

# **The new era in the power sector**

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# Strategy to Low Carbon Economy

- The vision: Clean electricity
- Roadmap to sustainable power systems
- Current trends: Revision of plans with emphasis to high RES penetration and the energy efficiency
- High RES penetration through Distributed generation and Utility-scale RES power plants, with severe impacts to the distribution system and transmission system
- **The questions:** Are we ready for high RES penetration into the today grid? How we must face the impacts to the grid and to the economy?

## Some Impacts of high RES Penetration

- High installed capacity, two to three times more than the conventional plants
- Extension of the grid, new power lines, new substations
- Storage capacity necessary
- New techniques for management of the system
- Forecasting models, innovative technologies
- Impacts to the existing thermal plants in the operation time
- Impacts to the electricity market, new tools
- Finally, high investment in new RES-electricity, in the grid with higher electricity cost,
- New jobs

## Some Steps to the Future Clean Electricity

- Strong implementation of energy efficiency measures
- Research, models, Studies on a Country, Regional and even European scale to optimize the technology capacity expansion, generator dispatch and transmission capacity expansion
- High penetration requires high flexibility in the system, to share the load to large areas; pump storage and large hydro provide flexibility
- To create RES-e paths for energy flow, system operation and electricity market with new tools, improve system flexibility, avoid congestion in transmission interfaces
- Grid operation will be different from current practice, least-cost economic dispatch throughout the Region or Europe
- Coordinated Actions and Time for the transformation of the power sector are needed

# **Thank you for your Attention**

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