Leapfrog Existing Grids and Grid Technology with The Interactive Energy Solution™

Innovari provides the interactive energy platform that enables utilities and their customers to improve how the world uses energy

What Do We Do?

Innovari provides the interactive energy platform that enables utilities and their customers to improve how the world uses energy.

Innovari has developed a framework to enable utilities and commercial energy customers to work together in ensuring an ever-more reliable and cost-effective energy value chain in partnership with their regulators.

Industry Veterans as your Partners

Our Executive Team has extensive experience gained from careers within the utility industry, including leadership positions in all aspects of the core utility business as well as building bridges between utilities and their regulators, end-use customers, partners and suppliers.

- Chris Hickman, CEO & President
- Jim Tillett, Chief Technology Officer
- Laura Raymond, Chief Commercial Officer
- Ed Solar, EVP of Global Sales & Marketing
- Andrew Fuselier, VP of Operations
- Phong Do, VP of Supply Chain & Procurement
- Salah Tayeh, Pres. of Innovari MENA
- Preetha Nair, Pres. of Innovari India & Asia
- Manuel Arancibia, Pres. of Innovari Latin America
- Suedeen Kelly, General Counsel

Choosing a Sustainable, Lower Cost Asset for Peak

Increases Customer Relationship and Loyalty

Asset: Central Station Generator

- Single, rate based Asset
- Ongoing O&M costs
- Fuel = Fossil fuels
  - Ongoing, highly variable
  - Increases grid losses
  - Negative environmental effects
  - No End-Use Customer interaction

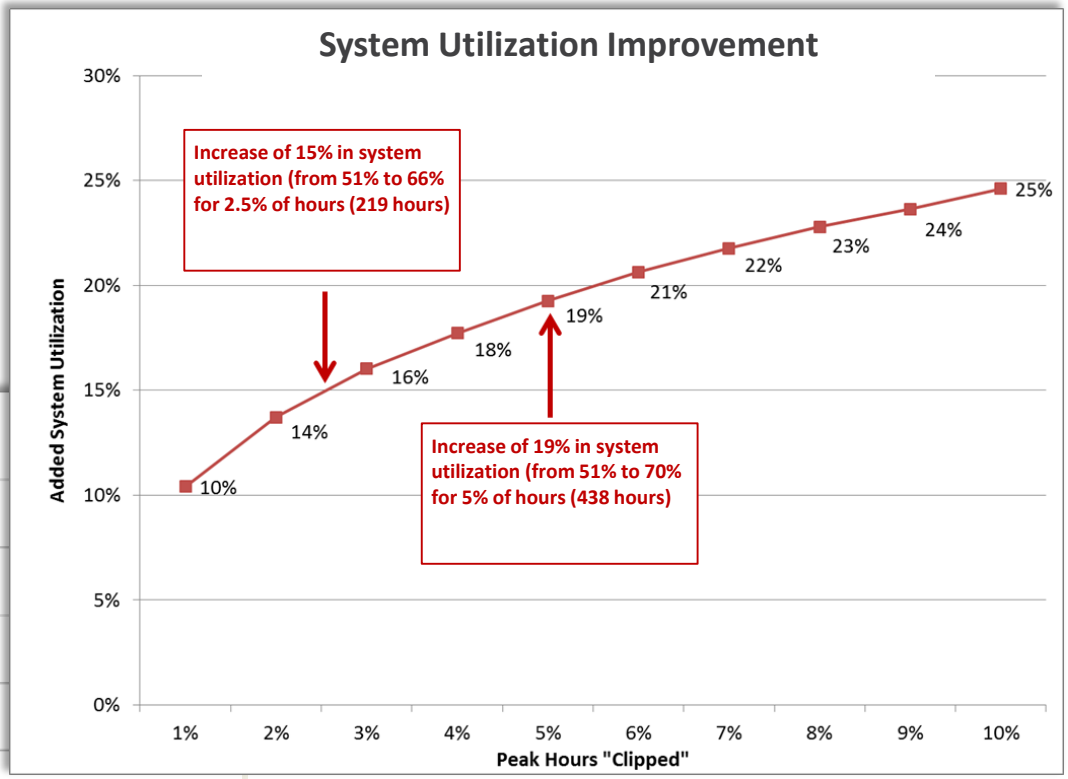
Asset: Virtual Power Plant (Approx 50% less cost)

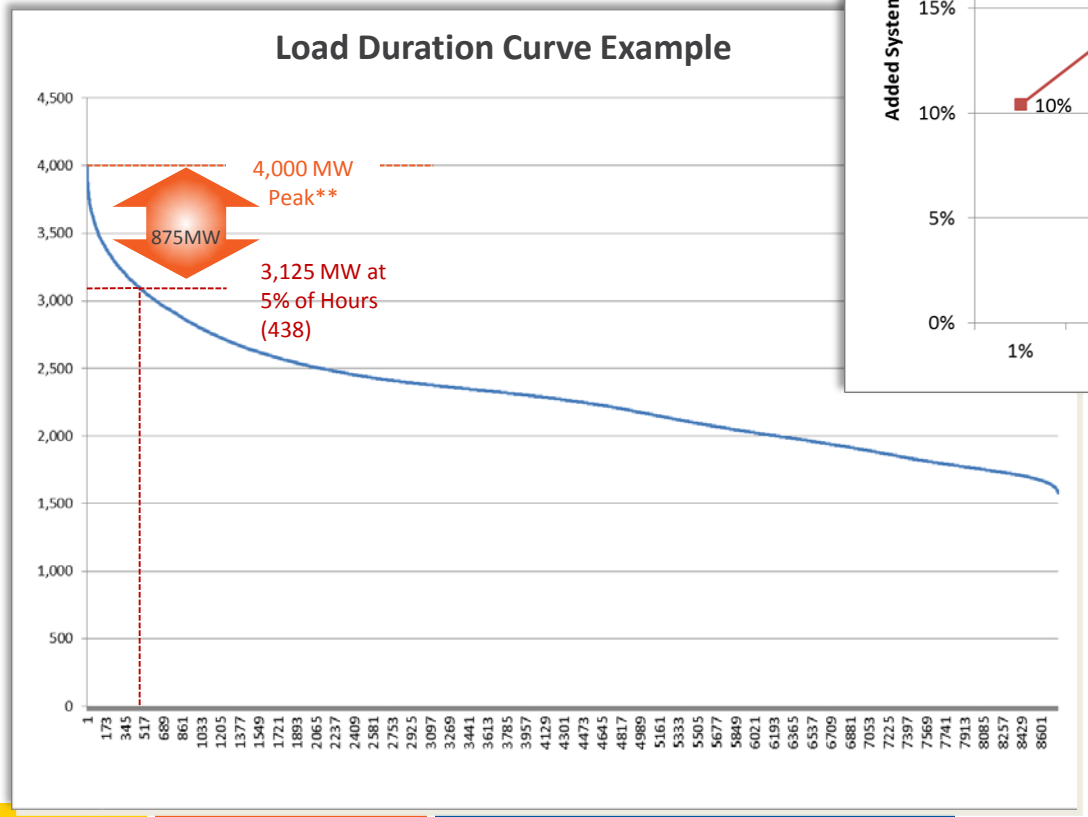
- Many distributed sites as one rate based Asset
- Ongoing O&M costs
- "Fuel" = Site Incentives
  - No fossil fuel burned or variable cost
  - Reduces grid losses
  - Positive environmental effects
- End-Use Customer incentives increase customer loyalty and satisfaction

Innovari Activity Around the World

Our Mission: Improving Overall System Utilization

- Modest improvements in dynamic load management results in large improvements in the system utilization of all existing assets (generation, transmission, and distribution).
- Defers or eliminates costly T&D upgrades (feeder reconductors, substation retrofits, etc.).



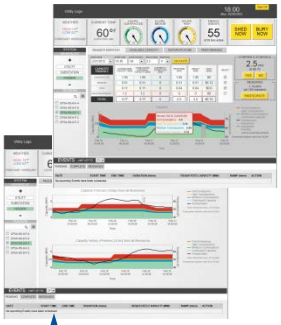


- Helps improve total system reliability.
- Allows inclusion of DSM in IRP as key part of growth and system management strategy.

What We Do: the "IES"

Utility

Schedule, dispatch and monitor Events via a secure, real-time portal or integrated with your EMS, DMS, OMS or other control system



End-Use Customer

Customer Site Agreement with opt-out and lighting and HVAC scheduling capabilities

NOC: Utility benefits

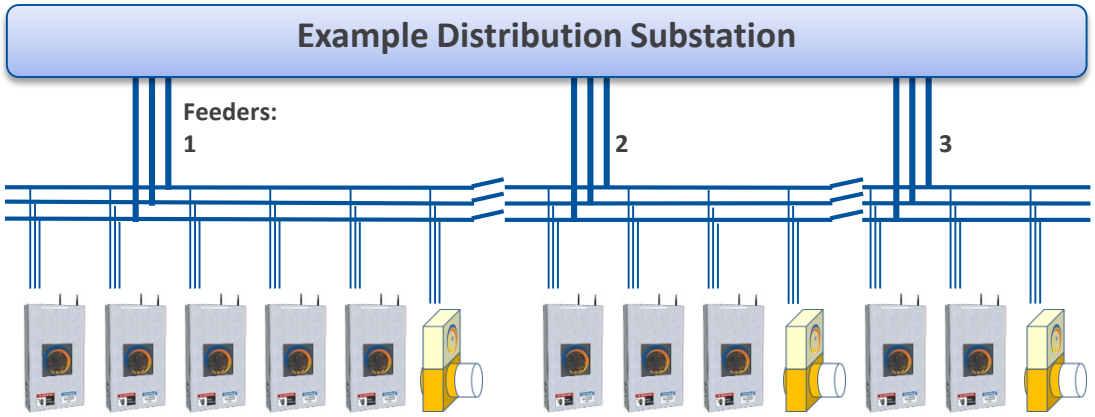
Proprietary algorithms applied to aggregate capacity and provide real-time verification to the Utility

NOC: Customer benefits

Monitoring and control ensures guaranteed End-Use Customer's building environment

Energy Agents™

Installed at Customer Sites. Provide additional controls for end-use customer. Tamper-resistant.



T&D Agents™

Advanced analytics for grid optimization

Our IES and expanding capabilities

Standalone BMS product line in development at the request of customers. It will be our third product.

Building Mangement System

Building Load

HVAC

Lighting

Other Load

Our original solution, the IES, with the Energy Agent™ product at its core, installed at Sites, enabling grid optimization and dynamic load management via coordination with proprietary algorithms in the Nexus.

Innovari Nexus

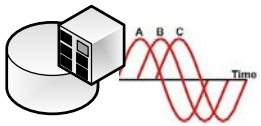
Datacenters

NOC

Energy Agent™

Generator

Solar Panel

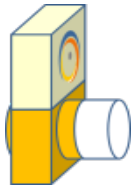


Phase Independent Battery Storage

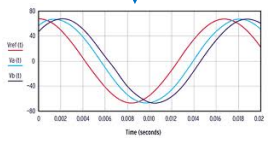
The Energy Agent™ has evolved to multiple versions with different functionalities.

