



SmartGridCity™:

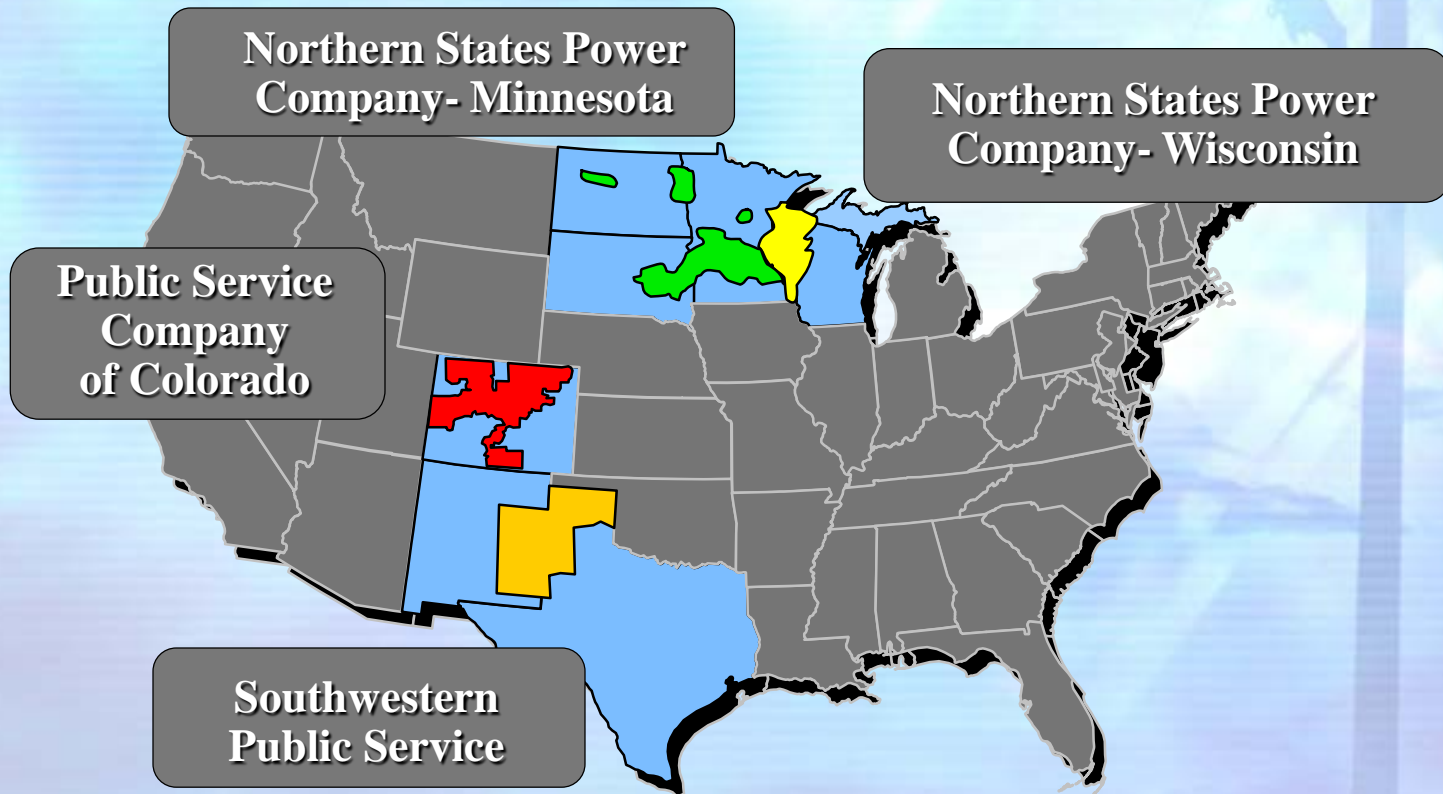
*A blueprint for a connected,
intelligent grid community*

