Greening Energy
Market and Finance

Innovations in Renewable Energy Sources: Microgrid Poland Island mode

Group 2I

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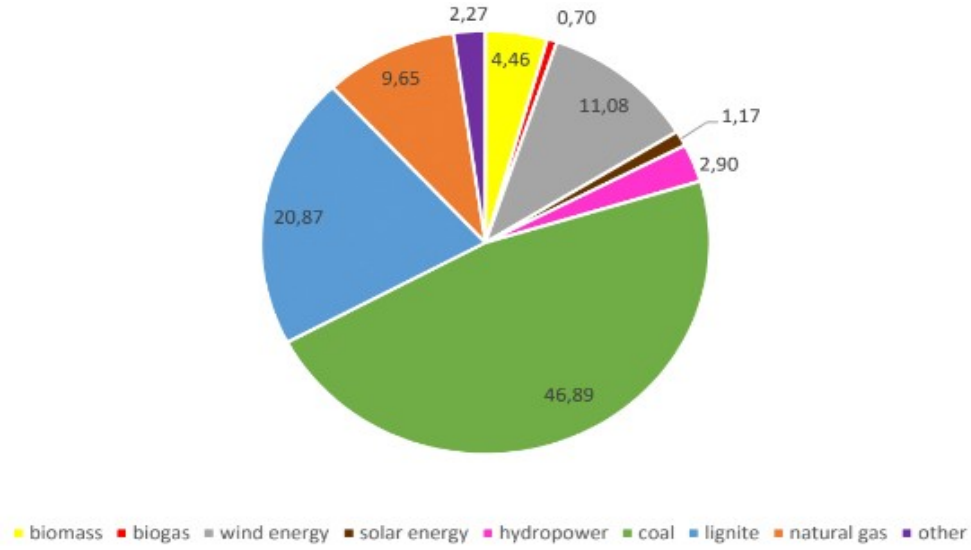
With the support of the Erasmus+ Programme of the European Union

Project website: http://grenfin.eu

Experience in the field of RES

The company supplies over 51 TWh of electricity annually to 5.6 million end customers. Where current activity is limited to the southern part of Poland.

The new strategy assumes investments in renewable energy by 2025, such as photovoltaic farms and wind farms. The increase of share of low- and zero-emission sources in the structure of piles and energy carriers to approx. 30% in 2025 and approx. 65% in 2030.



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Climate Risk

We have the 2/3 of the energy generated from coal and lignite:

We can review the climate risk there:

Classifications by Fitch Ratings:

- GHG Emissions & Air Quality - Emission CO2, sulphur dioxide(SO2), nitrogen oxide(Nox)

- Waste & Hazardous Materials Management - Ultra-clean coal tech reduces ash below 0.25% but still has issues sulphur to very low levels

- Water & Wastewater Management – water stresses is another concern. As water is used to create steam, which then turns turbines, generating electricity. Once-through uses water once and discharges it. Wet- recirculating that reuses water, but systems loses water during the cooling process

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Climate Risk & Potential damage to Microgrid

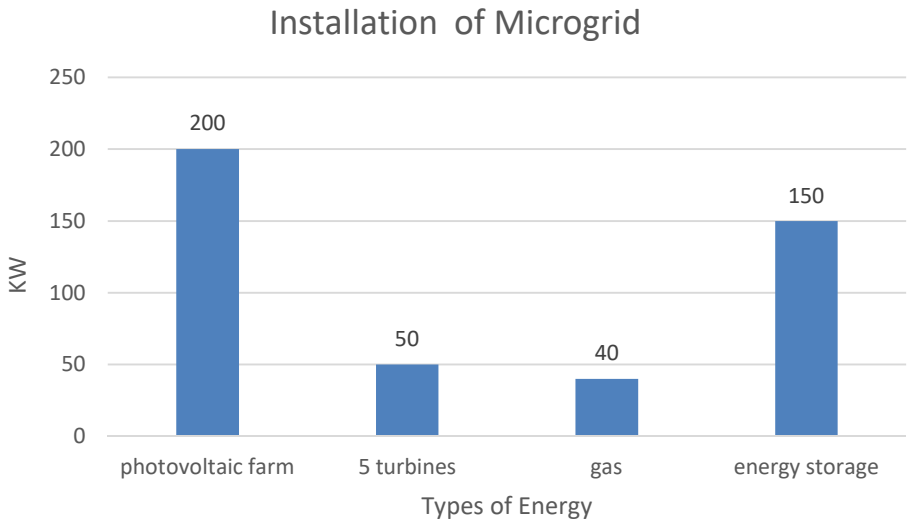
We can use wind and solar to reduce this but there are issues:

Climate risk includes changes of wind patterns can affect production of energy.

