-	-	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	-	-	-	-
	6		-	-	-	-	-	-	-	-	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	-	-	-	-
Unit 7																									
	1		-	-	-	-	-	-	-	-	-	-	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	-	-
	2		-	-	-	-	-	-	-	-	-	-	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	-	-
	3		-	-	-	-	-	-	-	-	-	-	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	-	-
	4		-	-	-	-	-	-	-	-	-	-	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	-	-
	5		-	-	-	-	-	-	-	-	-	-	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	-	-
	6		-	-	-	-	-	-	-	-	-	-	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	-	-
Unit 8																									
	1		-	-	-	-	-	-	-	-	-	-	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	-	-
	2		-	-	-	-	-	-	-	-	-	-	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	-	-
	3		-	-	-	-	-	-	-	-	-	-	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	-	-
	4		-	-	-	-	-	-	-	-	-	-	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	-	-
	5		-	-	-	-	-	-	-	-	-	-	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	-	-
	6		-	-	-	-	-	-	-	-	-	-	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	-	-
Unit 9																									
	1		-	-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490	-
	2		-	-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119	-
	3		-	-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616	-
	4		-	-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981	-
	5		-	-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656	-
	6		-	-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272	-
Unit 10																									
	1		-	-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490	-
	2		-	-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119	-
	3		-	-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616	-
	4		-	-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981	-
	5		-	-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656	-
	6		-	-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272	-
Unit 11																									
	1		-	-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490	-
	2		-	-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119	-
	3		-	-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616	-
	4		-	-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981	-
	5		-	-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656	-
	6		-	-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272	-
Workmanship Costs			-	-	-	-	79.585.892	81.177.609	82.801.162	84.457.185	86.146.329	87.869.255	89.626.640	-	246.062.752	250.984.007	256.003.687	-	-	-	-	-	-	-	-
TOTAL Cost of Services			-	-	-	-	206.148.169	210.271.132	346.151.948	353.074.986	497.131.565	507.074.196	659.745.360	-	2.398.233.674	2.446.198.348	2.495.122.315	1.868.646.273	1.906.019.198	1.512.108.564	1.542.350.735	1.123.712.679	1.146.186.932	701.466.402	-

DIVIDENDS

Number of days	0	365	366	365	365	365	366	365	365	365	366	0
Number of Years	0	1	2	3	4	5	6	7	8	9	10	0
Timeline End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 ……	
Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 ……	
Dividend Distributions												
Paid-in Capital		5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333
Legal Reserve I		-	-	-	-	-	-	-	-	-	-	-
Legal Reserve Limit		1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667
Profit before tax		-1.160.320.000	-1.163.520.000	-1.163.520.000	- 563.792.124	- 526.221.096	304.431.298	342.229.983	1.168.462.463	1.217.829.167	2.055.918.932	-
Taxes		-	-	-	-	-	-	-	-	179.266.529	652.127.883	-
Net Profit		-1.160.320.000	-1.163.520.000	-1.163.520.000	- 563.792.124	- 526.221.096	304.431.298	342.229.983	1.168.462.463	1.038.562.638	1.403.791.049	-
Accumulated Loss		-	-1.160.320.000	-2.323.840.000	-3.487.360.000	-4.051.152.124	-4.577.373.220	-4.272.941.922	-3.930.711.939	-2.762.249.476	-1.723.686.838	- 319.895.789
Distributable Profit		-	-	-	-	-	-	-	-	-	-	-
Legal Reserve I		-	-	-	-	-	-	-	-	-	-	-
Legal Reserve Check		-	-	-	-	-	-	-	-	-	-	-
Net distributable profit		-	-	-	-	-	-	-	-	-	-	-
First Dividend (80%)		-	-	-	-	-	-	-	-	-	-	-
Legal Reserve II		-	-	-	-	-	-	-	-	-	-	-
Declared dividend		-	-	-	-	-	-	-	-	-	-	-
Retained Earnings		-	-	-	-	-	-	-	-	-	-	-
Total Reserves		-	-	-	-	-	-	-	-	-	-	-
Checks for Distributable Profit		-	-	-	-	-	-	-	-	-	-	-

Number of days	365	365	366	365	365	365	366	365	365	365	366	365	365
Number of Years	60	61	62	63	64	65	66	67	68	69	70	71	72
Timeline End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092	31.12.2093	31.12.2094
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092	1.01.2093	1.01.2094
Dividend Distributions													
Paid-in Capital	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333
Legal Reserve I	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal Reserve Limit	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667	1.105.066.667
Profit before tax	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
Taxes	2.484.798.214	1.933.764.778	1.979.522.769	2.011.888.875	1.770.814.038	1.806.230.318	1.437.821.425	1.461.601.574	1.064.881.146	1.086.178.769	667.004.636	-	-
Net Profit	8.318.672.282	6.473.908.169	6.627.097.967	6.735.454.059	5.928.377.430	6.046.944.979	4.813.576.076	4.893.187.877	3.565.036.882	3.636.337.619	2.233.015.521	-	-
Accumulated Loss	- 564.647.304	-	-	-	-	-	-	-	-	-	-	-	-
Distributable Profit	7.754.024.978	6.473.908.169	6.627.097.967	6.735.454.059	5.928.377.430	6.046.944.979	4.813.576.076	4.893.187.877	3.565.036.882	3.636.337.619	2.233.015.521	-	-
Legal Reserve I	387.701.249	323.695.408	331.354.898	336.772.703	296.418.872	302.347.249	240.678.804	244.659.394	178.251.844	181.816.881	111.650.776	-	-
Legal Reserve Check	-	-	-	-	-	-	-	-	-	-	-	-	-
Net distributable profit	7.366.323.729	6.150.212.760	6.295.743.068	6.398.681.356	5.631.958.559	5.744.597.730	4.572.897.272	4.648.528.483	3.386.785.038	3.454.520.738	2.121.364.745	-	-
First Dividend (80%)	5.893.058.983	4.920.170.208	5.036.594.455	5.118.945.085	4.505.566.847	4.595.678.184	3.658.317.817	3.718.822.786	2.709.428.030	2.763.616.591	1.697.091.796	-	-
Legal Reserve II	589.305.898	492.017.021	503.659.445	511.894.508	450.556.685	459.567.818	365.831.782	371.882.279	270.942.803	276.361.659	169.709.180	-	-
Declared dividend	5.303.753.085	4.428.153.187	4.532.935.009	4.607.050.576	4.055.010.162	4.136.110.365	3.292.486.036	3.346.940.508	2.438.485.227	2.487.254.932	1.527.382.616	-	-
Retained Earnings	1.473.264.746	1.230.042.552	1.259.148.614	1.279.736.271	1.126.391.712	1.148.919.546	914.579.454	929.705.697	677.357.008	690.904.148	424.272.949	-	-
Total Reserves	977.007.147	815.712.429	835.014.344	848.667.211	746.975.556	761.915.067	606.510.586	616.541.672	449.194.647	458.178.540	281.359.956	-	-
Checks for Distributable Profit	-	-	-	-	-	-	-	-	-	-	-	-	-

