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NUCLEAR POWER FOR SUSTAINABLE DEVELOPMENT

How nuclear power contributes to sustainable development goals in the age of climate change challenge

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In order to reach energy and climate goals nuclear generation needs to double compared to today

”

Fatih Birol, Executive Director of IEA, at COP26, 2021

SUSTAINABLE DEVELOPMENT GOALS



“

Nuclear energy is an indispensable tool for achieving global sustainable development goals

”

UNECE, March 2021

INTRODUCTION

Today, the world is shifting towards new economic patterns that make sustainable development an even greater challenge.

In 2015, the UN launched its 17 Sustainable Development Goals, or SDGs, that cover a lot of ground and address various fields and sectors in social, economic and environmental dimensions. The SDGs have been adopted by 193 UN member states and can be applied to all countries regardless of their level of economic development, size or population. Achieving sustainable development goals has now become a driver for most of the world's economies. What is more, meeting sustainable development

GLOBAL CLIMATE AGENDA AND EFFICIENT ENERGY TRANSITION ARE ONE OF THE KEY ASPECTS OF SUSTAINABLE DEVELOPMENT.

NOWADAYS AN INCREASING NUMBER OF EXPERTS WORLDWIDE AGREE IT IS IMPOSSIBLE TO MEET GLOBAL CLIMATE TARGETS WITHOUT NUCLEAR ENERGY.

targets has become a responsibility not only for governments but also for businesses and financial institutions.

There is no denying that the energy sector is one of the key drivers of both social and economic development. Limited or unstable access to power is one of the key obstacles on the way to countries' comprehensive development. To ensure sustainable growth, it is therefore crucial for countries to

base their energy mix on reliable, affordable and sustainable energy sources.

Moreover, decarbonisation of the global energy mix is yet another high-priority goal to be achieved since the energy sector is one of the main CO₂ emitters. Nuclear power does not emit CO₂ during operation and contributes to achieving net-zero energy mix.

Nuclear power is a source of energy that provides dispatchable and clean electricity with a low carbon footprint and it is highly predictable in terms of costs and reliability of supply.

What is more, inclusion of nuclear power into the national energy mix results in developing energy-intensive industries, GDP growth, and social development by education, innovation and climate change mitigation — the three pillars of sustainable development.

Most importantly, nuclear power projects are positive examples of strong international cooperation that brings together various stakeholders and provides for building solid long-term partnerships. This is why nuclear power should keep and even strengthen its position in the global energy mix.

At the same time, the global energy system is undergoing drastic transformation; at a time when some regions are still struggling without basic commodities like heat and power, a comprehensive energy system is emerging.

The role of nuclear power is to ensure stability within modern integrated energy systems and contribute to achieving Sustainable Development Goals by all nations. To succeed in building a sustainable energy system for the world to prosper we need to make sure that nuclear power continues playing its unique role in the global energy balance while doing no harm to the environment. ■



Nuclear technologies are important sources of low-carbon electricity and heat that contribute to attaining carbon neutrality... the world's climate objectives will not be met if nuclear technologies are excluded



UNECE, August 2021

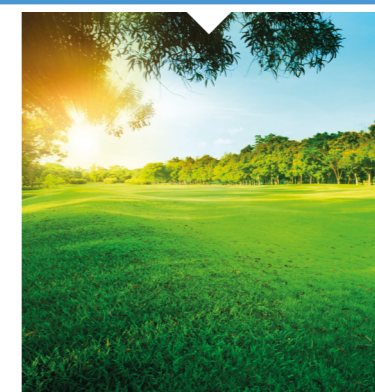
NUCLEAR POWER CONTRIBUTES TO



JOB CREATION

EACH NPP UNIT* CREATES
200,000
JOB-YEARS
OVER ITS
LIFECYCLE

ECONOMIC



CLIMATE MITIGATION

GLOBALLY,
NUCLEAR POWER
PLANTS PRODUCE
MORE THAN ONE
QUARTER (1/4) OF
ALL LOW-CARBON
ELECTRICITY

ENVIRONMENTAL



ACCESS TO ENERGY

ONE NPP*
CAN PROVIDE
ACCESS TO
BASELOAD
LOW-CARBON
ENERGY FOR
5 ABOUT
MLN PEOPLE

SOCIAL

THREE SUSTAINABLE DEVELOPMENT PILLARS

*1-unit NPP with 1,000-1,200 MWe capacity



Both sustainable development as a whole and the climate agenda in particular drive the development of green regulations for different types of activities. Such regulations aim to promote the activities that meet the sustainable development goals in general while specifically combating climate change. One of the most common types of green regulations are the so-called taxonomies, or classifiers, that set detailed criteria required to confirm the green nature of an activity.

THERE ARE MORE THAN 20 GREEN TAXONOMIES ALREADY APPROVED OR BEING DEVELOPED IN A NUMBER OF COUNTRIES. SOME OF THEM INCLUDE NUCLEAR ENERGY AS A GREEN TYPE OF ACTIVITY.