**Presented to the Utah Public Service Commission
May 13, 2009**



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Xcel Energy

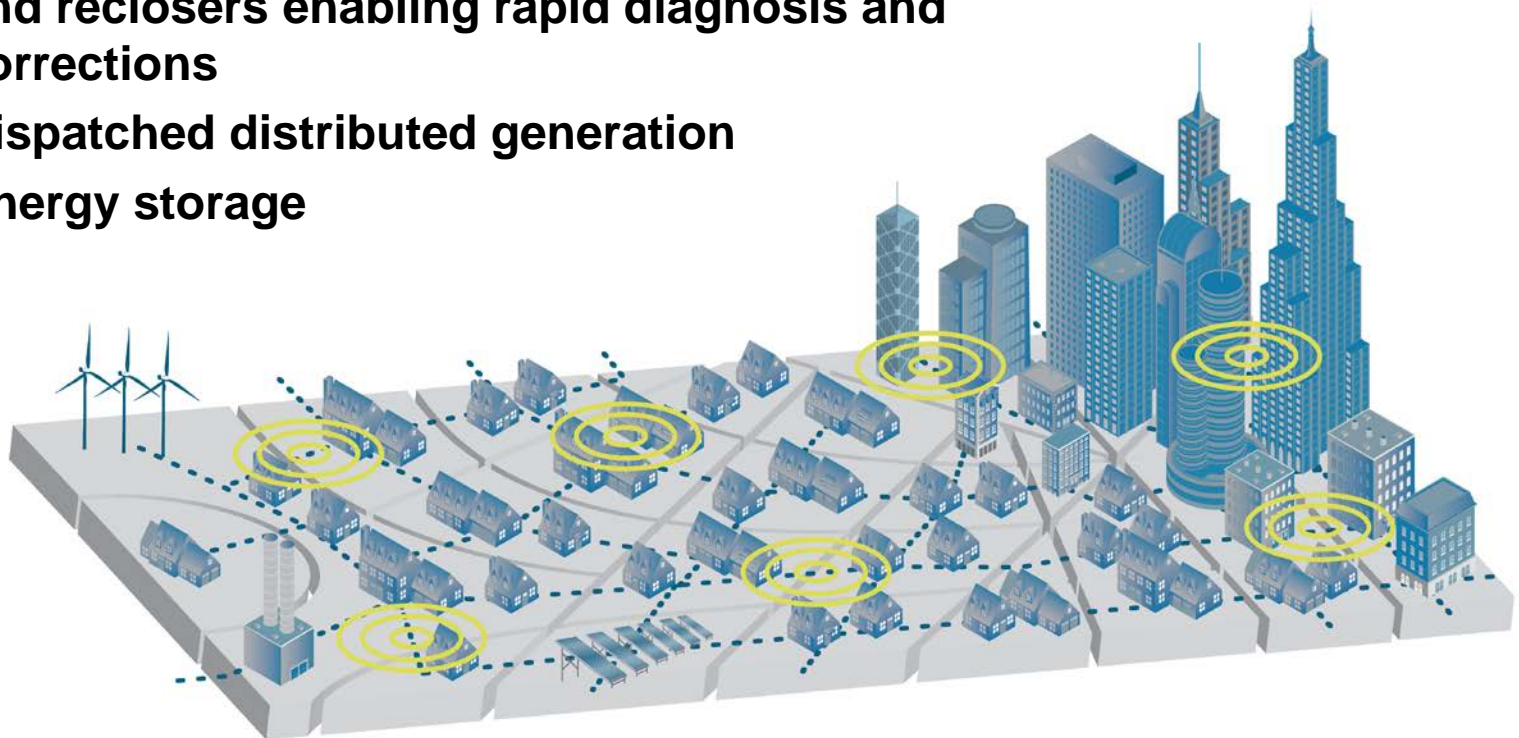


Smart Grid: A Digital, Information-Age Grid

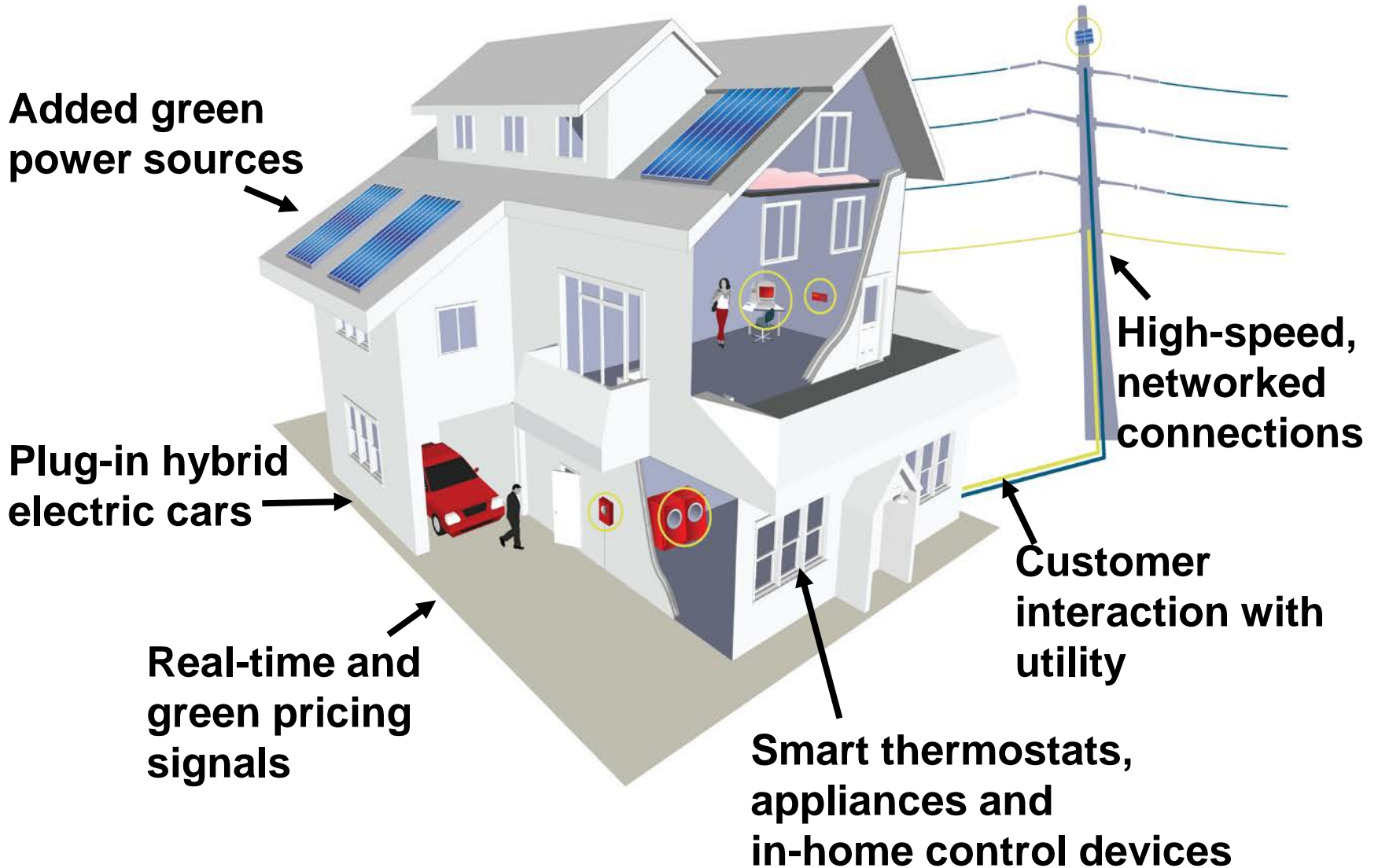
- **Basic structure**
 - **Similar to today's grid**
 - **Applies information technology available today**
 - **Much more information and control**
- **Power of information**
 - **More precise system design and operation**
 - **Improved reliability**
 - **Ability to meet customer needs and wants**
 - **More products and services**
 - **Reduced emissions and environmental impact**

An Integrated Energy System

- Incorporates entire energy pathway, from generation to customer
- High-speed, near real-time, two-way communications
- Sensors at substations, transformers, circuit breakers and reclosers enabling rapid diagnosis and corrections
- Dispatched distributed generation
- Energy storage



