U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Can Widgets Enable more Flexible Buildings?

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10 Minutes	**Introduction**
	BTO's vision of GEB and how building technologies can be used for grid services as well as EE.
20 Minutes	**GEB Component Technologies Fast Pitches**
	Discussing capabilities these devices offer to grid services.
	HVAC and Water Heating
	Thermal Storage
	Envelope and Windows
	Lighting
30 Minutes	**Moderated Q&A**
	Discussion amongst panelists and attendees to answer questions, flesh out potential of building devices for grid services, identify technology challenges, and share ideas.

What to Take Away from this Session

- Learn about some of the big questions and opportunities at the grid edge and how building technologies can be used for grid services as well as energy efficiency.

- Start thinking about how the work you do can be integrated into what is discussed today.

- Please provide any feedback if you have any!

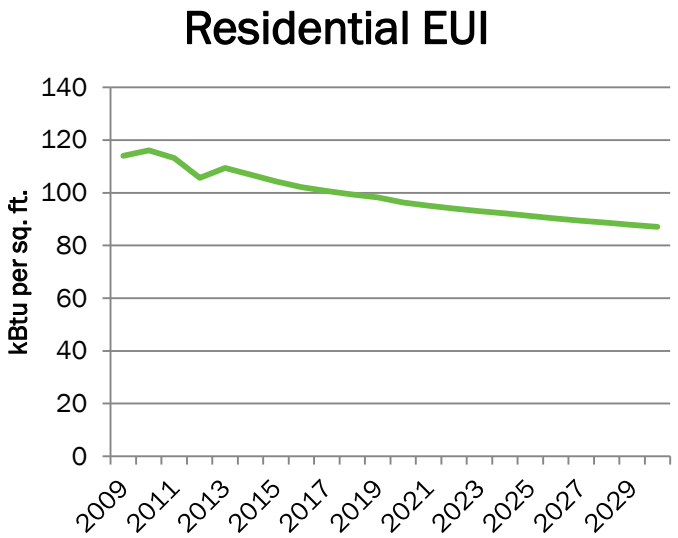
Opening Remarks

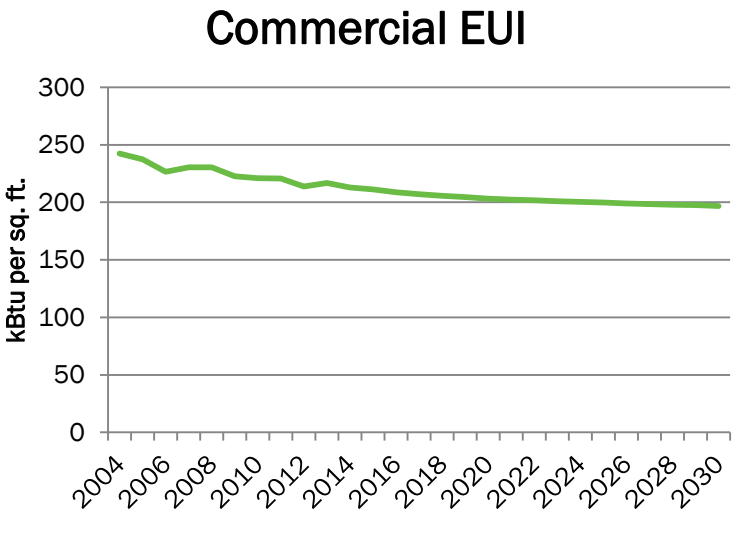
Mr. Daniel Simmons, Principal Deputy Assistant Secretary in the Office of Energy Efficiency and Renewable Energy

Get Smart: How Will Connected Buildings Change the Future?

Moderator: Ms. Maggie Molina, ACEEE
Panelists: Mr. David Nemztow, Building Technologies Office, Ms. Sue Coakley, Northeast Energy Efficiency Partnerships, Ms. Tracy Hawkin West, Southern Company, Dr. Tariq Samad, University of Minnesota, and other invited guests

BTO Goal: Reduce Building Energy Use by 30% by 2030





2030 sector-wide goal: reduce energy use 30% per sq. ft.