1

Green Regulation: Taxonomy Criteria

An important event of 2022 was the publication of an addition to the EU Taxonomy, which lays out detailed criteria with respect to nuclear energy. Its significance results from the EU Taxonomy for Sustainable Finance currently being the

most detailed among similar documents often used by other countries as the basis for developing their own national, green criteria. The addition will become effective on 1 January 2023.

THE EU TAXONOMY FOR SUSTAINABLE FINANCE (BECAME EFFECTIVE IN JULY 2020) SETS 6 PRIORITY ENVIRONMENTAL OBJECTIVES REQUIRED TO QUALIFY AN ACTIVITY AS GREEN:

- 1 climate change mitigation
- 2 climate change adaptation
- 3 sustainable use and protection of water and marine resources,
- 4 transition to a circular economy to prevent waste formation and its recycling
- 5 pollution prevention and control
- 6 protection and restoration of biodiversity and ecosystems

The green qualification under the EU Taxonomy is approved if at least one of the objectives is met while none of the others are negatively affected. Regarding nuclear energy, the most significant are the following sustainability parameters:

1. carbon footprint throughout the entire energy generation life cycle is less than 100 g of CO₂ eqv/kWh;
2. minimum use of water resources;
3. no risks of a nuclear accident during nuclear plant operation, safe handling of radioactive waste and spent nuclear fuel.

It is safe to say that the present-day nuclear energy solutions, due to their

low-carbon nature, generally meet the green criteria of the EU Taxonomy and the most stringent safety standards of the IAEA and local regulators in each country that operates nuclear power plants. The existing nuclear fuel cycle closure solutions also pursue the sustainable development logic in terms of trying to minimise the use of natural resources and maximise waste processing.

This said, the green qualification procedures that involve taxonomies consider each design individually to confirm its compliance with the green requirements expressly.

THE FOLLOWING TAXONOMIES QUALIFY NUCLEAR ENERGY AS A GREEN ACTIVITY:

- Climate Bonds Taxonomy (Climate Bonds Initiative, September 2021), without additional criteria
- EU Taxonomy for Sustainable Activities (EU, July 2020) and Complementary Climate Delegated Act (EU, March 2022)
- Green Bond Endorsed Projects Catalogue (2015 First Edition, China), criteria were introduced in the 2021 edition
- Green Project Taxonomy and Green Finance Standard (Russia, September 2021), without additional criteria
- K-Taxonomy (South Korea, December 2021), changes involving nuclear energy inclusion are expected to be introduced until the end of 2022



2 Energy Drives Sustainable Development



ENERGY IS SEEN AS BEING CRUCIAL FOR ACHIEVING SDGs

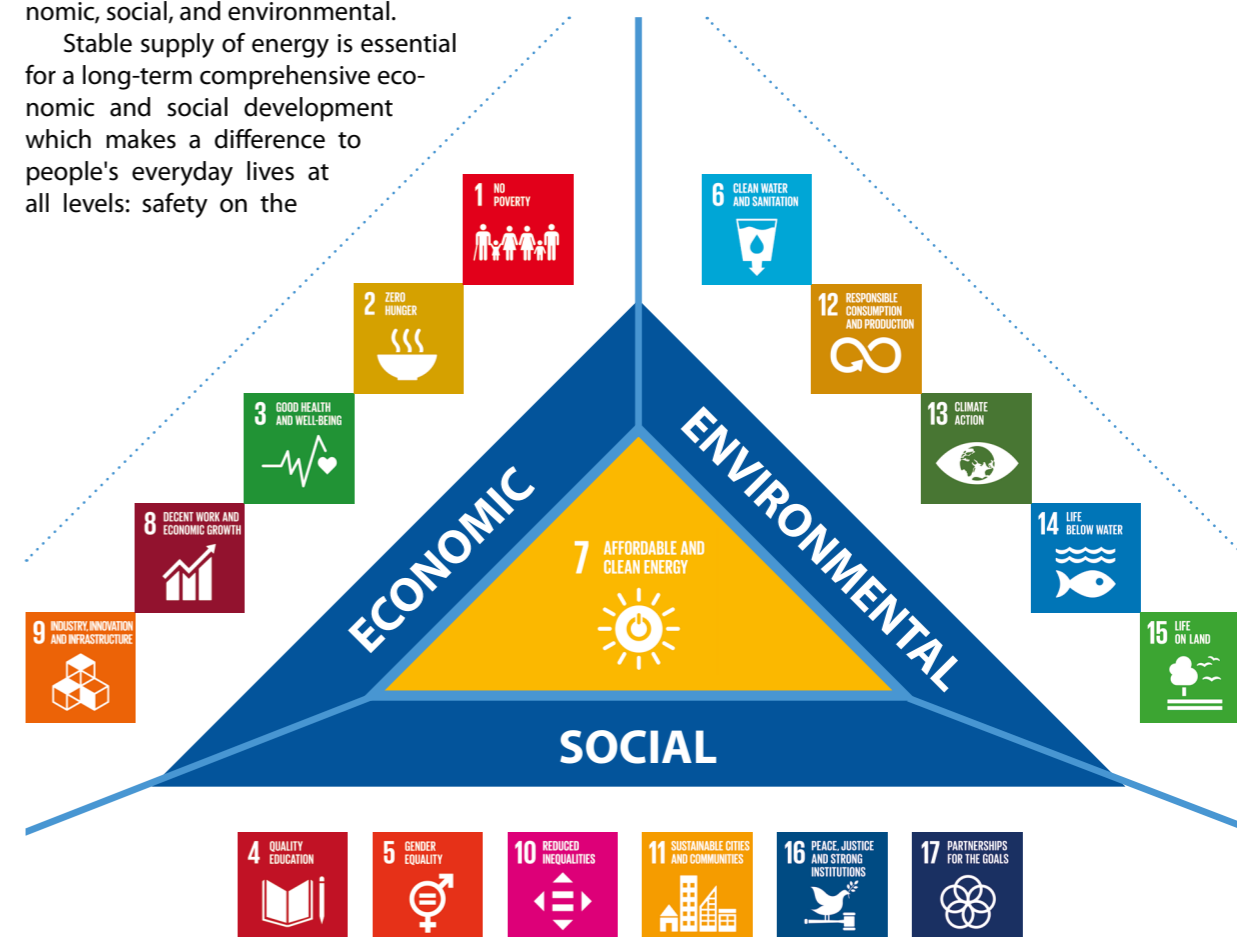
WHY IS ENERGY SO IMPORTANT FOR SDGs?