The Smart Home



SmartGridCity: The Vision

- **Create a catalytic event: Test much more than smart meters.**
- **Leverage public and private sector partnerships/research and development.**
- **Don't choose a technology winner in advance. Deploy multiple technologies, rate structures, in-home devices, etc.**
- **Test multiple benefit hypotheses ... don't predetermine outcomes.**
- **Establish an on-going testing and validation environment that will serve as a continuous Smart Grid innovation center.**



SmartGridCity: Project Status

- **Groundbreaking in April 2008**
- **Seven key “investing” partners**
- **Scope: City of Boulder -- 45,000 accounts (38,000 residential)**
- **Substation, Distribution & Communication system: Nearly complete**
- **More than 100 miles of fiber installed**
- **About 15,000 of 25,000 two-way meters installed**
- **Monitoring 3,200 transformers and 5,200 network elements**
- **Automated systems now in field use**
- **In process of installing 300 commercial and industrial meters**
- **Web portal and in-home devices offered to customers in Q2 2009**
- **Benchmarking throughout 2009**
- **New pilot pricing tariffs being developed, offered in Q1 2010**

Smart Grid Web Portal

- Allows customer to monitor and manage their energy use
- Online tools provide more options, choice and personal control

The screenshot shows the GridPoint Central web portal interface. At the top, it displays the user's name, John Q. Public, and the date, Monday, April 02, 2007. The main navigation bar includes links for ENERGY DASHBOARD, REPORTS, MY ACCOUNT, PRODUCT CATALOG, CUSTOMER SERVICE, and HELP. The user is logged in as 'Sales - Connect' with model C36-10-1 and a last sync time of Monday, April 02, 2007 12:45 AM. A warning icon indicates 'You have 2 current alerts'. The interface is divided into several sections: 'Did You Know?' with subscription benefits, 'My Weather' for Washington, DC (43°F), 'Backup Power' showing 16.2 hours runtime and 0.6 kW secure load, 'Savings' with a pie chart of renewable production (\$326.13 off-peak vs \$100.50 peak), 'Total Consumption Breakdown' pie chart showing 100 kWh total, and 'Environment' with a comparison of power generated to streetlights and pizzas.

GRIDPOINT CENTRAL

Welcome, John Q Public
Monday, April 02, 2007 **LOGOUT**

ENERGY DASHBOARD | REPORTS | MY ACCOUNT | PRODUCT CATALOG | CUSTOMER SERVICE | HELP

Sales - Connect Model: C36-10-1 Last Sync: Monday, April 02, 2007 12:45 AM

Select Appliance: Sales - Connect

Did You Know?

- ▶ Your GridPoint Central subscription provides:
 - ▶ Personal Energy Profiles for increased energy management and control.
 - ▶ Customized energy monitoring reports emailed directly to you weekly or monthly. Sign up now.
 - ▶ Single sign-on access to monitor one or more GridPoint appliances and accessories you own.
- ▶ GridPoint introduces a Thermostat Accessory Kit:
 - ▶ 7-day programmable thermostat to help conserve energy and keep you comfortable.

My Weather

Right now in Washington, DC (20006)

43°
Cloudy
Feels like: 39°F

UV Index: 1 (Low)
Wind: 7 mph S
Barometer: 30.24" / Falling
Visibility: 10.0 mi.

Show 5-Day Forecast

Monitoring | Energy Settings | Product Profile

Overview | Storage | Consumption & Production | Savings | Environment

Welcome!

Refer to your Energy Dashboard Overview for a summary of your most recent energy statistics monitored by your GridPoint systems. Change the 'View by' options to view data from a different time period or day.