FINANCIAL ANALYSIS

Vertical Analysis																				
Income Statement																				
Revenue	N/A	N/A	N/A	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cost of Services	N/A	N/A	N/A	23%	23%	19%	19%	18%	18%	18%	0%	22%	22%	22%	20%	20%	19%	20%	20%	20%
Gross Profit	N/A	N/A	N/A	77%	77%	81%	81%	82%	82%	82%	100%	78%	78%	78%	80%	80%	81%	80%	80%	80%
General Ad. Expenses	N/A	N/A	N/A	3%	3%	2%	2%	1%	1%	1%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Incentives	N/A	N/A	N/A	4%	4%	2%	2%	2%	2%	1%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
EBITDA	N/A	N/A	N/A	70%	69%	77%	77%	79%	79%	80%	100%	76%	76%	76%	80%	80%	81%	80%	80%	80%
Amortization and Depreciation	N/A	N/A	N/A	9%	9%	5%	5%	3%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBIT	N/A	N/A	N/A	61%	60%	73%	72%	76%	76%	78%	100%	76%	76%	76%	80%	80%	81%	80%	80%	80%
Interest	N/A	N/A	N/A	122%	118%	56%	53%	34%	31%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBT	N/A	N/A	N/A	-62%	-57%	17%	19%	43%	44%	56%	100%	76%	76%	76%	80%	80%	81%	80%	80%	80%
CIT																				
Carry for Loss																				
Tax	N/A	N/A	N/A	0%	0%	0%	0%	0%	7%	18%	23%	18%	18%	18%	19%	19%	19%	19%	19%	19%
Net Profit	N/A	N/A	N/A	-62%	-57%	17%	19%	43%	38%	38%	77%	59%	59%	59%	62%	62%	62%	62%	62%	62%

Vertical Analysis																				
Balance Sheet																				
Assets																				
Cash and Cash Equivalents	100%	99%	99%	76%	74%	48%	47%	24%	25%	6%	38%	51%	60%	66%	70%	73%	75%	77%	78%	79%
Fixed Assets	0%	1%	1%	25%	27%	54%	55%	79%	79%	99%	76%	60%	49%	42%	37%	33%	30%	28%	27%	25%
Accumulated Depreciation and Amortization	0%	0%	0%	-1%	-1%	-2%	-3%	-3%	-4%	-4%	-14%	-11%	-9%	-8%	-7%	-6%	-6%	-5%	-5%	-5%
TOTAL ASSETS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Liabilities																				
Short-term liabilities	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Long-term Liabilities	75%	80%	86%	89%	93%	90%	87%	78%	71%	62%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equity																				
Common Stock	32%	34%	37%	40%	43%	44%	45%	43%	42%	40%	41%	28%	21%	17%	14%	12%	11%	10%	9%	9%
Retained Earnings	-7%	-14%	-23%	-29%	-36%	-34%	-32%	-22%	-13%	-2%	58%	71%	79%	83%	86%	87%	89%	90%	90%	91%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Horizontal Analysis																				
Income Statement																				
Revenue		#DIV/0!	#DIV/0!	#DIV/0!	0%	101%	0%	50%	0%	34%	#DIV/0!	2%	2%	2%	-17%	2%	-20%	2%	-27%	2%
Cost of Services		#DIV/0!	#DIV/0!	#DIV/0!	2%	65%	2%	41%	2%	30%	#DIV/0!	#DIV/0!	2%	2%	-25%	2%	-21%	2%	-27%	2%
Gross Profit		#DIV/0!	#DIV/0!	#DIV/0!	-1%	111%	-1%	52%	0%	35%	#DIV/0!	-20%	2%	2%	-14%	2%	-20%	2%	-27%	2%
General Ad. Expenses		#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	2%	2%	2%	2%	#DIV/0!	#DIV/0!	2%	2%	-100%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Incentives		#DIV/0!	#DIV/0!	#DIV/0!	2%	2%	2%	2%	2%	2%	#DIV/0!	#DIV/0!	2%	2%	-100%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBITDA		#DIV/0!	#DIV/0!	#DIV/0!	-1%	123%	-1%	55%	-1%	36%	#DIV/0!	-22%	2%	2%	-12%	2%	-20%	2%	-27%	2%
Amortization and Depreciation		#DIV/0!	0%	2516%	0%	0%	0%	0%	0%	0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBIT		#DIV/0!	0%	-17507%	-1%	142%	-1%	58%	-1%	37%	#DIV/0!	-22%	2%	2%	-12%	2%	-20%	2%	-27%	2%
Interest		0%	0%	-3%	-4%	-4%	-5%	-6%	-7%	-8%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
EBT		0%	0%	-52%	-7%	-158%	12%	241%	4%	69%	#DIV/0!	-22%	2%	2%	-12%	2%	-20%	2%	-27%	2%
CIT																				
Carry for Loss																				
Tax		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	264%	#DIV/0!	-22%	2%	2%	-12%	2%	-20%	2%	-27%	2%
Net Profit		0%	0%	-52%	-7%	-158%	12%	241%	-11%	35%	#DIV/0!	-22%	2%	2%	-12%	2%	-20%	2%	-27%	2%