Long term goal: reduce energy use 50% per sq. ft.

Metric: energy use intensity (EUI)

Baseline: 2010

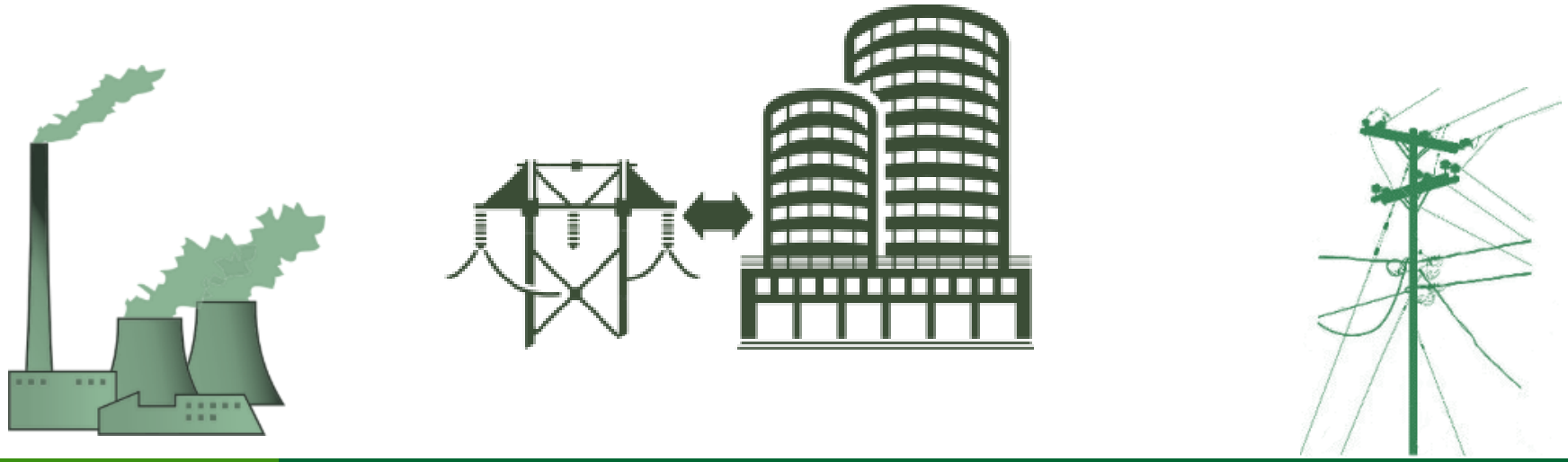
Rationale: allows comparisons across fuel types, building types, building sectors, end uses, that are more internationally relevant.

Grid-Interactive Efficient Buildings (GEB)

The concept of GEB is about the integration of energy efficiency and grid services recognizing that:

- Building energy efficiency is an important grid resource,
- Buildings can act as flexible, dispatchable grid resources,
- The value of energy changes based on time and location, and
- Buildings have a role in aggregating other DERs including electric vehicles (EVs), variable renewable energy (VRE) resources, and energy storage.

Buildings are an underutilized resource when it comes to grid planning and operation.



What are grid services?

