

**You are logged into the Technical
Standards Review Group (TSRG)
Quarterly meeting**

The meeting will begin momentarily

Massachusetts Technical Standards Review Group

Quarterly Meeting

June 8, 2023

**The Massachusetts
Technical Standards
Review Group**



Agenda

- 1:00-1:10** **Opening Comments**
- 1:10-2:15** **Sub-Committee Updates (15 min each)**
1. ESS Ramp Rates & Schedules Group
 2. IEEE 1547 Group
 3. Area Networks Group
 4. Expedited Pathway Group
 5. SIS Technical Analyses Group
- 2:15-2:45** **Update Items**
- Group Study update – Including CIP status
EDC - Technical Standards Updates (where applicable)
- 2:45-3:15** **Electric Sector Modernization Plan (ESMP) Update**
- 3:15-3:35** **Energy Storage Tariff / Wholesale Distribution Tariff Update**
- 3:35-3:55** **Eversource Interconnection Automation**
- 3:55-4:00** **Close Out**
1. Next scheduled quarterly meeting date
 - a. Sept 14, 2023 1PM-4PM
 - b. Dec 7, 2023 1PM-4PM
 2. Send topics for future meetings to
 - a. Mike Porcaro (Michael.Porcaro@nationalgrid.com)
 - b. Mrinmayee Kale (mkale@newleafenergy.com)

Administrative Items

- Refer to TSRG Website for all information related to the group
<https://www.mass.gov/info-details/massachusetts-technical-standards-review-group>
 - Membership
 - By-Laws
 - Reference Documents
 - Past Meeting Notes & Materials
 - Common Technical Guideline
 - Upcoming meeting info and registration link
- For any questions, suggestions, or to get on the mailing list email:
 - Chair - Michael.Porcaro@nationalgrid.com
 - Co-Chair - mkale@newleafenergy.com
- Use of the Teams chat is encouraged, but please keep comments respectful and professional

TSRG 1547 Update SubGroup Update

John Bonazoli

**The Massachusetts
Technical Standards
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IEEE 1547 Sub-Group Update

Mission Statement:

Establish clear criteria of requirements and default settings for usage of grid support functions set forth in IEEE standard 1547 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associate Electric Power Systems Interfaces.

Expected Group Output:

- (1) Default settings for requirements specified in IEEE 1547
- (2) Investigate usage and concerns of various modes of operation for Grid Support
- (3) Create guidelines for Grid Support Functions
- (4) Create requirements for communications between Facility interface and EDC central monitoring system

Team

First Name	Last Name	Company	Affiliation
John	Bonazoli	Unitil	EDC Rep/Chair
Mrinmayee	Kale	New Leaf Energy	DER Rep/ Vice-Chair
Mauhammad	Khan	Eversource	EDC Rep
Paul	Krell	Unitil	EDC Rep
Nathan	Walsh	National Grid	EDC Rep
Mina	Moawad	Eversource	EDC alt rep
Ruvini	Kankanamalage	National Grid	EDC alt rep
Joseph	Debs	Eversource	EDC alt rep
David	Ferrante	Eversource	EDC alt rep
Devon	Marcaurele	Eversource	EDC alt rep
Jeremy	Kites	Unitil	EDC alt rep
Tony	Morreale	LIG Consultants	DER Rep
Mike	Wall	NexAmp	DER Rep
Brian	Lydic	IREC	Cust/Gov Rep
Brad	Marszalkowski	ISO-NE	ISO Rep
Aurora	Edington	DOER	Cust/Gov Rep

Summary of Major Accomplishments & Upcoming Activities

Completed Activities:	
5/9/2022	Finalized Requirements document
9/12/2022	Presenation of NY Grid Support functions
9/12/2022	Presenation of impact of Grid Support functions on Risk of Islanding
7/30/2022	Created scope/mission of communications task force
12/12/2022	Revised deadlines for Default Setting Document
1/15/2023	Finalized membership of Communications Task Force
Upcoming Activities:	
3/1/23	Format Scope of EDC Requirements for Grid Support Functions
TBD	EDC's to study concerns of Volt/VAR
TBD	Finalize Grid support requirements and settings

