

The Smart & Strong Grid: Technology, Policy, and Finance to Connect People with Reliable Clean Energy



SMART GRIDS - A KEY ENABLER FOR THE TRANSITION TO CLEAN ELECTRICITY SYSTEMS

The power sector is undergoing a paradigm shift. A growing amount of variable renewable energy generation, coupled with increasing consumer involvement through microgeneration and flexible demand management, challenge the old ways of planning, operating, and investing in power systems. In the developing world, demand is growing rapidly, driving the need for massive investments in grids to connect more and more people while delivering high levels of service. Developed countries face problems with an aging infrastructure. Across this landscape of change, it is crucial for policy-makers to understand the synergies between grids and information and communication technologies. Only smart and strong grids will connect people with reliable clean energy.

A HOLISTIC APPROACH IS NECESSARY FOR ACHIEVING THE TRANSITION IN A COST-EFFICIENT WAY

Each power system is a SINGLE interacting system. The production and consumption of electricity has to be in balance at every moment 24/7 throughout the year. The system is also linked by value chain networks — changes in one link of the value chain can affect the whole system. Therefore, a holistic view across system planning, investment, and operation is needed to create a power grid capable of integrating the actions of all actors — including new market players — while maximizing the benefits and limiting costs. Smarter and stronger grids will require investment at all levels of the grid. Priority investment should be targeted where the deployment of new technologies will immediately improve system operation and promote clean energy deployment. This calls for the introduction of both power electronics and ICT technologies to increase grid flexibility and to provide knowledge and control capabilities of system behaviour. Furthermore, as they are at the centre of power systems, interaction and coordination between grid operators at all levels and across regions should be enhanced to minimize cost and secure system stability.

THIS WILL BRING THE FOLLOWING BENEFITS

- Unlock the full potential of renewable energy sources, both large scale wind, solar and hydro as well as distributed energy resources
- Promote efficient, intelligent energy consumption
- Encourage participation from customers e.g. by applying demand side measures and local storage
- Improve the sustainability of our energy system and supporting the long-term CO₂-reduction goals
- Enhance system stability, security of supply and quality of service; ensuring household and industrial consumers receive the electricity they need
- Unlock innovation, allowing new industries, services, and business models to be developed, promoting green economic growth and job-creation
- Offer cost efficient solutions compared to alternatives i.e. peak power plants

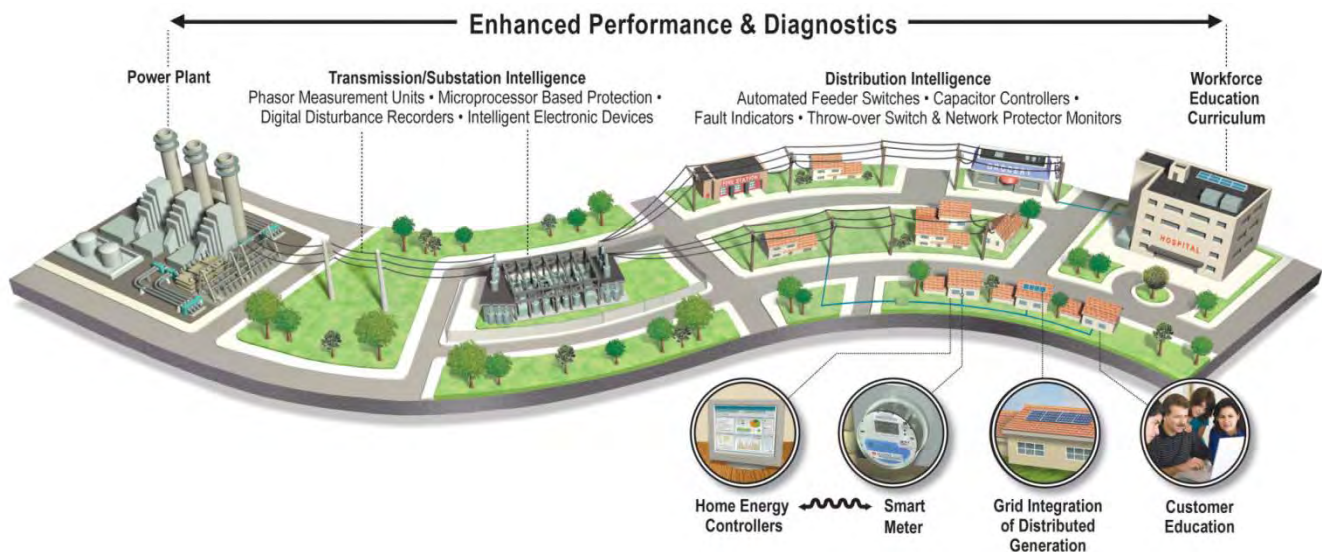


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GETTING THERE WILL REQUIRE THE JOINT EFFORT OF ALL ACTORS

POLICY MAKERS SHOULD FOCUS ON:

1. The adoption of interoperability standards to accelerate technology deployment and innovation

- Local or national standards should be aligned with internationally developed “future proof” standards in order to drive both deployment of available technologies and ongoing innovation.
- Technical and financial know-how is a key element for making the policy and interoperability decisions. Policy education has to be provided and international expertise exchange should be leveraged to advance international cooperation.

2. Support the implementation of technology roadmaps developed by authoritative organizations (e.g. IEA)

3. Implement stable financial support regimes and clear regulations

- Governments and regulators should support investment decisions with stable financial support regimes for new technology and business model deployment.
- Transparent and well -communicated cost-benefit analyses are crucial for clear regulations and stable financial support regimes and increase public acceptance.

4. Support simplification of permitting procedures regarding implementation of necessary grid infrastructure

5. Roles and regulations must be developed in parallel with changing markets and actors

- The cooperation of utilities should be encouraged to align procedures, implemented technologies, standards and long term planning.
- The necessary information exchange between Smart Grid actors has to be identified and assured in order to manage the system in the most efficient way and to secure system stability.

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