There is no doubt that energy is a prerequisite to sustainable development with nuclear power being its essential part. Access to reliable and affordable energy services ensures continuous development both at social and economic levels. SDG 7 is dedicated to providing affordable and clean energy since production and consumption of electricity have an impact on all three pillars of sustainable development — economic, social, and environmental.

Stable supply of energy is essential for a long-term comprehensive economic and social development which makes a difference to people's everyday lives at all levels: safety on the

streets, telecommunication systems, business processes and modern technologies for education and healthcare largely depend on the efficient operation of energy systems.

Unreliable and unstable access to power is one of the top constraints to economic development alongside with corruption, political instability, taxes, shadow economy and lack of finance, skills or land.



770 MILLION PEOPLE STILL DO NOT HAVE ACCESS TO ELECTRICITY

30.4% OF FIRMS SEE ELECTRICITY AS A MAJOR CONSTRAINT ON BUSINESS DEVELOPMENT

POWER OUTAGES COST AFRICAN COUNTRIES **~1-4%** OF THEIR ANNUAL GDP

ACCORDING TO THE IEA, GLOBAL POWER CONSUMPTION WILL MORE THAN DOUBLE BY **2040**

The good news is that the number of people without access to electricity fell from 1.7 billion in 2000 to 860 million in 2018 and by 2030 is projected to fall by 36%, despite an increase in the global population.

Developing countries in Sub-Saharan Africa are making good progress in decreasing the number of people without access to electricity; however, the electrification rate in this region is still below 45%. Asia has been very successful in providing access to electricity for people

ACCESS TO SUSTAINABLE ENERGY CAN CHANGE LIVES

and in 2021 reached the electrification rate of 94%, while in 2000 the indicator was merely 67%. It is expected that the universal access to electricity can be achieved in Asian countries by 2030. Latin America and the Middle East have already reached almost 100% electricity access (99% and 95%, respectively).

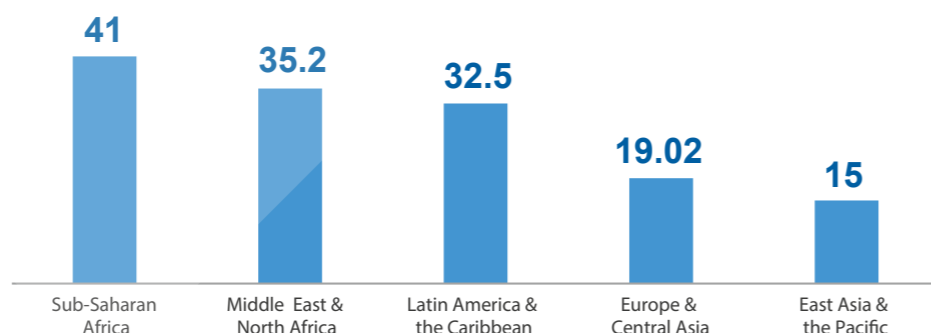
Even though the trend looks optimistic, by 2030 almost 8% of the world's population, which amounts to 670 million people, will still have no access to electricity.

Moreover, the mere access to electricity, which to many sounds synonymous to household access to electricity, is not itself enough to drive forward so-

The figures are self-explanatory: on average, 4.5% of annual sales are lost due to power outages globally, while for South Asia these losses account for almost 11%.

Limited access to power therefore goes far beyond just being an electricity and heat issue: it is an obstacle on the way to countries' sustainable development.