IEEE 1547 Sub-Group Update

#	Item	Relates to	Type	Resp. Person	Resp. Affiliation	Resp. Company	Due Date	Complete Date	Notes
1	Set up Communications Teams	Create communications requirments	Action	Bonazoli	EDC	Unitil	7/30/2022	7/30/2022	
2	Presentation on NY Grid functions	Research Grid Support functions	Decision	Kankanamalage	EDC	National Grid		9/12/2022	Con-Ed presented default advanced funtions adopted by NY Joint utilities
3	Presentation on Risk Of Islanding impact of inverter advanced functions	Research Grid Support functions	Decision	Kankanamalage	EDC	National Grid		9/12/2022	Study results show no indicatino that advanced inverter control functions have significant impact on island run-on times.
4	Finalize representation membershio of communicaitons task force	Create communications requirments	Decision	Bonazoli	EDC	Unitil		1/15/2023	
5	Formulate Communications Task Force Scope	Communications	Action	Task Force	Other		10/27/2022		Need to better define the scope and effort of the Communications task force
6	Format scope (questions) for EDC requirements	Research autonomous Grid Support functions	Decision	Kankanamalage	EDC	National Grid		2/1/2023	
7	Create guidleines for Grid Support Functions	Research autonomous Grid Support functions							

TSRG Area Networks SubGroup Update

Dan Mungovan

**The Massachusetts
Technical Standards
Review Group**



Area Networks Sub-Group Update

Mission Statement:

Identify system challenges for DG interconnections to area networks (per IEEE 1547 definition), which differ from radial systems. Identify amount of service territory served by area networks from each EDC to reference overall territory impact. Explore opportunities for alternative analyses and possibilities for increasing connection capabilities.

Expected Group Output:

Agreement on the requirements and means of analysis for connection of distributed generation to area networks. Elements that are common to all EDCs will be incorporated into the TSRG Common Guidelines, and will reference EDC standards for elements that are unique.

Following the outcome of this sub-group, system and project performance will be monitored, possibly requiring future adjustment.

Team			
First Name	Last Name	Company	Affiliation
Dan	Mungovan	Eversource	EDC
Mohamed	Shamog	National Grid	EDC
Tyler	Thibault	Eversource	EDC
Shakir	Iqbal	Eversource	EDC
Fritz	Octave	Eversource	EDC
Michael	Costa	Eversource	EDC
Jeremy	Kites	Unitil	EDC
Justin	Ulrich	Unitil	EDC
John	Bonazoli	Unitil	EDC
Nathan	Walsh	National Grid	EDC
Russ	Aney	Avid Solar	Industry
Jens	Foyer	Nexamp	Industry
Gerry	Bingham	DOER	DOER
Brian	Lydic	IREC	Gov/Cust

Milestone Summary	
Completed Activities:	
12/14/2022	Kick off meeting with SMEs
03/01/2022	Sub Group status report at TSRG quarterly meeting
06/29/2022	EDC members met with Consolidated Edison
09/2022-04/2023	Subgroup Pause
Upcoming Milestones & Activities:	

Area Networks Sub-Group

The sub-group meeting resumed on 04/19/2023.

- **Completed Items:**
 1. EDC provided a read out on their self assessment during the pause at sub-group meeting on 04/19/2023.
 2. Summary report of EDC meeting with Consolidated Edison shared with the sub-group on 04/18/2023.
 3. Data Request on EDC interconnected facilities to area networks provided on 04/18/2023.

- **On-going Discussion:**
 - The sub-group mission statement and expected sub-group output.

TSRG Expedited Process SubGroup Update

Quincy Vale

**The Massachusetts
Technical Standards
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Expedited Process Sub-Group

- Lead: Quincy Vale
- Members
 - 6 industry representatives
 - 3 EDC representatives (1 from each company)
 - Others welcome to join upon request
 - TSRG membership overall to be engaged via quarterly meeting updates
- Group focus
 - Consider technical characteristics of projects that may/may not allow the Expedited process
 - Consider electrical characteristics of the system that may drive study need
 - Consider technical criteria that may qualify a project to stay on the Expedited track
- First meeting
 - Day: Friday, June 23, 2023
 - Time: 10 AM to 11:30 AM ET (proposing 90 minutes)

TSRG Energy Storage SubGroup Update

Mike Porcaro

**The Massachusetts
Technical Standards
Review Group**



Energy Storage Sub-Group Update

Mission Statement:

Establish clear criteria surrounding ESS schedules & ramp rates. Consider customer impacts (negative and positive) to site operation, initial interconnection costs, market participation impacts, and long term revenue impacts. Consider technical impacts (negative and positive) to the safety, reliability, and long term system operation/maintenance.