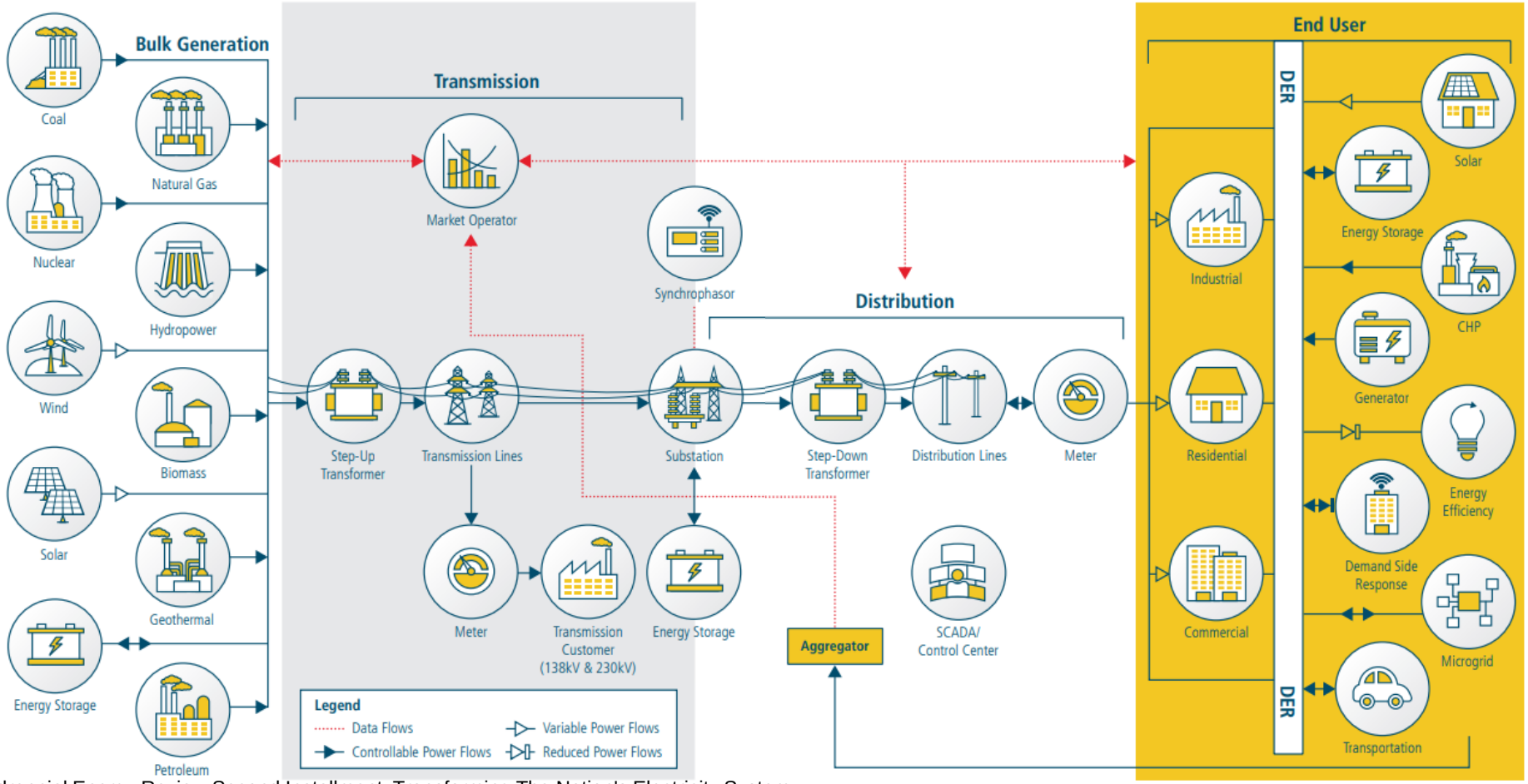
- **In the context of buildings, grid services are actions buildings can take in response to real-time grid conditions that provide value through avoided costs.**

- **Grid services can be subdivided into services that:**
  - Avoid **generation** costs by offsetting generation capacity investments, load-shifting to lower-cost generation, or providing ancillary services (frequency regulation and operating reserves)
  - Avoid **delivery** costs by offsetting transmission and distribution capacity investments, or supporting distribution-level voltage control

Where do different grid services plug in to the grid?