Evolving now to Balance Distributed Energy Resources

T&D Agent™



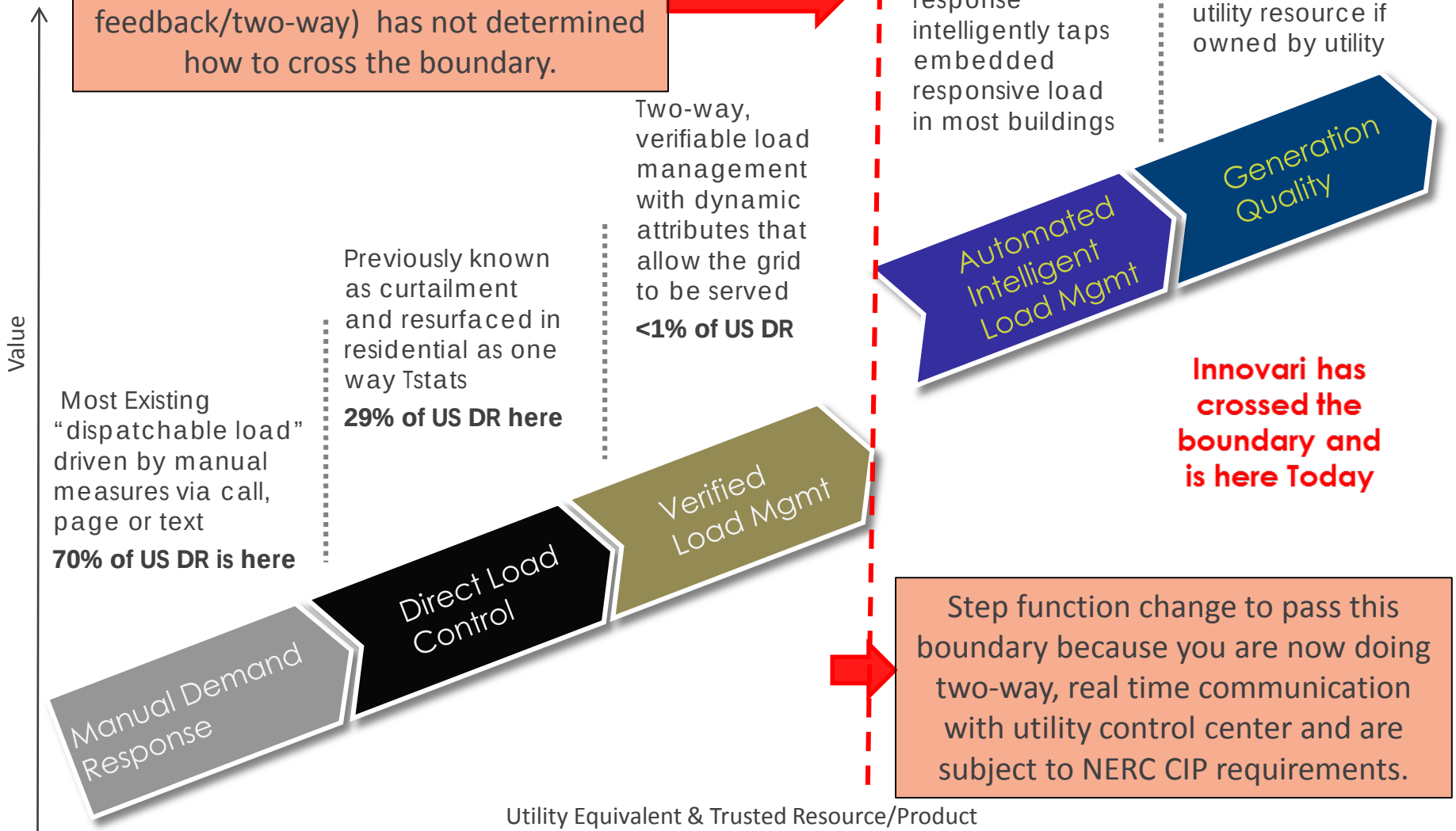
Our second product, the T&D Agent™, provides advanced Grid Analytics and deep Situational Awareness to the IES and utility.



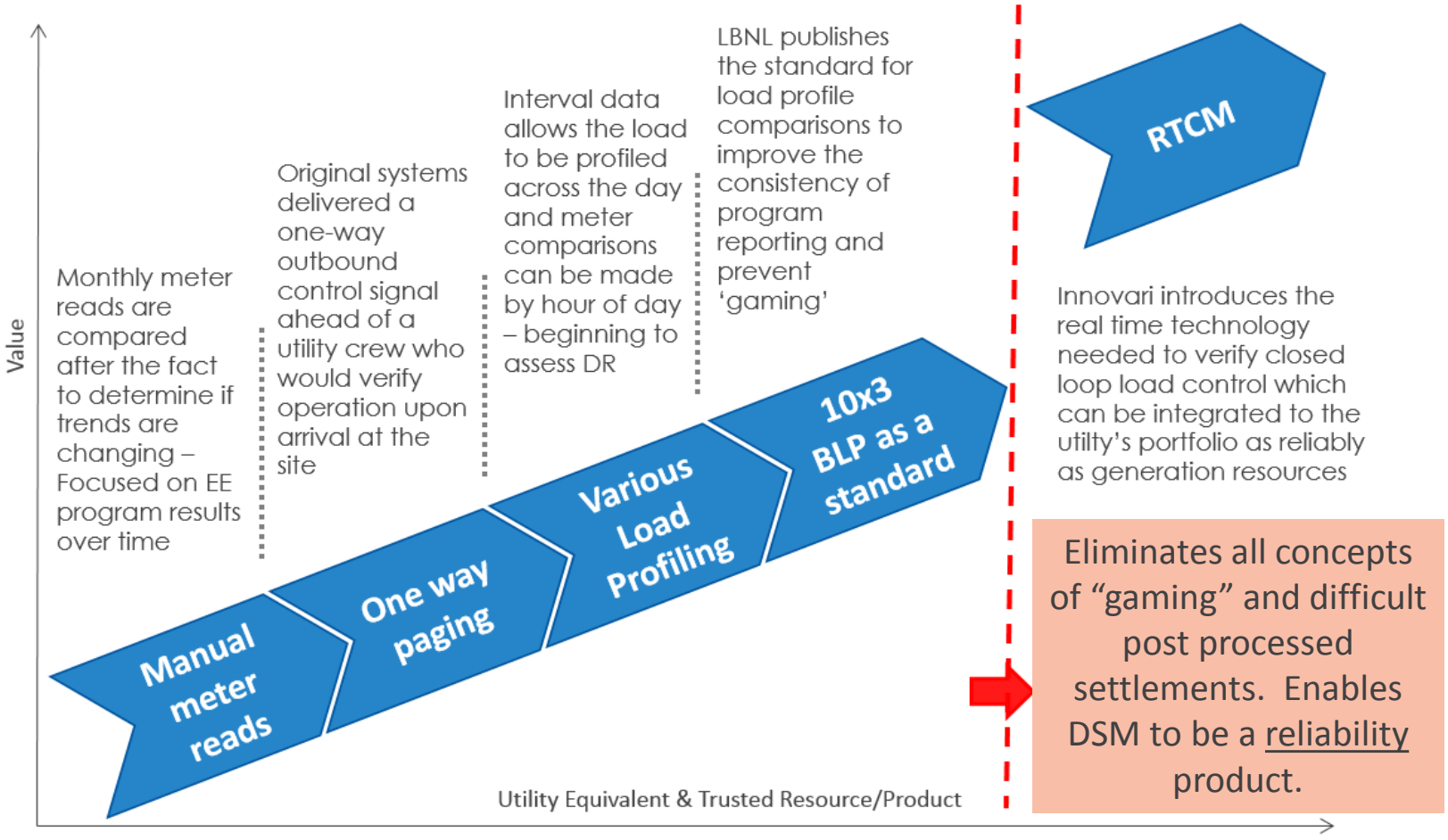
Grid Anaytics

Evolution of Load Management

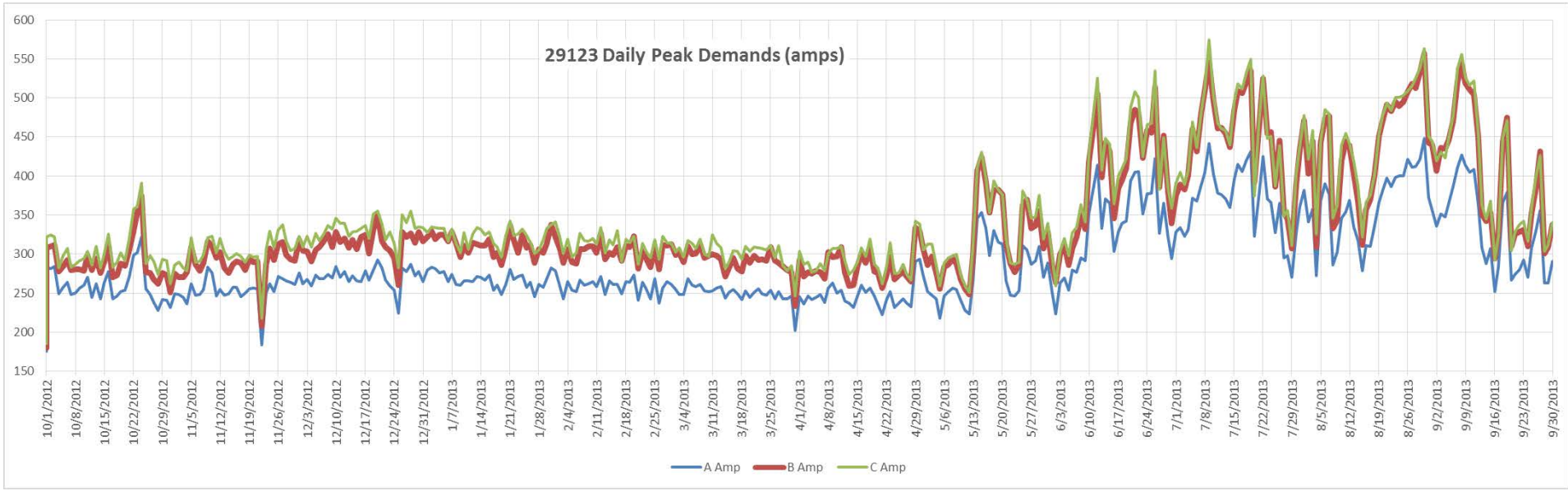
US initiative to create Open ADR (1.0 one way signaling, 2.0 examining feedback/two-way) has not determined how to cross the boundary.



Evolution of Measurement & Verification

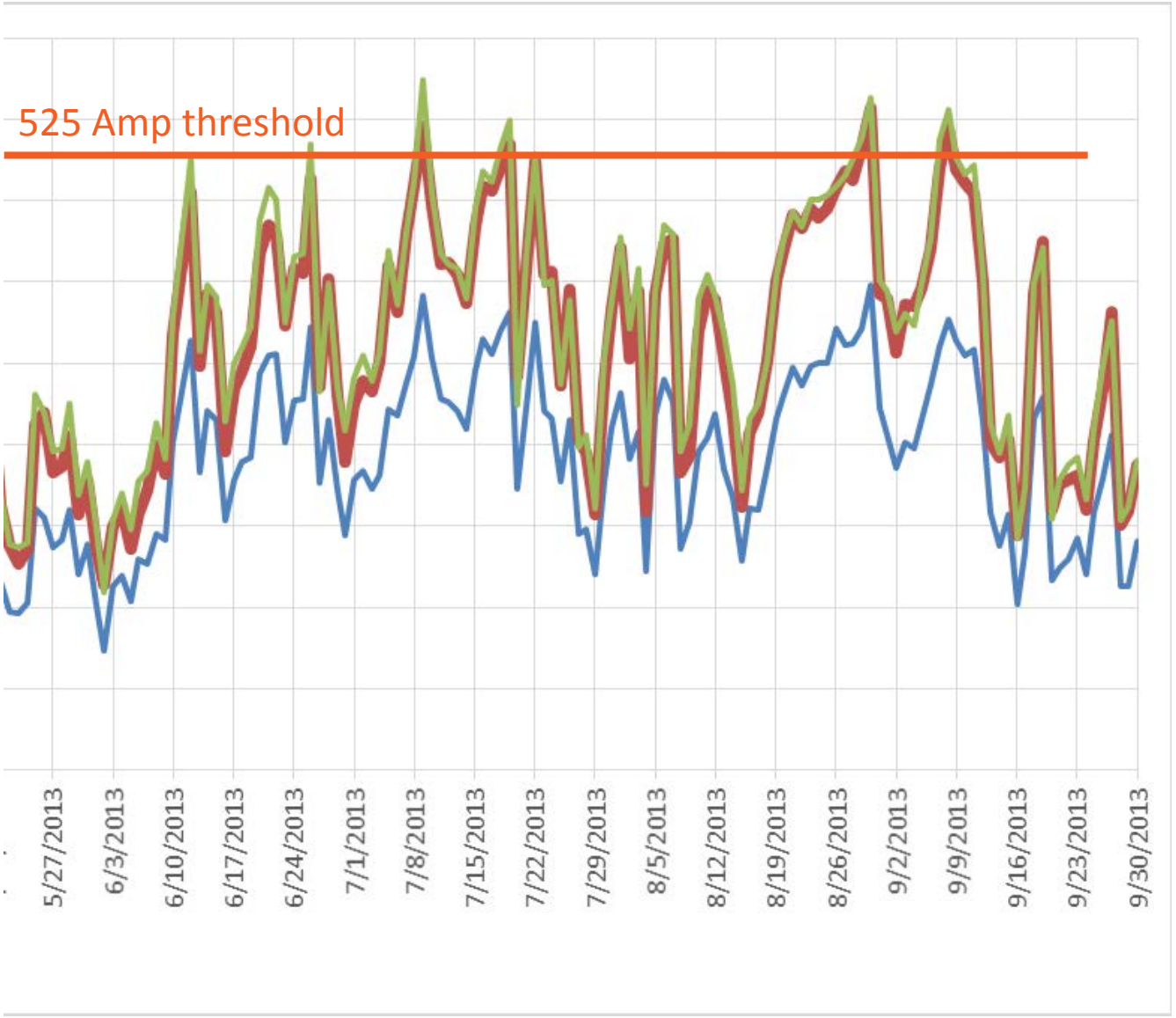


Start at the lowest level - Substation 291 Feeder 23



- Optimize feeder usage and defer or eliminate the need for feeder reconductor/upgrade that was currently planned as feeder operating limit of 550 Amps is being surpassed
- SCADA shows ~70 hours over 500 Amps. Maximum peak ~574 Amps
- To manage 50 to 75 Amps on this feeder, 620 to 930kW of load management would be required to keep the feeder at or below 500 Amps
- Goal: Install at least 620kW and up to 1 MW of load management

