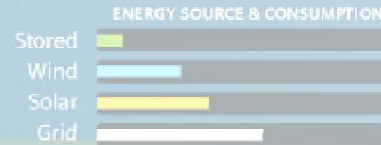




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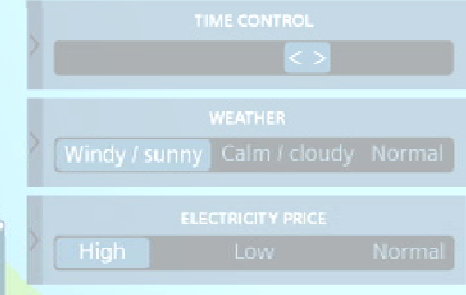
The Smart Building



DAILY CYCLE INFO

Higher electricity price period begins and the Smart Building adjusts to optimize energy usage and efficiency

Panel Session #37 “Building for the Future” – Smart Homes and Distributed Generation



Accounting for 40% of the world's energy consumption and 20% of total CO2 emissions, the smart grid will play a key role in energy efficiency. Smart buildings of the future can further save energy costs - and even earn money - by communicating with the power grid and reacting appropriately based on price signals and availability of renewable energy sources. Siemens offers innovative products and solutions for a sustainable future energy system.

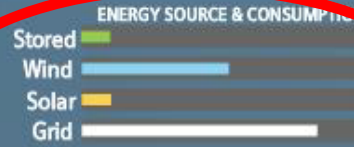
Great Lakes Symposium on Smart Grid and the New Energy Economy
September 26, 2012

Charles (Chip) O'Donnell, PE
Business Segment Head – Sustainability and Energy Management

Siemens Industry, Inc.
Building Technologies

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The Smart Building



DAILY CYCLE INFO

Smart Building begins to wake up...

TEMPERATURE SET POINT

75°F 23°C

6:06 START TIME

WEATHER SCENARIOS

Windy / sunny Calm / cloudy **Normal**

ELECTRICITY PRICE SCENARIOS

High Low **Normal**

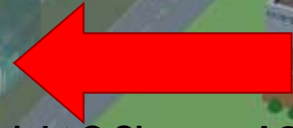
DEMAND RESPONSE EVENTS

Level 1 Level 2 Level 3 **Normal**

THE SMART BUILDING

Accounting for 40% of the world's energy consumption and 20% of total CO2 emissions, buildings play a crucial role in energy efficiency. A Smart Building of the future can further save energy costs – and even earn money – by communicating with the power grid and reacting appropriately based on price signals and availability of renewable energy sources. Siemens offers innovative products and solutions for a sustainable future energy system.

BAS



The Smart Building

ENERGY SOURCE & CONSUMPTION

Stored	High electricity price period begins and the Smart Building is selling back to grid
Wind	
Solar	
Grid	

