

DOE/OE Transmission Reliability Program

Using Industrial Loads for Provisioning Ancillary Services

Jose Gracia, ORNL

Supriya Chinthavali, ORNL

Jibonanda Sanyal, ORNL

Anna Shipley, SRA Intl.

graciajr@ornl.gov

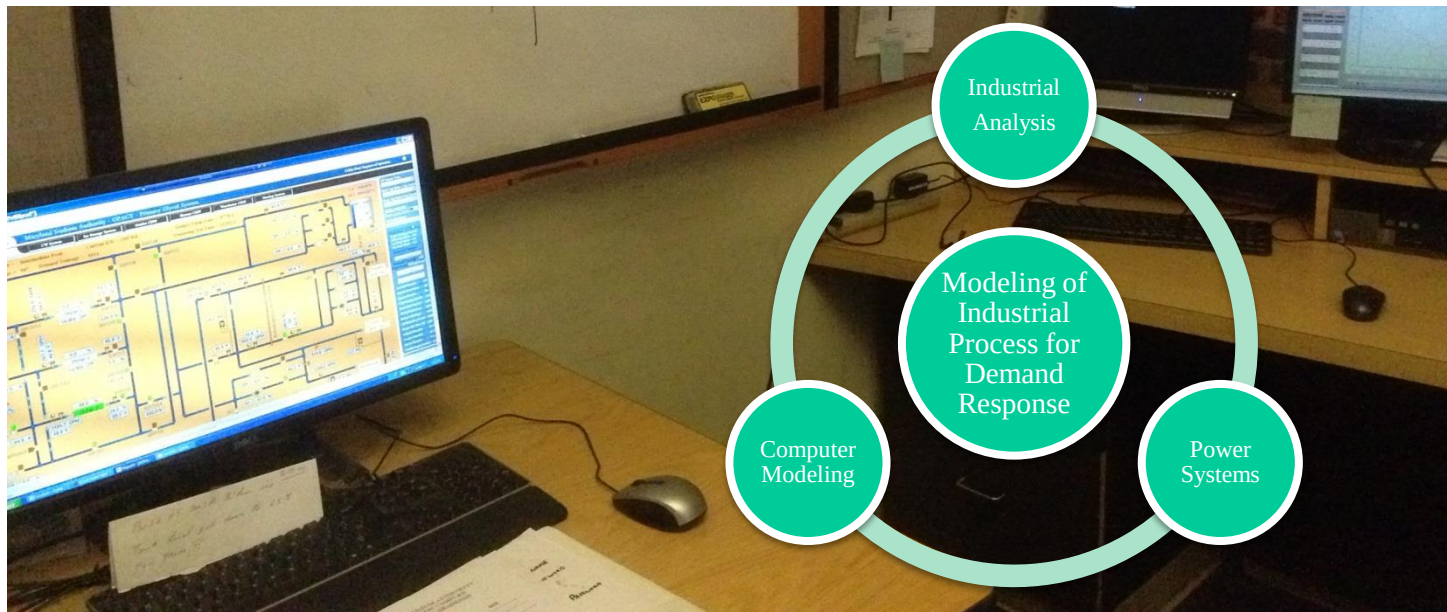
June 10-11, 2015

Washington, DC



Overall Project Objective

- Industrial Load as a Resource is focused on demonstrating the technical feasibility and business case for the utilization of industrial loads to provide ancillary services support.

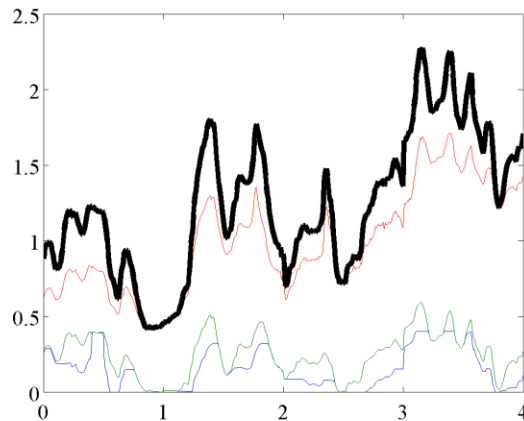


Past Accomplishments

- Industrial LAAR demonstration at Veolia North America facility was completed
- Received all data reports from project partner Enbala
- Determined needs for reducing hurdles to broader implementation of LAAR services, both from the customer and utility/ISO perspective
- A tool for determining cost-effectiveness (from the customer's perspective) of utilizing industrial loads for ancillary services support was proposed



Past Accomplishments – Veolia Demonstration



Chilled Water Loop Temperature (°F)		LCHWT	CHILLER RESPONSE
High Limit	39°F	TOO HIGH	INCREASED LOAD
Loop temperature	37°F < LCHWT < 39°F	Within this defined temperature range, the EPN can request the loop temperature change to increase or decrease load.	
Low Limit	37°F	TOO LOW	DECREASED LOAD

During demonstration, on-site engineers and operators noted that even with Enbala controls performing actions, they saw no change on process or jumps outside of bounds.



