Support for Demand Side Management (DSM)

Since the 1990s, RTI International has provided the full range of DSM services to utilities in the United States and abroad—from standing up DSM departments, to developing DSM strategies and programs, to implementing and evaluating DSM initiatives.

The need for conservation continues to grow as many regions around the world face dwindling resources and increasing costs associated with generating electricity and producing potable water. To add to the issue, greenhouse gas emissions associated with electricity and water production advance the looming threat and potential impacts of climate change. To mitigate these adverse impacts, many communities are investing in DSM as an essential part of the solution.

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Overview of DSM Portal

To develop RTI's DSM portal, our experts relied on their combined decades of DSM field experience; this experience involves designing projects and programs to characterize electricity and water consumption, as well as identifying solutions for reducing that consumption. The portal utilizes web-based tools and resources, as well as a secure warehouse of DSM-related data to support designing and implementing electricity and water DSM.

The portal has a wide range of data analysis and visualization capabilities, such as

- Secure online capabilities for customer-provided and/or customer-generated energy usage data and other DSM activities

- Project status tracking, document management, and geographic information system (GIS) mapping functions that enhance productivity and ensure stakeholder engagement

- Access to a variety of RTI-curated DSM reference documents and procedures, including the RTI DSM Toolkit.

The portal comprises three primary modules:

- Data Repository
- Mapping
- DSM Toolkit

Data Repository

This module is an abstract database capable of supporting a wide range of data useful for reporting and analysis. We will customize the data repository configuration to meet your organization's specific needs. Examples of data repository applications include the following:

- **Electricity/water utility meter data:** Electricity and/or water billing data are compiled, cleaned, and formatted to

  – Determine baseline consumption and technical potential for savings by sector, customer segment, and/or end use.

  – Identify trends in historical data resulting from changes in tariff rates, implementation of DSM programs, or other actions that impact consumption.

- **Building/facility survey data:** Collect and store data about building and facility location, design, function, and other characteristics; these data are compiled and linked with utility meter data to identify specific facilities or customer segments for targeted promotional campaigns and DSM initiatives.

- **Real-time equipment/sensor monitoring data:** Integrate data from monitoring devices capable of recording and/or transmitting real-time data into the data repository to help realize the potential benefits of smart metering systems and unlock customizable reporting, alerting, and analysis functionality. In addition, the portal can be connected to Smart Grid Internet of Things devices for the purposes of data storage, analysis, visualization, and alerting.

Mapping

The portal includes a full GIS module capable of spatial data overlays and ad hoc visualization. The Mapping module can be used to

- Identify locations or geographical areas

  – Where consumption of electricity, water, or another form of energy is unusually high (Figure 1).

  – Where there is a high concentration of certain types of facilities (e.g., industrial, residential).

- Display detailed information about mapped buildings (Figure 2).

This information can be instrumental in planning and launching DSM initiatives or tracking progress on a regional basis. Existing GIS layers may be imported into the data repository for review and analysis, and any spatial data within the system can be exported in standard GIS formats (e.g., GeoJSON/KML).

DSM Toolkit

The RTI DSM Toolkit comprises 22 methodologies associated with developing, implementing, and evaluating DSM initiatives for electricity and/or water; refer to Figure 3 for a list of these methodologies. For more quantitative procedures, the toolkit includes spreadsheets that calculate and summarize results in a readily usable format. The methodologies provide step-by-step procedures for all phases of DSM program development and implementation, including

- **Creation of DSM initiatives and projects:** Six methodologies facilitate developing and implementing DSM initiatives. Starting with ideation, these methodologies lead users through the process of conceptualizing, evaluating, and ranking potential DSM measures for implementation; developing business cases to support DSM initiatives; designing and implementing pilot projects; and designing and executing limited and full-scale implementation of DSM initiatives.

- **Characterization of electricity and water use:** There are separate methodologies for characterizing baseline electricity and water consumption. A key element is a set of user profiles that allocate consumption by various types of facilities (e.g., offices, restaurants, apartments, schools) to common end uses (e.g., electricity use for cooling or heating water, water use for washing clothes or flushing toilets). Additionally, the toolkit includes spreadsheets for determining the electricity and water baselines by sector and end use. The spreadsheets use basic electricity or water meter data as inputs and can be easily customized to match your organization's needs. Methodologies for conducting energy and water audits are also included. In addition to providing step-by-step procedures, these documents provide detailed data collection forms and an outline for the audit report.

