



ROSATOM



Nuclear Power

Global Challenges and Partnership for Europe

Zdeněk Šíma

Director, Rosatom Central Europe

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Nuclear response to global energy challenges



Sustainability:

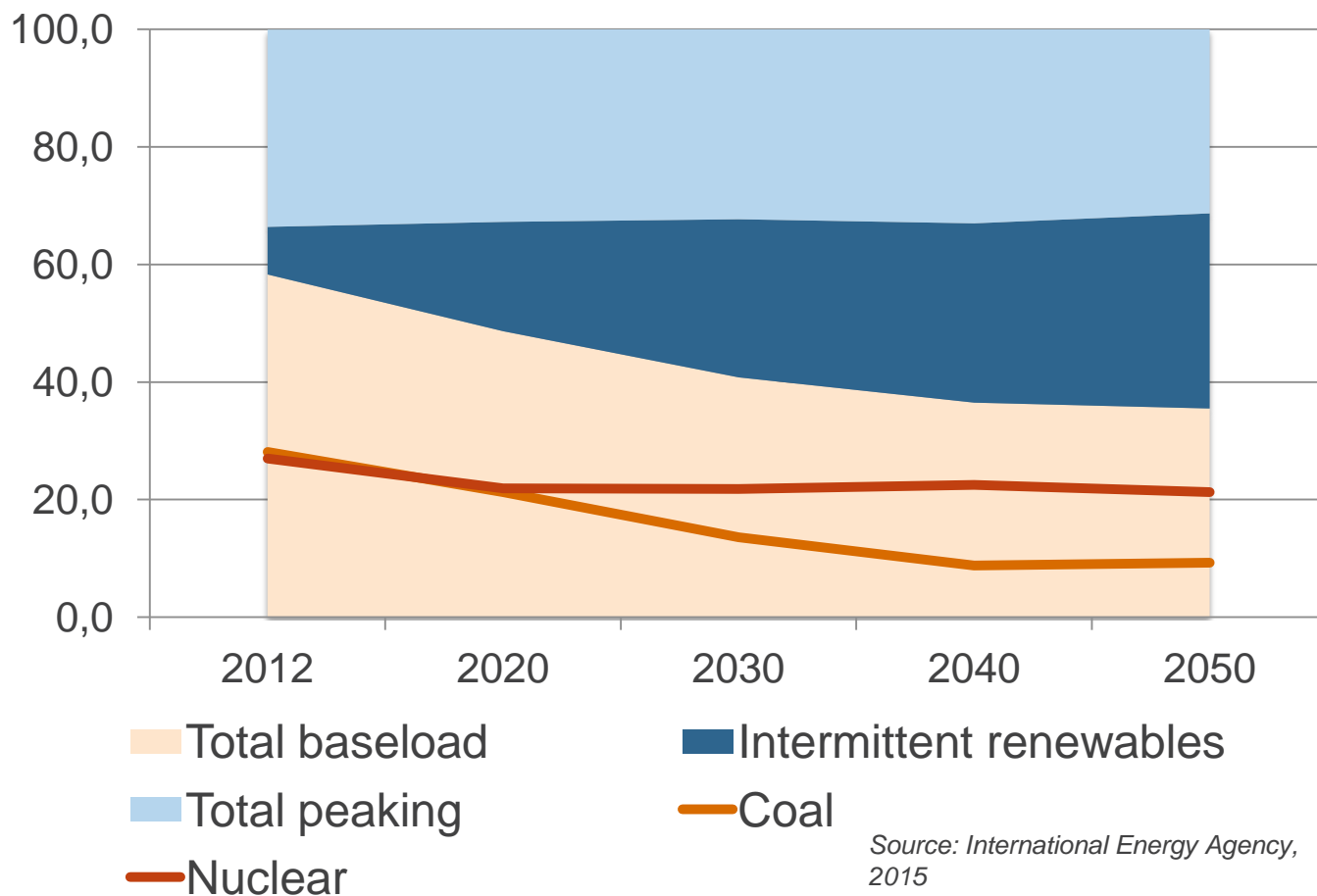
Global climate change agenda and the EU long term target of 80%-95% GHG emissions reduction by 2050.

Growth: Affordable energy supply is essential for economic growth and development.

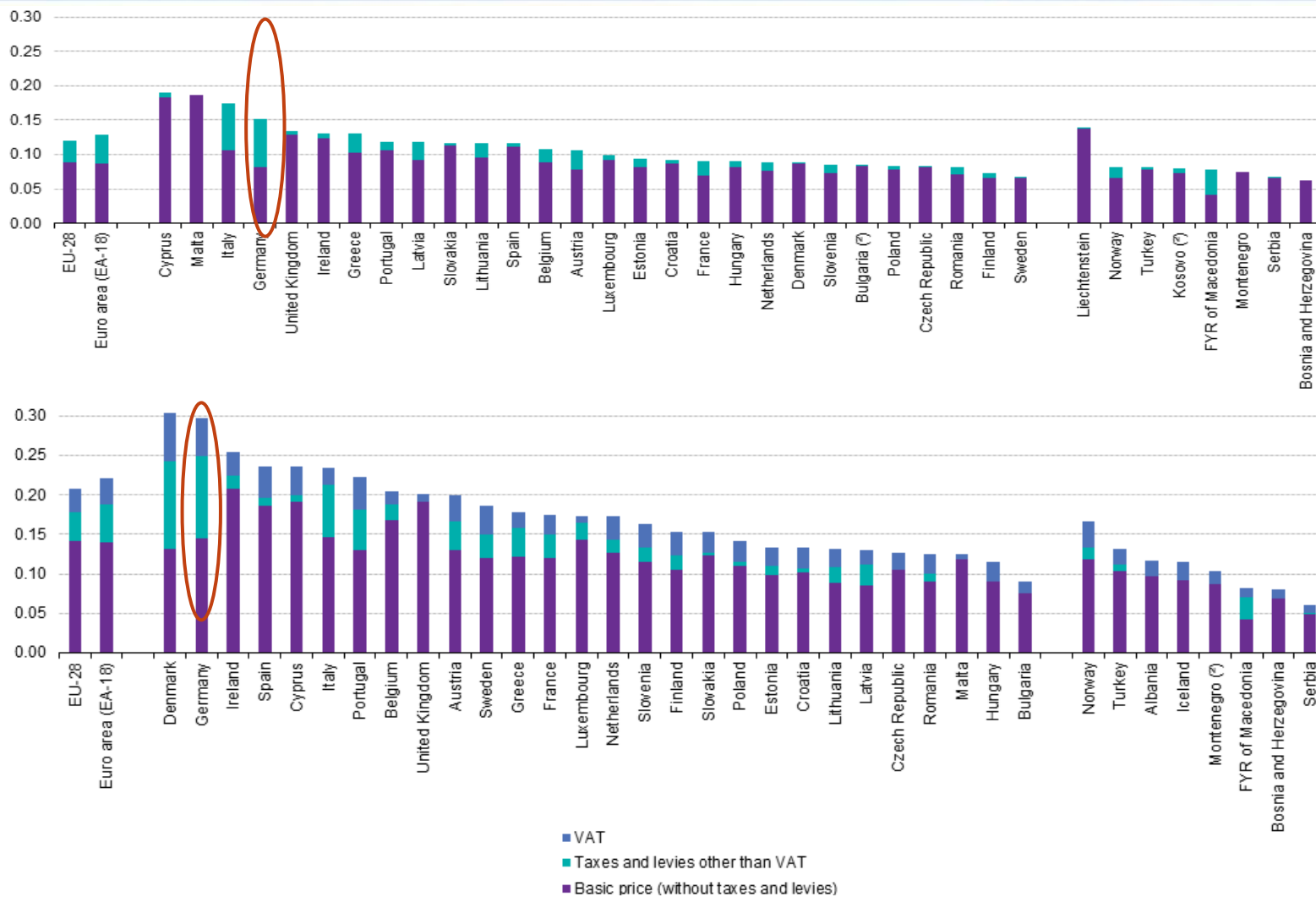
Energy Security: Reducing exposure to the risks related to the security of energy supply