My Most Recent Data: Live Household Consumption: **1.0 kWh**
Statistics as of: 9/15/2006 12:45:00 AM Live Renewable Production: **1.0 kWh**

View By: Time Period | Since Installation | Apply

Backup Power

Backup Power Available: **16.2 Hrs.**
Secure Load Usage: **0.6 kW**

Runtime (hours): **16.2**
Secure Load (kW): **0.6**

Total Consumption Breakdown

Total Circuit Consumption: **100 kWh**

Lighting: 25 kWh
Pump-Pool: 20 kWh
Pump-Well: 15 kWh
Water Htrs: 5 kWh
Others: 35 kWh

Savings

Renewable Produced: **\$426.64**
Peak: **\$326.13**
Off-Peak: **\$100.50**

Renewable Produced: **\$326.13** (Off-Peak) vs **\$100.50** (Peak)

Environment

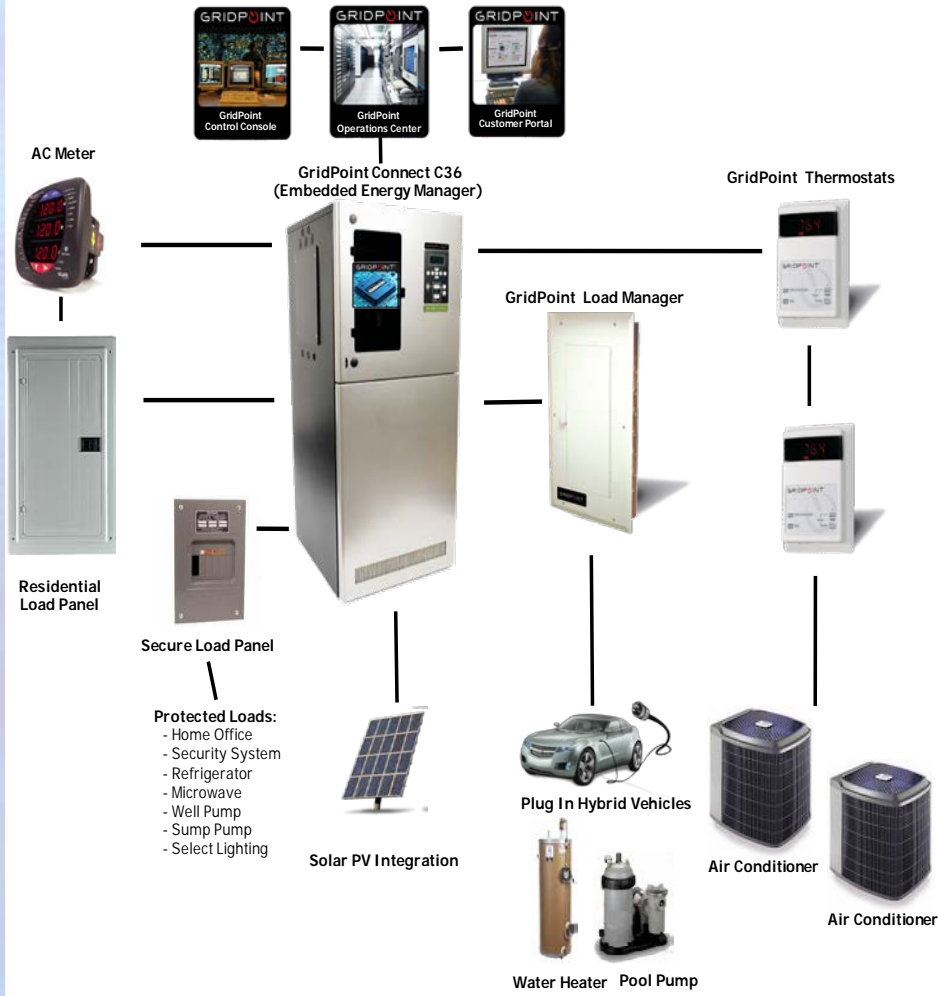
This is equivalent to:

- Powering streetlamps on a city block for 5,346.1 hours.
- Supplying enough lighting for 15.8 innings of Major League Baseball.
- Microwaving 52,510.2 pizzas.