- **Determining technical potential of savings from DSM measures:** Methodologies can determine the technical potential of savings from the implementation of electricity and water DSM measures. These documents are used in conjunction with the corresponding methodologies for baseline characterization. Furthermore, all calculations associated with determining technical potential are incorporated in the previously described baseline spreadsheets, resulting in a single spreadsheet that determines both the baseline and technical potential. The spreadsheets include default values for the percent savings of various DSM measures but also allow users to input other values. Users can also input penetration rates for high-efficiency measures. A separate methodology specifically addresses estimating the savings associated with implementing energy conservation measures at industrial facilities.

- **Evaluation of DSM programs and initiatives:** Several methodologies specify procedures for evaluating various aspects of DSM programs and initiatives. Included are procedures for determining key performance indicators (KPIs) for gauging the performance of DSM initiatives and procedures for developing measurement and verification (M&V) plans, which play a critical role in determining the savings from DSM measures. Supporting M&V determinations is a separate methodology for normalizing consumption to account for changes in weather and other factors. Accompanying this methodology is a spreadsheet for carrying out the calculations for normalizing the data. Procedures for measuring consumer behavior and awareness, process evaluations of DSM initiatives, and procedures for verifying work quality are also included for supporting DSM program evaluations.

- **Promotion and marketing:** These methodologies address the promotion and marketing of DSM initiatives and projects. Specifically, these methodologies include procedures for (1) targeting customers for DSM measure implementation and (2) developing marketing plans and collateral to increase public awareness and promote specific DSM initiatives.

Resource Library

The toolkit includes a Resource Library of more than 80 reports and other documents that provide DSM case studies, additional details to supplement the information and procedures presented in the toolkit methodologies, and other information to support DSM program development and implementation.
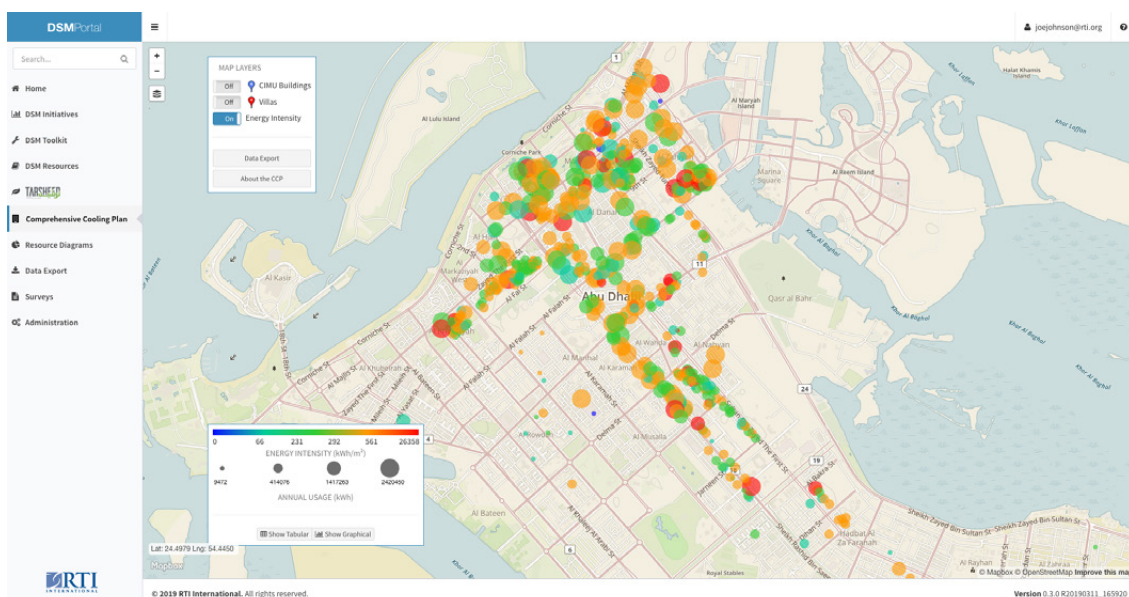

