SLOVAK ENERGY POLICY Synergies beteen Nuclear and Renewable Energy towards low carbon power production

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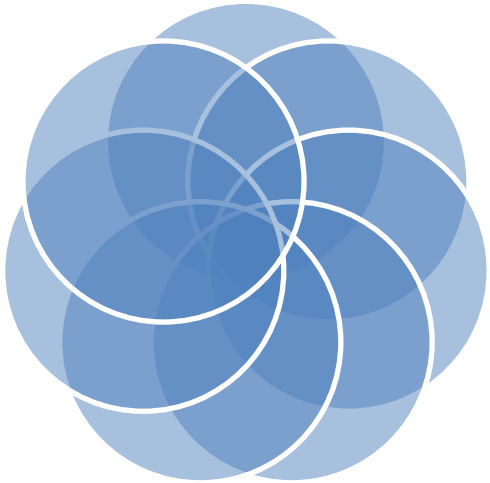
ENERGY POLICY OF THE SLOVAK REPUBLIC

Fundamentals of EP SK

high import dependency and ensuring reliability of supply

European energy union

High energy intensity of economy



Climate change and its consequences

Use of renewable energy sources and increasing energy efficiency

Impact on competitiveness of economy

Independent nuclear energy policy

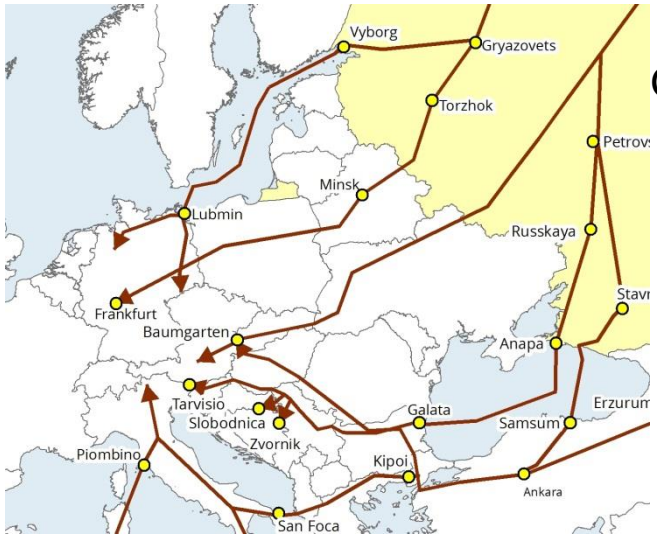
HIGH ENERGY DEPENDENCE ON RUSSIAN FEDERATION

IMPORTS FROM RUSSIA:

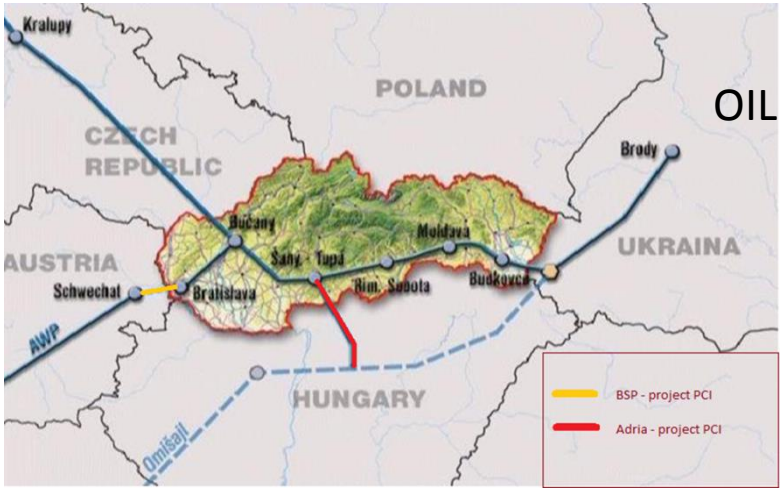
- 90% of primary energy sources
- 100% nuclear fuel (uranium from FR)
- 99% oil
- 98% natural gas

DOMESTIC ENERGY SOURCES:

- Brown coal



GAS

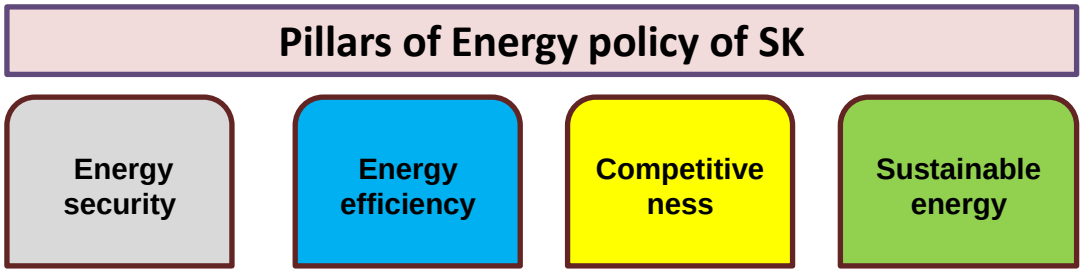


OIL

ENERGY POLICY OF THE SLOVAK REPUBLIC

- Approved by the Slovak government in November 2014
- Slovak energy policy outlook until 2030

- Strategic objective: to secure competitive, effective, reliable and low-carbon supply of energy for affordable prices, while taking into account consumer protection and sustainable growth



SUSTAINABLE DEVELOPMENT

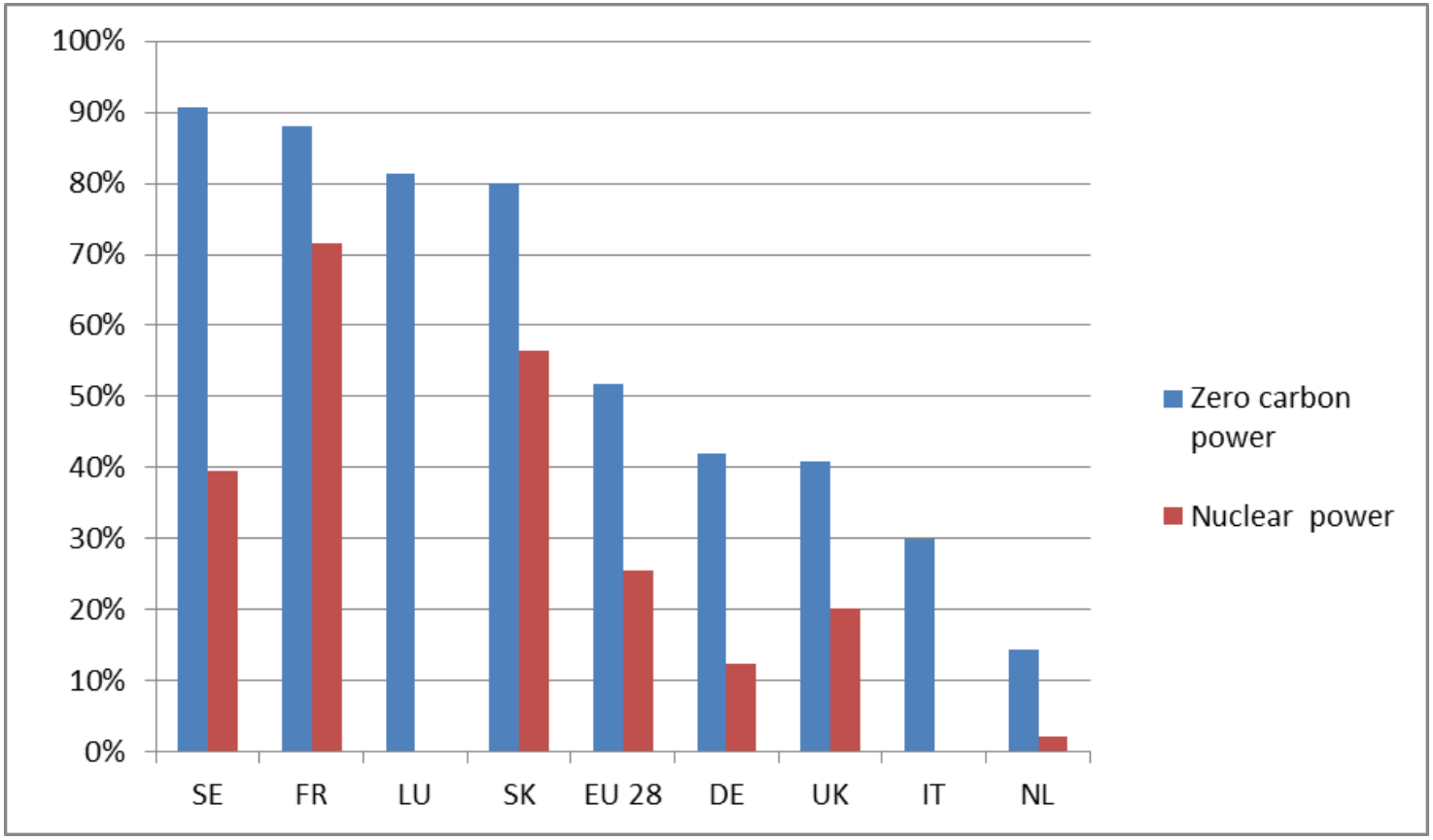
Global trends:

- To keep the increase in global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit it to 1.5°C – the Paris Agreement on climate change, 2015
- Decarbonization of economy, including energy sector

Transition to low-carbon economy in Slovakia:

- **Portion of low-carbon technologies – nuclear, hydro and other renewables in total electricity generation in 2018 ca. 80 %**
- **Cornerstones: NUCLEAR (Base load) + HYDRO (Peak load: flow through+pump storage) = Stabilisation of power system**
- **Other renewables (biomass + PV) - on the rise**
- **Fossil fuels (domestic brown coal) – on the decline**
- **The share will further increase after completion of Mochovce NPP Units 3,4**

ZERO CARBON POWER PRODUCTION IN EU

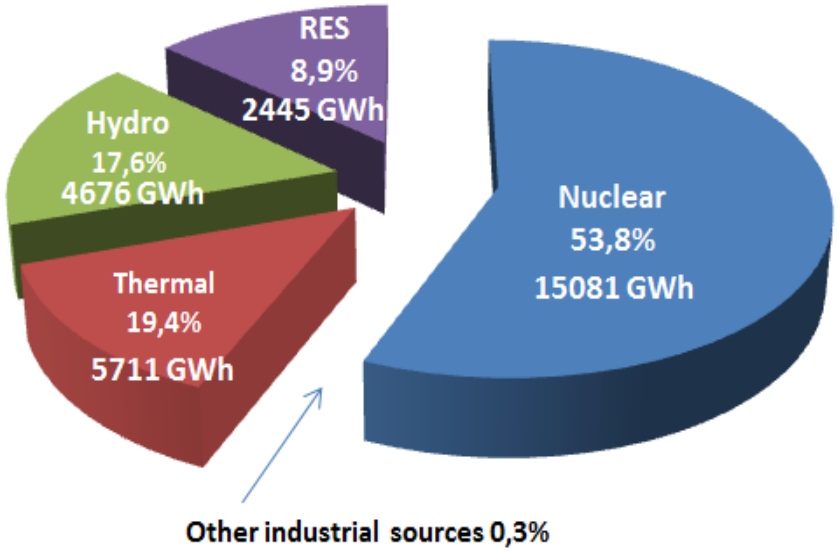


Source: EUROSTAT 2018

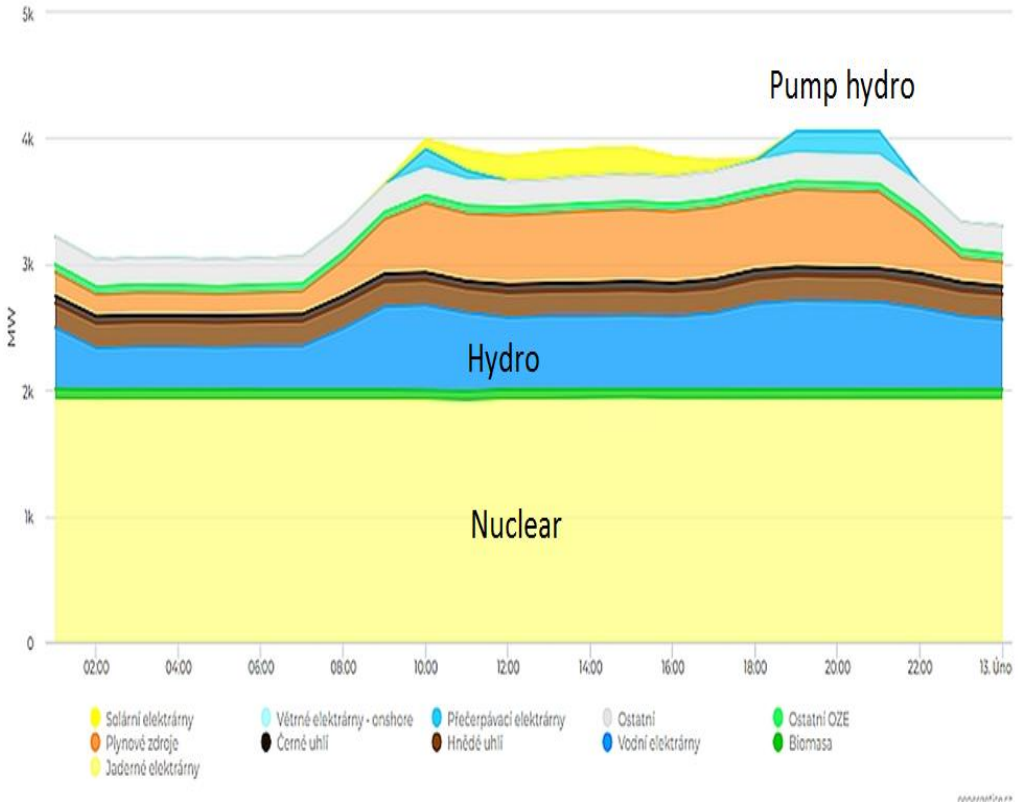
Structure of power production

Power production per year - 2017

RES : Biomass 6,8% + PV 2,1%

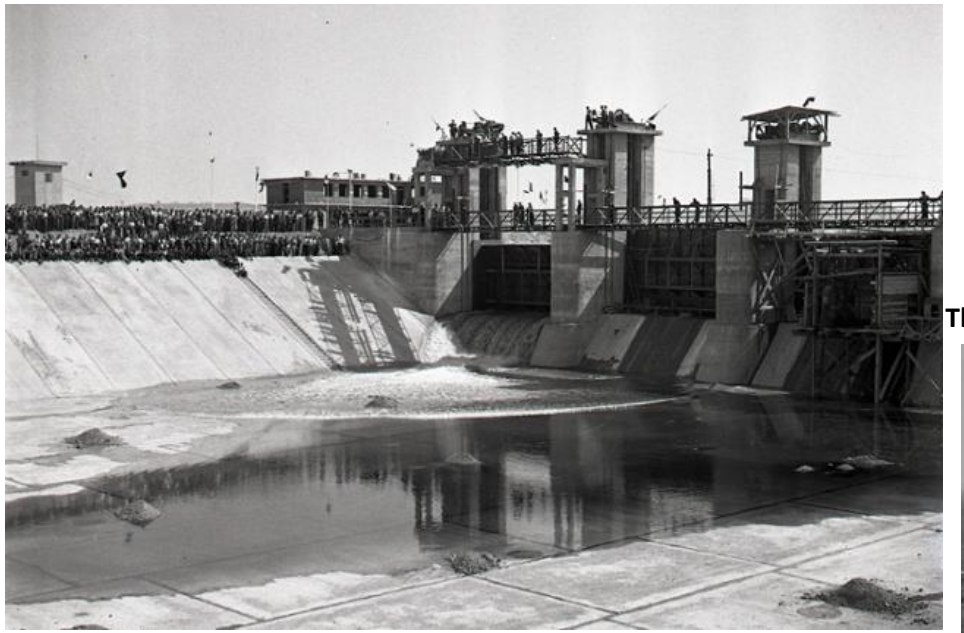


Power production per day - 12 Feb 2019



LARGE HYDRO - HISTORY