Share of firms that see electricity as a major constraint, by region



	Sub-Saharan Africa	East Asia and Pacific	Europe and Central Asia	Latin and Central America	South Asia	MENA
CONSTRAINT NO.1	ACCESS TO POWER	Corruption	Tax rate	Corruption	Political instability	Corruption
CONSTRAINT NO.2	Finance	ACCESS TO POWER	Political instability	Skills	ACCESS TO POWER	Political instability
CONSTRAINT NO.3	Shadow economy	Skills	ACCESS TO POWER	ACCESS TO POWER	Corruption	Land
CONSTRAINT NO.4	Corruption	Political instability	Corruption	Tax rate	Finance	ACCESS TO POWER
CONSTRAINT NO.5	Tax rate	Tax rate	Skills	Political instability	Land	Shadow economy

cial and economic development. It is its quality and quantity that matter.

It is not uncommon for households to have only low-quality access: limited hours of electricity at low voltage and relatively poor reliability. Few people ac-

tually have high-quality and reliable access to power.

Power supply should be sufficient and stable while prices should not fluctuate much and should demonstrate predictability in the long run. ■

▲
Top 5 constraints

ELECTRICITY SUPPLY IS ESSENTIAL FOR BOTH DAY-TO-DAY LIFE AND LONG-TERM DEVELOPMENT

QUALITY OF LIFE
In general, energy ensures economic stability and development, creates jobs and improves living standards



BUSINESS
Electricity supply is a key condition for successful development of transportation and commerce, micro-, small- and medium-size businesses, agriculture and various industries



HEALTH
Modern health-care system cannot possibly exist without energy. It allows refrigerating various types of medicine, vaccines as well as operating and sterilising medical equipment



EDUCATION
All kinds of educational institutions need electricity supply. It creates proper conditions for education, including incorporation of IT technologies into the educational process



3 The role of nuclear power in achieving SDGs

WITH A GROWING GLOBAL DEMAND FOR LOW-CARBON ENERGY, WORLD CAN BENEFIT FROM BUILDING NEW NUCLEAR POWER PLANTS

Lack of security, availability and reliability of the energy system can become a stumbling block to socio-economic development. For instance, power outages cost African countries ~1–4% of their GDP every year.

Moreover, 81% of the global energy mix is still based on fossil fuels, the same percentage as 30 years ago. Recent developments in the renewable energy sector are no doubt extremely significant, and renewables have become recognised as a very rapidly developing energy sector globally both in terms of installed capacity and in terms of the total volumes of investments. However, the energy sector is

still one of the main emitters of CO₂ and other GHGs that account for about 67% of total GHG emissions, which worsens climate change. According to the World Health Organization, the health sector suffers an estimated direct damage of USD 2–4 billion each year due to the global climate change.

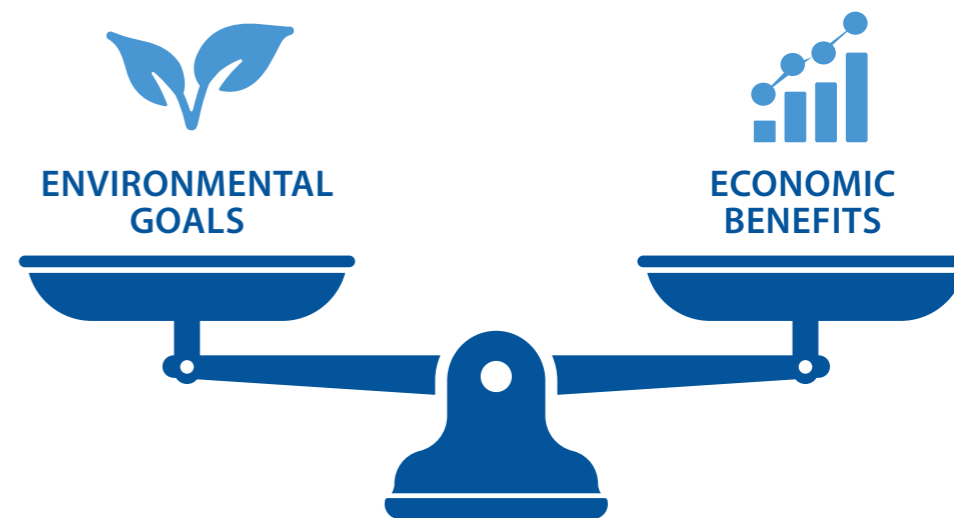
As a result, one of the key issues today is how to find the right balance between these two dilemmas: ensuring security of electricity supplies to boost economic development, on the one hand, and combating climate change efficiently, on the other. While some public groups are interested in environmental sustainability, others care more about GDP and income growth, which may go against the climate agenda.

Even though fossil fuels can provide the base load essential for economic growth, they barely contribute to climate change mitigation. At the same time, such low-carbon energy sources as wind and solar are intermittent and pose risks to the security of power supply, which is essential for heavy industries and medical institutions.

Here, the role of nuclear power cannot be overestimated.