Horizontal Analysis																				
Balance Sheet																				
Assets																				
Cash and Cash Equivalents		-7%	-7%	-29%	-9%	-37%	-3%	-47%	6%	-77%	1211%	71%	42%	30%	20%	17%	12%	11%	7%	7%
Fixed Assets		#DIV/0!	0%	2616%	0%	96%	0%	49%	2%	31%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accumulated Depreciation and Amortization		#DIV/0!	100%	1308%	93%	48%	33%	25%	20%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL ASSETS		-7%	-7%	-7%	-8%	-2%	-2%	4%	2%	5%	54%	27%	22%	18%	13%	12%	9%	8%	5%	5%
Liabilities																				
Short-term liabilities		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Long-term Liabilities		0%	0%	-4%	-4%	-5%	-5%	-6%	-7%	-9%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Equity																				
Common Stock		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Retained Earnings		100%	50%	16%	13%	-7%	-8%	-30%	-38%	-81%	-1473%	83%	47%	32%	21%	18%	12%	11%	7%	7%
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES		-7%	-7%	-7%	-8%	-2%	-2%	4%	2%	5%	171%	48%	33%	25%	18%	15%	11%	10%	6%	6%
Ratio Analysis																				
Debt Services Coverage Ratio	-	-	-	0,40	0,40	0,89	0,88	1,36	1,35	1,84	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Current Ratio	1,34	1,24	1,15	0,85	0,80	0,53	0,55	0,31	0,35	0,09	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Financial Leverage Ratio	75%	80%	86%	89%	93%	90%	87%	78%	71%	62%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

