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BUILDING-GRID OPTIMIZATION IN SOUTH ASIA

South Asia's energy systems are rapidly transforming, but there is much work to succeed in energy decarbonization while improving reliability, safety, and affordability.

The built environment can either hinder or enable and accelerate energy grid transformation. Building-grid integration is essential and becoming more critical every day. It is more economically feasible and far easier in terms of actual physical systems integration to absorb high levels of variable renewable energy (wind, solar) onto a grid whose buildings have a relatively high degree of demand flexibility and with time-oriented energy efficiency strategies implemented.

New Buildings Institute (NBI), a US-based nonprofit organization, is bringing its GridOptimal metrics and utility program framework to South Asia. NBI will work with government agencies, utility companies, and private sector leaders to develop and deliver India-specific metrics and analysis methodologies that promote energy efficiency and decarbonization of energy systems.

This project, supported under USAID's South Asia Regional Energy Partnership (SAREP) Partnership Fund, (SPF), will leverage NBI's extensive experience in the US to help accelerate the transformation of South Asia's energy sector.

This project's big-picture, long-term goal is to enable leading utilities and policymakers in India and across South Asia to accelerate the transformation and decarbonization of electricity energy systems through the deployment of buildings and associated behind-the-meter distributed energy resources as grid assets. The central objective of this project is to develop, deliver, and disseminate India-specific GridOptimal metrics and analyses that facilitate building-grid optimization by identifying critical behind-the-meter, time-oriented, energy efficiency and demand flexibility strategies in major building typologies and grid contexts.

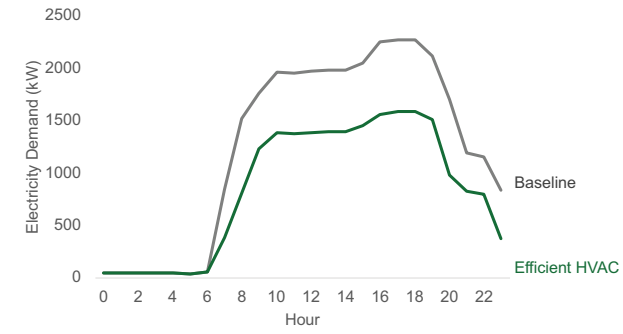
NEW TOOLS AND RESOURCES

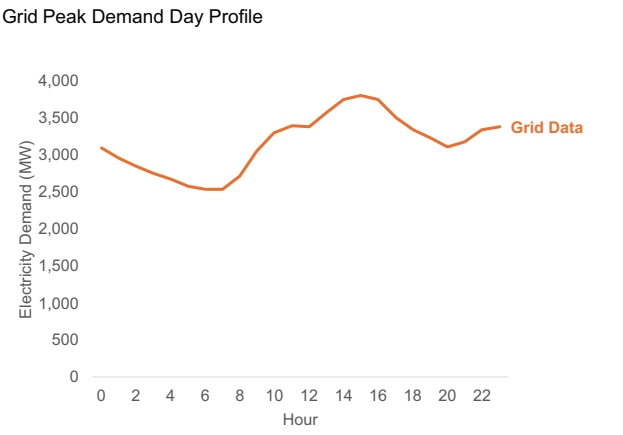
NBI and project partners have developed two new resources to help building designers, builders, and other project team members evaluate building-grid integration strategies in their projects and to help utility companies better understand the electricity grid system benefits available from behind-the-meter interventions in buildings.

GRIDOPTIMAL METRICS CALCULATOR SPREADSHEET TOOL

This freely available tool helps designers to visualize and quantify the load reduction benefits of various behind-the-meter retrofits that improve energy efficiency and control strategies that provide short-term demand response. These benefits are placed in the context of the electricity grid to highlight which interventions can best avoid peak demand on the grid.

The tool is designed to accept inputs from users for ease-of-use. Users simply need to select a building type, location, and intervention from dropdown menus to populate the summary table and graphics. Users may further customize the tool by adjusting source data, tariffs, or peak parameters to suit their specific situation.





