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The regional roles and benefits of wind power

A monitoring process for the partner regions Bavaria, Georgia, Québec, São Paulo, Shandong, Upper Austria and the Western Cape

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Agenda

Regional Leaders' Summit Energy Network



Introduction

The Regional Leaders' Summit (RLS) The RLS Energy Network Regional Renewable Alliance (RRA) RRA: Monitoring Activities

Wind power in the RLS regions

Regional policy frameworks and targets Installed capacities and operational details Key impacts of wind energy implementation Research & development activities

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Conclusion



Introduction



The RLS Energy Network

- The RLS Energy Network was initiated subsequent to the RLS meeting in São Paulo in 2012. It was agreed among the participants that renewable sources of energy require extensive research.
- The RLS Energy network is used as a means to bring together complementary strengths in energy research to be shared and further developed in a joint effort.
- The objective of the RLS Energy Network is to leverage the geographic and scientific potential of each region through cooperation in the following fields:
 - Renewable Energy
 - Storage & Conversion
 - Energy Efficiency
 - Waste to Energy





Introduction

Regional Renewable Alliance (RRA)

- The RLS Energy Network's roadmap, the Regional Renewable Allowance (RRA), established a permanent scientific group under the umbrella of the RLS.
 - **Objectives**: trigger new infrastructures, transnational transport and trade of renewable energy on a global scale
 - **Preparatory stage**: evaluating key technologies, knowledge and energy potentials
 - Implementation & demonstration phase: transcontinental demonstration projects that establish, test and evaluate new technologies







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Introduction

RRA: Monitoring activities

- Within the roadmap, a monitoring report describes the renewable energy resources and technologies in detail and key players in industries and universities for each participating region are determined.
- The database provides the status of renewable energy as well as the potential for each partner region.
- Scientific, industrial and administrative key players are identified and individual databases are set up and merged.
- The following slides present wind power highlights, objectives, trends and research activities of the RLS regions, as well as statistics for all regions compiled during the monitoring process.

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RLS ENERGY NETWORK DATABASE



Regional policy frameworks and targets

Several RLS regions have targets for increasing the amount of renewable energy or low-carbon energy in the electrical generation mix. These targets are based in legislation and appear in roadmap documents. Some RLS regions have specific goals or targets for renewable energy generally and wind energy in particular.





Installed capacities

• A **total installed wind power capacity** of about **18,955 MW** is in operation in the RLS regions Bavaria, Québec, Shandong, Upper Austria and the Western Cape by the end of 2015.

RLS regionTotal wind capacity in 2015 (MW)Image: Second system1,862Image: Second system3,510Image: Second system13,100Image: Second system47Image: Second system436

Table 1: Total installed wind capacity in selected RLS partner regions in 2015

Note: For the regions of Georgia and São Paulo, no detailed data is publically available for wind power or wind energy does not play a decisive role in the domestic energy system so far.



Installed capacities & operational details





Key impacts of wind energy implementation

- Wind power development directly affects the employment and income of the industry, mainly during the construction phase of a wind power project, but also during its operational phase. Indirectly, wind power construction and operation expenses may create demand for goods and services in the **regional economy**.
- Wind power plays a significant role in curbing **emissions** that would otherwise be generated from conventional sources.

Table 2: Employment effects (rounded) of wind energy in selected RLS regions in 2015

RLS region	Estimated jobs
Bavaria	11,800
Québec	5,000
Upper Austria	350
The Western Cape	2,400

Table 3: CO2 reduction by wind energy bydisplacing fossil fuel power plants in selected RLSregionsRLS regionCO2 reduction

RLS region	CO ₂ reduction
Shandong	21,500,000 t (in 2008)
Upper Austria	60,000 t (in 2015)
The Western Cape	1,200,000 t (in 2017)

Research & development activities

- R&D programs took a significant part in making wind energy technology more cost-competitive and consistent. **Research programs, in combination with demonstration activities implemented by the industry**, supported the role of wind generation as a significant contributor to respond to challenges of growing energy demand and to mitigate against climate change.
- Within the RLS partner regions several research and development activities in the field of wind energy are taking place.



RLS Energy Network: The regional roles and benefits of wind power

The Western Cape



Wind power highlights of Shandong, China



Development conditions

• Geographical advantages



- Peninsula, islands, mountains
- Coastline: 3,100 km, account for 1/6
- High wind speed, short periods of calm wind
- Rich in wind resources

Wind power highlights of Shandong, China



Development conditions

• Economic advantages (2016)

Power consumption reflects the level of the industrial power and population in Shandong

- The population in Shandong, ranked second in China, is around 99.5 million and accounts for about 7.2 % of the whole country's population.
- The third industry has contributed 55.7 % of economic growth. The second industry of the province's economic growth was 40.3 %.

Hence, wind power is a method to contribute to the increasing electricity demand.



Wind power highlights of Shandong, China

Development conditions

• Government Policy Support

The serious environmental issues and the lack of coal had pushed the government to decrease the thermal electricity generation and increase the electricity generation by renewable energy, especially by wind power.

- "The 12th Five-Year-plan" (2011-2015): 2 GW (offshore), 8 GW (total)
- "The 13th Five-Year-plan" (2015-2020): 6 GW (offshore), 15 GW (total)



Wind power highlights of Shandong



Outlook

• By **2030**, the **installed capacity of wind power** should reach more than **23 GW**.



Wind power capacity in Shandong

- Based on the topographical conditions, the Shandong government will mainly focus on the development of offshore wind power rather than on onshore wind power in order to:
 - to become a significant province on generating electricity by wind energy
 - to provide employment (almost 30,000 job opportunities) for maintaining the operation of wind plants. At the same time, the development of wind power would supply 5 million job opportunities to related industries such as the equipment manufacturing industry and ecological environmental protection.

Conclusions



- Within its **road mapping process**, the major objective of the **RLS Energy Network** with regard to **monitoring wind energy** is the evaluation and harmonization of data (installed capacities, electricity generation, socio-economic benefits) in order to allow comparative studies of the status quo and the developments within the partner regions, to identify synergies and foster joint research in this area.
- Due to these processes, RLS wind regions can support and accelerate wind deployment in regions that are new to wind energy or can benefit from the experience of regions that are successfully operating wind plants as part of their electrical systems.
- The **importance of wind energy** in the regional energy systems **varies** between the regions resulting from **different geographic and regulatory frameworks**.
- The Shandong and the Western Cape regions in particular show a continuous expansion of wind power. Wind power has become one of the fastest growing renewable energy sources in those regions.
- Although some RLS regions, do not have binding targets for wind power and/or low wind energy use in the regional energy system, the **economic benefits** (value added, employment) are shown.

Thank you for your attention!



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