



Real-Time, Flexible DR Control:

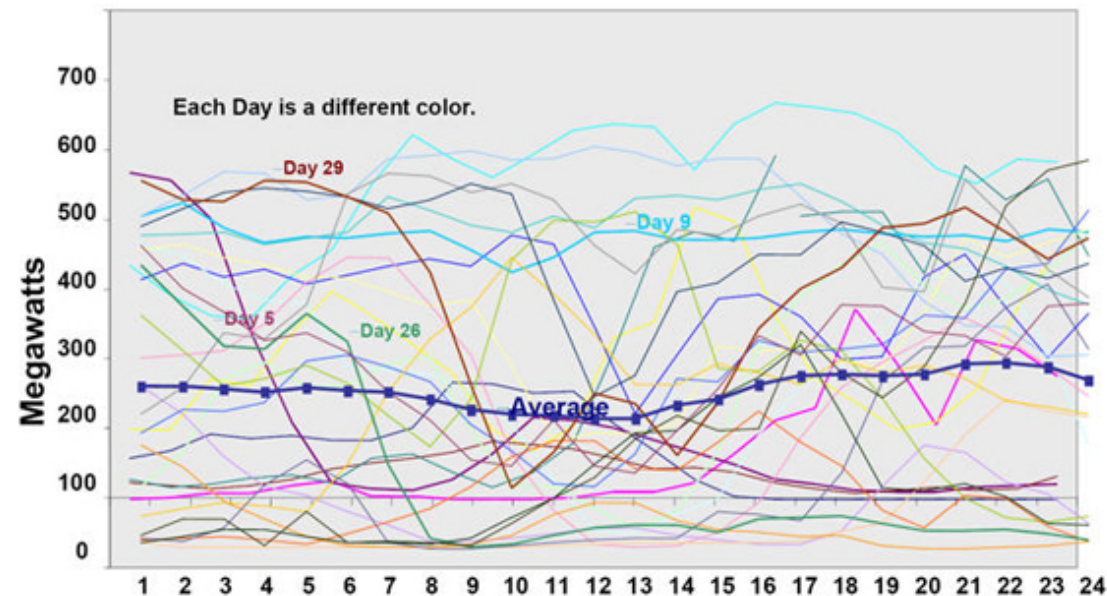
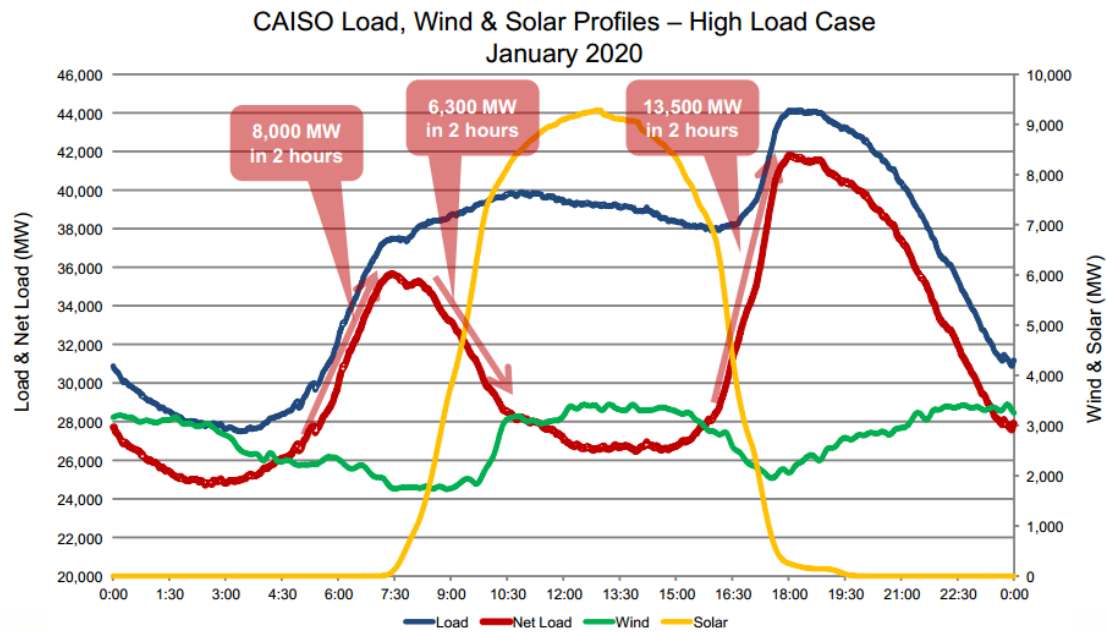
A New Tool to Support a Greener, Dynamic, and Decentralized Grid

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Leading Indicators of Industry Change



