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ONLINE

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Session 2: Implementation, Economic Impact and Challenges

- The Role of SME in the Energy Transition – A. Ćurković (Encro Energy)

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The Role of SME In the Energy Transition

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Introduction

- **ENCRO ENERGY** is the largest wind farm (WFs) project developer in Croatia, with 7 WFs in operation.
- Those 7 WFs represent **27% of renewable wind** energy production.
- Average **capacity factor of our WFs is 32%,** which is significantly higher than the EU average – 24%[1]
- Those constructed WFs have been selected as **best from over 30 projects** that have been primarily considered for development 15 years ago.
- The project development **does not stop** with the constructed windfarms – We have an additional 500 MW of wind and 570 MW of solar projects in the pipeline.

7 Windfarms in operation

141.4 MW

Installed capacity

385 GWh

Annual energy production

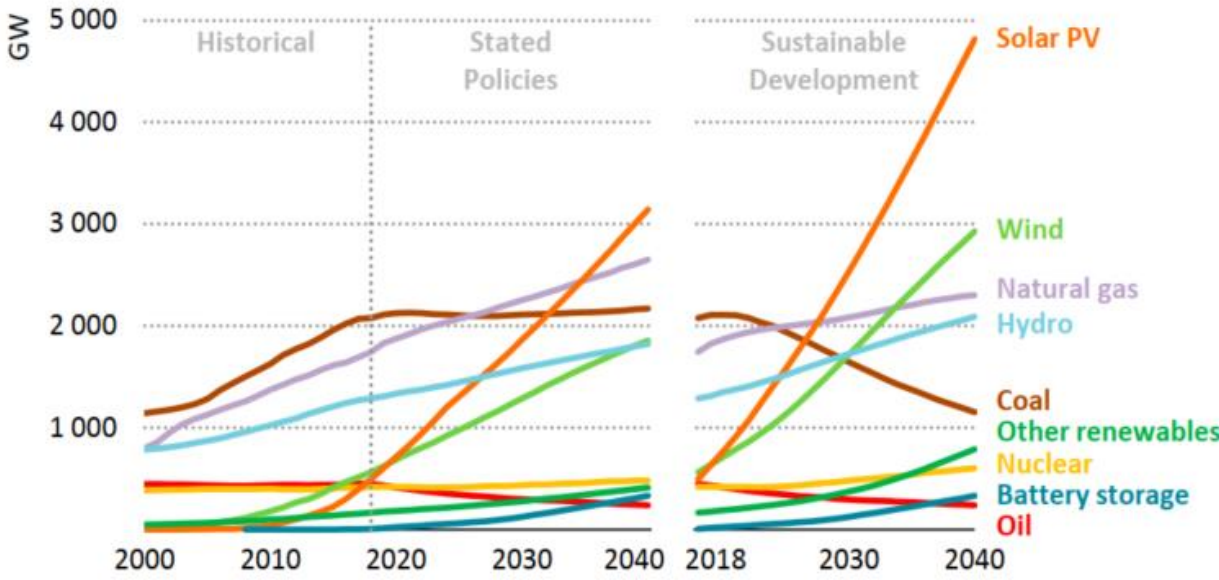
[1] Source: Wind energy In Europe In 2019, Trends and statistics; February 2020; Wind Europe

7 Wind farms and **385 GWh annually**

- **WF Zadar 6 (9MW) -** located In Gračac County, with a capacity factor of 31%. In commercial operation since January 2011
- **WF Poštak (44,2 MW) –** compared to the Zadar 6 turbines, the Poštak turbines have a 73% bigger rotor swept area and a 48% increase in nominal power. The capacity factor is 34%. In commercial operation since January 2011
- **WF Zadar 2 (18 MW) -** located in Benkovac and Obrovac Counties, since its operation date, together with WF Zadar 3, based on the capacity factor of 35%, they are ranked continuously 1st In Croatia. In commercial operation since February 2012
- **WF Zadar 3 (18MW) -** located In Benkovac County. The capacity factor is 35%. In commercial operation since February 2012
- **WF Voštane (20 MW) -** located In Trilj County, it has an above-average capacity factor of 29%. In commercial operation since August 2013
- **WF Kamensko (20 MW) -** located In Trilj County, it has an above-average capacity factor of 29%. In commercial operation since August 2013
- **WF Zadar 4 (9 MW) -** located In Benkovac County, with an above-average capacity factor of 28%. In commercial operation since August 2013