Operational Goals

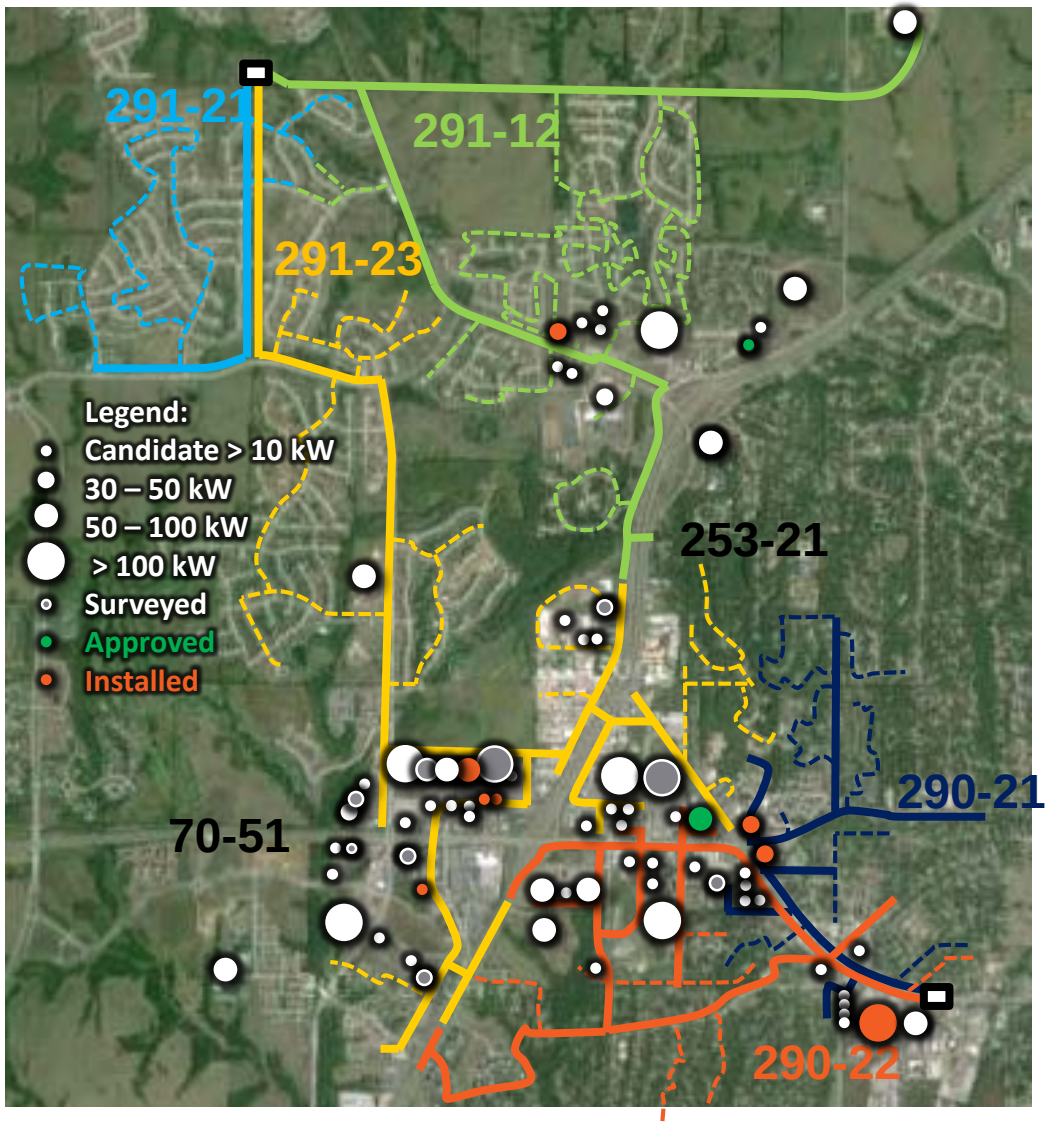


Expanding to Substation

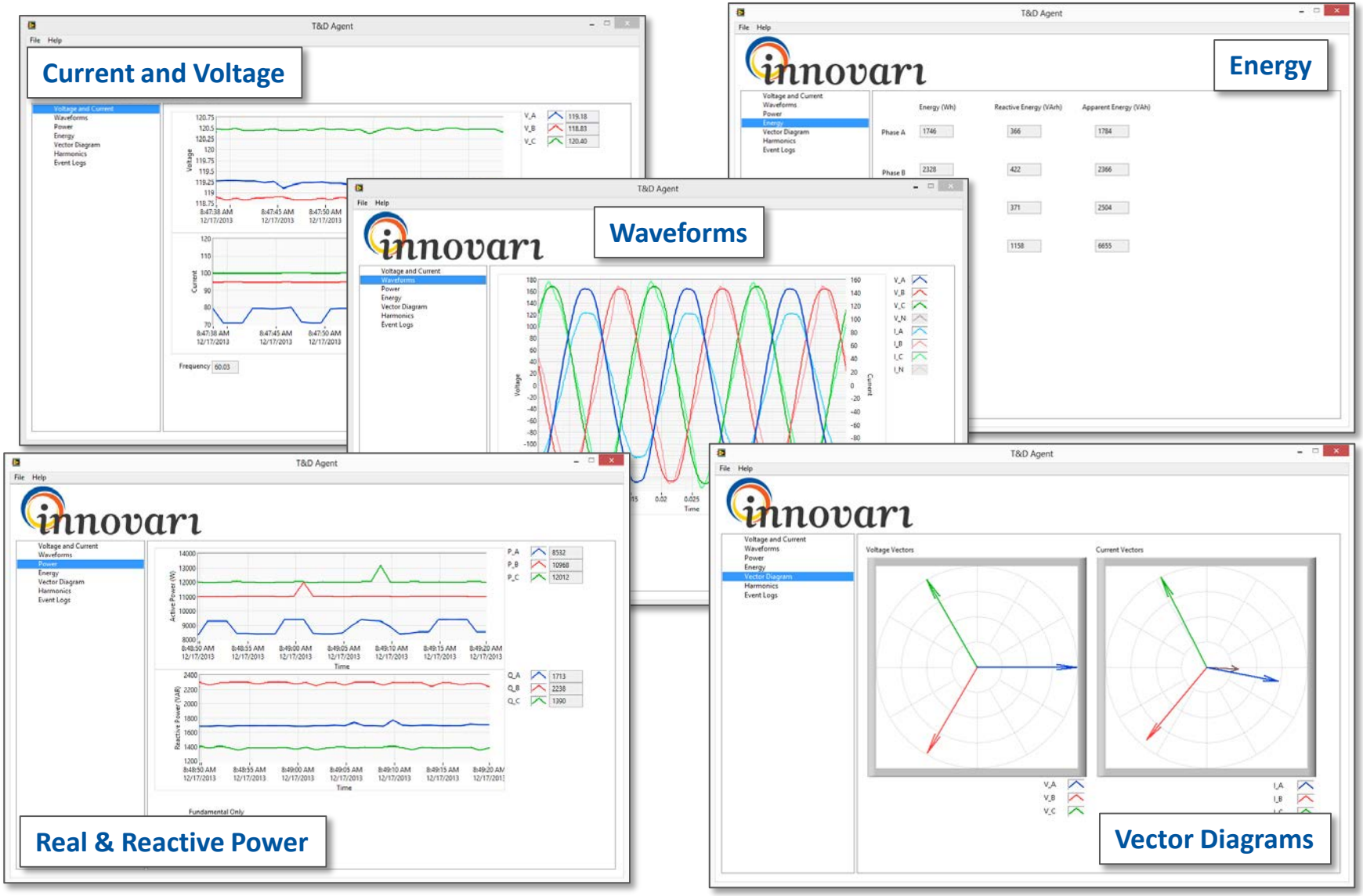
Emphasis on feeder 291-23

Substation relief desired for 291 and 290

	Expected Site kW range				
Feeder	10-30	30-50	50-100	100+	Total kW
290-21	2	1	0	0	100
290-22	2	3	3	1	700
291-12	2	2	0	1	300
291-23	**4**	**3**	**6**	**2**	**900**
Total (all Feeders)					~2.0MW



