



SmartGridCity™: **Plugging renewables into the smart grid**

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NREL Industry Growth Forum

November 4, 2009



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Company profile

Northern States Power Company- Minnesota

Northern States Power Company- Wisconsin

Public Service Company of Colorado

Southwestern Public Service

3.4 million electricity customers

1.9 million natural gas customers

Traditionally regulated



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What is a smart grid?

- ▶ **Uses 21st century technology to create a more reliable and flexible energy delivery system**
- ▶ **Put new tools in the hands of customers**
 - ▶ **Empowers you to make smarter energy choices through energy management and conservation**
- ▶ **It's an investment in our future**



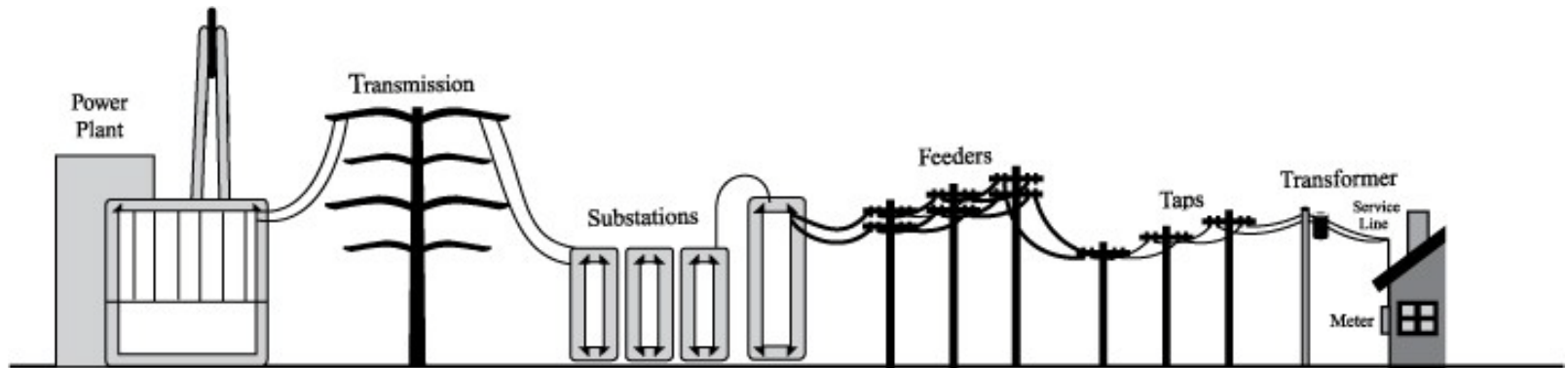
Today's Utility

- ✓ Limited energy storage
- ✓ Central power generation
- ✓ One-way binary demand response
- ✓ Limited real-time data
- ✓ Reactive outage management system



Tomorrow's Utility

- ✓ Energy storage devices
- ✓ More on-site power generation
- ✓ Flexible demand response
- ✓ Real-time distribution & customer data
- ✓ Real-time price signals
- ✓ Smart distribution system and processes
- ✓ Better customer information, choice & tools





How it works: **Adding Renewable Energy**

TODAY:

Infrastructure unable to maximize renewable resources

TOMORROW:

Smart grid technologies enable higher percentage of renewable power

- ▶ Energy storage systems
- ▶ Green power signals
- ▶ Demand response
- ▶ Widespread distributed generation
- ▶ Plug-in hybrid electric vehicles





Longer-term hypotheses

▶ Can we further reduce our carbon footprint?

- ▶ *Customer reaction to conservation tools*
- ▶ *More green power options*
- ▶ *Reduced peak demand, lowered emissions*
- ▶ *Fewer truck rolls*

▶ Can we further enhance service?

- ▶ *Reduced minutes out, faster problem resolution*
- ▶ *Operational savings*
- ▶ *Lowered call center volume*

▶ Can we optimize system capacity?

- ▶ *Minimized line losses*
- ▶ *Improved asset use and life*
- ▶ *Self-monitoring, self-balancing grid*



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www.xcelenergy.com/smartgridcity