Nuclear is indispensable for decarbonisation

EU Electricity Output Shares Projections (%)



Electricity prices for industrial consumers (top) and households (bottom) in Europe (second half 2014, EUR per kWh)

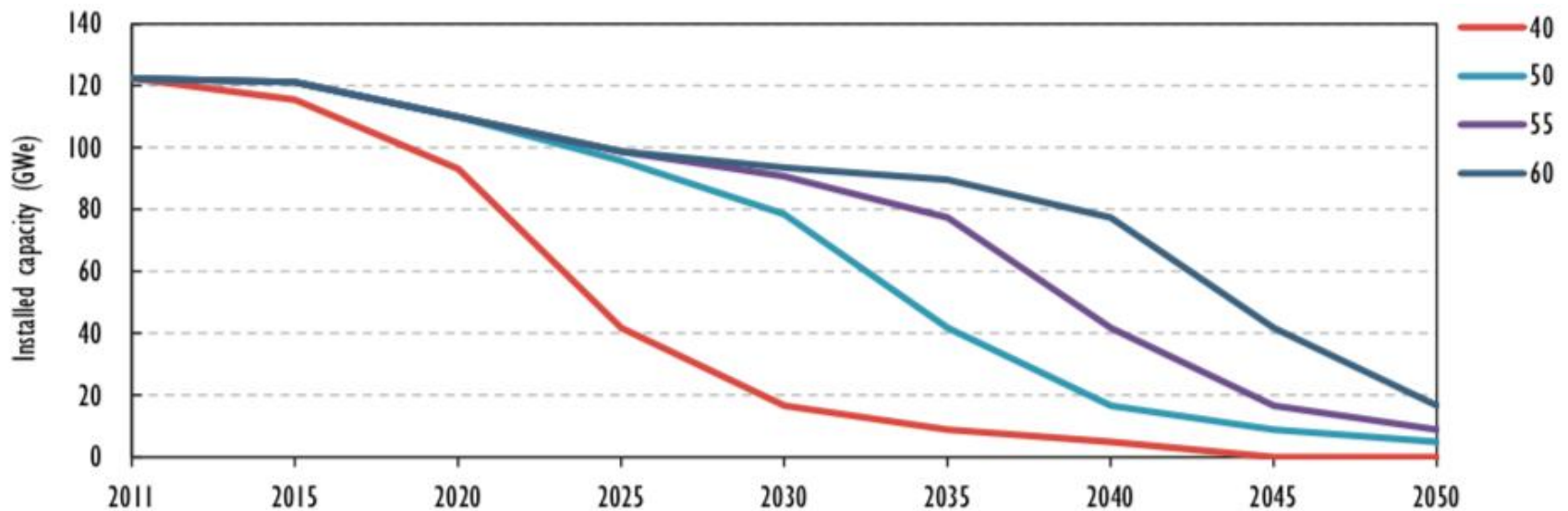


Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_price_statistics

Nuclear capacities in Europe are ageing

Half of the European Union's 131 nuclear power plants have been operating for more than 29 years (IAE).

If all plant lifetimes were 40 years, 25% of the EU nuclear units to be closed by 2020, 50% - by 2024, and 75% - by 2026.



Source: OECD/NEA (2012), *The Economics of Long-term Operation of Nuclear Power Plants*, OECD Publishing, Paris.

Value creation for Europe



Rosatom as an integral part of Europe's nuclear industry:

- Uranium deliveries to France since 1971.
- 18 VVER reactors operate in the EU
- Affiliates and subsidiaries in Hungary, Germany, Czech Republic
- Rep offices in Prague, Bratislava, Budapest and Paris
- More than 1500 reactor-years of VVERs' safe commercial use.
- Rosatom is committed to cooperation with the EU in implementation of its energy objectives.
- Potentially: □12 billion export revenue and more than 18,000 high skilled jobs in the EU

LTO: Solution proven in Russia for EU VVERs Fleet

NPP	No. of years of extension	Implimentation
Kola, units 1,2	By 15 years	2003, 2004
Novovoronezh, units 3,4	By 15 years	2001, 2002
Kola, unit 3	By 25 years	2011
Kola, unit 4	By 25 years	October 2014

Novovoronezh NPP



Kola NPP



Kozloduy NPP (Bulgaria)