T&D Agent™ Advanced Analytics



Real System Observations from the T&D Agent™

Voltage Control Error on Phase C

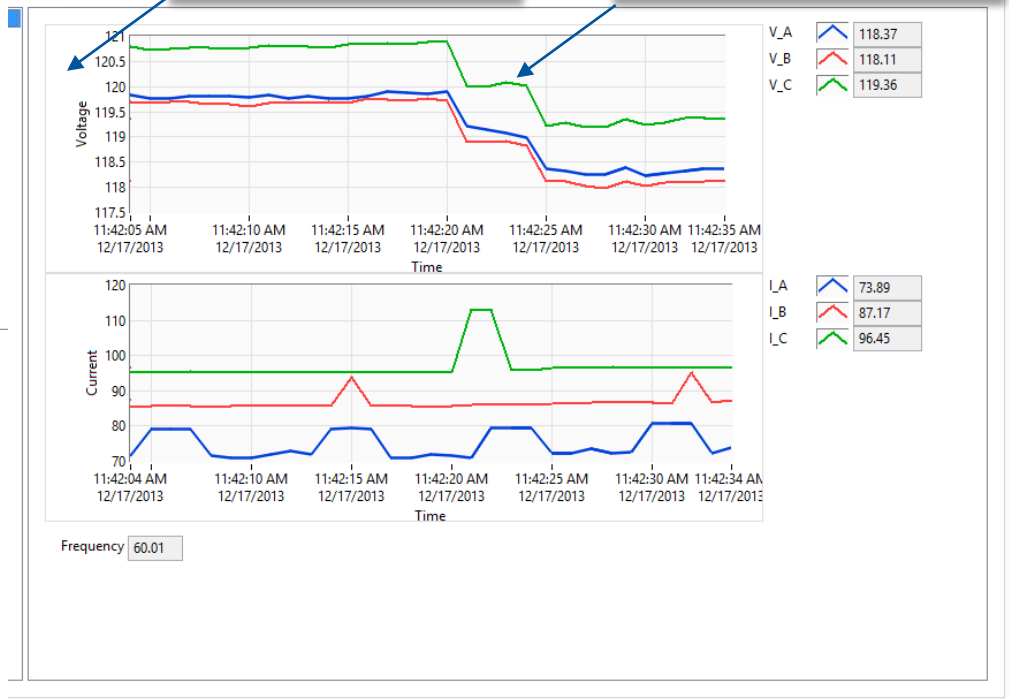
Recovery from Event

Real time validation of load drop, load bury and load recovery

Incorrect Coordination between LTC and Distribution Cap Bank

Cap Bank Raised Voltage

Load Tap Changer 2 step lower

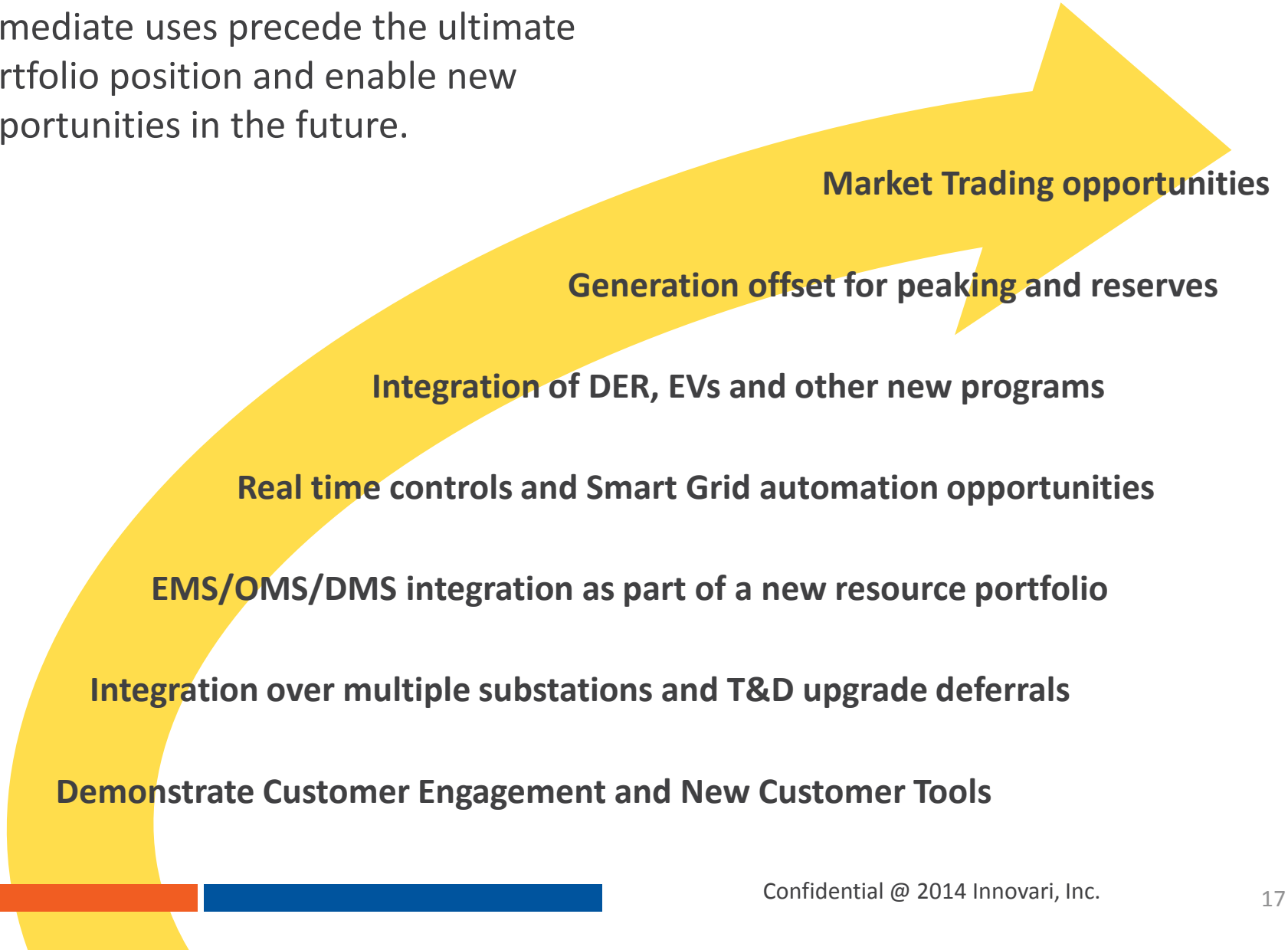


Opportunities for Future

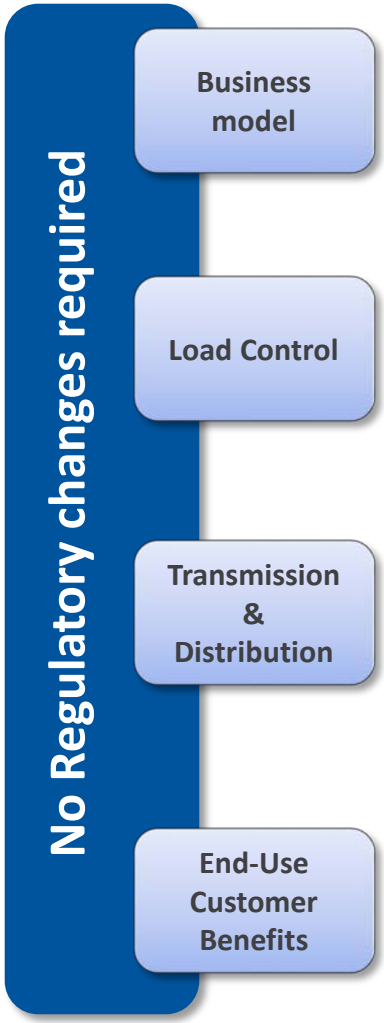
- Future Potential – This is New and Different – Use as Planning Tool
  - Think of us as a planning tool that allows you to focus on infrastructure building in new regions.
  - We are a capex resource that also helps build customer relationships.
  - We provide an efficient regulatory asset as an alternative to inefficient upgrading of existing poles and wires.
- Distributed Generation
  - Significant amount of capacity distributed throughout territory, with tremendous potential to benefit the Utility and its end-use customers
- Solar integration
  - Opportunity to provide monitoring/coordination/load balancing with distributed solar arrays. Lots of existing and new ones coming, we can help!
- Distributed Storage
  - Opportunity to test distributed battery storage arrays. Examine business model for solar balancing, customer UPS and examination of load following for central station wind. Awesome new technology and we want to demonstrate here!
- Regulatory Momentum
  - Leverage momentum with regulators to drive positive business model

Engage at Your Own Pace

Immediate uses precede the ultimate portfolio position and enable new opportunities in the future.



Summary of the IES



- Utilities own the hardware that can be incorporated into rate base
- Cost-competitive alternative to feeder reconductors, substation upgrades and distributed generation as a targeted resource
- Utility maintains and enhances the relationship with the customer

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- Two-way verifiable, secure method of managing demand side resources
- Aggregated (as a resource) or targeted (Feeder) dispatch
- Sophisticated algorithms ensure quality of end-use customer environment while cost-effectively meeting utility capacity needs

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- Grid Level Optimization
- System situational awareness far beyond the substation
- Detailed grid analytics including Voltage, Current, Harmonics, Fault Recording and wave-form event analysis
- Extensible to include existing or new Smart Grid technologies

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- Incentives for program participation
- Scheduling capabilities (lights and HVACs) via secure web portal
- Opportunity for charitable giving of incentives

What makes the Innovari IES different?

The Business Model

- Enhances relationship between the utility and its customers
- Plant-in-service asset that utility can put in rate base and earn on
- New tool for enhanced community involvement and branding (non-profit)
- ~7% Capacity Factor Resource vs. <1% industry norm (876 hrs vs. 80 hrs)
- Engage at your own Pace – Not an all or nothing decision

The Providers

- Innovari team: utility and energy industry careers, not pit stops. Extensive experience, in the trenches and in senior management positions
- Utilize Local partner: proven track record with utility and the community

The Technology

- Secure and Reliable: two-way verifiable load management designed to be NERC CIP compliant
- Used and Useful: patented technology and algorithms make DSM/DER a real part of managing the grid day to day, in real-time
- Future Ready: built to enable energy transactions between buildings and the utility. (DER: Solar, DG, Fuel Cells, Batteries, etc.)

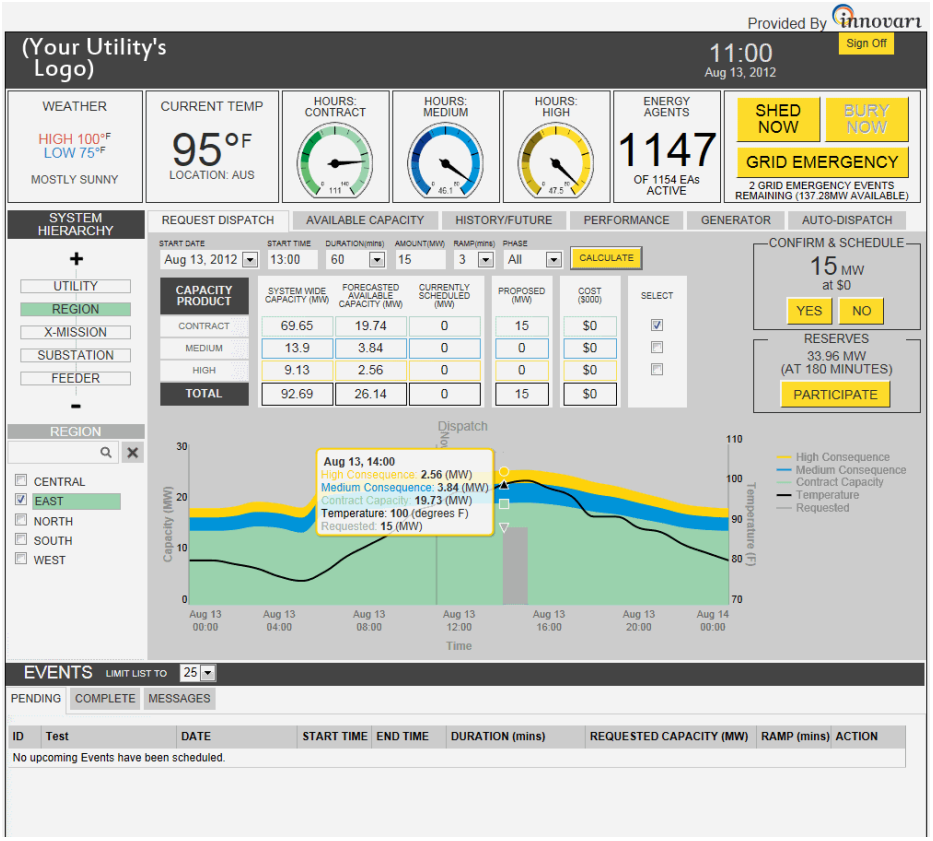
How does it work?

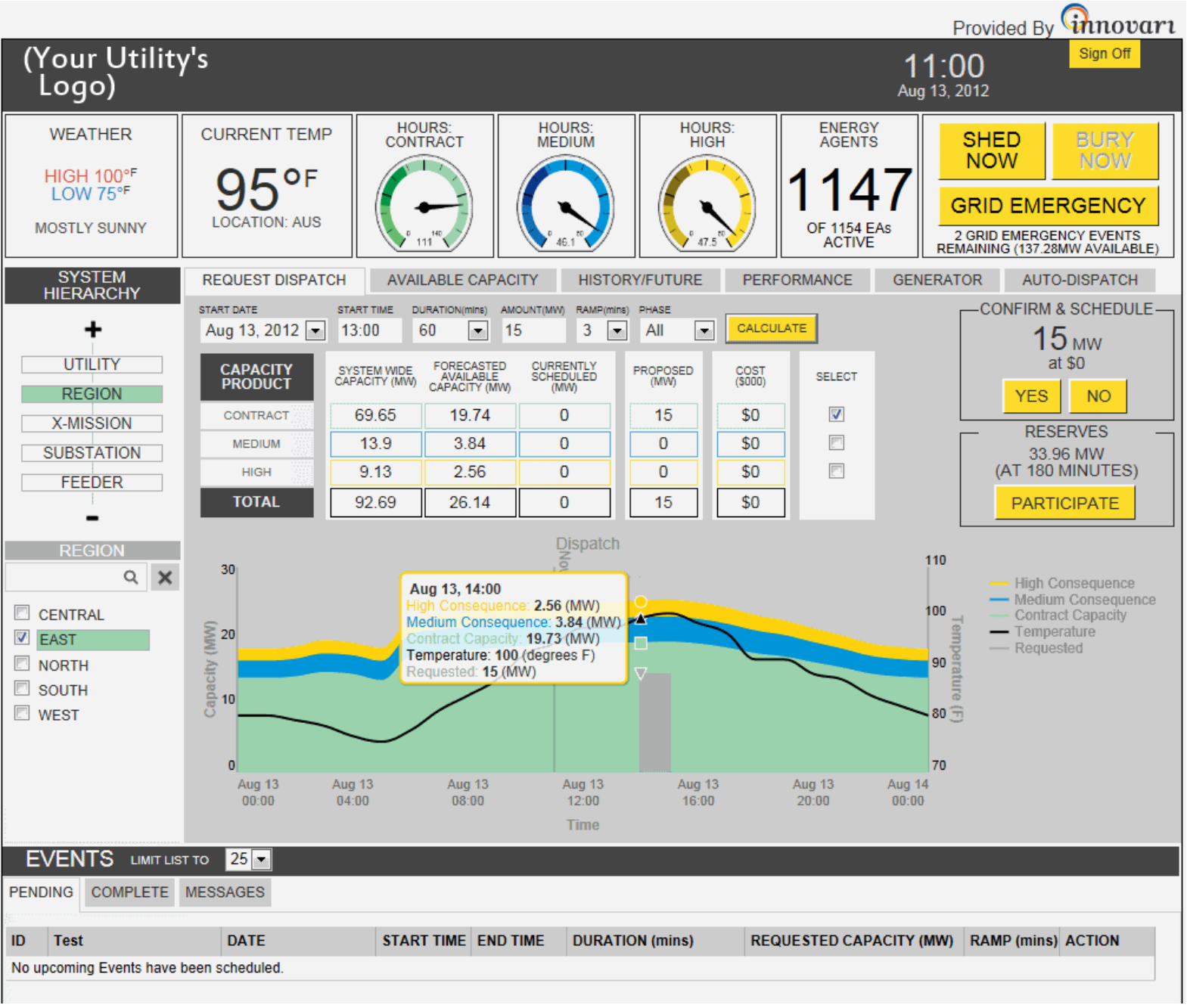
Two Primary Interfaces:

- Utility Portal
- Building Portal

The Utility Portal enables Real-time Scheduling, Dispatch and Monitoring

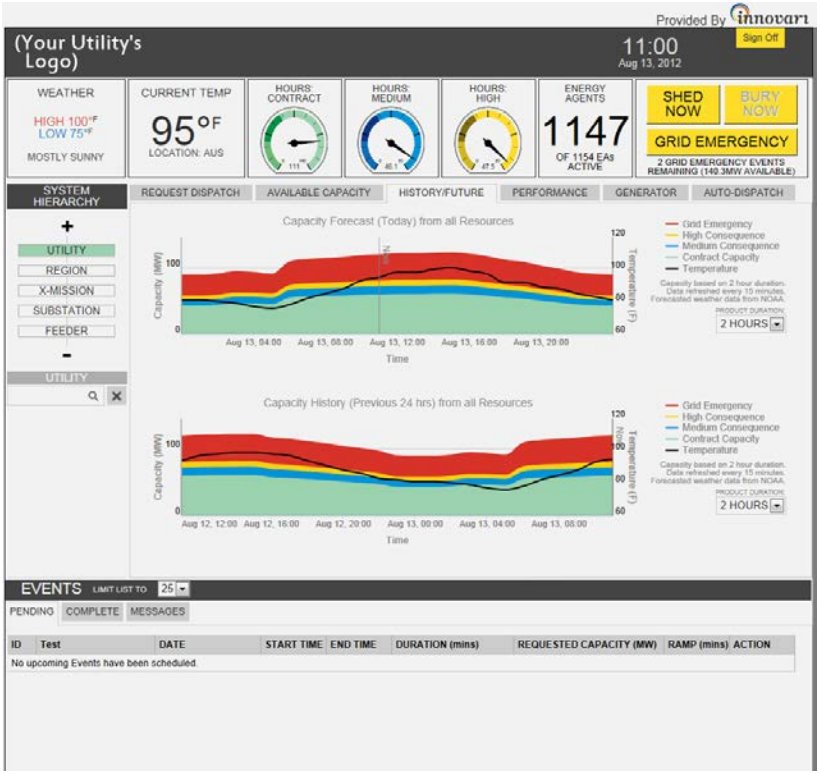
- Familiar functionality for System Operators
- Two-way, real-time, pre and post verification of Events
- Immediate load shed command for Grid Emergencies
- Dynamic updates
- History and forecasts
- Control hierarchy down to the Feeder level as built around the Utility's Connectivity Model