Expected Group Output:

Agreement on ESS study & operation as it relates to ESS schedules & ramp rates. Elements that are common to all EDCs will be incorporated into the TSRG Common Guidelines, and will reference EDC standards for elements that are unique.

Following the outcome of this sub-group, project performance will be monitored, possibly requiring future adjustment.

Team

First Name	Last Name	Company	Affiliation
Michael	Porcaro	National Grid	EDC
Emily	Slack	National Grid	EDC
Gerhard	Walker	Eversource	EDC
Shakir	Iqbal	Eversource	EDC
Justin	Ulrich	Unitil	EDC
John	Bonazoli	Unitil	EDC
Kavita	Ravi	Blue Wave	Industry
Mrinmayee	Kale	Borrego	Industry
Greg	Hunt	Zero Point	Industry
Amit	Barnir	Kearsarge	Industry
Matt	Parlon	Ameresco	Industry
Gerry	Bingham	DOER	DOER
Brian	Lydic	IREC	Gov/Cust
Pierre	Journal	Engie	Industry
Jeff	Long	Engie	Industry

Summary of Major Accomplishments & Upcoming Activities

Completed Activities:

12/7/2021	Kick off meeting with SMEs
3/24/2022	Sub Group status report at TSRG quarterly meeting
5/5/2022	EDC examples/explanation of challenges with capacity reservation for ESS & impacts to daily system control/operation & planning efforts
6/2/2022	ESS study process proposed by EDCs to the group
8/4/2022	Final coordination and agreement on ESS study process
12/22/2022	Common Guideline updated to reflect ESS study process
3/7/2023	Exploring new technology solutions (ARI, PCS/PPC)
4/13/2023	Reviewed Eversource ESS schedule approach

Upcoming Activities:

	Discuss behind-the-meter applications and technical assessment
	Further discussions on dynamic grid controls (ARI, PCS/PPC)

NEXT MEETING 6/20 1PM-3PM

TSRG System Impact Study SubGroup Update

Michael Porcaro

**The Massachusetts
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System Impact Study Sub-Group Update

Mission Statement:

Review the technical analyses, tools and procedures associated with SIS. Focus on optimization, automation, and efficiency, using existing utility standards, to reduce cost and timing of SIS. Consider utility standards as they relate to evaluation processes in the study as they drive SIS tasks. Consider alternative evaluations/considerations to still maintain safety/reliability.

Expected Group Output:

Agreement on efficiencies that can be realized to reduce SIS cost and/or time, while still maintaining the safety/reliability of the grid and not challenging any requirements of the DG tariff (MDPU 1468).

Specific details of future state such as that of the ESMP, flexible interconnections, or other constructs that are not yet part of standard utility offerings for all customers are out of scope for the group.

Team		
First Name	Last Name	Company
Courtney	Feeley Karp	Klavens Law Group, P.C.
Brian	Lydic	IREC
Gerry	Bingham	DOER
Claire	Loe	Blue Wave Solar
Doug	Pope	Pope Energy
Greg	Hunt	ZPE Energy
Kavita	Ravi	Blue Wave Solar
Nachum	Saadon	Grid Edge Technology
Nigam	Trivedi	Blue Wave Solar
Richard	Labrecque	Agilias
Russ	Aney	Parallel Products
Ryan	McGlothlin	Silo Electric
Daniel	Dabkowski	Eversource
David	Laplante	National Grid
Emily	Slack	National Grid
Jennifer	Chalifoux	National Grid
Nathan	Walsh	National Grid
Samer	Arafa	National Grid
Shakir	Iqbal	Eversource
Quinn	Perry	Control Point

Milestone Summary

Completed Activities:

5/25/2023	Kick off meeting with SMEs

Upcoming Milestones & Activities:

	Review specific tasks of each EDC in SIS
	Review benchmarking of efficiencies realized by other utilities/jurisdictions

Updates

**The Massachusetts
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Group Study Update – National Grid

Disclaimer: Information provided solely intended as an aid to discussions at the TSRG and should not be used for any other purposes and is subject to change. Nothing contained in this presentation shall constitute legal or business advice or counsel.