Joint project with EDF – matching skills

Investment \$500-\$1,000/kWe compared to ≈\$5,000/kWe for new build

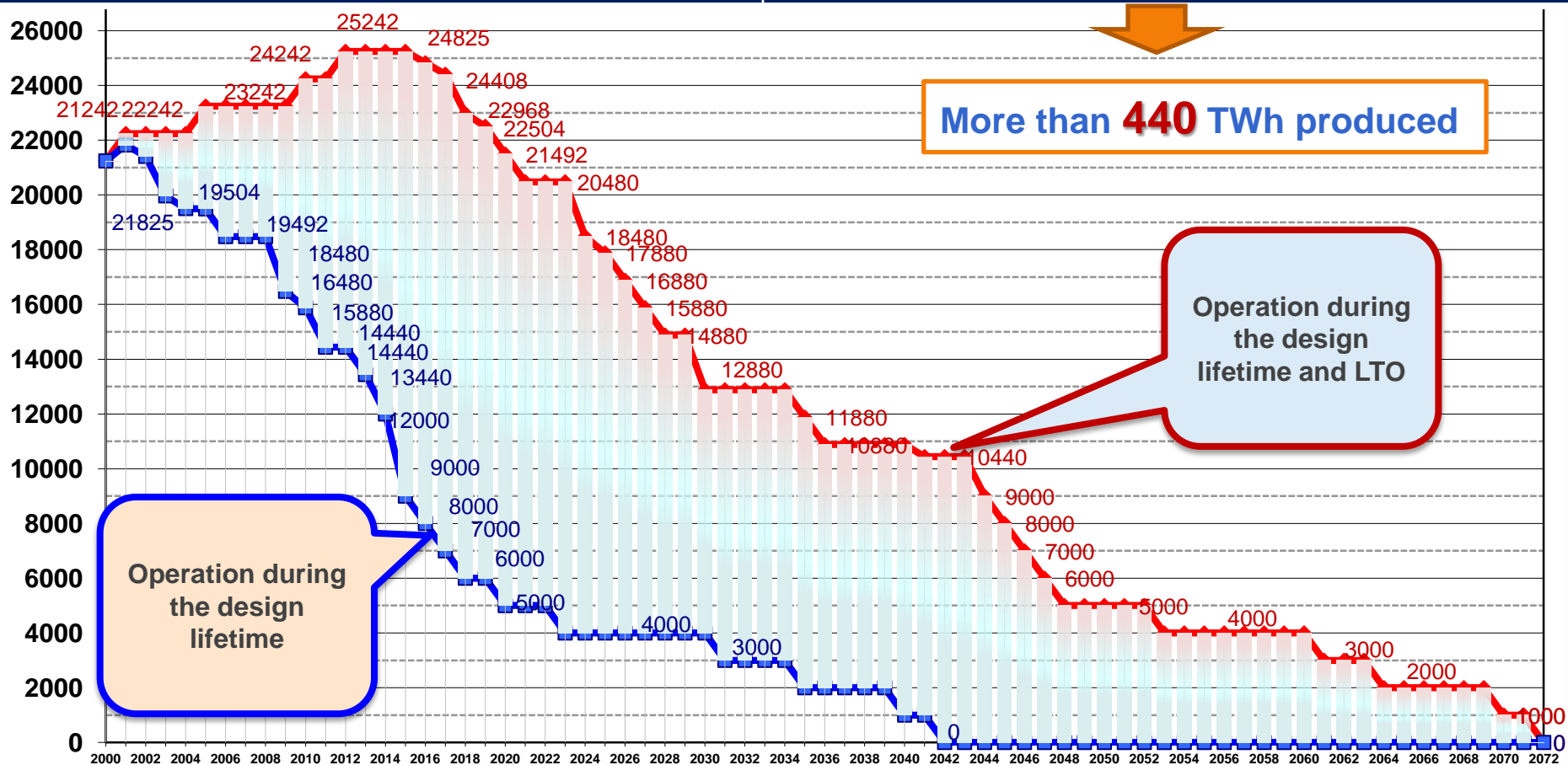
LCOE \$30-\$70/MWh significantly below alternative sources

Technologies proven in Russia (13 reactors), Finland, CEE

Life Extension Projects in Russia

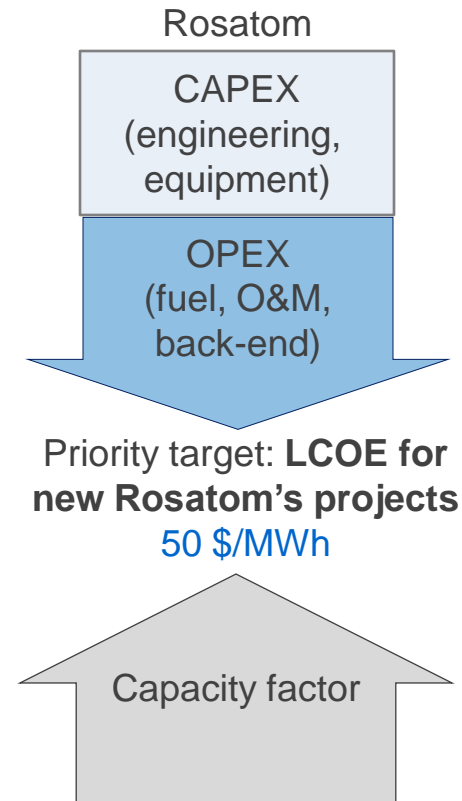
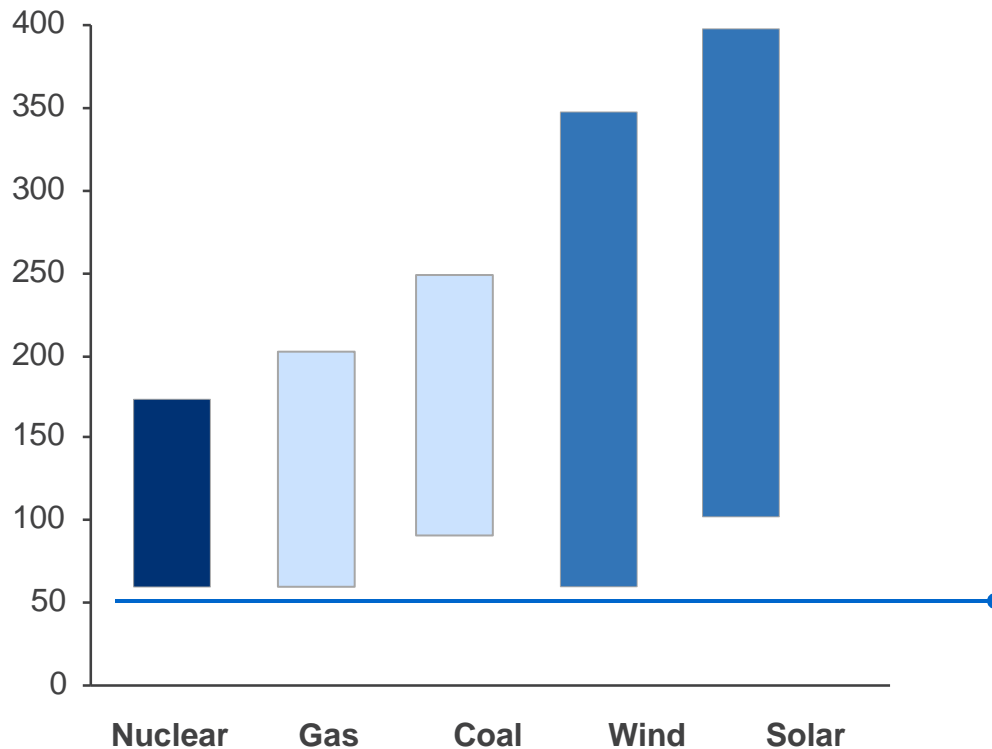
10 NPPs, 34 units
Nominal power 26242 MW