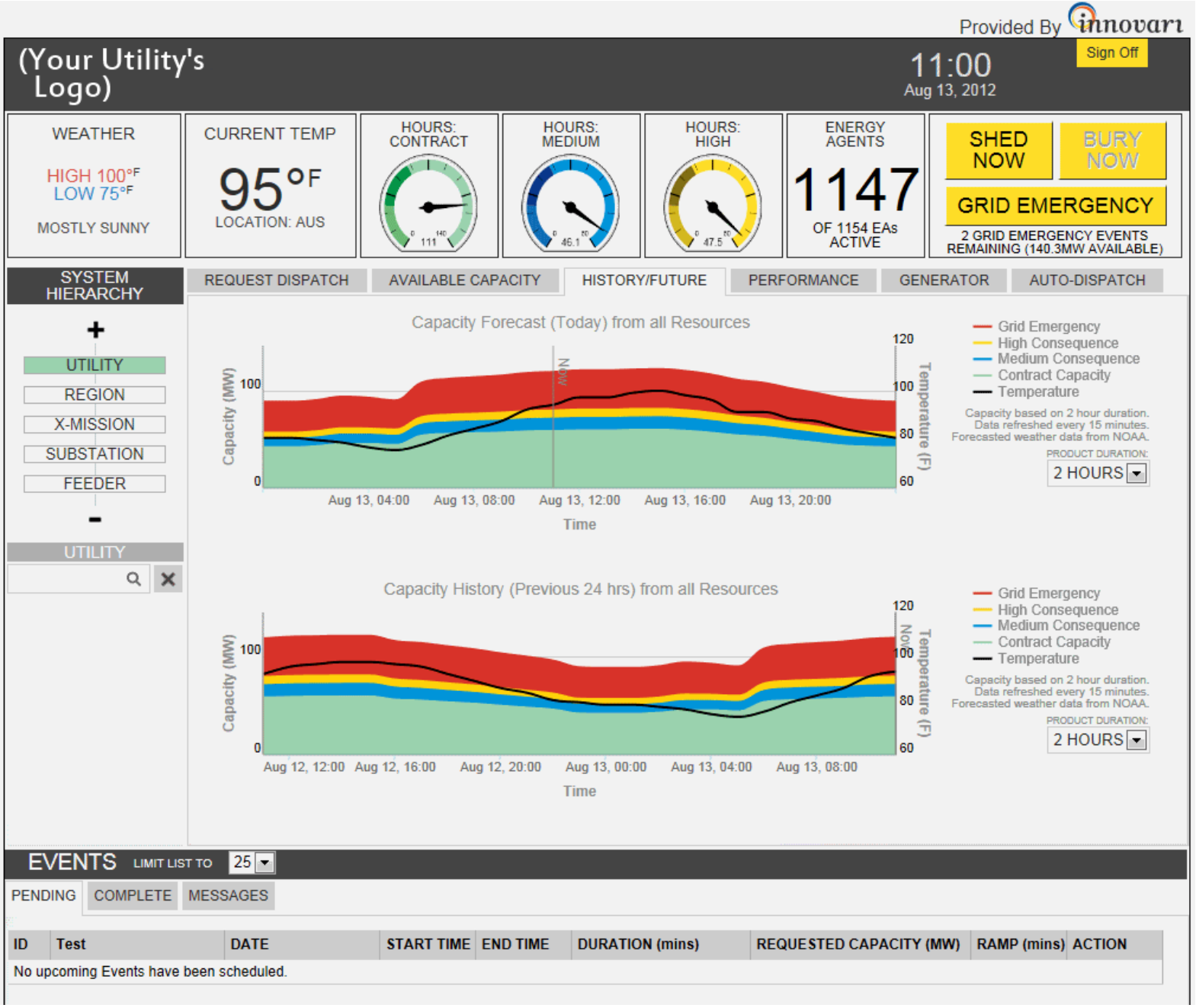


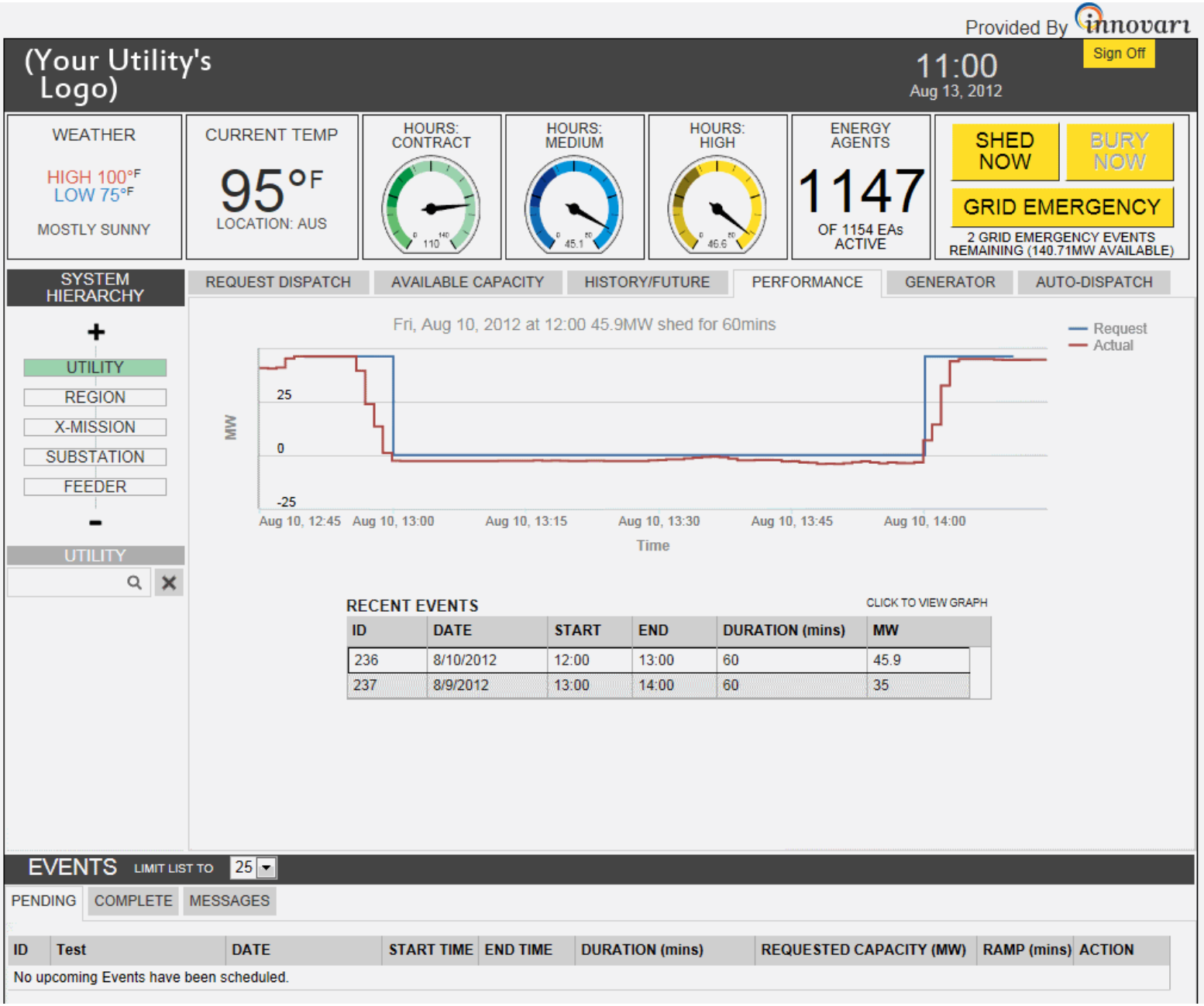


Multiple Dashboards provide More Info

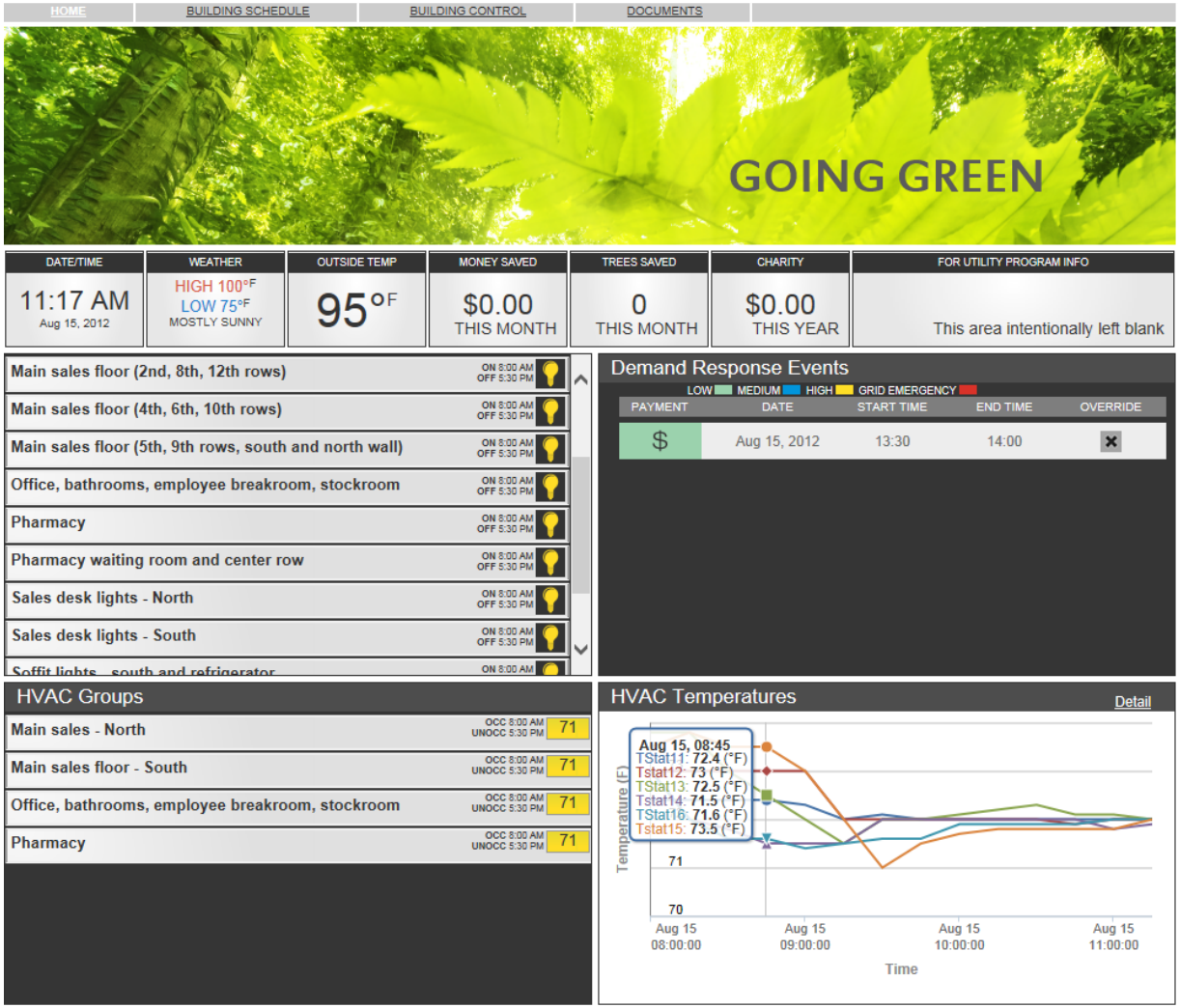
- Instantaneous Available Capacity
- 24 hour history and day ahead forecasts
- Summary of Pending and Completed Events
- Performance Metrics
- All available by system hierarchy
- Additional details are available dynamically with “mouse rollover” for a clear, intuitive and user friendly operator interface







Building Portal provides Opportunity for Utility to Enhance Relationship with End-Use Customers



- New tools for customer: ability to schedule lighting and HVAC groups, including temperature setpoints
- View status of demand response Events
- View temperature profiles of HVAC groups
- Customizable “widgets” for additional Utility-Customer interaction

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DATE/TIME	WEATHER	OUTSIDE TEMP	MONEY SAVED	TREES SAVED	CHARITY	FOR UTILITY PROGRAM INFO
11:17 AM Aug 15, 2012	HIGH 100°F LOW 75°F MOSTLY SUNNY	95°F	$0.00 THIS MONTH	0 THIS MONTH	$0.00 THIS YEAR	This area intentionally left blank

Main sales floor (2nd, 8th, 12th rows)	ON 8:00 AM OFF 5:30 PM
Main sales floor (4th, 6th, 10th rows)	ON 8:00 AM OFF 5:30 PM
Main sales floor (5th, 9th rows, south and north wall)	ON 8:00 AM OFF 5:30 PM
Office, bathrooms, employee breakroom, stockroom	ON 8:00 AM OFF 5:30 PM
Pharmacy	ON 8:00 AM OFF 5:30 PM
Pharmacy waiting room and center row	ON 8:00 AM OFF 5:30 PM
Sales desk lights - North	ON 8:00 AM OFF 5:30 PM
Sales desk lights - South	ON 8:00 AM OFF 5:30 PM
Soffit lights - south and refrigerator	ON 8:00 AM

Demand Response Events

LOW MEDIUM HIGH GRID EMERGENCY

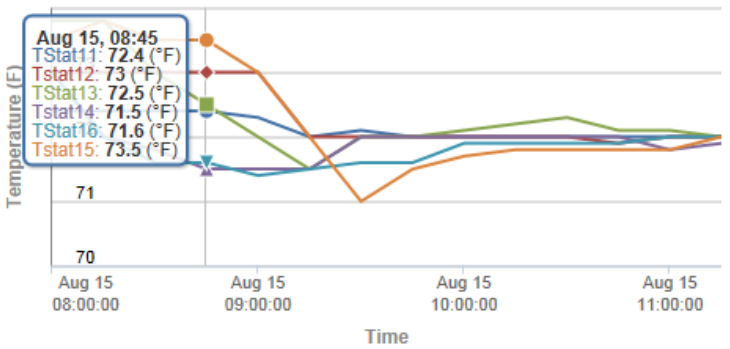
PAYMENT	DATE	START TIME	END TIME	OVERRIDE
$	Aug 15, 2012	13:30	14:00	✖

HVAC Groups

Main sales - North	OCC 8:00 AM UNOCC 5:30 PM	71
Main sales floor - South	OCC 8:00 AM UNOCC 5:30 PM	71
Office, bathrooms, employee breakroom, stockroom	OCC 8:00 AM UNOCC 5:30 PM	71
Pharmacy	OCC 8:00 AM UNOCC 5:30 PM	71

HVAC Temperatures

Detail



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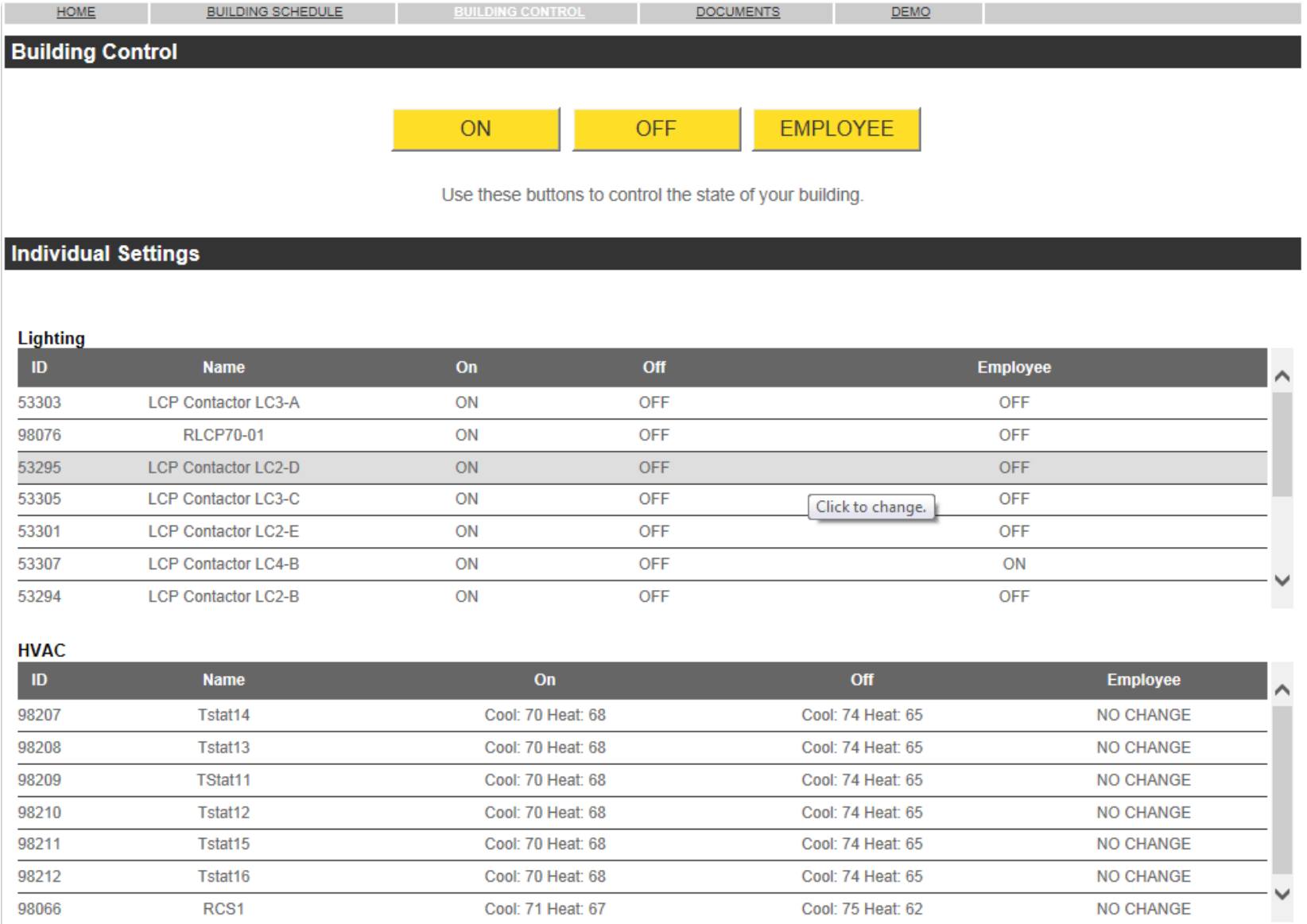
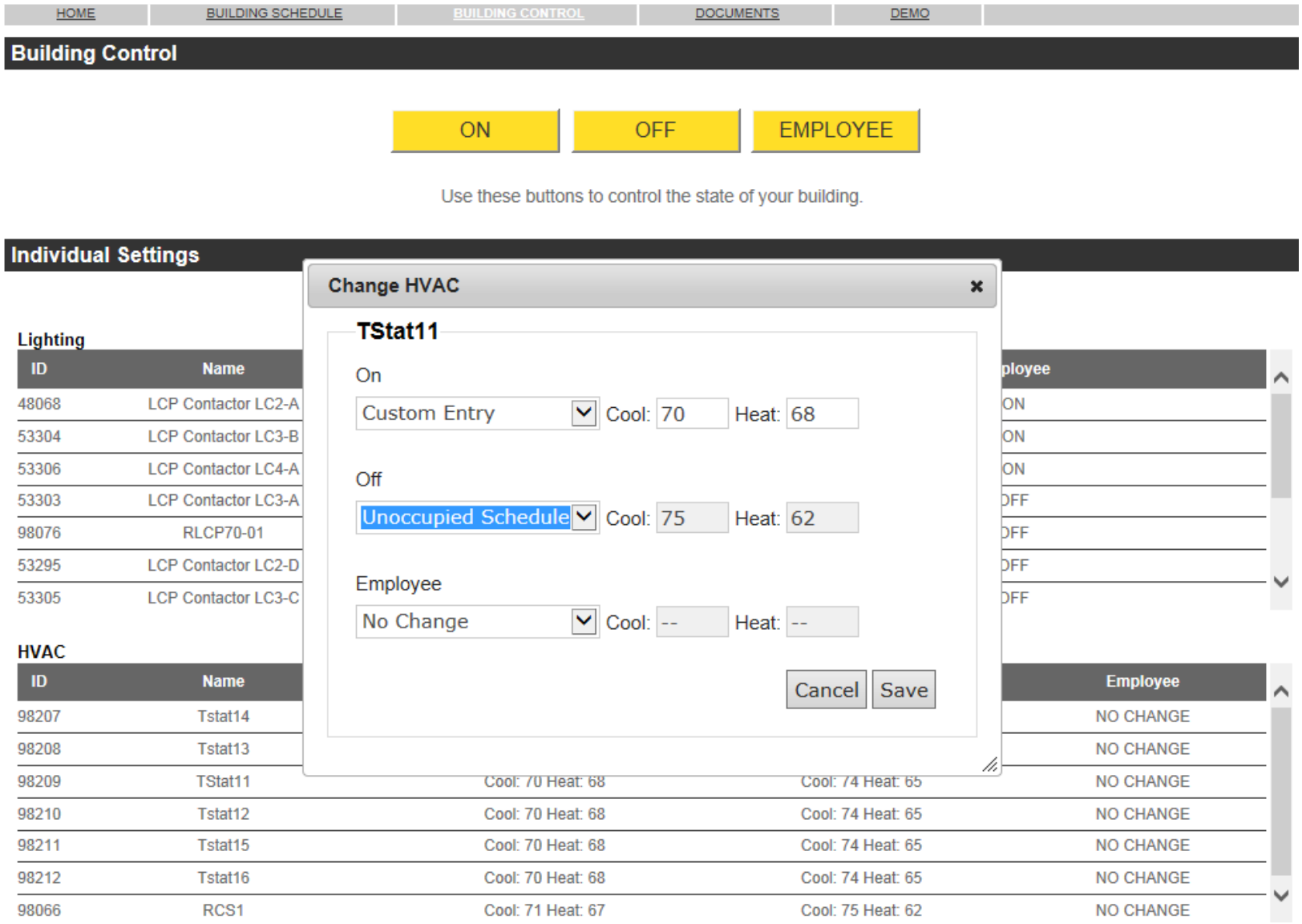
Building Schedule