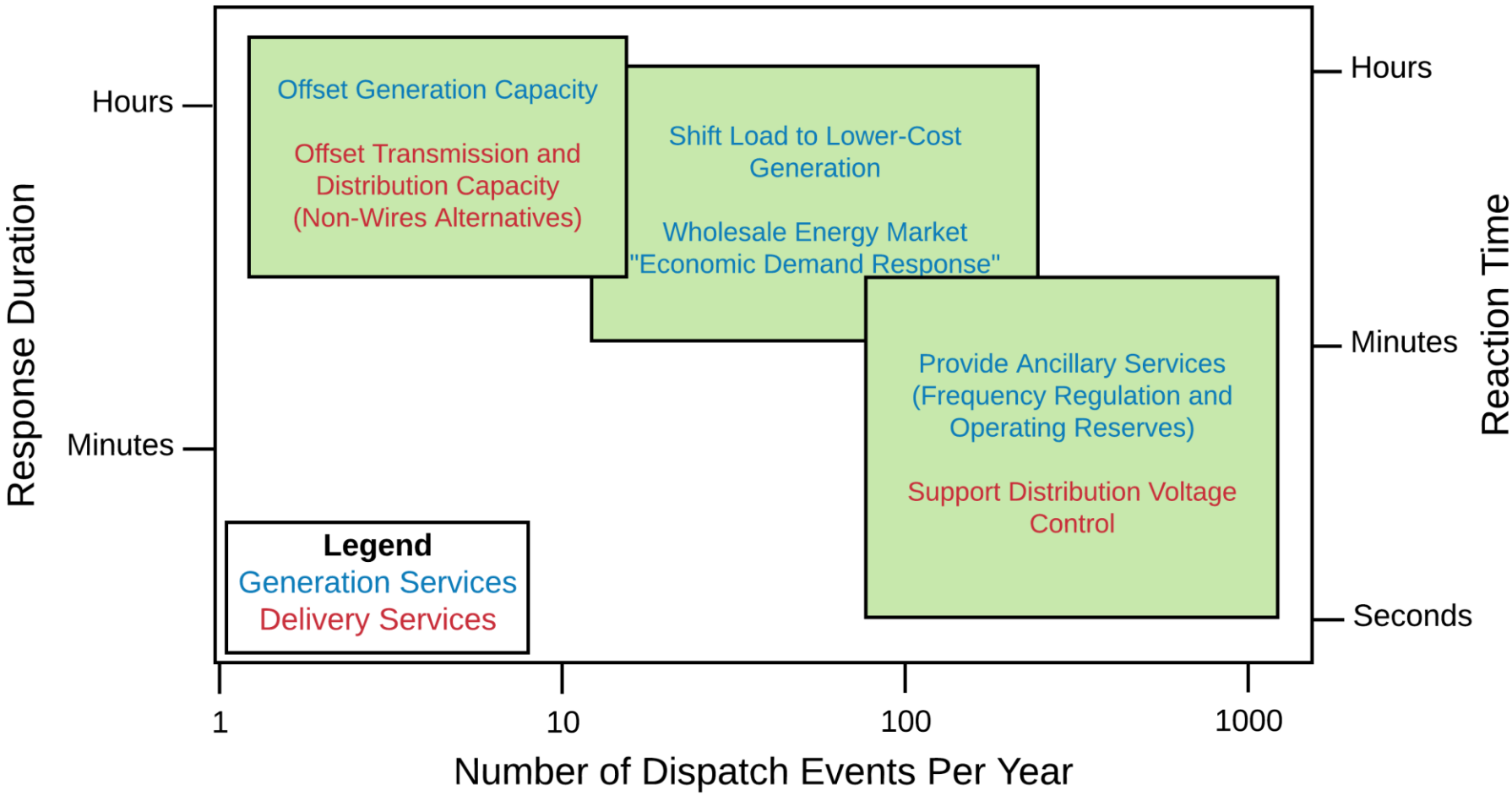
Generation Services
Reduce generation capital and operating costs

Delivery Services
Reduce transmission and distribution capital and operating costs



Quadrennial Energy Review Second Installment: Transforming The Nation's Electricity System

Different grid services have different technical requirements



Our Panel

Panelists

Laura Petrillo-Groh

Air Conditioning, Heating, and Refrigeration Institute (AHRI)

Ravi Prasher

Lawrence Berkeley National Laboratory (LBNL)

Roderick Jackson

National Renewable Energy Laboratory (NREL)

Michael Poplawski

Pacific Northwest National Laboratory (PNNL)

Moderator

Kristen Brown

Commonwealth Edison Company

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