Estimations

- **Distribution**
 - BD as listed in tariff, barring any group member driven holds
- **Transmission**
 - Model validation: 2-6 months
 - Level 3 ASO study: 6-9 months

CIP Locations

Territory	Group Study ID	Applications		CIP Docket Number
		Qty of Applications	MW	
West	Barre-Athol 001	10	40.98	DPU docket 23-09, filed Jan 2023
West	Gardner-Winchendon 001	8	46.36	DPU docket 23-06, filed Jan 2023
West	MPL-East 001	9	34.79	DPU docket 22-170, filed Dec 2022
West	Shutesbury 001	5	19.99	DPU docket 22-61, filed May 2022
West	Spencer-Rutland 001	12	61.71	DPU docket 23-12, filed Jan 2023

Territory	Group Study ID	Group Study Status	Application		Group Study Start Date	ASO Hold Start Date	PSCAD Model Approval Complete	ASO Study Name	ASO Study Start Date	ASO RC Approval	Group Study Delivery	Critical Path Item	Estimated date for critical path item completion
			Qty	MW									
West	Sample Study 1	ASO Hold	3	23	12/12/2022	2/3/2023	N					PSCAD Model Approval	Aug 2023
West	Sample Study 2	160BD Study	4	45	1/1/2023		N					PSCAD Model Approval	Jun 2023
West	Sample Study 3	160BD Study	5	30	5/5/2022	9/1/2022	Y	ASO Study 001-a	12/1/2022			RC Approval	Sept 2023
West	Sample Study 4	ASO Hold	3	30	8/1/2022	11/5/2022	Y	ASO Study 001-b				Preceding ASO Study Approval	
Southeast	Sample Study 5	125BD Study	3	28	8/1/2022	10/5/2022	Y	ASO Study 002	11/1/2022	5/15/23		Finalize D Study	Aug 2023
Southeast	Sample Study 6	125BD Study	3	28	8/1/2022	10/5/2022	Y	ASO Study 002	11/1/2022	5/15/23		Group Time Extension Request	Jul 2023

EDC Technical Standards

- As needed, EDC technical standards may be updated
- Below is general discussion for awareness of major elements that may have been changed/amended/added within the last 12 months

Eversource (April 27, 2023)

- Added section 1.6 DER SCADA Visibility & Control Requirements and 1.7 Interconnection Requirements based on Site Conditions

National Grid (January 1, 2023)

- Section 4.0: UL1741-SB inverters will be required for all projects starting 10/1/23
- Section 7.3.2.1(5): Offers new interconnection transformer arrangement with the new UL1741SB inverters. If the inverter is tested and certified to the optional GFOV test, supplemental grounding can be avoided.
- Section 7.6.12.4: Guidance for submission of required docs and data related to anti-islanding screen for UL1741SB inverters. To be reflected in upcoming ESB issuance

Unitil (May 1, 2000)

- No Update

Electric Sector Modernization Plan (ESMP)