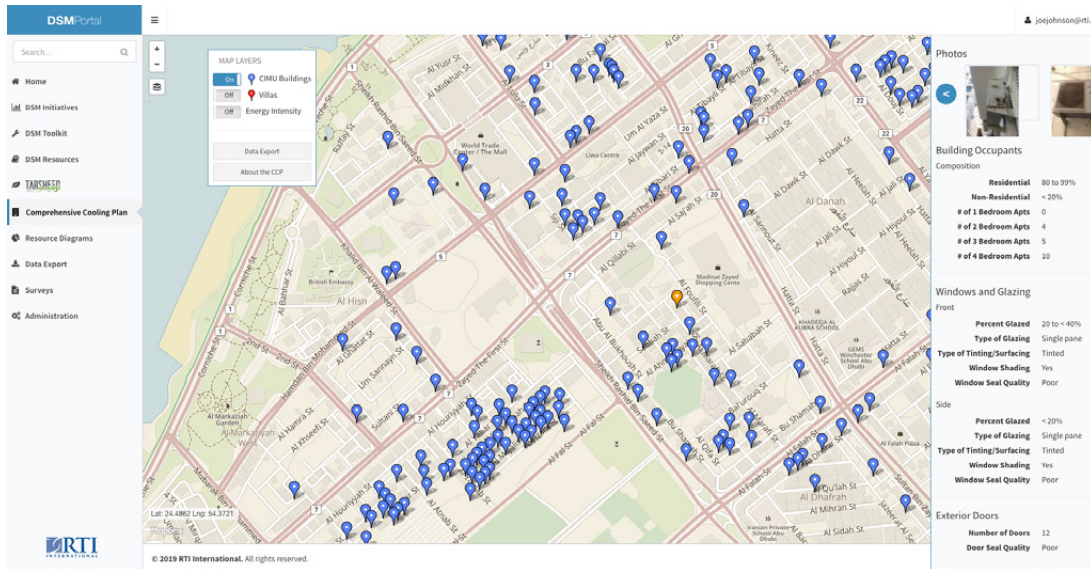
Figure 1. Mapping of buildings by energy intensity

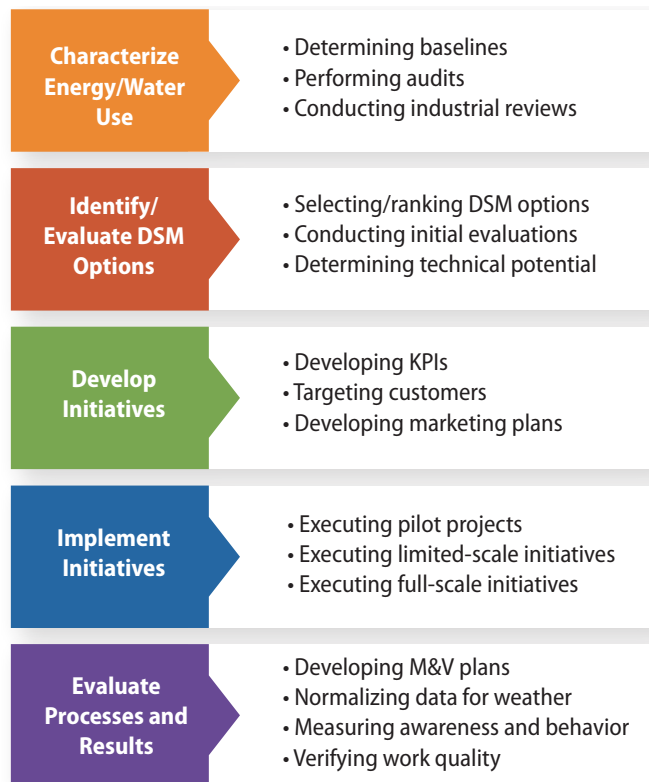*Figure 2. Features of surveyed buildings*

Figure 3. Toolkit methodologies for DSM initiative development and implementation

More Information

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