FINANCIAL STATEMENTS

Number of days		365	366	365	365	365	366	365	365	365	366	0	365	365	366	365	365	365	366	365	365	365	366	365	365
Number of Years	0	1	2	3	4	5	6	7	8	9	10	0	60	61	62	63	64	65	66	67	68	69	70	71	72
Timeline End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 …..		31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092	31.12.2093	31.12.2094
Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 …..		1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092	1.01.2093	1.01.2094
Income Statement																									
Revenue		-	-	-	915.971.004	915.971.004	1.836.961.027	1.831.942.008	2.747.913.012	2.747.913.012	3.673.922.054	-	10.803.470.496	11.019.539.906	11.270.725.035	11.464.729.319	9.567.837.740	9.759.194.495	7.763.506.065	7.897.140.186	5.753.630.707	5.868.703.321	3.601.486.560	-	-
Cost of Services		-	-	-	206.148.169	210.271.132	346.151.948	353.074.986	497.131.565	507.074.196	659.745.360	-	-	2.398.233.674	2.446.198.348	2.495.122.315	1.868.646.273	1.906.019.198	1.512.108.564	1.542.350.735	1.123.712.679	1.146.186.932	701.466.402	-	-
Gross Profit		-	-	-	709.822.835	705.699.872	1.490.809.080	1.478.867.022	2.250.781.447	2.240.838.816	3.014.176.694	-	10.803.470.496	8.621.306.232	8.824.526.688	8.969.607.004	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
General Ad. Expenses		-	-	-	30.277.241	30.882.786	31.500.442	32.130.451	32.773.060	33.428.521	34.097.091	-	-	93.610.829	95.483.046	97.392.707	-	-	-	-	-	-	-	-	-
Incentives		-	-	-	38.819.749	39.596.144	40.388.067	41.195.828	42.019.745	42.860.139	43.717.342	-	-	120.022.456	122.422.906	124.871.364	-	-	-	-	-	-	-	-	-
EBITDA		-	-	-	640.725.845	635.220.942	1.418.920.571	1.405.540.743	2.175.988.643	2.164.550.155	2.936.362.261	-	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
Amortization and Depreciation		-	3.200.000	3.200.000	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBIT		-	-3.200.000	-3.200.000	557.008.674	551.503.770	1.335.203.399	1.321.823.571	2.092.271.471	2.080.832.984	2.852.645.089	-	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
Interest		1.160.320.000	1.160.320.000	1.160.320.000	1.120.800.797	1.077.724.866	1.030.772.102	979.593.588	923.809.008	863.003.816	796.726.157	-													
EBT		-1.160.320.000	-1.163.520.000	-1.163.520.000	-563.792.124	-526.221.096	304.431.298	342.229.983	1.168.462.463	1.217.829.167	2.055.918.932	-	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
CIT		-	-	-	-	-	304.431.298	342.229.983	1.168.462.463	1.217.829.167	2.055.918.932	-	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
Carry for Loss				-1.163.520.000	-1.727.312.124	-2.253.533.220	-1.949.101.922	-1.606.871.939	-438.409.476	779.419.691	2.835.338.623	-	10.803.470.496	8.407.672.946	8.606.620.736	8.747.342.933	7.699.191.468	7.853.175.297	6.251.397.501	6.354.789.450	4.629.918.028	4.722.516.389	2.900.020.157	-	-
Tax		-	-	-	-	-	-	-	-	179.266.529	652.127.883	-	2.484.798.214	1.933.764.778	1.979.522.769	2.011.888.875	1.770.814.038	1.806.230.318	1.437.821.425	1.461.601.574	1.064.881.146	1.086.178.769	667.004.636	-	-
Net Profit		-1.160.320.000	-1.163.520.000	-1.163.520.000	-563.792.124	-526.221.096	304.431.298	342.229.983	1.168.462.463	1.038.562.638	1.403.791.049	-	8.318.672.282	6.473.908.169	6.627.097.967	6.735.454.059	5.928.377.430	6.046.944.979	4.813.576.076	4.893.187.877	3.565.036.882	3.636.337.619	2.233.015.521	-	-
Cash Flow Statement																									
Net Profit		-1.160.320.000	-1.163.520.000	-1.163.520.000	-563.792.124	-526.221.096	304.431.298	342.229.983	1.168.462.463	1.038.562.638	1.403.791.049	-	8.318.672.282	6.473.908.169	6.627.097.967	6.735.454.059	5.928.377.430	6.046.944.979	4.813.576.076	4.893.187.877	3.565.036.882	3.636.337.619	2.233.015.521	-	-
Operating Activities																									
Amortization and Depreciation		-	3.200.000	3.200.000	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	83.717.172	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change in VAT		-	-	-	12.411.299	1.007.710	13.871.730	1.053.054	13.799.128	1.121.172	13.954.236	-52.450.134	162.052.057	12.638.660	4.738.864	3.221.193	-23.912.310	877.659	-29.862.188	-484.004	-32.192.976	-956.659	-34.087.973	-56.862.963	-4.738.580
Cash Flow from Operating Activities		-1.160.320.000	-1.160.320.000	-1.160.320.000	-467.663.653	-441.496.215	402.020.199	427.000.208	1.265.978.763	1.123.400.982	1.501.462.457	-52.450.134	8.480.724.340	6.486.546.829	6.631.836.831	6.738.675.251	5.904.465.120	6.047.822.637	4.783.713.887	4.892.703.873	3.532.843.906	3.635.380.960	2.198.927.548	-56.862.963	-4.738.580
Investing Activities																									
CAPEX		-	128.000.000	-	3.348.686.869	-	3.348.686.869	-	3.348.686.869	192.000.000	3.220.686.869	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Share Holder's Equity	5.525.333.333																								
Cash Flow from Investing Activities		-	-128.000.000	-	-3.348.686.869	-	-3.348.686.869	-	-3.348.686.869	-192.000.000	-3.220.686.869	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Free Cash Flow		-1.160.320.000	-1.288.320.000	-1.160.320.000	-3.816.350.522	-441.496.215	-2.946.666.670	427.000.208	-2.082.708.106	931.400.982	-1.719.224.412	-52.450.134	8.480.724.340	6.486.546.829	6.631.836.831	6.738.675.251	5.904.465.120	6.047.822.637	4.783.713.887	4.892.703.873	3.532.843.906	3.635.380.960	2.198.927.548	-56.862.963	4.738.580
Financing Activities																									
Debt Repayment		-	-	-	478.621.455	521.697.386	568.650.151	619.828.664	675.613.244	736.418.436	802.696.095	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Borrowing	12.892.444.444																								
Cash Flow From Financing Activities		-	-	-	-478.621.455	-521.697.386	-568.650.151	-619.828.664	-675.613.244	-736.418.436	-802.696.095	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cash Flow	18.417.777.778	-1.160.320.000	-1.288.320.000	-1.160.320.000	-4.294.971.977	-963.193.601	-3.515.316.820	-192.828.456	-2.758.321.350	194.982.546	-2.521.920.508	-52.450.134	8.480.724.340	6.486.546.829	6.631.836.831	6.738.675.251	5.904.465.120	6.047.822.637	4.783.713.887	4.892.703.873	3.532.843.906	3.635.380.960	2.198.927.548	-56.862.963	-4.738.580
Balance Sheet																									
Assets																									
Cash and Cash Equivalents	18.417.777.778	17.257.457.778	15.969.137.778	14.808.817.778	10.513.845.801	9.550.652.200	6.035.335.379	5.842.506.923	3.084.185.573	3.279.168.119	757.247.612	704.797.478	9.180.753.623	15.667.300.452	22.299.137.283	29.037.812.534	34.942.277.654	40.990.100.291	45.773.814.179	50.666.518.052	54.199.361.957	57.834.742.918	60.033.670.466	59.976.807.503	59.972.068.923
VAT Receivable		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fixed Assets		-	128.000.000	128.000.000	3.476.686.869	3.476.686.869	6.825.373.737	6.825.373.737	10.174.060.606	10.366.060.606	13.586.747.475	-	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778	18.417.777.778
Accumulated Depreciation and Amortization		-	-3.200.000	-6.400.000	-90.117.172	-173.834.343	-257.551.515	-341.268.687	-424.985.859	-508.703.030	-592.420.202	-	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869	-3.348.686.869
TOTAL ASSETS	18.417.777.778	17.257.457.778	16.093.937.778	14.930.417.778	13.900.415.497	12.853.504.725	12.603.157.602	12.326.611.974	12.833.260.321	13.136.525.695	13.751.574.884	704.797.478	24.249.844.533	30.736.391.361	37.368.228.192	44.106.903.443	50.011.368.563	56.059.191.200	60.842.905.088	65.735.608.961	69.268.452.866	72.903.833.827	75.102.761.375	75.045.898.412	75.041.159.832
			-7%																						
Liabilities																									
VAT Payable		-	-	-	12.411.299	13.419.008	27.290.738	28.343.791	42.142.919	43.264.092	57.218.328	4.768.194	162.052.057	174.690.717	179.429.582	182.650.774	158.738.464	159.616.123	129.753.935	129.269.931	97.076.955	96.120.296	62.032.323	5.169.360	430.780
Short-term liabilities																									
Long-term Liabilities	12.892.444.444	12.892.444.444	12.892.444.444	12.892.444.444	12.413.822.989	11.892.125.603	11.323.475.452	10.703.646.788	10.028.033.544	9.291.615.108	8.488.919.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Payables																									
Equity																									
Common Stock	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333	5.525.333.333
Retained Earnings		-1.160.320.000	-2.323.840.000	-3.487.360.000	-4.051.152.124	-4.577.373.220	-4.272.941.922	-3.930.711.939	-2.762.249.476	-1.723.686.838	-319.895.789	-319.895.789	7.754.024.978	14.227.933.147	20.855.031.113	27.590.485.172	33.518.862.602	39.565.807.581	44.379.383.656	49.272.571.533	52.837.608.415	56.473.946.034	58.706.961.555	58.706.961.555	58.706.961.555
TOTAL SHAREHOLDER'S EQUITY AND LIABILITIES	18.417.777.778	17.257.457.778	16.093.937.778	14.930.417.778	13.900.415.497	12.853.504.725	12.603.157.602	12.326.611.974	12.833.260.321	13.136.525.695	13.751.574.884	5.210.205.738	13.441.410.369	19.927.957.198	26.559.794.028	33.298.469.280	39.202.934.399	45.250.757.037	50.034.470.924	54.927.174.797	58.460.018.703	62.095.399.663	64.294.327.211	64.237.464.248	64.232.725.668
Balance Check	-	-	-	-	-	-	-	-	-	-	-	-4.505.408.261	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164	10.808.434.164