DAILY CYCLE INFO

TEMPERATURE SET POINT: 74°F | 23°C

14:16 START TIME

WEATHER SCENARIOS

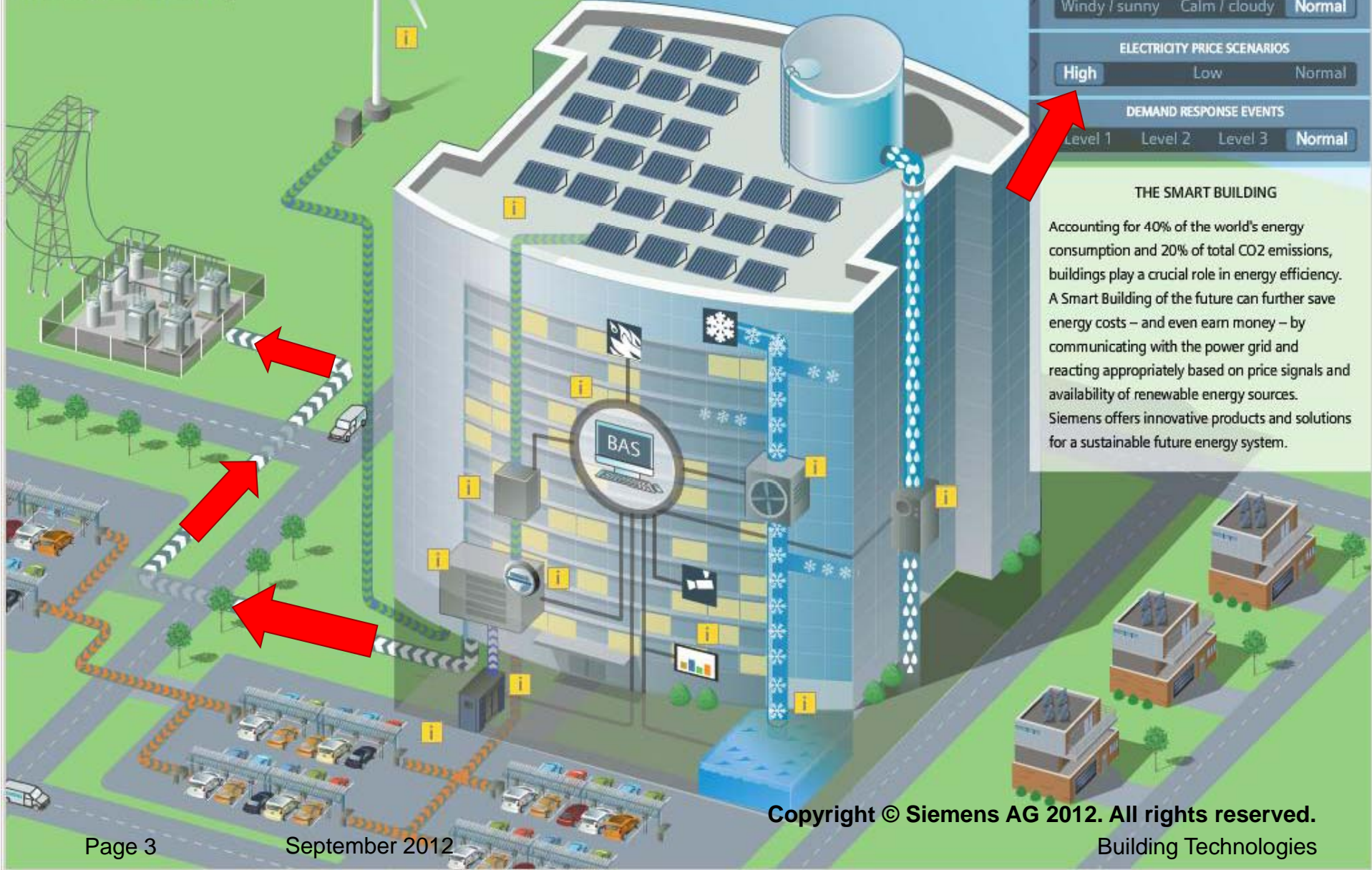
Windy / sunny | Calm / cloudy | **Normal**