MIT researchers say climate change could reduce the yield of solar modules.

Both have seasonality to production that plays with each other so there is an overlap of production of energy, such as greater production in Apr - Sep for Solar and winter period for wind turbines.

In case of damages made to microgrid we have an energy storage of 150 KW that has a capacity of 250 kWh.



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Financial Risk

What are the consequences of not receiving a project funding?

- Microgrids do not exist in Poland law at present.
- Necessary building and environmental permits issued by the Office for construction.
- High entry barrier at est. EUR 1,100,000. as environmental and innovative aspect of the project.
- Complex project that is 3 stages:
    1. Prepare tender to Contractors
    2. Performance of tender and selection of Contractor
    3. Cooperation with the Contractor in the construction of the pilot installation and its commissioning
    4. Stages must be planned in a way that minimizes delay

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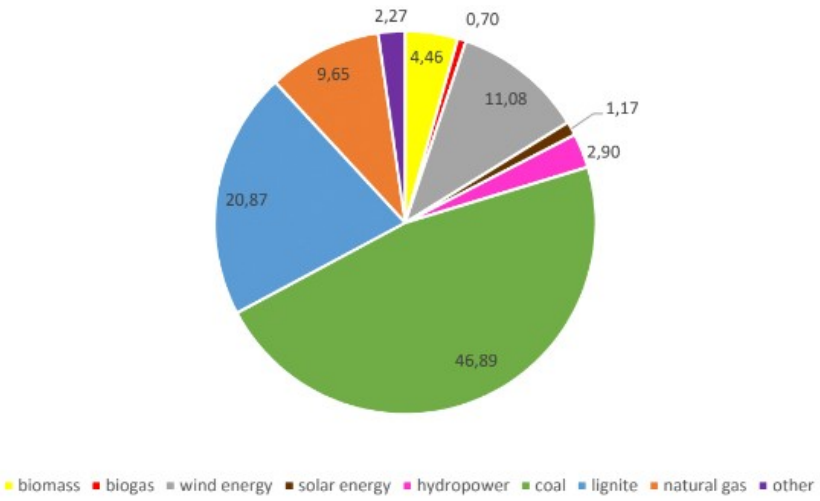
Poland Carbon Tax as of 2020

Current Carbon Tax in Poland is 0.09 € where others EU countries have a higher rate.



Carbon Tax Rates, Share of Covered Greenhouse Emissions, and Year of Implementation in European Countries (as of April 1, 2020)

	Carbon Tax Rate (per ton of CO_2e)		Share of Jurisdiction's Greenhouse Gas Emissions Covered	Year of Implementation
	Euros	US-Dollars		
Denmark (DK)	€23.77	$26.00	40%	1992
Estonia (EE)	€1.83	$2.00	3%	2000
Finland (FI)	€62.18	$68.00	36%	1990
France (FR)	€44.81	$49.00	35%	2014
Iceland (IS)	€27.43	$30.00	29%	2010
Ireland (IE)	€25.60	$28.00	49%	2010
Latvia (LV)	€9.14	$10.00	15%	2004
Liechtenstein (LI)	€90.53	$99.00	26%	2008
Norway (NO)	€48.46	$53.00	62%	1991
Poland (PL)	€0.09	$0.10	4%	1990

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Sources of co-financing for project

Fund?	Innovation Fund	Strengthened implementation of Circular Economy
Why consistent?	Innovative technologies for emissions reduction. European-wide commitment in energy transition.	Microgrids limit raw material use, reduce missions, reduce risk of power outages
Significant criteria?	Effectiveness in emission avoidance. -Project maturity; Cost-efficiency.	Implementation of sustainable development principle, support effective functioning economy & society
Amount funded?	Up to 60%	Up to 85% (Min 300.000 €, Max 1.000.000 €)