VAT																								
VAT Payable	-	-	-	164.874.781	164.874.781	330.652.985	329.749.561	494.624.342	494.624.342	661.305.970	-	1.944.624.689	1.983.517.183	2.028.730.506	2.063.651.277	1.722.210.793	1.756.655.009	1.397.431.092	1.421.485.233	1.035.653.527	1.056.366.598	648.267.581	-	-
	-	-	-	164.874.781	164.874.781	330.652.985	329.749.561	494.624.342	494.624.342	661.305.970	-	1.944.624.689	1.983.517.183	2.028.730.506	2.063.651.277	1.722.210.793	1.756.655.009	1.397.431.092	1.421.485.233	1.035.653.527	1.056.366.598	648.267.581	-	-
VAT Receivable	-	-	-	15.939.198	16.257.982	16.583.142	16.914.805	17.253.101	17.598.163	17.950.126	-	-	49.280.631	50.266.244	51.271.568	-	-	-	-	-	-	-	-	-
Fuel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance	-	-	-	2.123.339	2.165.806	2.209.122	2.253.304	2.298.370	2.344.338	2.391.225	-	-	6.564.915	6.696.214	6.830.138	-	-	-	-	-	-	-		
Consumables	-	-	-	283.112	288.774	294.550	300.441	306.449	312.578	318.830	-	-	875.322	892.828	910.685	-	-	-	-	-	-	-	-	-
Outages	-	-	-	4.289.145	4.374.928	4.462.426	4.551.675	4.642.708	4.735.562	4.830.274	-	-	13.261.129	13.526.352	13.796.879	-	-	-	-	-	-	-	-	-
Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel storage	-	-	-	1.274.003	1.299.483	1.325.473	1.351.983	1.379.022	1.406.603	1.434.735	-	-	3.938.949	4.017.728	4.098.083	-	-	-	-	-	-	-	-	-
Unit 2																								
Fuel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance	-	-	-	2.123.339	2.165.806	2.209.122	2.253.304	2.298.370	2.344.338	2.391.225	-	-	6.564.915	6.696.214	6.830.138	-	-	-	-	-	-	-	-	-
Consumables	-	-	-	283.112	288.774	294.550	300.441	306.449	312.578	318.830	-	-	875.322	892.828	910.685	-	-	-	-	-	-	-	-	-
Outages	-	-	-	4.289.145	4.374.928	4.462.426	4.551.675	4.642.708	4.735.562	4.830.274	-	-	13.261.129	13.526.352	13.796.879	-	-	-	-	-	-	-	-	-
Insurance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel storage	-	-	-	1.274.003	1.299.483	1.325.473	1.351.983	1.379.022	1.406.603	1.434.735	-	-	3.938.949	4.017.728	4.098.083	-	-	-	-	-	-	-	-	-
Net VAT for the Period	-	-	-	**-148.935.583**	**-148.616.799**	**-314.069.843**	**-312.834.757**	**-477.371.241**	**-477.026.179**	**-643.355.844**	-	**-1.944.624.689**	**-1.934.236.552**	**-1.978.464.263**	**-2.012.379.709**	**-1.722.210.793**	**-1.756.655.009**	**-1.397.431.092**	**-1.421.485.233**	**-1.035.653.527**	**-1.056.366.598**	**-648.267.581**	-	-
Opening	-	-	-	-	-12.411.299	-13.419.008	-27.290.738	-28.343.791	-42.142.919	-43.264.092	-57.218.328	-0	-162.052.057	-174.690.717	-179.429.582	-182.650.774	-158.738.464	-159.616.123	-129.753.935	-129.269.931	-97.076.955	-96.120.296	-62.032.323	-5.169.360
VAT Receivable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Payable	-	-	-	148.935.583	148.616.799	314.069.843	312.834.757	477.371.241	477.026.179	643.355.844	-	1.944.624.689	1.934.236.552	1.978.464.263	2.012.379.709	1.722.210.793	1.756.655.009	1.397.431.092	1.421.485.233	1.035.653.527	1.056.366.598	648.267.581	-	-
Closing	-	-	-	-12.411.299	-13.419.008	-27.290.738	-28.343.791	-42.142.919	-43.264.092	-57.218.328	-4.768.194	-162.052.057	-174.690.717	-179.429.582	-182.650.774	-158.738.464	-159.616.123	-129.753.935	-129.269.931	-97.076.955	-96.120.296	-62.032.323	-5.169.360	-430.780
VAT Receivable to BS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Payable to BS	-	-	-	12.411.299	13.419.008	27.290.738	28.343.791	42.142.919	43.264.092	57.218.328	4.768.194	162.052.057	174.690.717	179.429.582	182.650.774	158.738.464	159.616.123	129.753.935	129.269.931	97.076.955	96.120.296	62.032.323	5.169.360	430.780
VAT Change to CF	-	-	-	-12.411.299	-1.007.710	-13.871.730	-1.053.054	-13.799.128	-1.121.172	-13.954.236	52.450.134	-162.052.057	-12.638.660	-4.738.864	-3.221.193	23.912.310	-877.659	29.862.188	484.004	32.192.976	956.659	34.087.973	56.862.963	4.738.580

FINANCING				0	0	0	0	0	0	0	0	0	0
			Number of days	365	366	365	365	365	366	365	365	365	366
			Number of Years	1	2	3	4	5	6	7	8	9	10
		Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032
			Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032
Equity	30%												
Debt	70%												
Interest Rate	9%												
Loan maturity	15												
TOTAL	18.417.777.778												
Debt	12.892.444.444												
Equity	5.525.333.333												
TOTAL	18.417.777.778												
			Total										
Installments			23.991.333.786	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252	1.599.422.252
Interest				1.160.320.000	1.160.320.000	1.160.320.000	1.120.800.797	1.077.724.866	1.030.772.102	979.593.588	923.809.008	863.003.816	796.726.157
Principal							478.621.455	521.697.386	568.650.151	619.828.664	675.613.244	736.418.436	802.696.095
Net Borrowing			12.892.444.444	12.892.444.444	12.892.444.444	12.892.444.444	12.413.822.989	11.892.125.603	11.323.475.452	10.703.646.788	10.028.033.544	9.291.615.108	8.488.919.012

FINANCING	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of days	0	365	366	365	365	365	366	365	365	365	366	365	365
Number of Years	0	61	62	63	64	65	66	67	68	69	70	71	72
End Date	……	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092	31.12.2093	31.12.2094
Start Date	……	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092	1.01.2093	1.01.2094