NPPs with LTO - 21 units
Nominal power 13242 MW



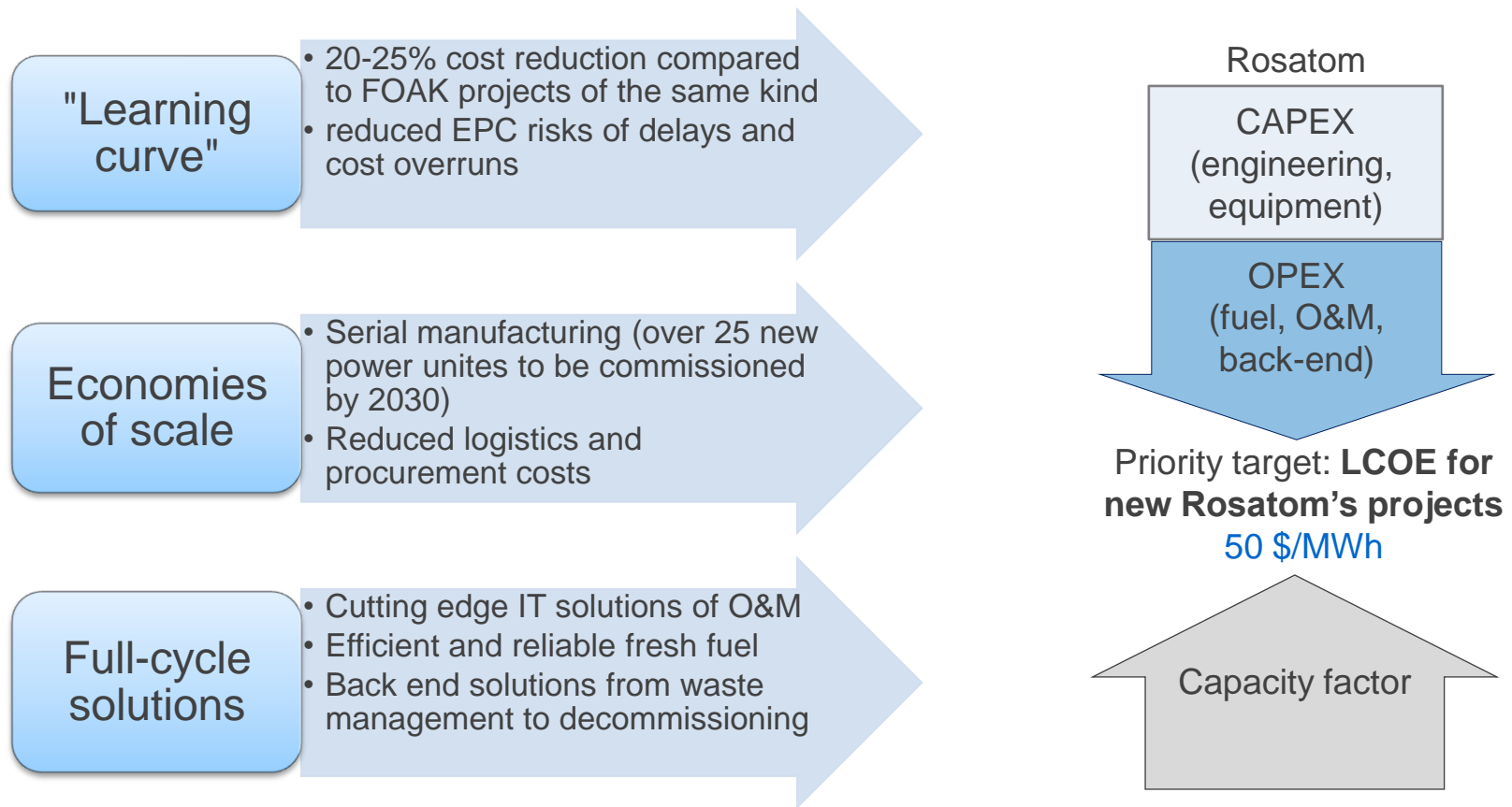
Targeting lifetime values for utilities

Range of levelized cost of electricity (LCOE)*, \$/MWh

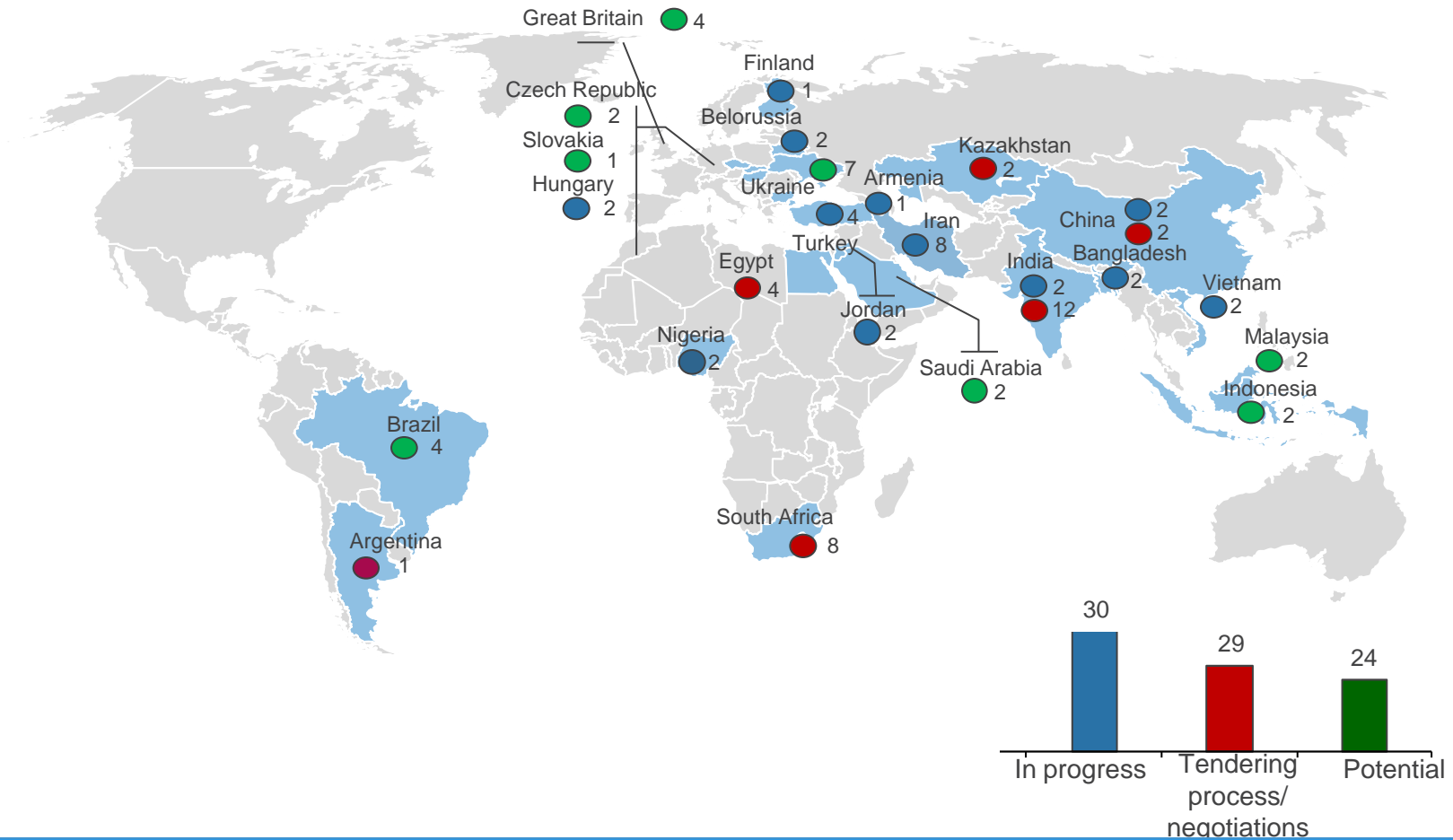


Source: EIA, IEA, Nuclear Energy Institute (NEI)

Rosatom leadership economics