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Further insights in financing alternatives

The co-funding strategy integration with alternative financial sources:

- Potential synergies allowed for by the Innovation Fund
- Greeen Bonds
- Weather Derivatives

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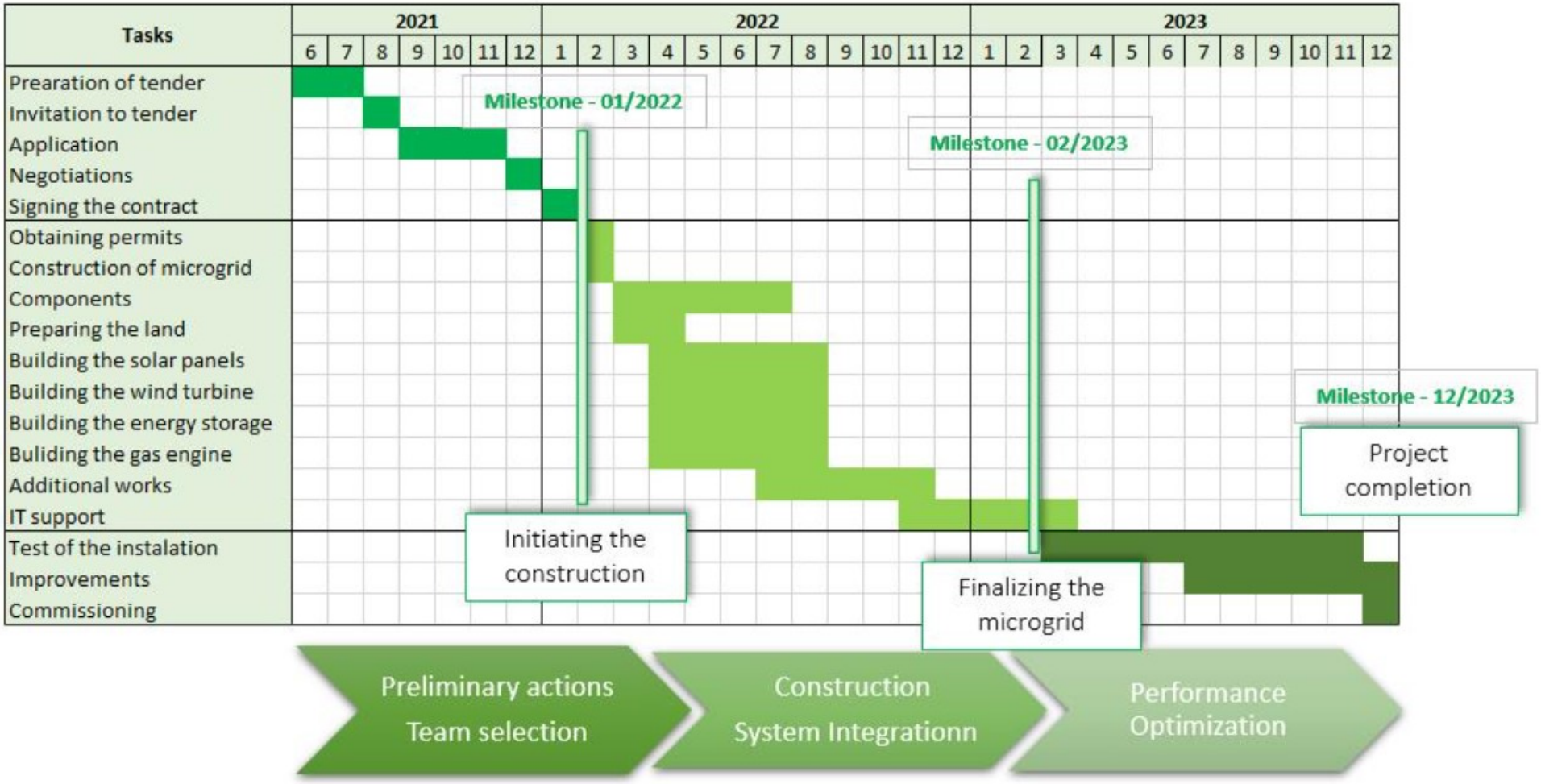
Schedule for Project



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