FUEL

						Escalation Rate		0	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02		0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	
						Number of days		365	366	365	365	365	366	365	365	365	366		365	366	365	365	365	366	365	365	365	
						Number of Years		1	2	3	4	5	6	7	8	9	10		61	62	63	64	65	66	67	68	69	
					Timeline	End Date		31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	….	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	…..
						Start Date		1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	….	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	…..
					Years in Operation	Control																						
Unit 1	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	60		0	0	0	0	1	1	1	1	1	1	1		1	1	1	0	0	0	0	0	0	
Unit 2	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	60		0	0	0	0	1	1	1	1	1	1	1		1	1	1	0	0	0	0	0	0	
Unit 3	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	60		0	0	0	0	0	0	1	1	1	1	1		1	1	1	1	1	0	0	0	0	
Unit 4	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	60		0	0	0	0	0	0	1	1	1	1	1		1	1	1	1	1	0	0	0	0	
Unit 5	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	60		0	0	0	0	0	0	0	0	1	1	1		1	1	1	1	1	1	1	0	0	
Unit 6	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	60		0	0	0	0	0	0	0	0	1	1	1		1	1	1	1	1	1	1	0	0	
Unit 7	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	60		0	0	0	0	0	0	0	0	0	0	1		1	1	1	1	1	1	1	1	1	
Unit 8	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	60		0	0	0	0	0	0	0	0	0	0	1		1	1	1	1	1	1	1	1	1	
Unit 9	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	60		0	0	0	0	0	0	0	0	0	0	0		1	1	1	1	1	1	1	1	1	
Unit 10	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	60		0	0	0	0	0	0	0	0	0	0	0		1	1	1	1	1	1	1	1	1	
Unit 11	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	60		0	0	0	0	0	0	0	0	0	0	0		1	1	1	1	1	1	1	1	1	
Fuel Consumption		**Yearly Consumption**																										
Unit 1	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 2	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 3	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 4	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 5	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 6	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 7	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 8	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 9	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 10	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Unit 11	Ton	7500						7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	
Fuel Cost		1663						1.663	1.696	1.730	1.765	1.800	1.836	1.873	1.910	1.948	1.987		5.456	5.565	5.677	5.790	5.906	6.024	6.145	6.268	6.393	
Fuel Costs																												
Unit 1								-	-	-	13.235.917	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	-	-	-	-	-	-	
Unit 2								-	-	-	13.235.917	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	-	-	-	-	-	-	
Unit 3								-	-	-	-	-	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	-	-	-	-	
Unit 4								-	-	-	-	-	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	-	-	-	-	
Unit 5								-	-	-	-	-	-	-	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	-	-	
Unit 6								-	-	-	-	-	-	-	14.326.982	14.613.522	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	-	-	
Unit 7								-	-	-	-	-	-	-	-	-	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	
Unit 8								-	-	-	-	-	-	-	-	-	14.905.792		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	
Unit 9								-	-	-	-	-	-	-	-	-	-		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	
Unit 10								-	-	-	-	-	-	-	-	-	-		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	
Unit 11								-	-	-	-	-	-	-	-	-	-		40.922.657	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	
Total Fuel Cost								-	-	-	26.471.834	27.001.270	55.082.591	56.184.243	85.961.892	87.681.130	119.246.336		450.149.222	459.152.206	468.335.250	390.847.054	398.663.995	316.273.436	322.598.905	235.036.345	239.737.072	