TODAY, NUCLEAR POWER IS THE KIND OF BASELOAD CARBON-NEUTRAL ENERGY THAT MAKES IT POSSIBLE TO SUCCEED IN BOTH AREAS

Finding the right balance between economic and environmental goals





Ensure access to affordable, reliable, sustainable and modern energy for all



ROSATOM

NUCLEAR ENERGY IS:

AFFORDABLE ENERGY

While NPP construction projects require substantial capital investments, their operational costs make up a relatively smaller share of generation costs.

Fuel prices account for less than 20% of NPP power generation costs. While conventional energy sources highly depend on fuel prices, nuclear power costs are hardly affected by fuel price fluctuations, which is crucial when energy sources are imported. This low dependency on fuel prices provides for cost predictability even in the long run and ensures energy security for more than 60 years.

Secondly, the fuel campaign for nuclear power is much longer than for other conventional energy sources. Uranium has the highest energy value compared to the most common fossil fuels used to generate electric power. While 1 kg of coal provides 8 kWh of electricity, 1 kg of

uranium generates 50,000 kWh, a figure which would require 2.7 million kg in coal equivalent.

What is more, since all power plants invariably need fuels to operate, longer fuel campaigns typical of nuclear power plants may substantially increase logistics efficiency. For example, a large coal-fired power plant at full load requires at least one daily coal delivery of over 10,000 tons, especially in "peak seasons" when demand is at its highest. Coal burning therefore heavily depends on the capacity to transport coal in sufficient amounts reliably and at reasonable prices. This means that final prices for consumers are affected not only by coal prices, but also by logistics. Nuclear power does not require frequent fuel deliveries so that reliability of power supply and generation costs do not so much depend on fuel transportation.

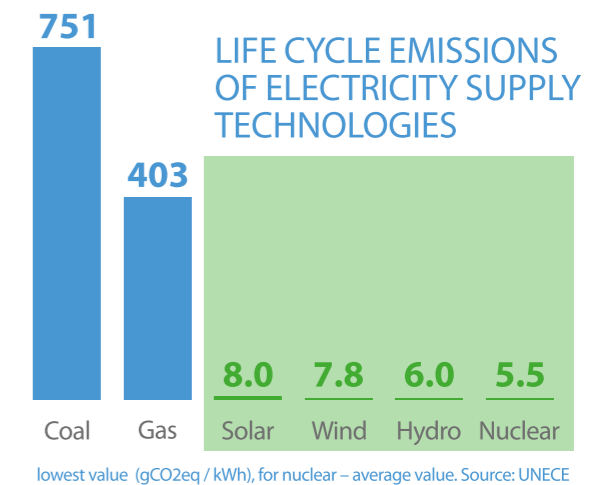
RELIABLE ENERGY

Nuclear power makes a significant contribution to ensuring energy security and optimising the cost of electricity.

One factor that contributes to energy security is nuclear power plants' ability to be built on a wide range of sites and generate power regardless of climatic conditions. This overcomes the main limitation of renewable energy sources that are non-dispatchable and highly dependent on weather conditions. Today, very few very few countries in the world can achieve a renewa-

bles-only grid — since energy storage is still very expensive. These are well-off and developed countries with predominantly residential electricity consumption and favourable geographical and climatic conditions. Energy intensive industries currently cannot rely on wind or solar power. Therefore, even though renewable sources are clean, the electricity they generate is intermittent. At the same time, nuclear power ensures reliable base load supply during the whole 60+ year lifecycle.