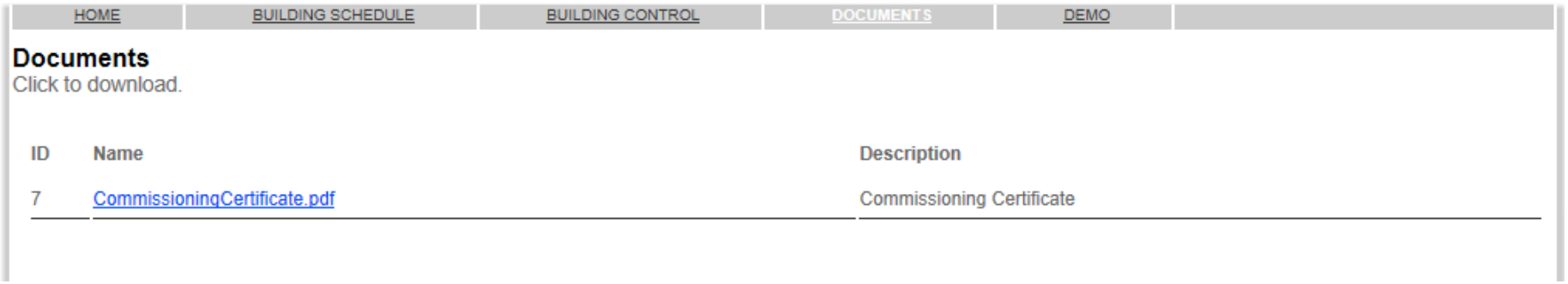
EDIT SCHEDULE

LIGHTING GROUPS	SUN	MON	TUE	WED	THU	FRI	SAT
Electrical room	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Main sales floor - soffits	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Main sales floor (11th and 7th rows)	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Main sales floor (2nd, 8th, 12th rows)	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Main sales floor (4th, 6th, 10th rows)	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Main sales floor (5th, 9th rows, south and north wall)	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Office, bathrooms, employee breakroom, stockroom	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Pharmacy	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Pharmacy waiting room and center row	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Sales desk lights - North	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Sales desk lights - South	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Soffit lights - south and refrigerator	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Stock room	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
Stock room north lights	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM

HVAC GROUPS			SUN	MON	TUE	WED	THU	FRI	SAT
Main sales - North									
	COOL	HEAT							
OCCUPIED	71°	67°	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM	8:00 AM - 5:30 PM
UNOCCUPIED	75°	62°							
EDIT SET-POINT									







Thank You!

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Santa Clara, CA

INNOVARI MIDDLE EAST

Amman, Jordan

INNOVARI INDIA

Mumbai, India
Gurgaon, India

INNOVARI LATIN AMERICA

Buenos Aires, Argentina

Robust Security is a Prerequisite

Physical

- Unique physical intrusion detection
- All wired communications secured inside the EA
- Upon security breach, EA will erase execution code and data and wait for NOC “all-clear” to rebuild personality

Architecture

- Built for NERC CIP compliance
- Physically isolated server infrastructure w/limited access, all activities monitored and audited.
- All EA-Network Operations Center communications are:
  - Initiated by the Client application (EA) within expected check-in periods and verified by the Host (NOC)
  - HTTPS based security with Federal Information Based Processing Standard (FIPS) 256 bit Advanced Encryption Standard (AES)
  - Configurable firewalls
  - Message Signature and payload verified on each check-in based on what is expected. Incorrect payloads or signatures are rejected and alarmed for NOC review.
- Certificate based Machine to Machine authentication inside Nexus

Network Operations Center

- Includes independent utility data system with multiple security trust zones
- Communications between NOC and utility is built to utility guidelines which can include:
  - Encrypted tunnel for communication
  - Authentication of utility side users
  - Utilize utility preferred communication protocols such as ICCP, portal, web services, etc.

Back-Up

Engagement Process

Utility Engagement Process

Identify Target Sites

- Utility Planning Group
- ID Target Feeders or Substations
- Collect One Year of Meter Data for All C&I
- Connectivity Model and GIS Analysis

Outline Engagement Approach

- Utility Marketing & Customer Groups
- Define Engagement Process
  (Who does what, Joint badge, Collateral)
- Identify Utility Account Managers
- Define Customer Program Parameters
  (Opt out, Term/ etc.)

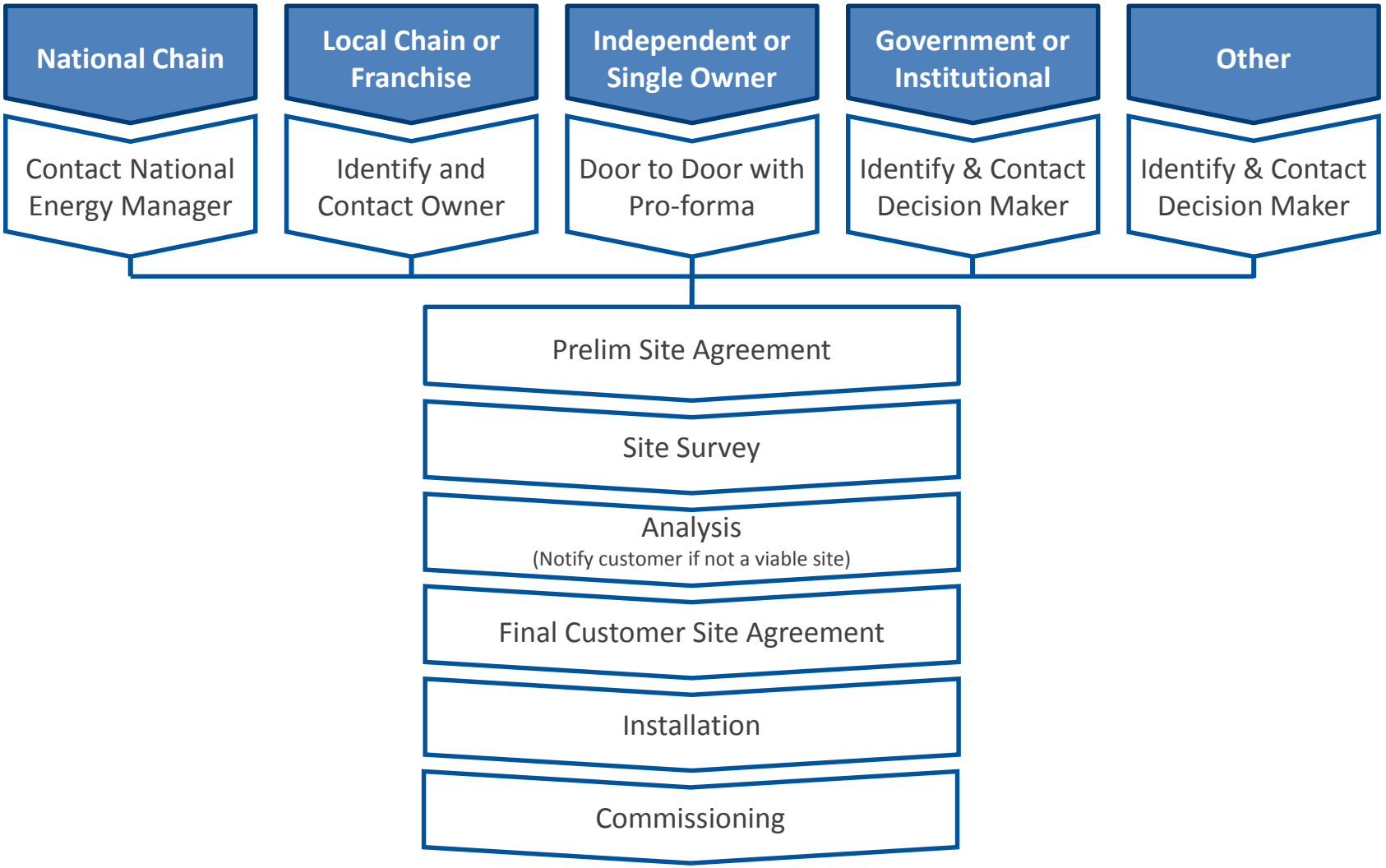
Segment viable customers (Customer Sites and viable T&D Enhanced Sites)

- National Chain
- Local Chain or Franchise
- Independent or Single Owner
- Government or Institutional
- Other

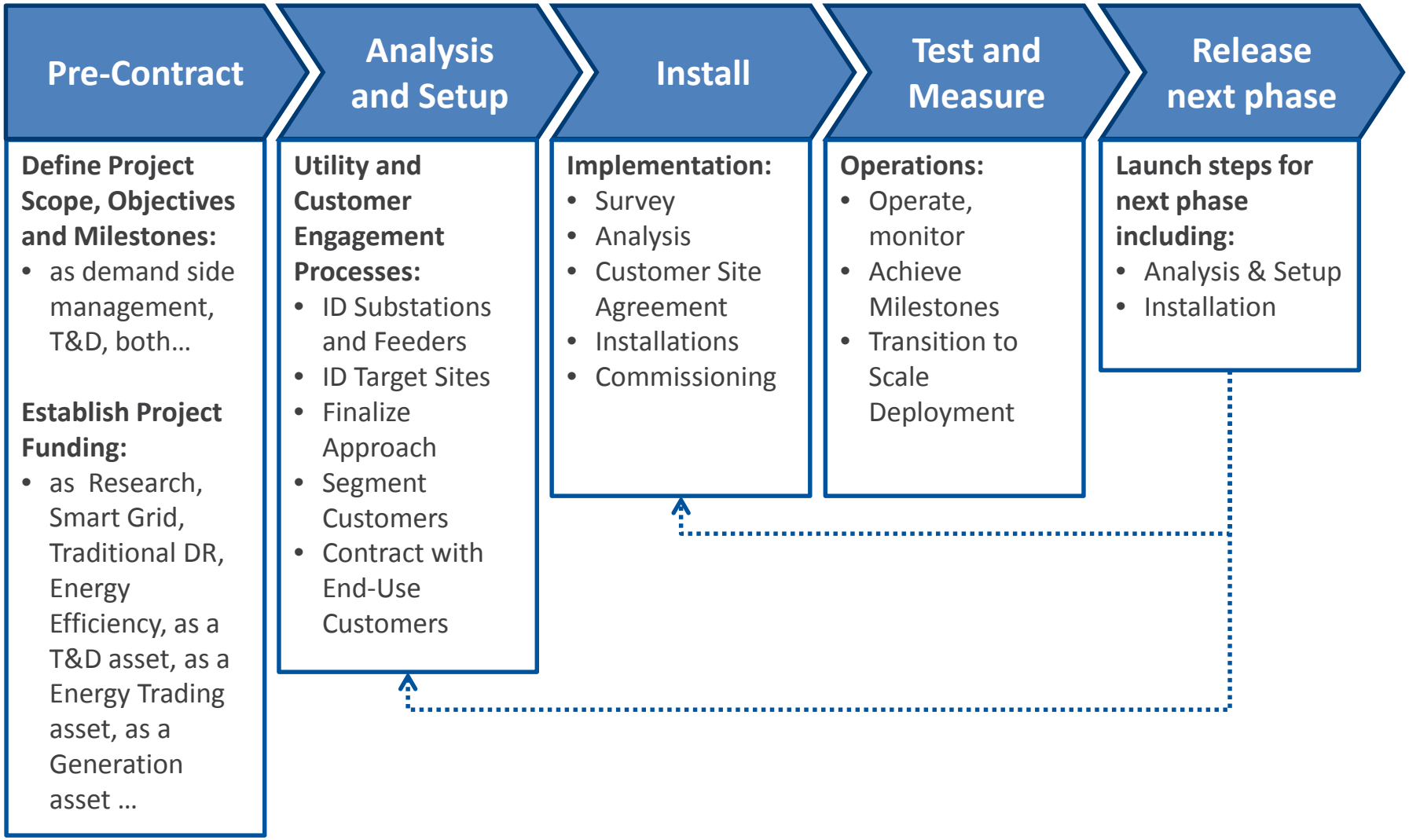
Continue to *Customer Engagement Process …*