OPEX

						Escalation Rate	0	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
						Number of days	365	366	365	365	365	366	365	365	365	366	0	365	366	365	365	365	366	365	365	365	366
						Number of Years	1	2	3	4	5	6	7	8	9	10	0	61	62	63	64	65	66	67	68	69	70
					Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	......	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092
						Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	......	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092
					Years in Operation	Control																					
Unit 1	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	30	30	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0
Unit 2	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	30	30	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0
Unit 3	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	30	30	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0
Unit 4	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	30	30	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0
Unit 5	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	30	30	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0	0	0
Unit 6	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	30	30	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0	0	0
Unit 7	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	30	30	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0
Unit 8	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	30	30	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0
Unit 9	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Unit 10	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Unit 11	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Operating Costs																											
Unit 1		**First Year Costs**		**Reporting Classification**	**VAT**																						
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	-	-	-	-	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	11.796.328	12.032.254	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	-	-	-	-	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	1.572.844	1.604.301	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	-	-	-	-	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	23.828.582	24.305.154	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	-	-	-	-	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	5.504.953	5.615.052	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	-	-	-	-	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	7.077.797	7.219.353	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	-	-	-	-	-	-	-
7																											
Unit 2																											
1 Fuel		12.472.500	100%	Cost of Services			-	-	-	13.500.635	13.770.648	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	-	-	-	-	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	11.796.328	12.032.254	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	-	-	-	-	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	1.572.844	1.604.301	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	-	-	-	-	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	23.828.582	24.305.154	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	-	-	-	-	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	5.504.953	5.615.052	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	-	-	-	-	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	7.077.797	7.219.353	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	-	-	-	-	-	-	-
7																											
Unit 3																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	-	-	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	-	-	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	-	-	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	-	-	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	-	-	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	-	-	-	-	-
Unit 4																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	14.046.061	14.326.982	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	-	-	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	12.272.899	12.518.357	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	-	-	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	1.636.387	1.669.114	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	-	-	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	24.791.257	25.287.082	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	-	-	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	5.727.353	5.841.900	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	-	-	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	7.363.740	7.511.014	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	-	-	-	-	-
Unit 5																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	-	-	-
Unit 6																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	14.613.522	14.905.792	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	-	-	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	12.768.725	13.024.099	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	-	-	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	1.702.497	1.736.547	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	-	-	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	25.792.824	26.308.680	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	-	-	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	5.958.738	6.077.913	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	-	-	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	7.661.235	7.814.459	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	-	-	-
Unit 7																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	-	-	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	-	-	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	-
Unit 8																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	-	-	15.203.908	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	-
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	13.284.581	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	-
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	1.771.277	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	-
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	26.834.854	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	-
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	-	-	6.199.471	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	-
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	7.970.749	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	-
Unit 9																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272
Unit 10																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272
Unit 11																											
1 Fuel		12.472.500	100%	Cost of Services	0%		-	-	-	-	-	-	-	-	-	-	-	41.741.110	42.575.932	43.427.450	44.295.999	45.181.919	46.085.558	47.007.269	47.947.414	48.906.363	49.884.490
2 Maintenance		10.897.983	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	36.471.752	37.201.187	37.945.211	38.704.115	39.478.197	40.267.761	41.073.116	41.894.579	42.732.470	43.587.119
3 Consumables		1.453.064	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	4.862.900	4.960.158	5.059.361	5.160.549	5.263.760	5.369.035	5.476.415	5.585.944	5.697.663	5.811.616
4 Outages		22.013.927	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	73.672.939	75.146.397	76.649.325	78.182.312	79.745.958	81.340.877	82.967.695	84.627.049	86.319.590	88.045.981
5 Insurance		5.085.726	100%	Cost of Services			-	-	-	-	-	-	-	-	-	-	-	17.020.151	17.360.554	17.707.765	18.061.920	18.423.159	18.791.622	19.167.454	19.550.803	19.941.819	20.340.656
6 Fuel storage		6.538.790	100%	Cost of Services	18%		-	-	-	-	-	-	-	-	-	-	-	21.883.051	22.320.712	22.767.126	23.222.469	23.686.918	24.160.657	24.643.870	25.136.747	25.639.482	26.152.272
In the scope of Incentive																											
Personnel		91.906.327	80%	Cost of Services	0%		-	-	-	99.482.365	101.472.012	103.501.452	105.571.481	107.682.911	109.836.569	112.033.300	-	307.578.440	313.730.009	320.004.609	-	-	-	-	-	-	-
	Training Cost		20%	General Ad. Expenses	18%		-	-	-	*19.896.473*	*20.294.402*	*20.700.290*	*21.114.296*	*21.536.582*	*21.967.314*	*22.406.660*	-	*61.515.688*	*62.746.002*	*64.000.922*	-	-	-	-	-	-	-
Corporate overhead		63.934.836	85%	General Ad. Expenses	18%		-	-	-	69.205.123	70.589.226	72.001.010	73.441.030	74.909.851	76.408.048	77.936.209	-	213.967.610	218.246.962	222.611.902	-	-	-	-	-	-	-
	Energy Cost		15%	General Ad. Expenses	18%		-	-	-	*10.380.768*	*10.588.384*	*10.800.152*	*11.016.155*	*11.236.478*	*11.461.207*	*11.690.431*	-	*32.095.142*	*32.737.044*	*33.391.785*	-	-	-	-	-	-	
TOTAL		**798.923.058**																									
TOTAL Cost of Services							-	-	-	264.972.523	270.271.974	275.677.413	281.190.961	286.814.781	292.551.076	298.402.098	-	819.239.025	835.623.805	852.336.281	-	-	-	-	-	-	-
TOTAL General Ad. Expenses							-	-	-	30.277.241	30.882.786	31.500.442	32.130.451	32.773.060	33.428.521	34.097.091	-	93.610.829	95.483.046	97.392.707	-	-	-	-	-	-	-
TOTAL Costs							**-**	**-**	**-**	**295.249.765**	**301.154.760**	**307.177.855**	**313.321.412**	**319.587.840**	**325.979.597**	**332.499.189**	**-**	**912.849.854**	**931.106.851**	**949.728.988**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Incentives Subject to Opex																											
Social Security Incentives							-	-	-	-17.409.414	-17.757.602	-18.112.754	-18.475.009	-18.844.509	-19.221.400	-19.605.828	-	-53.826.227	-54.902.751	-56.000.807	-	-	-	-	-	-	-
Withholding Tax Incentive							-	-	-	-19.896.473	-20.294.402	-20.700.290	-21.114.296	-21.536.582	-21.967.314	-22.406.660	-	-61.515.688	-62.746.002	-64.000.922	-	-	-	-	-	-	-
Training Support							-	-	-	-994.824	-1.014.720	-1.035.015	-1.055.715	-1.076.829	-1.098.366	-1.120.333	-	-3.075.784	-3.137.300	-3.200.046	-	-	-	-	-	-	-
Energy Support							-	-	-	-519.038	-529.419	-540.008	-550.808	-561.824	-573.060	-584.522	-	-1.604.757	-1.636.852	-1.669.589	-	-	-	-	-	-	-
Opex							-	-	-	231.968.626	236.607.999	241.340.159	246.166.962	251.090.301	256.112.107	261.234.349	-	717.197.952	731.541.911	746.172.749	-	-	-	-	-	-	-
Incentive							-	-	-	-38.819.749	-39.596.144	-40.388.067	-41.195.828	-42.019.745	-42.860.139	-43.717.342	-	-120.022.456	-122.422.906	-124.871.364	-	-	-	-	-	-	-
Net Opex							-	-	-	193.148.877	197.011.855	200.952.092	204.971.134	209.070.557	213.251.968	217.517.007	-	597.175.496	609.119.006	621.301.386	-	-	-	-	-	-	-