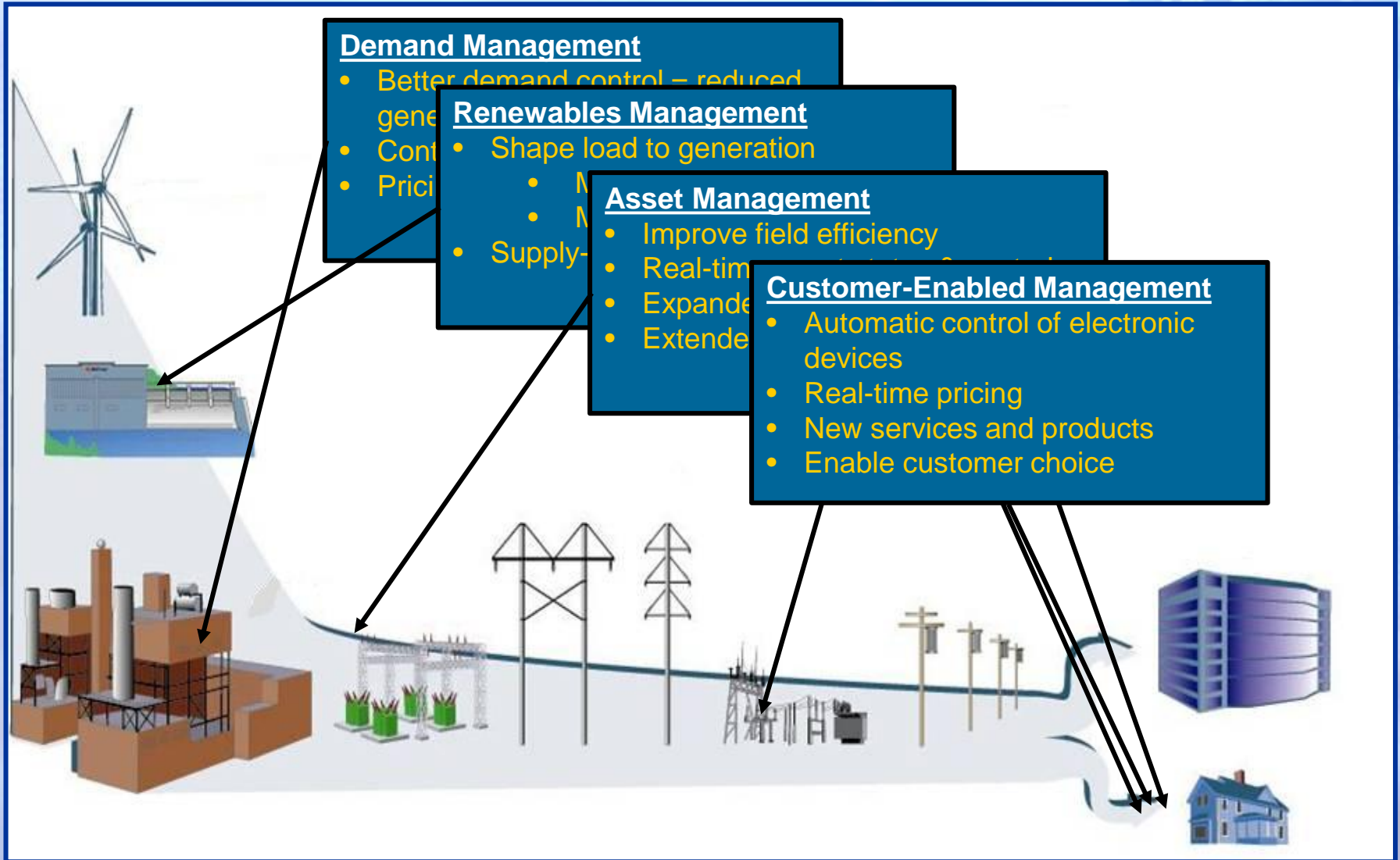
Power Generated:* **4,811.5 kWh**

* Power Generated is based on Total Renewable Produced

In-Home Energy Management Devices



Smart Grid Benefits



What's needed?

- **New regulatory construct**
 - Utilities encouraging customers to use less electricity
 - Utilities offering customers more services, rather than just product
- **Cost recovery for investments made**
- **National smart grid standards to ensure interoperability**
- **Federal stimulus: should recognize previous investments, lower match**



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www.xcelenergy.com/smartgridcity