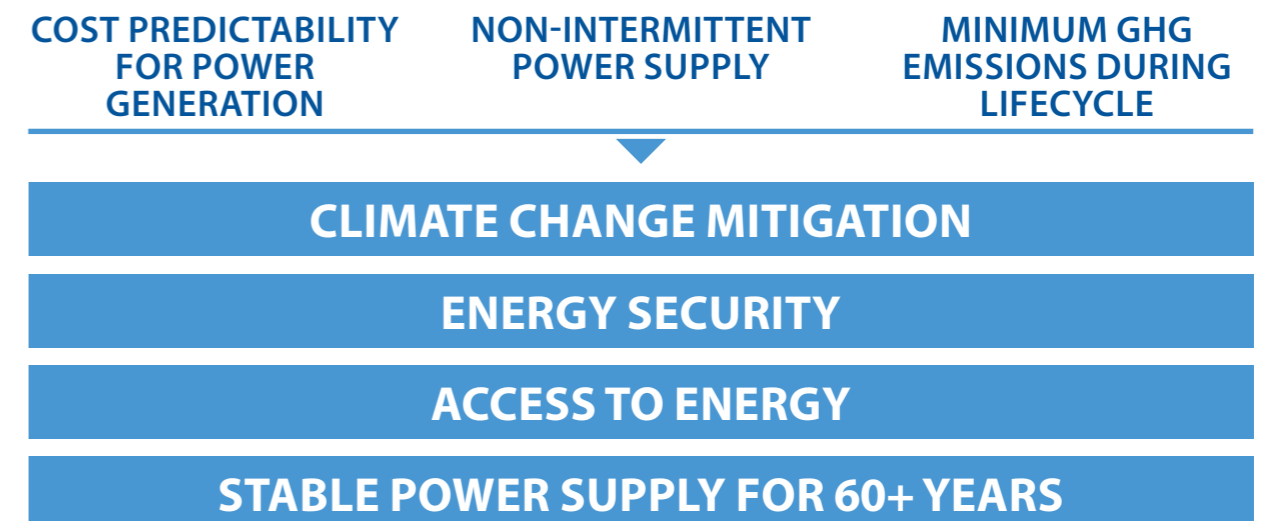
LOW-CARBON ENERGY



UN Intergovernmental Panel on Climate Change (IPCC) IPCC studies on lifecycle greenhouse gas emissions by generation types were conducted in 2014. They confirm the low figures of greenhouse gas emissions for nuclear power: the average figures are 12 g of CO₂-eq/kWh for nuclear power at 11 g CO₂-eq/kWh for wind and 24 g CO₂-eq/kWh for hydropower, respectively.¹

In October 2021, the United Nations Economic Commission for Europe (UNECE) published a study according to which greenhouse gas emissions from the lifecycle of a nuclear power plant are the lowest in comparison with other types of generation (the average value for a nuclear power plant is 5.5 g CO₂-eq/kWh, at the lower limit of hydropower – 6 g of CO₂-eq/kWh and the lower limit of wind power – 7.8 g CO₂-eq/kWh).¹²

NUCLEAR ENERGY IS THE ONLY EXISTING TYPE OF GENERATION THAT MEETS ALL THE CRITERIA OF SUSTAINABLE ENERGY SYSTEMS AT ONCE



Since 1980, total CO₂ emissions have almost doubled and reached the historic peak. At the UN Climate Change Conference COP-21 held in Paris in 2015, the leaders of 150 nations pledged to keep the increase in global temperatures by 2100 well below 2°C and as close as possible to 1.5°C compared to pre-industrial levels.

However, global emissions continue growing: In 2019 greenhouse gas (GHG) emissions reached a record high of 58.1 GtCO₂e.¹³

Despite this, global energy mix is still based on fossil fuels with energy consumption and production standing behind around 2/3 of the global GHG emissions. According to the UNEP Copenhagen Climate Centre, UNEP-CCC, fossil CO₂ emissions reached a record 37.9 GtCO₂ in 2019, but dropped to 36.0 GtCO₂ in 2020. CO₂ emissions from land use change have constituted 10 per cent of cumulative GHG emissions since 2010, and can vary significantly from year to year due to climate conditions.¹⁴

In order to succeed in limiting global warming to below 2°C and 1.5°C, by 2030 emissions have to be lower than in 2018 by 25% and 55%, respectively. That means that the energy sector has to evolve with one of the options being

adding nuclear capacities to the global energy balance.

Over the past five decades, nuclear power has cumulatively avoided the emission of about 70 gigatonnes (Gt) of carbon dioxide (CO₂).¹⁵

Today, nuclear provides 10% of the electricity produced worldwide. Nuclear generation will need to double by 2050 if we are to reach our net zero climate goals, according to experts at the IEA.¹⁶

NUCLEAR POWER PLANTS OPERATING TODAY ACCOUNT FOR ABOUT 10% OF THE WORLD'S CLEAN ELECTRICITY¹⁷



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

NUCLEAR POWER HELPS TO ACHIEVE NOT ONLY CLIMATE BUT ALSO ECONOMIC GOALS

Nuclear energy goes further than just bringing light to houses — it gives the green light to the countries' economic growth and social development while paving the way to combating climate change.

All modern economies need power even though different countries have different economic models. Some focus on heavy industry or machinery sectors development that require a reliable source of base load energy. Others develop the service sector driven by public-oriented services such as consumer goods industry, agriculture and tourism that require clean and reliable electricity supply when and where it is needed. Digital economies focus on innovation and digital aspects such as the development of data centres, high-tech and computerised services. For them, a stable and reliable source of power is one of the top priorities.

Depending on its exact needs and long-term goals, each nation chooses a certain development vector. Nuclear power can be integrated effectively into any of these models.

For countries with overreliance on any particular source in the energy mix, nuclear power is a tool to diversification while meeting the growing demand for reliable electricity supply and combating effects of climate change by cutting CO₂ emissions.

What is more, nuclear power plants can contribute to renovation of power capacities by reducing the average age of installed capacity and thus contributing to stability within the energy system.

Nuclear power plants benefit countries by creating jobs during NPP construction and operation, both directly and indirectly:

1 job created at an NPP leads to 10 jobs created in other fields.

Although part of NPP project implementation costs are associated with the construction or renovation of grid infrastructure, railways, bridges, roads, etc., this infrastructure can be used for purposes not related to further operation of nuclear power plants.

NPP projects lead to the creation and development of the urban environment around the nuclear power plant.