The future of power generation is renewable

- The year **2019 was the second warmest** on record and the end of the warmest decade (2010- 2019) ever recorded.
- The United Nations *2030 Agenda for Sustainable Development Goals (SDG)* (25 September 2015) and The Paris Agreement from November 2016 aim to hold the increase in the global average temperature to **well below 2˚C above pre-industrial levels**, that is only possible if the near future of power generation is renewable.
- To achieve the outcomes of the UN SDGs, the **International Energy Agency has modelled the Sustainable Development Scenario (SDS).**
- The SDS holds the temperature rise to below 1.8˚C with a 66% probability. [3]
- In the SDS, renewables provide 2/3 of electricity supply worldwide by 2040**: Solar PV and wind together provide 40%.**



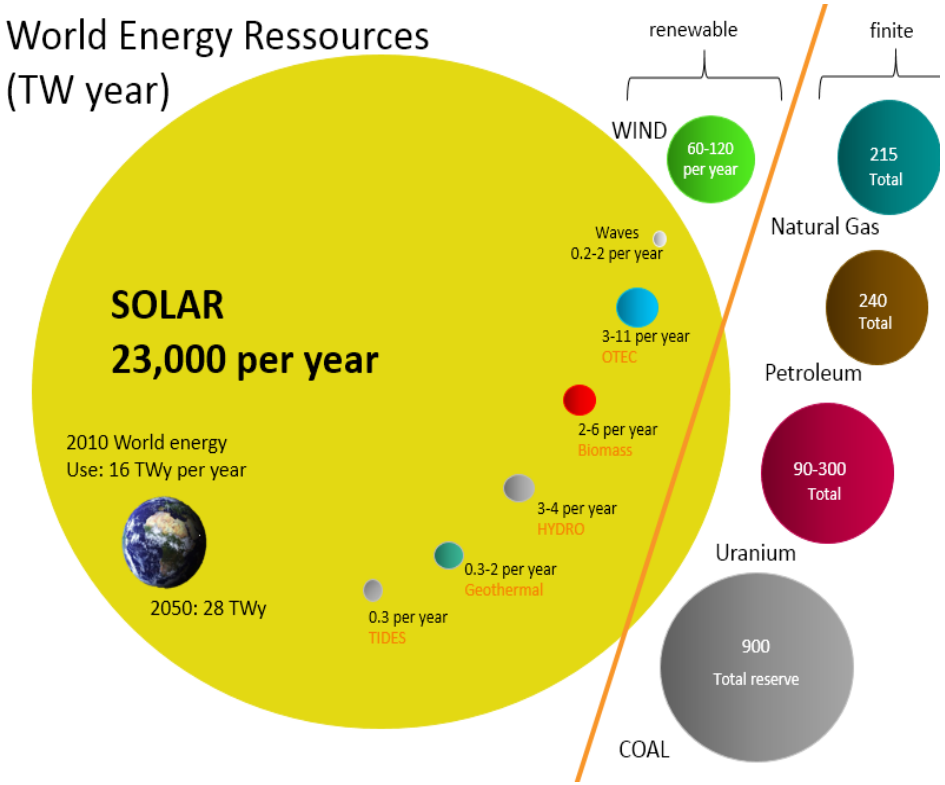
Global power generation capacity by source and scenario[4]

2 WMO Statement on the State of the Global Climate in 2019

3 "this is equivalent to limiting the temperature rise to 1.65 ° C with a 50% probability"; WEO 2020; International Energy Agency