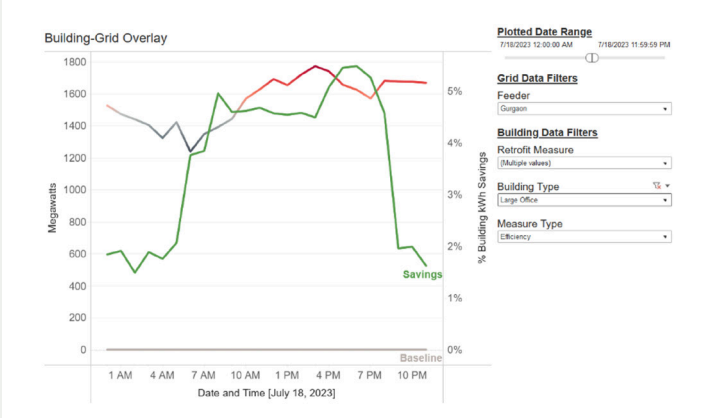
BUILDING AND GRID LOAD SHAPE INTERACTIVE DATA VISUALIZATION DASHBOARDS

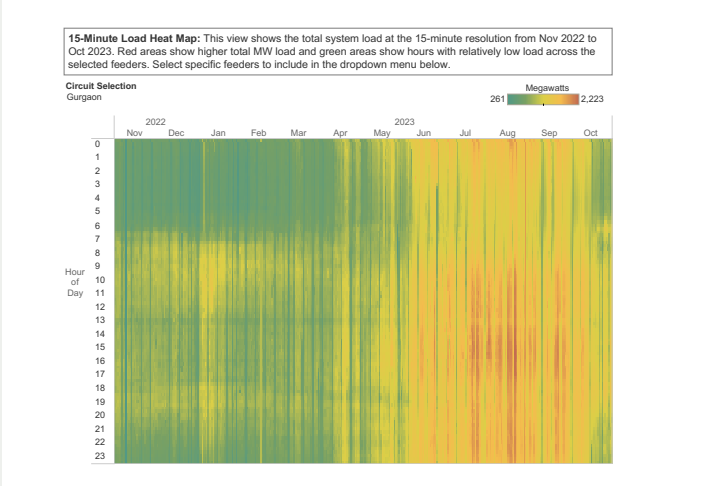
Haryana: https://bit.ly/3vZExAa

Indore: https://bit.ly/43SUdlx

These free interactive web-based data visualization dashboards allow visual comparisons of grid load data to building energy model load profiles. Users can review grid data at the feeder level, across multiple feeders, or for the entire city. Similarly, users can review load shape data for buildings (single family home, large and medium office, large and medium hotel, retail store, and warehouse).

Dashboards are available and pre-populated with electricity grid load shapes derived from feeder-level data covering Indore and Gurgaon cities.





GRIDOPTIMAL INDIA

The project, funded by USAID under SAREP Partnership Fund (SPF) consists of four primary components that work together to contribute to the clean energy transition in South Asia:

Regionally Customized GridOptimal Metrics Development: NBI has developed customized metrics for South Asia that consider the regional policy and utility landscape. The metrics are included in a freely accessible spreadsheet calculator for project teams to help evaluate building design and operations choices.

Grid and Building Data Collection, Organization, and Analysis: NBI is collaborating with leading Indian utilities (DHBVN in Haryana and MPPKVVCL in Madhya Pradesh) to gather a library of critical electricity grid and building load shape data relevant to both sides of the meter (both grid and building scales). This data library will be a crucial resource for successfully deploying building-grid integration utility programs.

Utility Program Framework Development: NBI is working with leading utilities DHBVN in Haryana and MPPKVVCL in Madhya Pradesh to develop best practices in building-grid integration program development. The utilities have been selected in collaboration with India's National Smart Grid Mission (NSGM). The goal is to advance utility programs in India and develop a program framework that can be used by other utilities in the region.