Nuclear power plays an important role

200,000 JOB-YEARS OVER A LIFE CYCLE ARE CREATED BY EACH NPP CONSTRUCTED¹⁸

in boosting socio-economic development both in the short-term and long-term perspectives: construction of an NPP results in comprehensive spillover and multiplier effects on GDP throughout the NPP lifecycle.

NPP construction provides outstanding opportunities for local companies to gain the required competencies to operate in international markets. By participating in NPP construction, local industries can be involved in the global value chains and international projects, which will increase their country's investment attractiveness.

4 Nuclear power contributes to SDGs



AS A RESULT, NUCLEAR POWER HAS A **DIRECT IMPACT** ON FOUR SUSTAINABLE DEVELOPMENT GOALS



WITH **MORE POSITIVE EFFECTS** ON OTHER SUSTAINABLE DEVELOPMENT GOALS

NPP construction is a comprehensive and complex project that reaches out far beyond just the power sector. Nuclear power is indeed an efficient tool to continuously provide a number of benefits to the country where it's used for more than 60 years. Countries can fully rely on NPP projects in accomplishing their ambitious sustainable development goals.





DIRECT IMPACT

MORE POSITIVE EFFECTS



7 AFFORDABLE AND CLEAN ENERGY
GOAL 7: Affordable and Clean Energy

8 DECENT WORK AND ECONOMIC GROWTH
GOAL 8: Decent Work and Economic Growth

9 INDUSTRY INNOVATION AND INFRASTRUCTURE
GOAL 9: Industry, Innovation and Infrastructure

13 CLIMATE ACTION
GOAL 13: Climate Action



1 NO POVERTY
GOAL 1: No Poverty
Reliable electricity supply is essential for production activities (agriculture, industrial or service sectors), which as a result boosts development and reduces poverty.

2 ZERO HUNGER
GOAL 2: Zero Hunger
Nuclear energy can ensure food supply and security: electricity helps the agriculture sector to improve by operating machinery and equipment, heating or cooling stocks, and providing light on farms.

3 GOOD HEALTH AND WELL-BEING
GOAL 3: Good Health and Well-Being
Nuclear power ensures stable electricity generation that enables medical clinics and hospitals to provide all the required services: operate and sterilise medical equipment, refrigerate vaccines, etc.

ECONOMIC

6 CLEAN WATER AND SANITATION
GOAL 6: Clean Water and Sanitation
An efficient water cycle is part of nuclear power plant operation. Therefore, high standards for water treatment and purification are set at all NPPs.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION
GOAL 12: Responsible Consumption and Production
All stages of nuclear facilities construction, operation and decommissioning are strictly regulated and controlled both by the hosting country's regulating authority and the vendor's standards, which prevents significant harm to the environment and ecosystems. All NPPs are also under international supervision of the IAEA.

14 LIFE BELOW WATER
GOAL 14: Life Below Water
GOAL 15: Life on Land
For all NPP projects, an environmental impact assessment is required to ensure that all the specific features of local land and water ecosystems are taken into account to avoid any harm to the environment.

ENVIRONMENTAL

4 QUALITY EDUCATION
GOAL 4: Quality Education
Nuclear power enhances human resources development since NPPs require highly educated and trained personnel.

10 REDUCED INEQUALITIES
GOAL 10: Reduced Inequality
Nuclear community is smoothing inequality barriers between emerging and developed economies by ensuring access to reliable energy for all as a foundation for consistent economic growth.

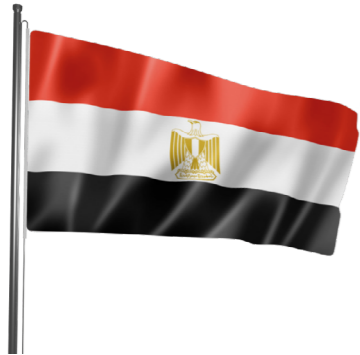
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
GOAL 16: Peace and Justice Strong Institutions
One of the objectives of the IAEA Statute is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

5 GENDER EQUALITY
GOAL 5: Gender Equality
NPP staff requirements have no gender restrictions. This is especially important for countries that are actively working on ensuring overall equality and empowerment. What is more, nuclear community contributes to gender equality thanks to the IAEA programmes for gender equality or the Women in Nuclear organisation that support and encourage women working in the nuclear industry throughout the world. Women make up 24.7% of workers in the field of nuclear technology.

11 SUSTAINABLE CITIES AND COMMUNITIES
GOAL 11: Sustainable Cities and Communities
Stable energy systems are crucial for the development of safe, resilient and sustainable human settlements — they improve city infrastructure, provide modern living conditions, and create jobs.

17 PARTNERSHIPS FOR THE GOALS
GOAL 17: Partnerships for the Goals
Nuclear power provides solutions for various stakeholders: governments, local communities, and commercial institutions. The overall sustainability of nuclear power industry depends on a continuous dialogue between the customers and the suppliers as well as all the companies within the industry.