4 Figure 1 ▻ Global power generation capacity by source and scenario; WEO 2020; IEA

The Potential of Solar Energy



- Calculated by the **Fraunhofer Institute for Solar Energy Systems ISE** (Technology development of solar cells by 2050, 16.11.2018)
- Data for the fossil fuel reserves in TWy calculated by British Petroleum Company In 2015 (BP Statistical Review of World Energy Primary Energy: Consumption, June 2015. London)

ENCRO Ready to go projects in Croatia

3 New **Solar Power Plants** (SPPs):

- **SPP Gornji Humac** on the island of Brač with a total rated power at, grid connection point, of 9,9 MW (13 MW DC peak);
- **SPP Hrvace** is located near the city of Sinj grid connection point of 9,9 MW (13 MW DC peak);
- **SPP Gradic** is a PV power plant located In the Benkovac County at grid connection point, of 9,9 MW (13 MW DC peak)
- All projects have valid permits and are ready for construction; and
- It is important to mention that the Island of **Brač is one of the 26 EU Islands** that was selected for technical and professional support for the transition to „clean energy".

3 New **Windfarms** (WFs):

- **WF ZD2P -** located in Benkovac and Obrovac, grid connection capacity 48 MW - 8 years of on-site wind resource measurement ;
- **WF ZD3P -** located in Benkovac, grid connection capacity 33 MW - 8 years of on-site wind resource measurement; and
- **WF Visoka –** located in Sinj county, with a grid connection capacity of 33 MW - 1 year of on-site wind resource measurement.

The Potential of Renewable Energy in Croatia

- Croatia has **huge potential** for wind and solar energy, confirmed in government document:
  - The Integrated National Energy and Climate Plan,
  - Energy Development Strategy,
  - Low Carbon Development Strategy, and
  - Climate change Adaptation Strategy.
- The Strategy plan predicts that the energy development of Croatia will be based on RES, **primarily on solar and wind**.
- This gives the **SME a fair opportunity** to develop the RES projects.
- The most serious difficulties at the moment for SME:
  - According to the Transmission System's current Grid rules, it would be necessary to start building a new and reconstructing the existing transmission grid. Although these are the current rules, **they set unrealistic and unpractical conditions for grid stability**. The result will be **expensive and unnecessary** over a constructed network and unnecessary costs to RES projects.

SWOT analysis for renewable energy powered by SME

Flexibility in Human resources

SME dynamics

Technological innovation

Up-to date knowledge

Generally wide computer literacy

PTSD based on the lack of process transparency and new rules as you go through Project development

Cumbersome bureaucracy

Demographics

Government owned business dominance

EU funds

Low interests on debt

Project finance

Geostrategic position and natural resources

SARS-COVID19

Accelerated negative climate change

Socio-political engineering (fake news**, NIMTO**, NIMBY, BANANA, CAVE)

Highly aggressive non-inclusive NGOs

PESTLE analysis

Political, Economic, Social, Technological, Legal, Environmental analysis

P **Policy makers** strongly **support RES** short and long-term, through Parliament accepted doc.

E **Economy participants** are **strongly motivated** to care for stable and secure power generation due to significant dependence on energy imports. Electrification has great potential to support new products and services, improve living standards and increase GDP.

S **Social progress** is secured by employment boost and **increasing number of entrepreneurs**.

T **Technology innovations** have led to a **dramatic reduction in RES investment cost**, the process continues in terms of raw material availability and production process.

L **Legal framework** is **predictable in the long run**, amendments are clearly defined with the aim of creating a single European market. Fossil fuels business is clearly shifting to RES, thus contributing to the accelerated energy transition and transparency of regulations.

E **Environmental global framework** through the **Paris agreement and UN SDGs** aims at low carbon society where protection of biodiversity and healthy human environment are civilization priorities for the first time in human history. RES are the foundation for these goals.

Instead of a conclusion

Project finance & PPA ▶ **Small and medium enterprises**

Corporate finance ▶ **Incumbent utilities**

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Thank you for your attention