Past Accomplishments - Lessons

- Water chilling loops appear to be great candidates for regulation resources.
- Veolia Energy receives compensation from Enbala based on its level of availability and contribution in Enbala's network. Enbala takes the risk of complying with PJM regulation requirements.
- Facilities with large thermal resources (such as CHP) may also be candidates for providing regulation and other ancillary services.



Past Accomplishments – Needs

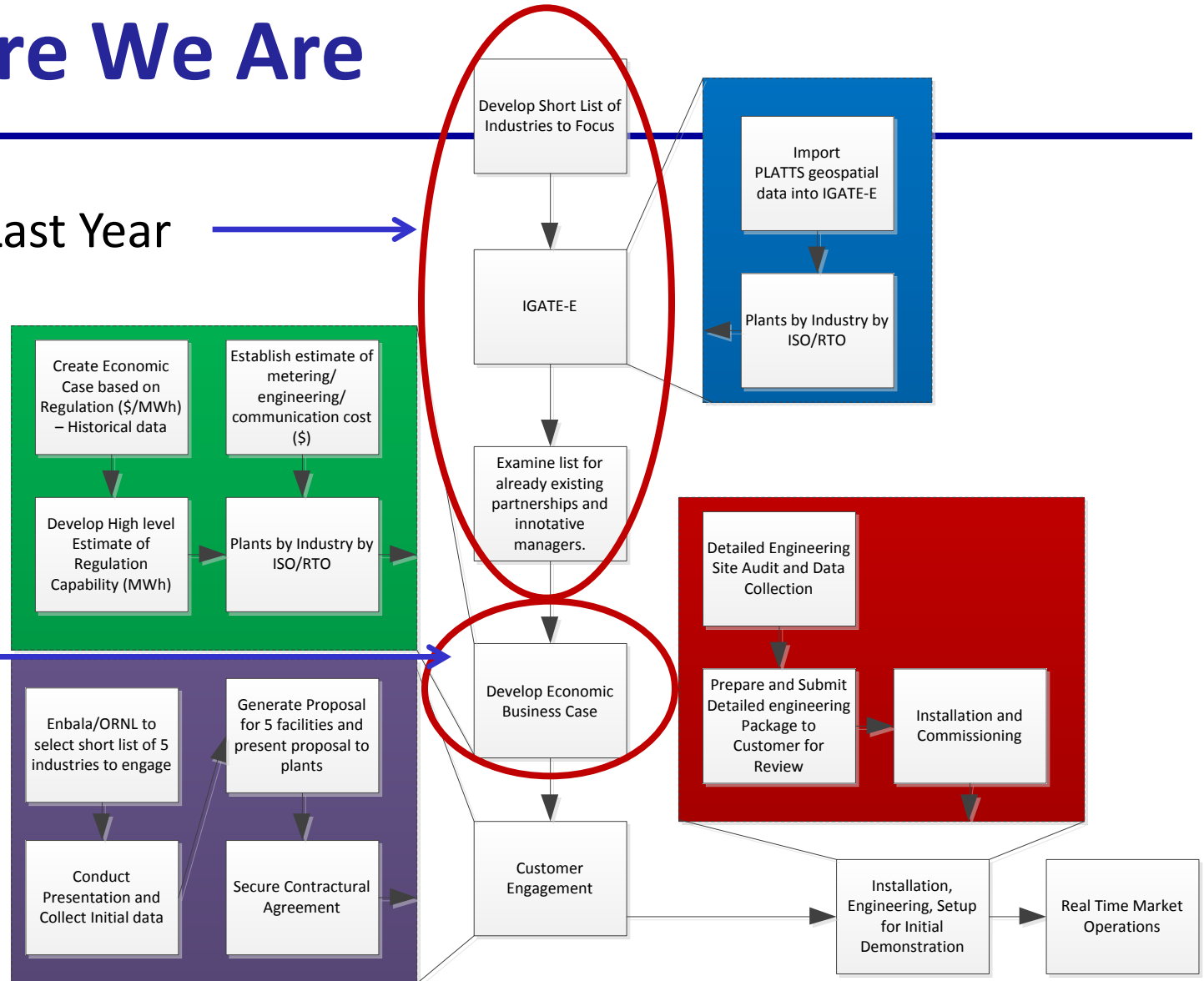
- If industrial loads are to become a viable resource for ancillary services support, there needs to be methods for determining site and load feasibility that are simple and inexpensive.
- Enbala and Veolia took on significant financial risk in order to demonstrate the viability of industrial loads for regulation – it is not reasonable that this can be replicated over and over again.