ELECTRICITY PRICE SCENARIOS

High | Low | Normal

DEMAND RESPONSE EVENTS

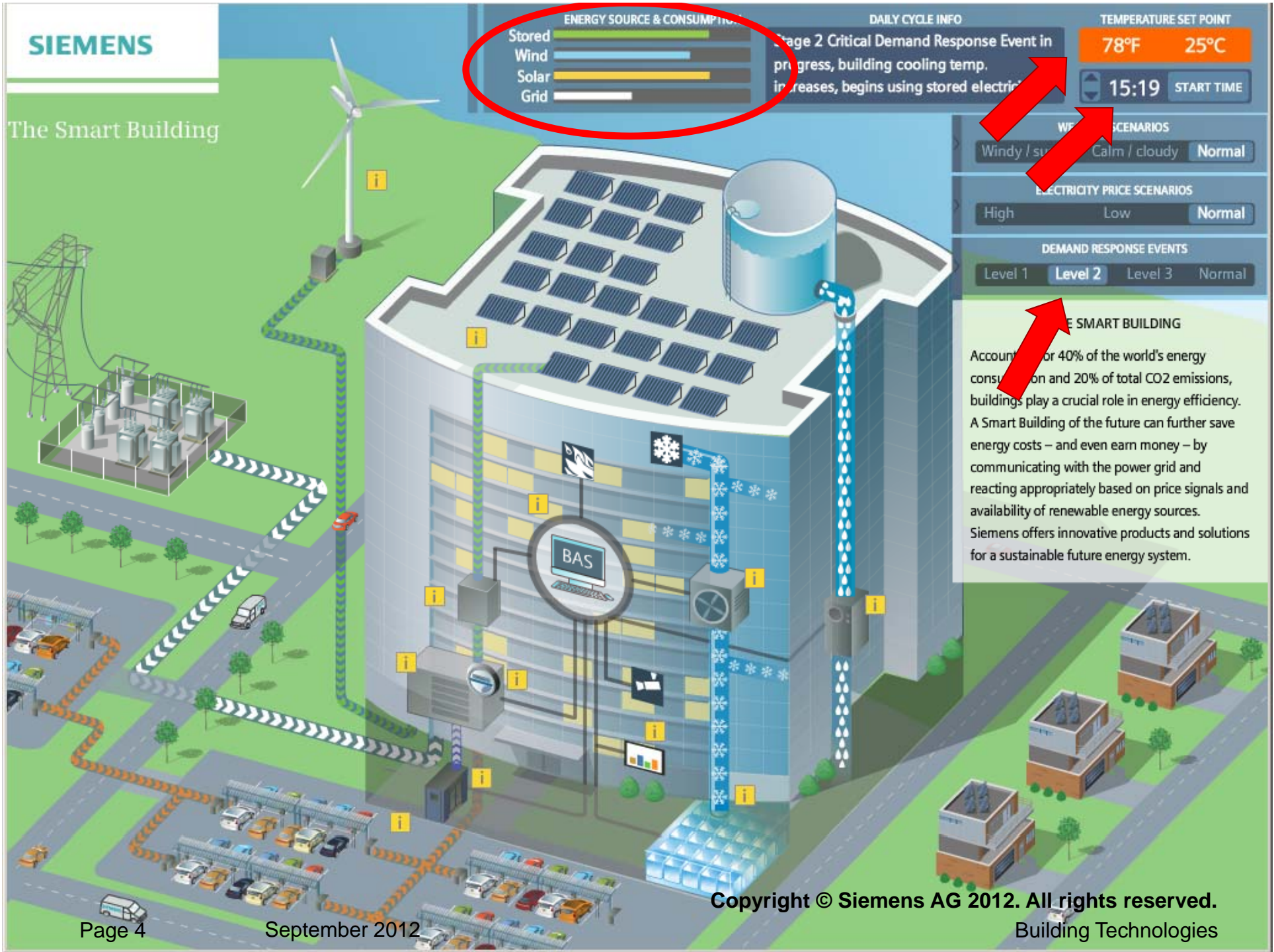
Level 1 | Level 2 | Level 3 | **Normal**



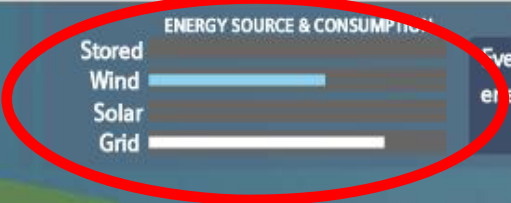
THE SMART BUILDING

Accounting for 40% of the world's energy consumption and 20% of total CO2 emissions, buildings play a crucial role in energy efficiency. A Smart Building of the future can further save energy costs – and even earn money – by communicating with the power grid and reacting appropriately based on price signals and availability of renewable energy sources. Siemens offers innovative products and solutions for a sustainable future energy system.