Rosatom's VVER is the most common new-build worldwide



Rosatom NPP construction perspective overseas backlog – more than 80 units

Majority of new builds in EU are VVERs



Hanhikivi NPP (VVER1200)



Olkiluoto 3 NPP (EPR)



Flamanville 3 NPP (EPR)



Mochovce 3-4 NPP (VVER-440)



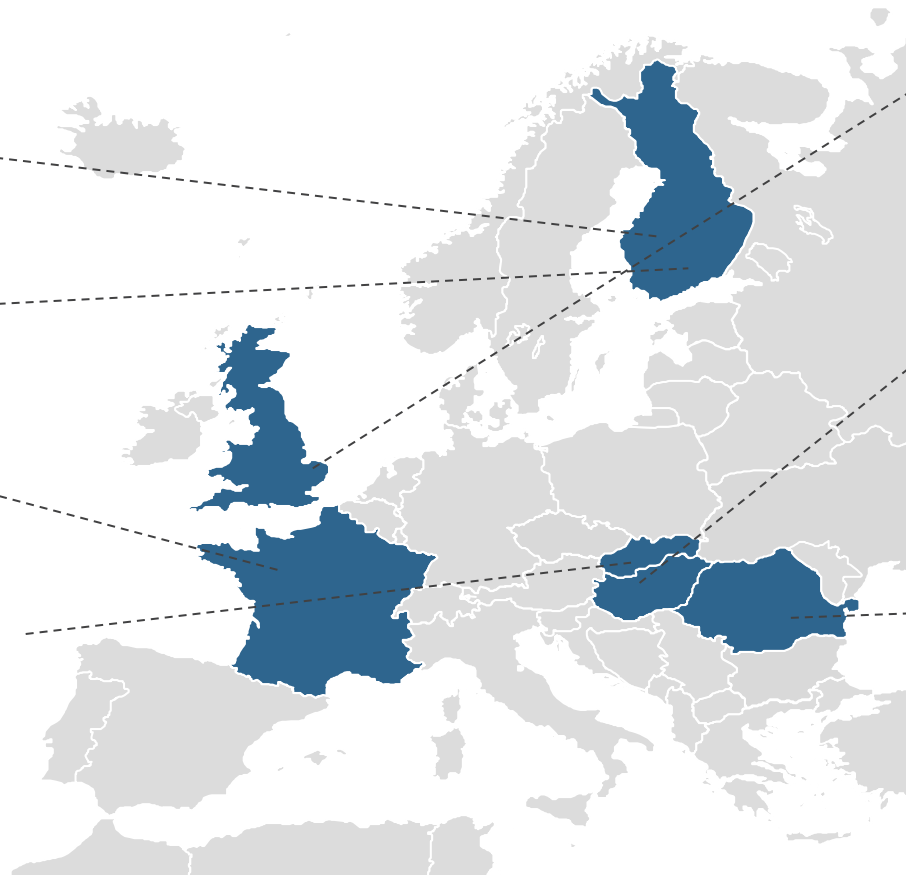
Hinkley Point C (EPR)