Where We Are

Last Year

This Year



Looking Forward

The next phase of this project will build on this work and focus on establishing the business case for any potential industrial ancillary services provider. The next steps are:

- Create a user-friendly tool and guidance document to assist ORNL staff in discussions with potential industrial or commercial electricity users.
- Identify an opportunity for a follow-on Load as a Resource demonstration in an industrial facility to be co-funded by Advanced Manufacturing Office (AMO).

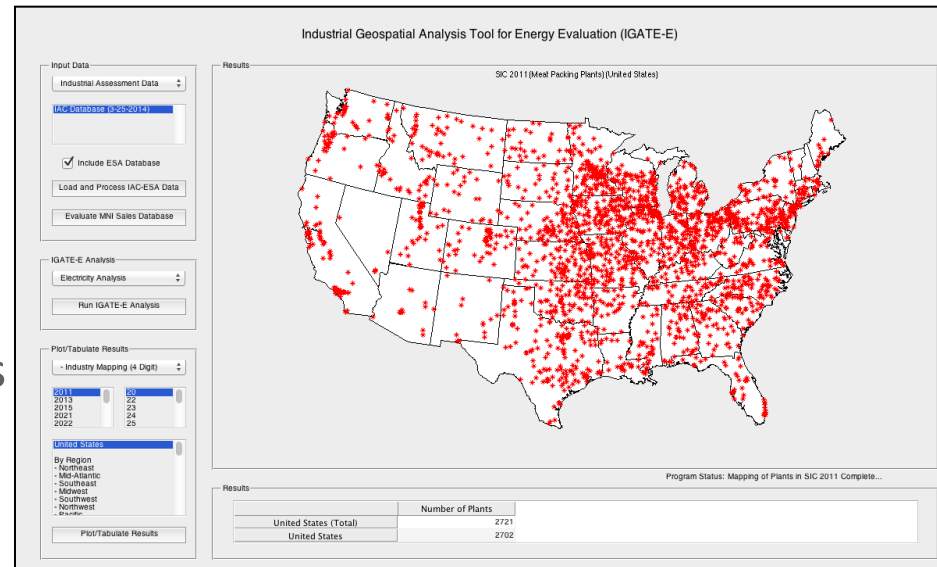


Tool Development Efforts

ORNL is working on developing user-friendly on-line tool and guidance document for use in discussions with potential industrial and commercial electricity end-users. This will build upon the IGATE-E Modeling activities conducted in FY 14.

Model Objective:

This tool will assist ORNL staff in working with individual facility managers in determining if participating in ancillary services markets makes sense as a stand-alone business decision, or only as an “add-on” activity when meter and control instrumentation is being installed.



Tool Development Efforts

Tool Inputs:

- Facility electricity usage (kW and kWh), monthly for 12 months
- Facility thermal usage (MMBTU, MMBTU/hr), monthly for 12 months
- Market data for different services (\$/kW or \$/kWh)
- Quantity of flexibility by industry for different services
- Cost of production loss (\$/product quantity)
- Thermal and electrical load shapes
- SIC (NAICS) code
- Zip code
- Desired rate of return
- Weighted average cost of capital
- Estimate of additional benefits (\$/month or \$/year) from any improvements to control systems



Tool Development Efforts

Tool Outputs:

- Estimate of % and absolute amount of available electrical resource can be used for DR services (kW)
- Estimate of market value of DR services on a per month basis (\$)
- Estimate of maximum investment for additional controls or instrumentation and installation that would provide the desired rate of return, based on average weighted cost of capital (\$)



Deliverables

- Report on data gathered on regional ancillary services markets – Summer 2015
- Industrial sector ancillary services market potential by region – Fall 2015
 - Currently gathering regional data and establishing data schemas
- Demonstration of “beta” business case tool – Fall 2015



Follow-On Work

- Once the tool is complete, the efficacy of both the tool and additional types of industrial loads to provide ancillary services will be determined
- Identify demonstration partner
- Additional revenue stream identification – if it is determined that there is not significant cost-effective potential for ancillary services support, are there other economic streams that would make this cost-effective? If so, determine what those are.