SOCIAL

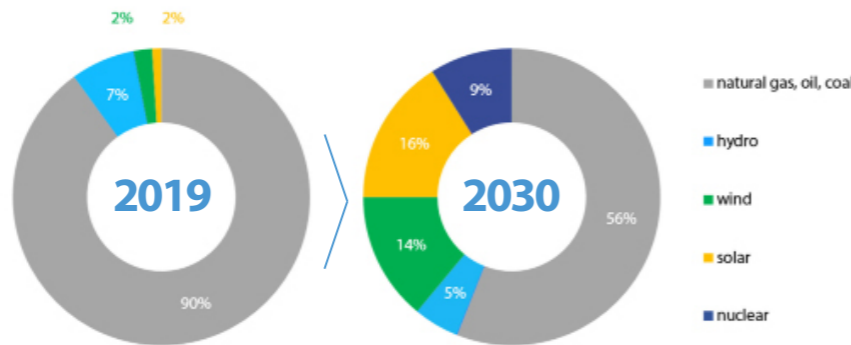


EGYPT

El Dabaa NPP is the first nuclear plant to be built in Egypt, near El Dabaa (3.5 km from the Mediterranean Seas and 300 km from Cairo). The plant envisages the construction of four VVER-1200 units (Gen III+).

GENERATION MIX

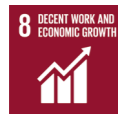
Energy balance (electrical power generation, %)



UNDER CONSTRUCTION

Installed Capacity
4.8 GW
Generation
31.2 TWh/Y

NPP CONTRIBUTION TO COUNTRY'S SUSTAINABLE DEVELOPMENT



GDP growth. About **\$4 bln (1% of total GDP)** will be added to Egypt's GDP over the period of El Dabaa NPP construction

Tax effect. More than **\$700 mln** will be additional tax revenues to the country's budget over the construction period

Share of local population hired. **70% of workers (18,000 people)** during the construction phase will be local Egyptian population

Local suppliers. **62 local companies** are involved into the El Dabaa NPP construction



Energy provision. El Dabaa NPP can provide with electricity about **20 million people (19% of the country's population)**

Increase in low-carbon sources generation. **13 p.p.** increase in the share of electricity generation by low-carbon sources after NPP launch (to 22%)



Public education. **More than 1,700 people** will receive training supported by Rosatom (including higher education)



GHG emissions savings. About **15 mln tonnes** will become annual emissions savings of CO2 equivalent after NPP construction (7% of the current level)

INFRASTRUCTURE DEVELOPMENT PROJECTS

Road infrastructure
Construction of an access road to NPP (Alexandria – Marsa Matruh and El Dabaa NPP highway)

Marine infrastructure
Seaport infrastructure (3.5 km from NPP)

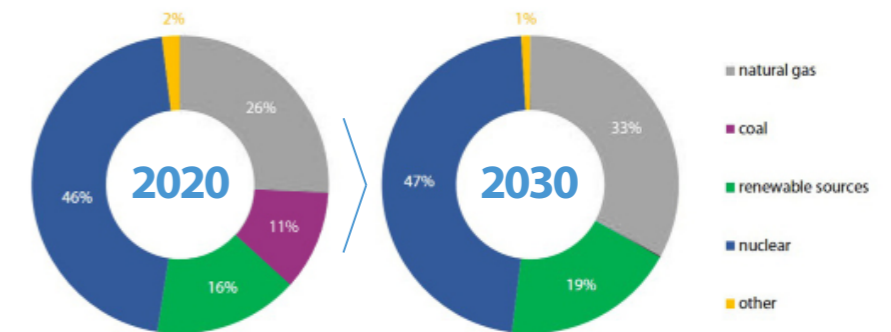


HUNGARY

Paks II NPP is a two-unit plant based on VVER-1200 (Gen III+). The plant is being built near town of Paks on the Danube River

GENERATION MIX

Energy balance (electrical power generation, %)



UNDER CONSTRUCTION

Installed Capacity
2.4 GW
Generation
19.1 TWh/Y

NPP CONTRIBUTION TO COUNTRY'S SUSTAINABLE DEVELOPMENT



GDP growth. About **\$4.6 bln (2.5% of total GDP)** will be added to Hungary's GDP over the period of Paks II NPP construction

Tax effect. About **\$2 bln** will be additional tax revenues to the country's budget over the construction period

Jobs. **2,200 jobs** will be created at the NPP and service

Local suppliers. More than **120 local companies** are involved in the Paks II NPP construction



Energy provision. Paks II NPP can provide with electricity about **4.3 million people (44% of the country's population)**

Increase in low-carbon sources generation. **13 p.p.** increase in the share of electricity generation by low-carbon sources after NPP launch (to 76%)



Public education. About **870 people** will receive training supported by Rosatom (including higher education)



GHG emissions savings. About **5 mln tonnes** will become annual emissions savings of CO2 equivalent after NPP construction (12% of the current level)

INFRASTRUCTURE DEVELOPMENT PROJECTS

Road infrastructure
Construction of an access road connecting the NPP from the west with Road 6
Construction of the access road from the north has nearly begun

Railroad connection of the Hungarian transport system and the NPP site
In-site railroad tracks construction

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