The Smart Building



The Smart Building



DAILY CYCLE INFO

Evening and overnight hours with low energy cost and low consumption

TEMPERATURE SET POINT

78°F 25°C
20:08 START TIME

WEATHER SCENARIOS

Windy / sunny Calm / cloudy **Normal**

ELECTRICITY PRICE SCENARIOS

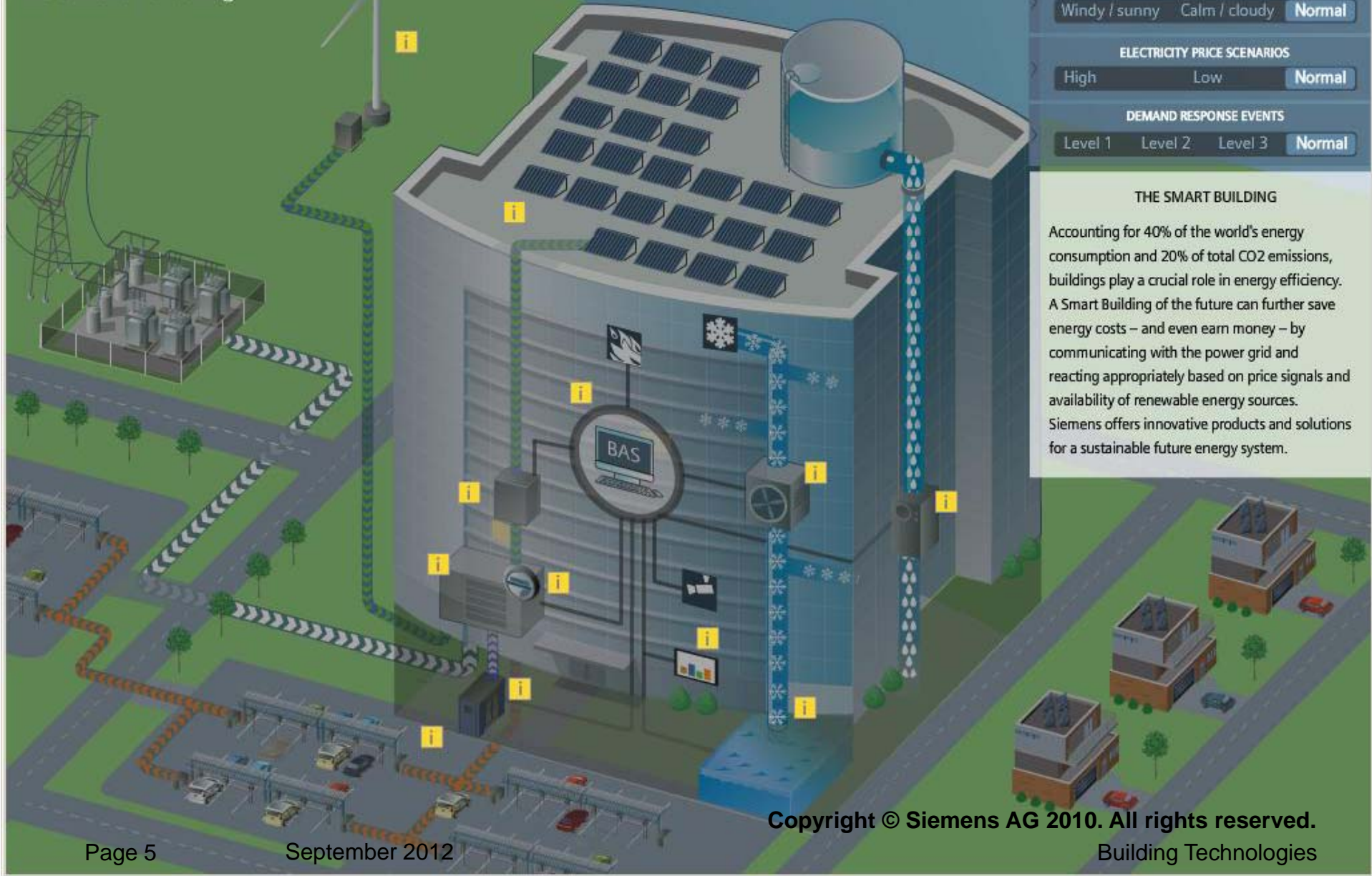
High Low **Normal**

DEMAND RESPONSE EVENTS

Level 1 Level 2 Level 3 **Normal**

THE SMART BUILDING

Accounting for 40% of the world's energy consumption and 20% of total CO2 emissions, buildings play a crucial role in energy efficiency. A Smart Building of the future can further save energy costs – and even earn money – by communicating with the power grid and reacting appropriately based on price signals and availability of renewable energy sources. Siemens offers innovative products and solutions for a sustainable future energy system.



Mobile Lifestyles are Clear Drivers to the Connected Home

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Saving money is a key benefit sought by all types of consumers—solutions will need to deliver here.

The connected home lifestyle needs to be made affordable, and where possible, positioned as a way to actually *reduce expenses*. *New types of bundles (think on-demand video and games on any device) may offer value here while creating ‘sticky’ experiences to earn consumer loyalty.*

Smart appliances and energy management solutions will have to deliver on the promise of lowering expenses in order to maximize their potential. Rebates and incentives will get the process started, but proof points will need to demonstrate ability to reduce the cost of energy bills and home repairs.

Saving money on energy bills using smart appliances and dynamic pricing will require consumers to climb a learning curve. Establish energy management user communities to share successes and struggles managing and reducing energy bills. Provide incentives for energy conservation efforts in the form of points redeemable for valuable merchandise or services.

Safety and security are perceived as key benefits of the connected home, and are major reasons for interest in remote access.

Drive home the ‘peace of mind’ message when talking about remote access.

The addition of energy monitoring to safety and security will be appealing to some *without the emphasis on remote monitoring and control—especially older consumers who mainly want to feel safe and save money.*

Source: CABA “State of the Connected Home Market”, March 2012