Construction of 1. large hydro power plant started in 1930s



Cascade of 15 large HPP on the river Vah

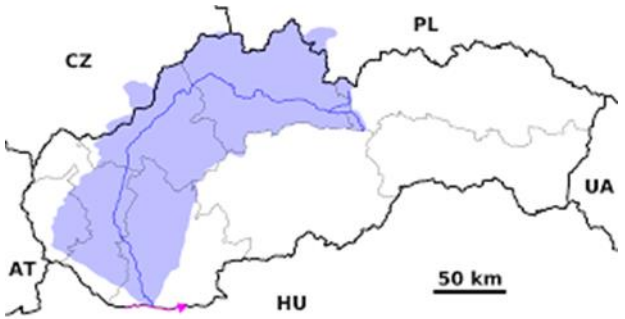
The largest flow through HPP – Gabcikovo (720 MW) on the river Danube

More than 20 large hydro power plants built until 1992

LARGE HYDRO - Present

The largest flow through HPP Gabcikovo (720 MW) on the river Danube

The largest pump storage HPP - Cierny Vah (735 MW)



NUCLEAR ENERGY IN THE SLOVAK REPUBLIC - SPECIFICITIES

- Use of nuclear energy is a key part of the Energy Policy of the Slovak Republic.
- Slovakia will continue to use nuclear energy as a safe, reliable, environmentally accetable, verified and economicaly-viable electricity generation source.
- High public support thanks to sufficient level of dissemination of information
- Long-term support of the Slovak government
- High standards of nuclear safety

NUCLEAR INSTALLATIONS IN SLOVAKIA

Slovakia has extensive experience in **planning**, **construction, operation and decommissioning** of nuclear power plants.