REVENUE						Escalation Rate	0	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02										
						Number of days	365	366	365	365	365	366	365	365	365	366	365	365	366	365	365	365	366	365	365	365	366
						Number of Years	1	2	3	4	5	6	7	8	9	10	60	61	62	63	64	65	66	67	68	69	70
					Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032 ……	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092
						Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032 ……	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092
Price Forecasts																											
PPA							193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	193,6	-	-	-	-	-	-	-	-	-	-	-
Market							129,09	131,7	134,3	137,0	139,7	142,5	145,4	148,3	151,2	154,3	415,2	423,5	432,0	440,7	449,5	458,5	467,6	477,0	486,5	496,3	506,2
Price							193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	193.635	415.2433965	423.5482645	432.0192298	440.6596144	449.4728066	458.4622628	467.631508	476.9841382	486.523821	496.2542974	506.1793833
					Years in Operation	Control																					
Unit 1	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	30	30	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Unit 2	Operation Start Date	1.01.2026	Operation End Date	1.01.2086	30	30	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Unit 3	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	30	30	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
Unit 4	Operation Start Date	1.01.2028	Operation End Date	1.01.2088	30	30	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
Unit 5	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	30	30	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Unit 6	Operation Start Date	1.01.2030	Operation End Date	1.01.2090	30	30	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Unit 7	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	30	30	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
Unit 8	Operation Start Date	1.01.2032	Operation End Date	1.01.2092	30	30	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
Unit 9	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Unit 10	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Unit 11	Operation Start Date	1.01.2033	Operation End Date	1.01.2093	30	30	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Installed Capacity							90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Installed Capacity																											
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Daily Generation																											
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480	6480
Yearly Generation																											
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Total Generated in Operation																											
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			0	0	0	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	0	0	0	0	0	0	0
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			0	0	0	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	0	0	0	0	0	0	0
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			0	0	0	0	0	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	0	0	0	0	0
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			0	0	0	0	0	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	0	0	0	0	0
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			0	0	0	0	0	0	0	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	0	0	0
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			0	0	0	0	0	0	0	2365200	2365200	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	0	0	0
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			0	0	0	0	0	0	0	0	0	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	0
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			0	0	0	0	0	0	0	0	0	2371680	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	0
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			0	0	0	0	0	0	0	0	0	0	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			0	0	0	0	0	0	0	0	0	0	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			0	0	0	0	0	0	0	0	0	0	2365200	2365200	2371680	2365200	2365200	2365200	2371680	2365200	2365200	2365200	2371680
Revenue																											
Unit 1	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			-	-	-	457.985.502,0	457.985.502,0	459.240.256,8	457.985.502,0	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	-	-	-	-	-	-	-
Unit 2	Operation Start Date	1.01.2026	Operation Start Date	1.01.2086			-	-	-	457.985.502,0	457.985.502,0	459.240.256,8	457.985.502,0	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	-	-	-	-	-	-	-
Unit 3	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			-	-	-	-	-	459.240.256,8	457.985.502,0	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	-	-	-	-	-
Unit 4	Operation Start Date	1.01.2028	Operation Start Date	1.01.2088			-	-	-	-	-	459.240.256,8	457.985.502,0	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	-	-	-	-	-
Unit 5	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			-	-	-	-	-	-	-	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	-	-	-
Unit 6	Operation Start Date	1.01.2030	Operation Start Date	1.01.2090			-	-	-	-	-	-	-	457.985.502,0	457.985.502,0	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	-	-	-
Unit 7	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			-	-	-	-	-	-	-	-	-	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	1.150.726.141,3	1.173.740.664,1	-
Unit 8	Operation Start Date	1.01.2032	Operation Start Date	1.01.2092			-	-	-	-	-	-	-	-	-	459.240.256,8	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	1.150.726.141,3	1.173.740.664,1	-
Unit 9	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			-	-	-	-	-	-	-	-	-	-	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	1.150.726.141,3	1.173.740.664,1	1.200.495.519,8
Unit 10	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			-	-	-	-	-	-	-	-	-	-	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	1.150.726.141,3	1.173.740.664,1	1.200.495.519,8
Unit 11	Operation Start Date	1.01.2033	Operation Start Date	1.01.2093			-	-	-	-	-	-	-	-	-	-	982.133.681,5	1.001.776.355,1	1.024.611.366,8	1.042.248.119,9	1.063.093.082,3	1.084.354.943,9	1.109.072.295,0	1.128.162.883,6	1.150.726.141,3	1.173.740.664,1	1.200.495.519,8
TOTAL Revenue							-	-	-	915.971.004,0	915.971.004,0	1.836.961.027,2	1.831.942.008,0	2.747.913.012,0	2.747.913.012,0	3.673.922.054,4	10.803.470.496,4	11.019.539.906,4	11.270.725.035,2	11.464.729.318,6	9.567.837.740,4	9.759.194.495,2	7.763.506.064,8	7.897.140.185,5	5.753.630.706,6	5.868.703.320,7	3.601.486.559,5

VALUATION

		1	2	3	4	5	6	7	8	9	10	
	Number of days	365	366	365	365	365	366	365	365	365	366	
	Number of Years	1	2	3	4	5	6	7	8	9	10	
Timeline	End Date	31.12.2023	31.12.2024	31.12.2025	31.12.2026	31.12.2027	31.12.2028	31.12.2029	31.12.2030	31.12.2031	31.12.2032	.....
	Start Date	1.01.2023	1.01.2024	1.01.2025	1.01.2026	1.01.2027	1.01.2028	1.01.2029	1.01.2030	1.01.2031	1.01.2032	.....
Valuation												
Cash Flow To the Project		-1.160.320.000	-1.288.320.000	-1.160.320.000	-3.816.350.522	-441.496.215	-2.946.666.670	427.000.208	-2.082.708.106	931.400.982	-1.719.224.412	
Equity Injection		-5.525.333.333										
Dividend		-	-	-	-	-	-	-	-	-	-	
Cash Flow to the Shareholders		-5.525.333.333	-	-	-	-	-	-	-	-	-	
IRR												
Project IRR	10,86%											
Equity IRR	12,29%											
Net Present Value												
Project NPV	2.948.281.832											
Equity NPV	3.889.083.347											
		-	-	-	193.148.877	197.011.855	200.952.092	204.971.134	209.070.557	213.251.968	217.517.007	
LCOE Calculation												
		-	128.000.000	-	3.348.686.869	-	3.348.686.869	-	3.348.686.869	192.000.000	3.220.686.869	
Total OPEX	22.028.926.803											
		-	-	-	4.730.400	4.730.400	9.486.720	9.460.800	14.191.200	14.191.200	18.973.440	
Total CAPEX	18.417.777.778											
Total Generated Capacity	1.562.101.200											
LCOE	25.89											

	60	61	62	63	64	65	66	67	68	69	70
Number of days	365	365	366	365	365	365	366	365	365	365	366
Number of Years	60	61	62	63	64	65	66	67	68	69	70
End Date	31.12.2082	31.12.2083	31.12.2084	31.12.2085	31.12.2086	31.12.2087	31.12.2088	31.12.2089	31.12.2090	31.12.2091	31.12.2092
Start Date	1.01.2082	1.01.2083	1.01.2084	1.01.2085	1.01.2086	1.01.2087	1.01.2088	1.01.2089	1.01.2090	1.01.2091	1.01.2092
Cash Flow To the Project	6.350.310.411	6.477.347.154	6.631.070.191	6.738.611.365	5.904.459.796	6.047.822.194	4.783.713.850	4.892.703.870	3.532.843.905	3.635.380.960	2.198.927.548
Dividend	4.341.326.654	4.428.153.187	4.532.935.009	4.607.050.576	4.055.010.162	4.136.110.365	3.292.486.036	3.346.940.508	2.438.485.227	2.487.254.932	1.527.382.616
Cash Flow to the Shareholders	4.341.326.654	4.428.153.187	4.532.935.009	4.607.050.576	4.055.010.162	4.136.110.365	3.292.486.036	3.346.940.508	2.438.485.227	2.487.254.932	1.527.382.616
	585.466.172	597.175.496	609.119.006	621.301.386	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
	26.017.200	26.017.200	26.088.480	26.017.200	21.286.800	21.286.800	16.601.760	16.556.400	11.826.000	11.826.000	7.115.040

WACC

Calculation of Cost of Equity

Türkiye Eurobond 20 Years Yield	9,00%
Türkiye Credit Default Swap	5,85%
Ke	14,85%

WACC

		Cost of Equity	Cost of Debt
		ke	kd
		14,85%	0,09
TOTAL		Weight of Equity	Weight of Debt
	18.417.777.778	5.525.333.333	12.892.444.444
		30,00%	70,00%
Weights		0,04	0,05
WACC		9,31%	