Customer Engagement Process

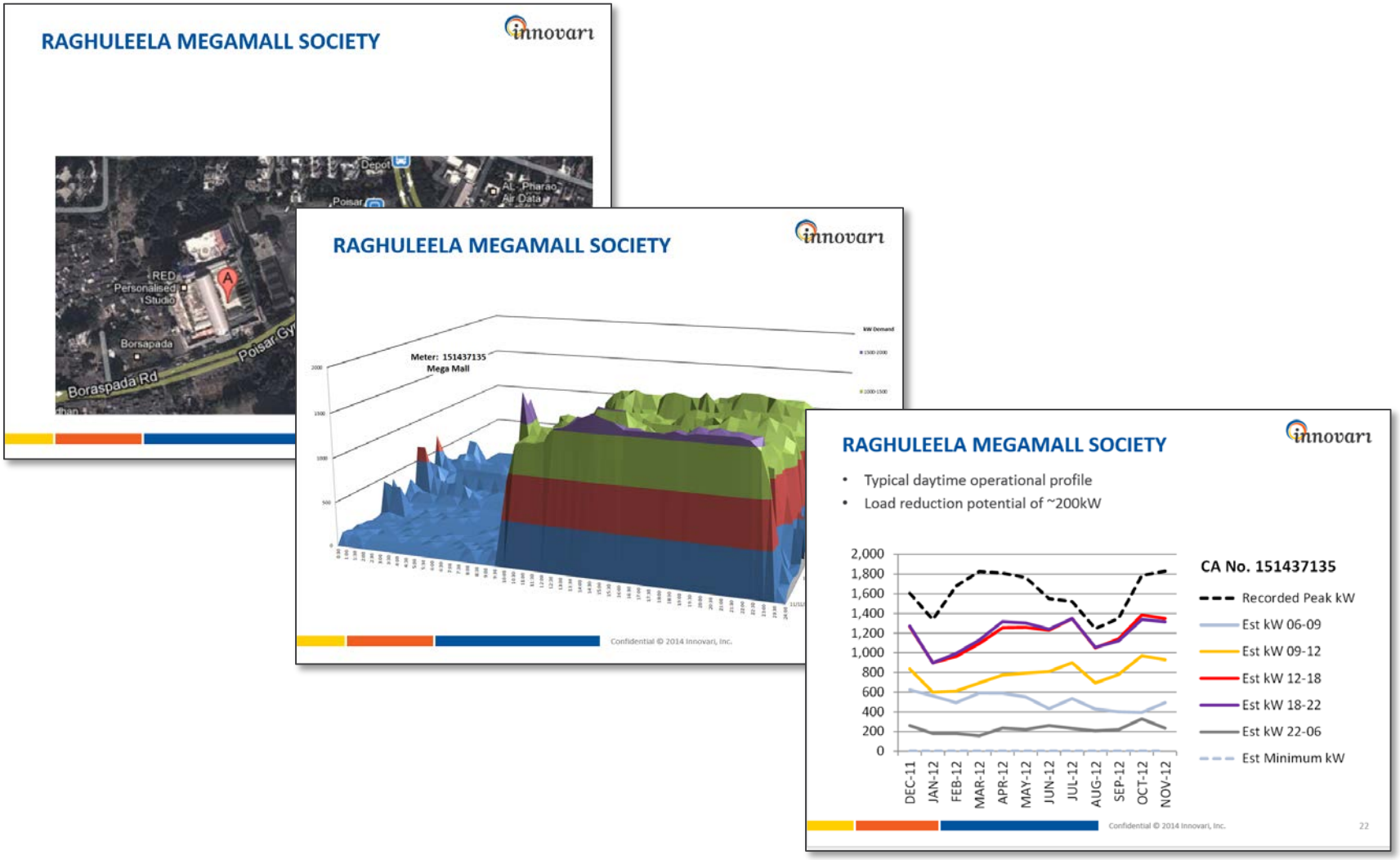
… Continued from *Utility Engagement Process*



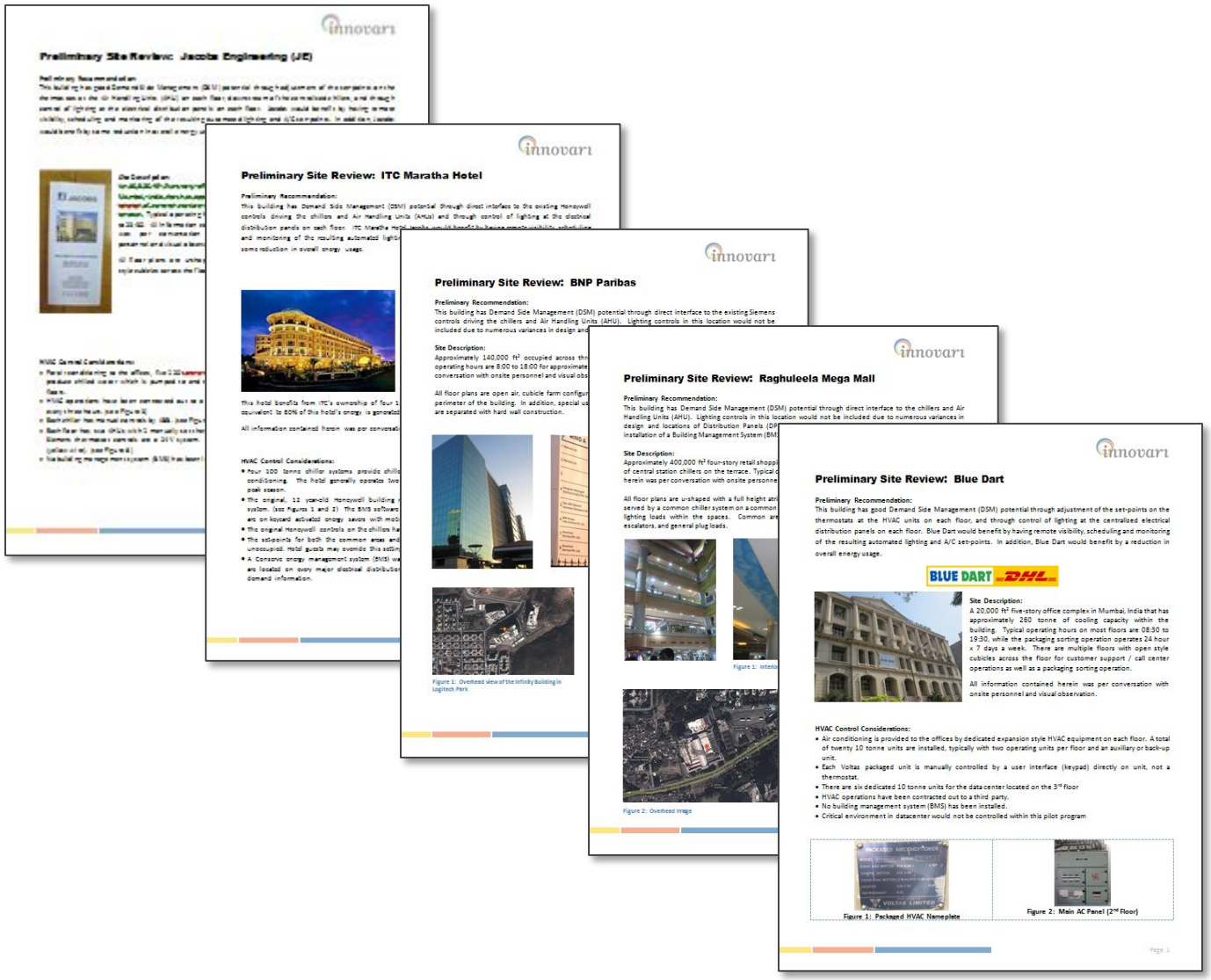
Typical Deployment Timeline



Preliminary Screening of Sites (Example)



Preliminary Site Reports (Example)

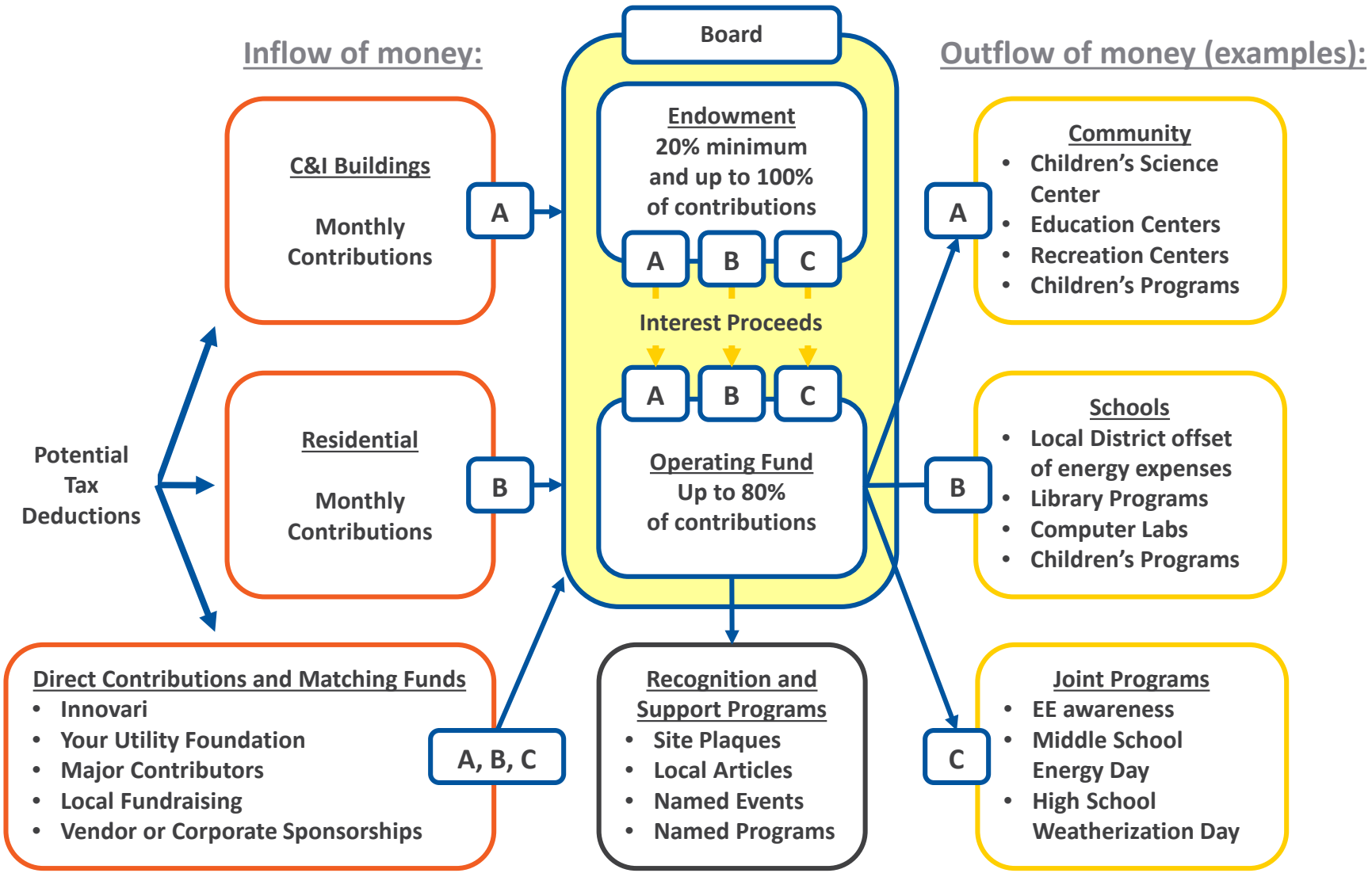


Back-Up

Opportunity to work with the Community

- Not-for-Profit Structure
- Cost comparative to generator

Unique Not-for-Profit Structure & Opportunity



The Choice for a Utility – 50MW of What?

Traditional Peaker (2-6 or ??? Years)	Utility Owned IES (6-24 months)
Purchase Land	No Land
Siting Process	No Siting Process
EA/EIS - Environmental Permits	No EA/EIS or Permits (RECs!!!)
Interconnection Study	No Interconnection Study
Gas Line Extension	No Gas Line Extension (No fuel cost)
Construction Costs/Delays	No Construction Costs/Delays
Interconnection Facility	No Interconnection Facilities
Total delivered at end of project	Delivered as acquired – even day one!
Losses on Grid (10% = Lose 5 MW!!)	REDUCES losses (Gain 5 MW)
Increases Spinning Reserve Requirement (12% = Build another 6 MW!!!)	REDUCES Spinning Reserve Requirement (Gain 6 MW)
50MW – 5MW – 6MW = **39MW IRP EFFECT**	50MW + 5MW + 6MW = **61MW IRP EFFECT**
Delivered for $1,500 to $2,500 per kW	Delivered for $695 per kW*
O&M and Fuel Variable each year	Annual Programmatic fixed $43 per kW-yr*
New Emissions and increased fuel requirement	Reduce current and future emissions and fuel use
$75-$125M capx - $4-$8M opex variable	$34.75M capx - $2.15M opex fixed

*plus applicable shipping/tax/customer incentive/etc