Paks 5-6 NPP (VVER-1200)



Cernavoda 3&4 (CANDU 6)

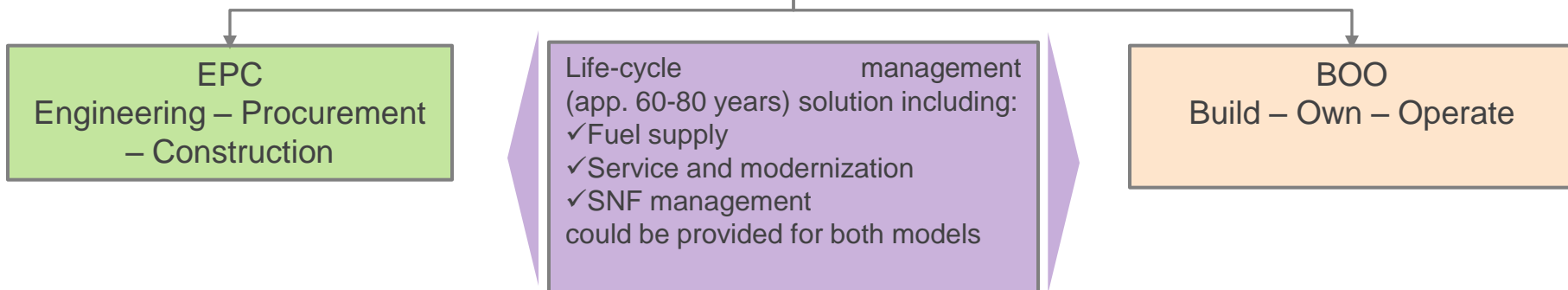


Countries previously committed to nuclear new build remain upbeat on its development. More than 50 GW new NPPs envisaged.

Rosatom implements NPP construction projects using flexible models meeting needs of every customer



NPP construction project



Hungary (Paks NPP extension)

- Implementation period – 2014-2025
- Legal basis – Intergovernmental Agreement of January 14, 2014
- Total capacity – 2 400 MW (2 units)
- Intergovernmental agreement on Russian state credit provision for Hungary on the purpose of the project execution signed March 28, 2014
- Financing terms: 80% - Russian state credit, 20% - Hungary own funds

Turkey (Akkuyu NPP construction)

- Implementation period – 2011-2023
- Legal basis – Intergovernmental Agreement of May 12, 2010
- Total capacity – 4 800 MW (4 units)
- PPA period – 15 years, fixed price terms (\$12,35 cents per kw/h)
- Akkuyu SPV created, Rosatom holds 100% shares. International investors are welcome to join the project with up to 49% Akkuyu SPV stake

We export reliable technologies with a proven track-record at home

VVER - 1000



Commissioned since 2008: Kalinin NPP (unit 4), Rostov NPP (units 2,3)
Rostov NPP unit 3 was commissioned ahead of schedule

Under construction: Rostov NPP (unit 4)

VVER - 1200



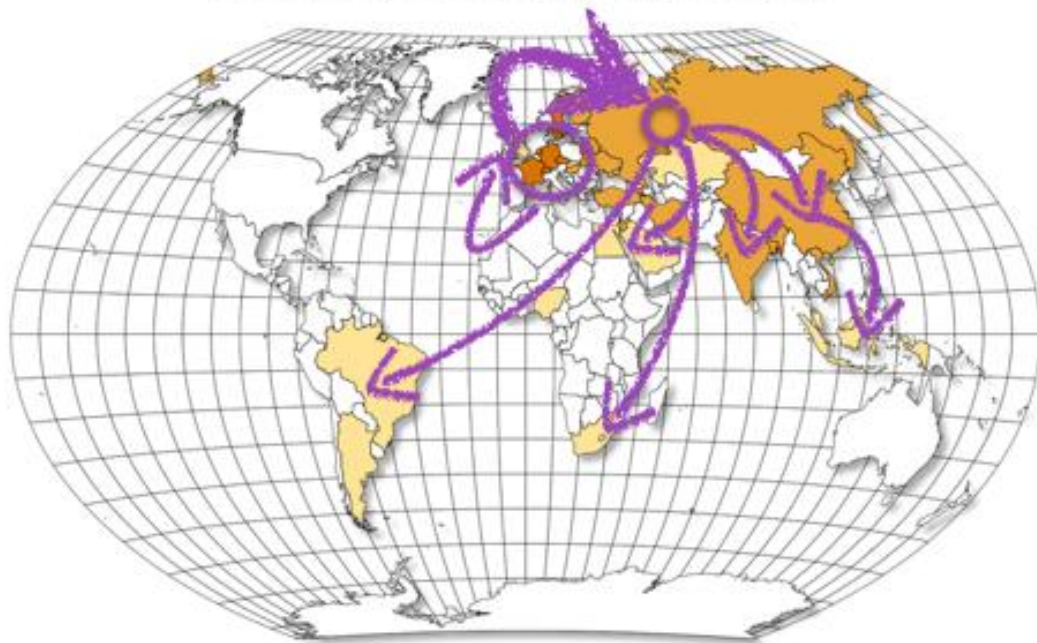
Under construction: Leningrad NPP - 2 (2 units), Novovoronezh NPP - 2 (2 units), Baltic NPP (2 units)
First VVER - 1200 to be commissioned in 2015