Stakeholder Engagement: NBI will engage with government agencies, private sector leaders, and other stakeholders to gather local perspectives, identify critical areas for focus, gather data, document needs, and challenges, and ensure that project results are actionable. The goal is to identify actionable pathways to improving building-grid integration in South Asia by leveraging building-grid analysis methodologies.

ROUNDTABLE WORKSHOPS

NBI will host two workshops to convene interested stakeholders. The broad agenda of the roundtables is to consider promising strategies to improve building-grid integration and how to deploy those strategies in India, and seek input from participants related to proposed building-grid integration strategies, tools and resources, need research, and barriers. The participants include a wide array of practitioners across the building industry, including utilities, policymakers, nonprofits, civil society and government entities.

BRINGING BUILDING-GRID OPTIMIZATION TO SCALE

The project aims to empower South Asian governments, utilities, and industry partners to achieve energy decarbonization and grid transformation. Building on the success of the GridOptimal® Buildings Initiative, NBI is working with Indian partners to create, adapt, and apply GridOptimal metrics and tools in the region.

To tailor the metrics to the unique needs of South Asia, the adaptation involves adjustments to metric categories to align with regional policies and utilities, customized energy simulation modeling, and the inclusion of relevant Indian electricity grid system data. Clear and consistent metrics and freely available design tools play a crucial role in enabling scalable, high-impact energy system transformation outcomes. This a way to quantify the flexibility of a building in responding to grid demands through its design and operational measures.

- Customized GridOptimal Metrics and Tools
- Grid and Buildings Data Library
- Advance Utility Program Framework
- Stakeholder Engagement

DISCLAIMER

This study is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this study are the sole responsibility of New Buildings Institute and do not necessarily reflect the views of USAID or the United States Government.

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> “The big-picture goal of this project is to help accelerate the decarbonization of the electricity grid, reduce electricity costs, and improve resilience through building-scale strategies such as targeted efficiency, demand flexibility, and distributed energy resources.”

Alexi Miller
Director of Building Innovation, NBI

At the conclusion of the project, the following outcomes are expected:

- ☑ New building-grid integration metrics, calculator tools, visualization dashboards, data libraries, and analysis results will be available in South Asia.
- ☑ Based on the newly developed metrics and analysis results, a new utility program framework will be created that can be implemented by participating and other utilities in the region.
- ☑ The building-grid integration metrics, data libraries, and program framework will enable leading utilities and policymakers in the region to accelerate the transformation and decarbonization of electricity energy systems by deploying buildings and associated behind-the-meter distributed energy resources as grid assets.
- ☑ The new program framework will be vetted with key industry stakeholders, including designers, to help maximize its uptake and success.
- ☑ The project will lay the groundwork for improved building-grid integration outcomes across South Asia, leading to a more reliable, safe, and affordable energy system low in carbon emissions.

ABOUT SAREP PARTNERSHIP FUND

The SAREP Partnership Fund (SPF) supports market-based transformative solutions to enable the clean energy transition, particularly by engaging the private sector, local organizations, and new, underutilized partners. It also harnesses innovative business models, solutions, technologies, resources, experiences, and networks of relationships that exist across stakeholders. SPF aims to expand and maximize the impact of USAID resources innovatively and sustainably through activities designed, owned, and implemented by grantees under the SAREP Program.

ABOUT NBI

New Buildings Institute (NBI) is a nonprofit organization working to advance energy efficiency and decarbonization of the built environment. Our efforts are imperative to keeping energy costs affordable, cutting carbon emissions that are fueling climate change, and delivering on improved health, safety, and resiliency for all. We work collaboratively with industry market players— governments, utilities, advocates, AEC professionals, and others— to drive leading-edge design, innovative technologies, and public policies and programs for scale. Throughout its 25-year history, NBI has become a trusted and independent resource helping to create buildings that are better for people, communities, and the planet. Visit newbuildings.org to learn more.