J. BOHUNICE SITE

facility	type	status	license holder
NPP A-1	HWGCR	in decommissioning	JAVYS , a.s.
NPP V-1 (EBO1,2)	WWER 440/230	in decommissioning	JAVYS , a.s.
NPP V-2 (EBO3,4)	**WWER 440/213**	**in operation**	**SE, a.s.**
ISFS	wet type	in operation	JAVYS , a.s.
treatment of RAW	different techn.	in operation	JAVYS , a.s.
New NPP	feasibility study	under way	JESS, a.s.

MOCHOVCE SITE

facility	type	status	license holder
NPP EMO1,2	**WWER 440/213**	**in operation**	**SE, a.s.**
Facility for Treatment of LqRAW		in operation	JAVYS , a.s.
Ra-waste Repository	near surface	in operation	JAVYS , a.s.
NPP EMO3,4	**WWER 440/213**	**under construction**	**SE, a.s.**

FIRST NPP IN SLOVAKIA – A1

1958 - Start of construction

1972 - 1977 – Power plant operation (First in Eastern Europe)

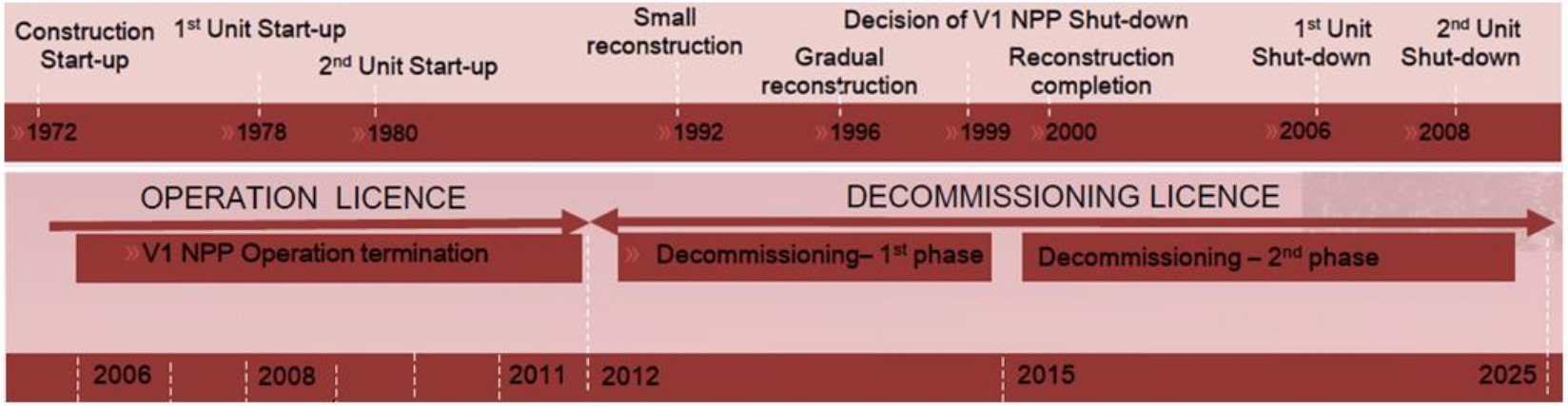
1999 – Start of decommissioning

NPP A1 BOHUNICE – IN DECOMMISSIONING

1958	1972	1977	1979	1994	1999	2008
Start of construction	Start of operation	End of operation	Gov. decision of decommissioning	Putting the NPP A-1 into radiation safe state	1st Decommissioning licence	End of 1st Decommissioning - phase

2009	2017	2021	2025	2033
Start of Decommissioning – 2nd phase	Start of Decommissioning – 3rd phase	Start of Decommissioning – 4th phase	Start of Decommissioning – 5th phase	Main Production Unit - conversion into the TSÚ RAO

NPP V1 Bohunice – Decommissioning



NUCLEAR POWER PLANTS IN OPERATION

COMPLETION OF MOCHOVCE NPP (EMO 3, 4)

- Budget more than 5,4 billion EUR
- More than 150 suppliers
- More than 800 experts from Enel/SE, a.s.
- More than 3500 workers

- The largest private investment in Slovakia
- 1 of 3 NPPs under construction in Europe
- Cooperation of DE, IT, FR, and RU companies in construction

THANK YOU FOR YOUR ATTENTION