*...Increased Ramping yet reduced Peak
Shifting requirements.*

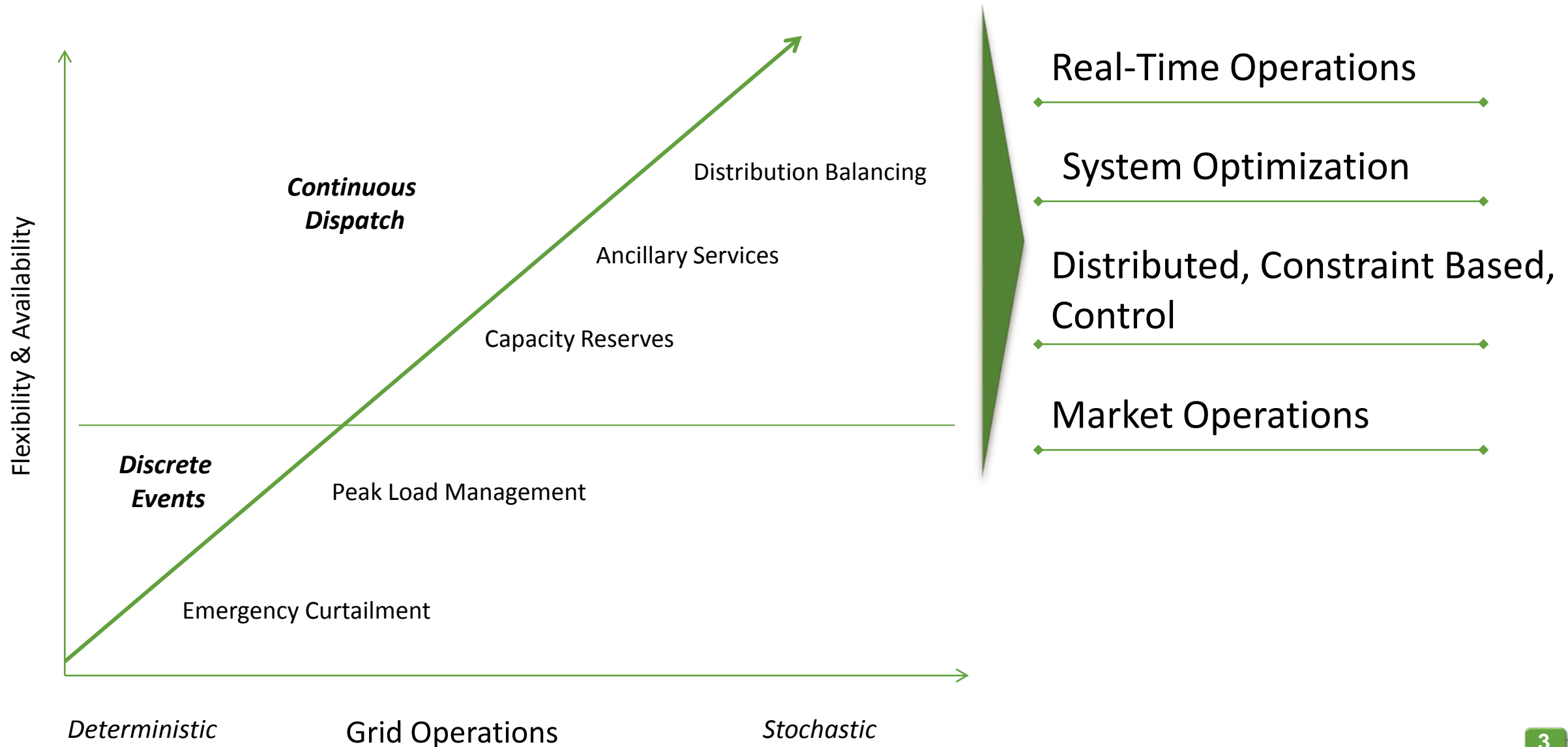
*...renewable integration continues to stress the
system planning and operations.*

New York Times

September 14, 2014

Electric utility executives all over the world are watching nervously as technologies they once dismissed as irrelevant begin to threaten their long-established business plans.

Operations: Moving From 100 hours to 8760 hours



The Grid Needs More Flexible, Real-Time Responsive Resources...

- A stable grid requires controllable resources
- Generation is becoming decentralized and less controllable
- Some loads (e.g. electronics) are becoming more demanding

However, many energy-consuming processes can be modulated

- Adjust their energy consumption to balance activity on the grid
- As long as the changes have a well-defined, constrained impact to the process, this can be done all day long

But how does this help mitigate the effects of climate change and support a greener grid?

How Can Flexible DR Help the Environment?