Regulatory Issues

- **Data Privacy** – concerns raised nationwide, particularly in California with California PUC
- **Socio-Economic** - Effect of Smart Grid Technologies on different socioeconomic groups within a given regulatory geography
- **Enablement Costs and Pricing** – Who will bear the costs of enablement? Utilities? Ratepayers? Manufacturers?
- **Interoperability** – still a pressing need for interoperability standards and testing. Not yet “plug and play.”
- **Utility/Manufacturer Cooperation** – pressing need for collaboration – and not realized yet.

Manufacturer Issues

- **Dynamic Pricing Needed**– to raise demand and homeowner opportunity for engagement.
- **Automated Response to Price Signals** – needed to drive economic incentives for residential and commercial markets.
- **Real-time Access to Pricing and Usage**– without price and spend information access, adoption rates are predicted to be low.
- **Interoperability Standards**– still a pressing need for interoperability standards and testing. Not yet “plug and play.”
- **Unclear Regulatory Policies** – difficult to invest in uncertain and fragmented markets.

Advent of Technology is driving rapid improvement

SIEMENS

- **Demand Response** – technology to enable real time control of renewable energy load shifts, distributed generation and consumer demand.
- **Home Networking** – Zigbee and other protocols defined
- **Industry Standards** – Being developed but needs alignment among all manufacturers.
- **Interoperability** – still a pressing need for interoperability standards and testing. Not yet “plug and play.”

From the Consumer Electronics Association

If the Internet revolution is precedent, the above solutions are just the tip of the iceberg.

The future will likely see converged consumer electronic devices that will not only enable consumers to control their energy consumption, but also allow them to do so via their smart televisions, mobile phones and tables and other consumer electronics devices.

But until dynamic pricing programs become more widespread, the energy management market will likely remain underdeveloped as entrepreneurs, established companies and financial institutions will not commit the resources necessary to develop innovative products and services due to a lack of consumer demand.

Source: Consumer Electronics Association

Unlocking the Potential of the Smart Grid – A Regulatory Framework for the Consumer Domain of Smart Grid

Questions?