Currently 9 units are under construction in Russia including BN-800 and KLT

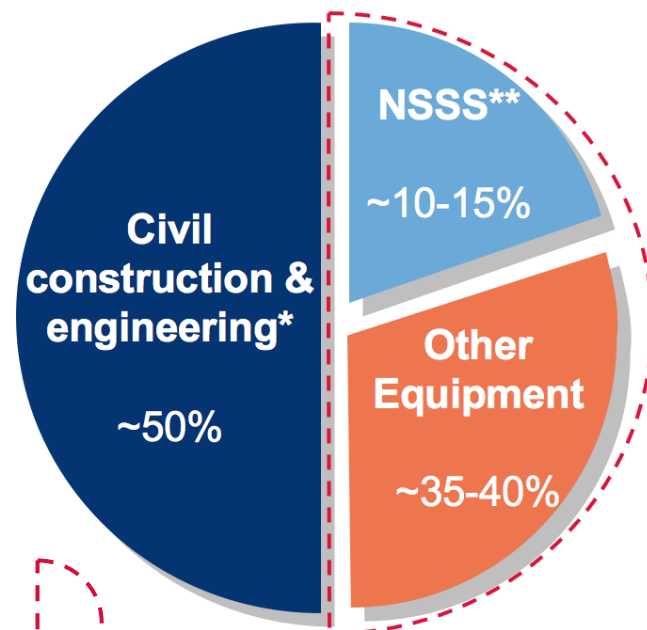
By 2030 it is expected to put into operation additional 15 units (~18,6 GWe) and reach capacity of 44 GWe

Supply chain flexibility – cooperation for Europe

Rosatom global supply chain options



- Value-added localization in Europe
- Export opportunities for EU nuclear firms for Rosatom projects worldwide - \$300Bn by 2030
- Creating high-skilled jobs in Europe and keeping talent at home preventing brain-drain



Cost of equipment:

- Valves, pumps and piping (6%)
- Other equipment (5%)
- Air cooling systems (3%)
- Turbine and generator equipment (6%)
- Electrical equipment (9%)
- I&C (6%)

Estimate of positive economic impacts for the Czech Republic (2 units)

Economic impacts

Increase of GDP

Budget impacts

Increase of personal taxes, corporate taxes, VAT and consumer taxes

Increase of medical and social insurance paid by employees and by companies due to increased employment

Decreased of social payments to unemployed persons

Labour market impacts

Increase of employment

Item	Value
Investment phase	
Investment phase duration	14 years
Example of contract value	CZK 239,4 billion
Share of Czech companies in CZK	CZK 165,3 billion
% share of Czech companies	68,98%
Operation phase for initial 20 years	
Average amount of procurement plus increased personal costs per year	CZK 4,1 billion.
Contracts of Czech companies for similar projects in 3rd countries for 20 years	
Average amount of induced purchases per year	CZK 2,55 billion

Estimate of positive economic impacts for the Czech Republic (2 units) slide 2

Summary

Summary of impacts in figures

- Additional GDP created by the Project within 20 years : CZK 242,6 billion
- Additional average increase of GDP per year : 0,21%
- Decrease of unemployment : 0,14% per year
- Newly created jobs during investment phase : 15 592 (average per year)
- Newly created jobs during operation and due to additional contracts in 3rd countries : 4 720 a year
- Increase of state budget income : CZK 85,8 billion, approx. 2,86 a year



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Thank you for your attention

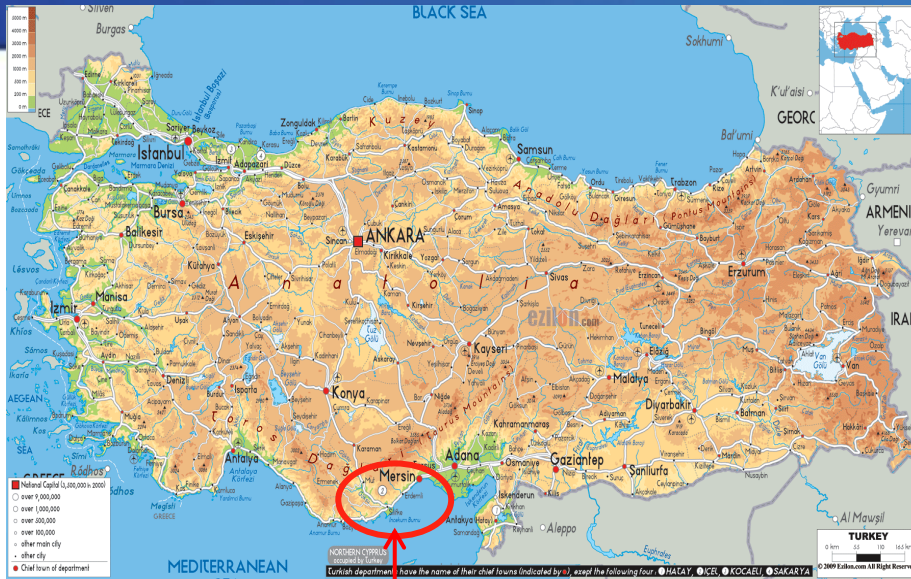


Zdeněk Šíma
+420 602 382 185
sima@rosatom.cz

BACK-UP

BACK-UP SLIDES

Examples of Rosatom Projects Implementation: BOO – Akkuyu NPP Project (1)



The Akkuyu site, Turkey

Akkuyu Project Features

- First Nuclear Power Plant in Turkey
- First Rosatom BOO (Build-Own-Operate) Project. Under the IGA, Rosatom is responsible for engineering, procurement, construction, operation and maintenance of the plant.
- Legal Basis: Intergovernmental Agreement (May 12, 2010)
- Project Design: AES-2006 (VVER-1200)
- Total Capacity: 4 800 MW (4 x 1 200 MW)
- Development Period: 2011-2023
- Total Cost: ~ \$ 20 bln
- Power Purchase Agreement for 15 years, fixed price terms. Term Sheet is signed.
- Support of Russian and Turkish Governments
- Maximum involvement of Turkish personnel in construction and operation of the NPP
- Employment Potential: up to 10 000 vacancies for the construction period only

Examples of Rosatom Projects Implementation: BOO – Akkuyu NPP Project (2)