Hybrid Storage Concept

The Problem:

Battery storage is often viewed as the “holy grail” for renewable energy integration. Storage is a key technology; however, large battery installations are expensive, intensive, and result in lost power – they are not 100% efficient. A recent study has also shown that lithium-ion batteries have potential adverse impacts on the environment and public health beyond the benefits from their day-to-day use.†

The Solution:

A hybrid energy storage network that utilizes a diverse portfolio of energy storage technologies (including smaller, more cost-effective, and environmentally-friendly batteries) to provide a combination of high efficiency, power and energy storage capability. This solution resourcefully taps into the inherent storage existing within in the energy-consuming processes at large commercial and industrial sites.



†Batteries made with cathodes using nickel and cobalt, and electrode processing with solvents, have the most potential adverse environmental impact, including resource depletion, climate change, ecological toxicity, and human health, such as respiratory, pulmonary, and neurological effects.
(<http://sciencebusiness.technewslit.com/?p=13963>)

How Can Flexible DR Help the Environment? Renewable Firming in Eastern Canada



The Problem:

System operations would prefer to leverage renewable resources in “firm” blocks of output. Renewable energy can only be firmed using conventional generation, energy storage or “load following generation.”

The Solution:

A distributed energy control platform (operated by Enbala) connecting and optimizing to create a real-time, dynamic, response solution that un-obtrusively controls loads to firm-up the generation output of the renewable energy.

Real World Results:

- 2,000 individual devices
- 30 sites geographically distributed
- 15 MW of load on 15-min operation
- 24 by 7 Operations
- Grid Resource



“New Brunswick’s energy policy is targeting 40% renewable energy by 2020, and this project is helping us strive towards that goal.”

- Michel Losier, Program Director, PowerShift Atlantic.

How Can Flexible DR Help the Environment?

Improving the Efficiency of Traditional Generation

The Problem:

Generation is managed to deliver the required power and energy, meet the target ramp rates, and manage and maintain the required reserves. However, this complex task requires the management of generators in ways that are typically not optimally efficient due to demand requirements, ramp rates, and generator operating constraints. Some analyses suggest firming IRs with fuel-burning generation may increase emissions.†

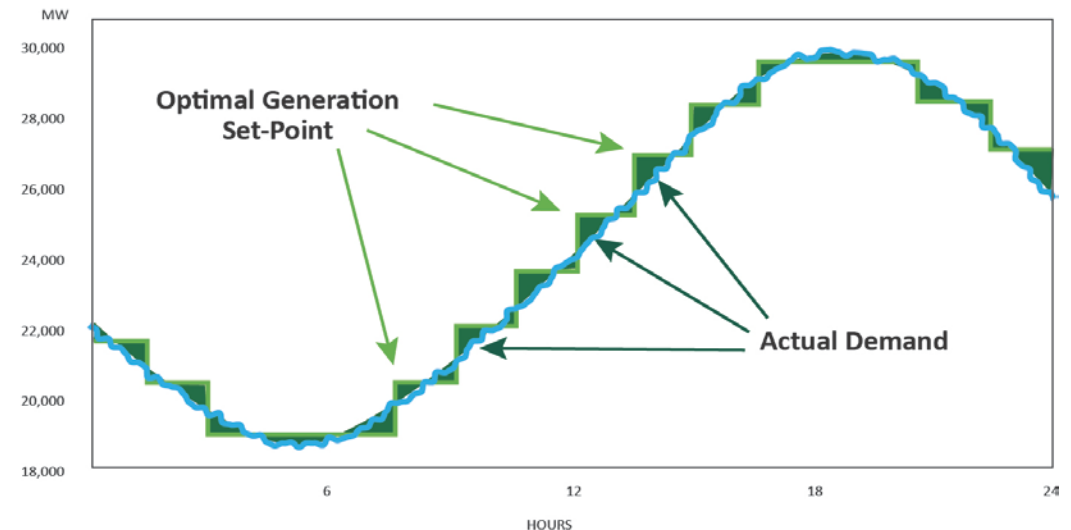
†See "References"

The Solution:

A network of flexible DR resources can free up generation to move directly between optimal setpoints, displacing total reliance on generators and allowing them to operate closer to their maximum efficiency.

Study Results:

- Up to 3% efficiency savings
- \$80-100M in reduced costs
- Decrease in wear and tear
- Lowered system emissions



The Next Great Opportunity for Our Industry

Dynamic, real-time and flexible DR is the application our modern grid needs...

Historically, utilities have delivered energy and given away stability; in the future, their primary business will be stability and efficiency, which will require a holistic approach to grid optimization, including consideration of emissions.

By utilizing existing demand-side resources to their full potential, utilities and grid operators can better integrate renewables, capture the full value of energy storage, and increase generator efficiency – creating a greener and more sustainable future power system.



Thank You

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