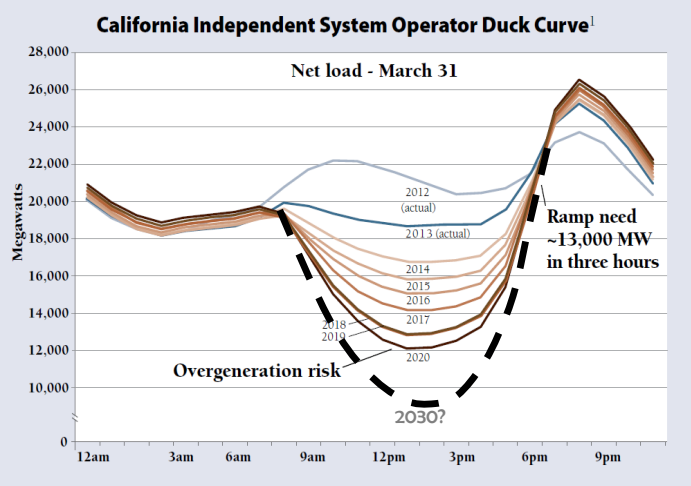
The GridOptimal™ Initiative

A New Rating System and Metric For Building-Grid Interactions

The role of buildings, renewable energy and storage in the utility industry is changing and near-term solutions are needed to address today's challenges and capitalize on opportunities for market transformation. New Buildings Institute and the U.S. Green Building Council are launching a multi-year effort to develop a comprehensive grid edge initiative that will refine and disseminate a new building rating system called GridOptimal™. We are currently assembling a team of utilities and other partners who can advise and support this ground-breaking project.

For a century, electric and gas utilities planned for constant growth and were required to anticipate how the steadily increasing growth in demand would need to be met with supply from generation resources and distribution infrastructure. But this established paradigm is shifting and interest in high-performance buildings with low energy demands is growing rapidly. Simultaneously, the price of photovoltaic (PV) panels has dropped exponentially and distributed renewable energy systems are now within reach for many building owners. These trends are disrupting the very assumptions that underlie the utility business model.

Rapid increases in renewable energy resources are already leading to technical and policy limits on new renewable energy sources, as explained by Jim Lazar using the "Duck Curve" concept. Unless new strategies are developed to help integrate building and generating loads more effectively, the potential for carbon reductions from renewable energy will be constrained.



The graph shows the predicted load shape on an illustrative day in southern California. Credit: Jim Lazar

Work by NBI and other advocates is bringing zero net energy (ZNE) buildings into the mainstream. As these buildings increase their market share, it is more important than ever to consider how different energy efficiency and on-site generation strategies can interact with local electricity grids.

The Value of a Score

Building-scale technologies are one critical component of the transformation of the power grid. However, at the building level there is a real lack of knowledge and incentive to encourage grid-friendly design and operation, even though buildings built today may interact with the grid for a century or more.

It is illuminating to consider the impacts of individual buildings on the grid through the lens of a building's "grid citizenship." A good grid citizen is a building that contributes to, rather than detracts from, the reliable, safe, and affordable operation

of a clean electric grid. For instance, a good grid citizen building may be carefully designed and operated in a way that minimizes its power demand during the grid's peak hours while maintaining energy-efficient operation throughout the year. Some features that may enhance a building's grid citizenship characteristics and capabilities are passive HVAC and lighting systems, energy storage systems, renewable energy generation management, and peak load management.

Across North America there are no metrics, quantitative or qualitative, that define building-level grid citizenship or rate building-grid interaction quality. Current thinking on the topic is fragmented and different players are using different language to discuss the topic from a variety of perspectives.

By creating a standardized metric that defines a building's contribution to the relevant utility grid scale—the building's operational performance as a grid asset —many doors open. Utilities may incentivize grid-sensitive design. Government agencies may include the metric in their procurement requirements or in their climate policies. Designers and building owners can consider these impacts in a project in a sensible, straightforward approach. As we develop a way to define building-grid interaction quality, the market can respond by developing solutions for many of the issues facing the utility grid today and tomorrow. Future building codes can begin to encourage the adoption of these solutions and help ensure that the buildings coming online are acting as good grid citizens.

There is a need and opportunity for respected national leaders on high-performance buildings such as NBI and the USGBC to provide objective clarity and consistency in a collaborative, inclusive process with the goal of creating standards and tools to meet these challenges.

The aim of this initiative is to provide standards, tools, and guidance to improve building-grid interactions in the built environment by empowering owners, architects, and engineers with a dedicated building rating system to help them achieve specific objectives. The initiative will build on NBI's proven leadership on this issue, and on USGBC's Performance Excellence in Electricity Renewal (PEER) power system rating project and the market reach of the Leadership in Energy and Environmental Design (LEED) green building rating system, to develop and deploy a comprehensive rating system and certification protocol.

The proposed rating system would play a major role in bridging the gap in knowledge, understanding, and priorities between the two sides of the grid: operators and consumers.

Ultimately, this program will enable the GridOptimal rating system to become an important factor in rating building grid citizenship and will establish a market-facing certification protocol and user interface.

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