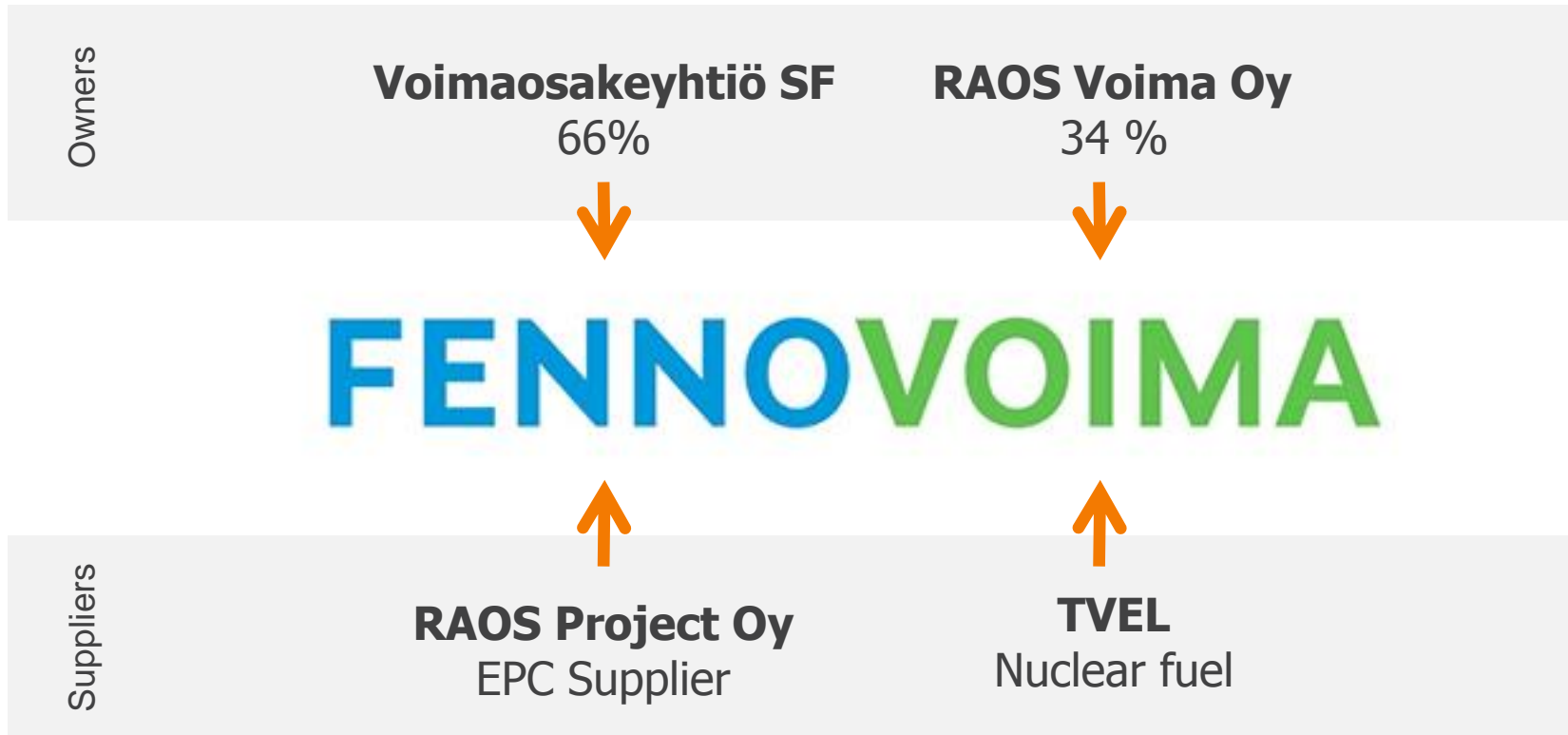
- Akkuyu NPP construction project will be implemented in accordance with the BOO model.
- The choice of the Project model was subject to a number of factors, including:
 - ✓ Consistently-high wholesale electricity prices in Turkey (above the European average), making the Project potentially profitable for investors to generating capacities;
 - ✓ The large number of local and foreign private investors to generating facilities on the Turkish market as a promoting factor for the electricity market's investor-friendly model;
 - ✓ TETAS's track record with entering into long-term electricity purchase contracts;
 - ✓ Turkey's solid macroeconomic environment.

Examples of Rosatom Projects Implementation: EPC + Joint Ownership – Hanhikivi NPP Project (1)

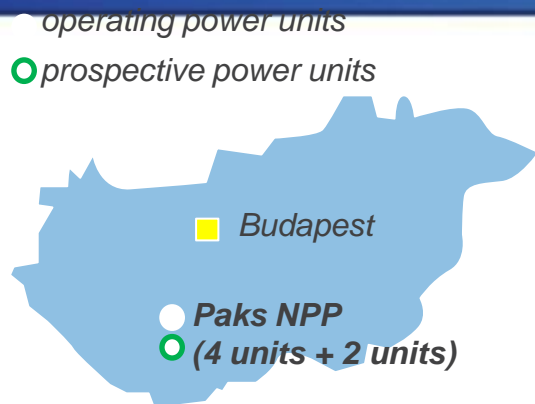
- Fennovoima Oy – project company founded in 2007 to build a nuclear power plant (NPP) at a greenfield site in Pyhäjoki
- Owned by Finnish Voimaosakeyhtiö SF and RAOS Voima Oy
- Turnkey delivery of Rosatom's AES-2006 PWR
- Fuel supply contract with TVEL for first 10 years of operation
- Currently in licensing phase, 1st concrete in 2018, commercial operation planned to start 2024
- Operation based on Mankala principle: electricity for owners at cost price
- Personnel:
 - Currently: ~220
 - During construction: ~500 (high peak)
 - In operation phase: ~500



Examples of Rosatom Projects Implementation: EPC + Joint Ownership – Hanhikivi NPP Project (2)



Examples of Rosatom Projects Implementation: EPC + State Loan – Paks-2 NPP Project



Project Parameters and Specifications

Power units: 2 x 1200 MW

Project design: VVER-1200 (AES-2006)

Construction period (Unit 5): 2018-2023

Commissioning: 2024, 2025

Implementation scheme: without tender based on intergovernmental agreement; contracts portfolio for turnkey construction

Financing: 80% - state loan of the Russian Federation, 20% - of the Hungarian party

Operating power units 1-4 – of the Russian VVER-440 design

Main Stages of the Project

Precontract phase

Contracts Implementation

August 2013 – March 2014

April 2014 – December 2014

2015-2025

2025...

Precontract phase, stage 1:

Development and approval of intergovernmental agreements on: cooperation, financing and key terms and conditions of contracts

Precontract phase, stage 2:

Development and approval of contract terms and conditions (EPC, fuel supply and spent nuclear fuel treatment contract, service contract)

Implementation of EPC contract

Implementation of fuel supply and spent nuclear fuel treatment contract as well as of service contract