Building a Smarter, Stronger, Cleaner
Energy Future

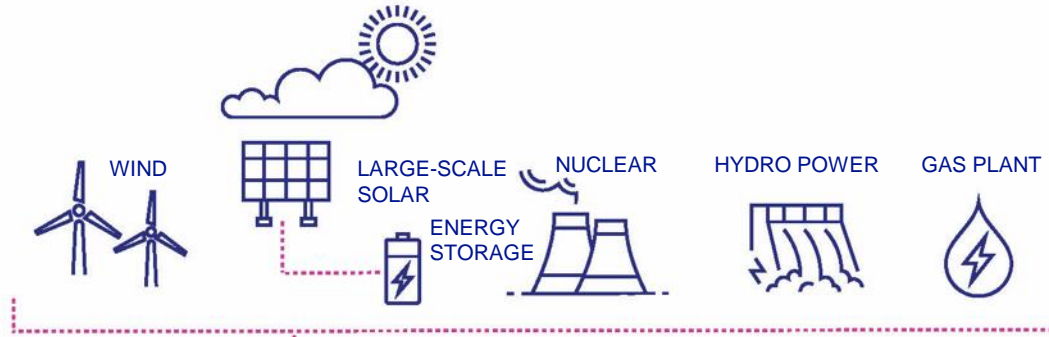
Where We Are, Where We're Headed

- **We're On Our Way.** Achieving the Commonwealth's climate and clean power targets is an ongoing success story that's already under way... and there is much more to do.
- **Upgrades Ahead.** It will require an electric network buildout and upgrade at a significant pace and scale, in collaboration with policymakers, customers and communities.
- **Future Forward.** It will require that we transform our capabilities and create a network that's fundamentally smarter, stronger and cleaner than today's system. This future network must:
 - deliver necessary emission reductions
 - enable deployment of new, electrified end-use technologies and clean resources
 - and provide a more individualized, seamless and improved experience for all customers

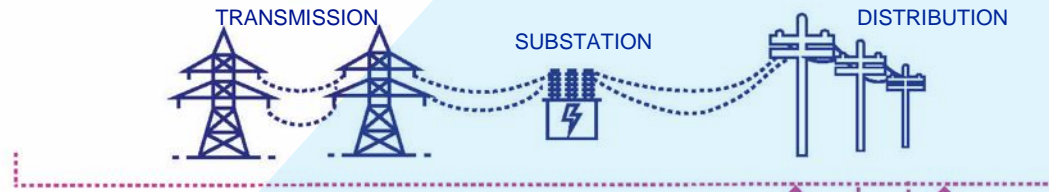


Modernizing Our Energy Systems

Generation



Transmission



Distribution



Key Drivers to Achieving Net Zero by 2050



Expanding Energy Efficiency

Ensure customers are taking advantage of Energy Efficiency Programs and align programs to meet evolving customer needs



Advancing Smart Electrification

Drive electrification of transport and heat, coupled with smart technologies to optimize potential



Integrating Renewables and Storage at All Levels

Maximize and optimize clean resources and their value

The Commonwealth Is Taking Action Today

Through legislation and regulation, the Commonwealth has:

- Established emissions reduction and clean energy technology targets
- Enabled utilities to take steps to modernize the grid and deploy automated metering infrastructure
- Advanced electric vehicle charging
- Supported deployment of distributed solar, energy storage and advanced offshore wind through targets and programs
- Increased the efficiency of homes and buildings, heat pump adoption and building electrification through codes, standards and programs

Utilities are implementing these policies and plans, and those being driven by the federal government and the ISO-NE and are working to align investments accordingly.



What is the ESMP?



In conjunction with the other utilities, each Investor Owner electric utility is required develop an electric-sector modernization plan (ESMP) to proactively upgrade the distribution and, where applicable, transmission systems to meet the Commonwealth's climate goals



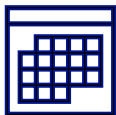
Prepare and use three planning horizons - 1) a 5-year forecast, 2) 10-year forecast and 3) a demand assessment through 2050



Establishes a Grid Modernization Advisory Council (GMAC), who will review the plans and provide advice and guidance to the utilities and the DPU. Its remit is “to encourage least-cost investments in the electric distribution systems, alternatives to the investments or alternative approaches to financing investments that will facilitate the achievement of the statewide greenhouse gas emission limits.”



Submit the first plan for review, input and recommendations to the GMAC by September 1, 2023.



The company files the plan with the department by end of January, 2024, and the department shall approve, approve with modifications or reject the plan within 7 months of submittal.

Our Plan must:

- i. improve grid reliability, communications and resiliency;
- ii. enable increased, timely adoption of renewable energy and distributed energy resources;
- iii. promote energy storage and electrification technologies necessary to decarbonize the environment and economy;
- iv. prepare for future climate-driven impacts on the transmission and distribution systems;
- v. accommodate increased transportation electrification, increased building electrification and other potential future demands on distribution and, where applicable, transmission systems; and
- vi. minimize or mitigate impacts on the ratepayers of the commonwealth.

The Electric Sector Modernization Plan:

Addressing Challenges, Delivering Solutions

Challenge

- Balance grid investment needs
- Align outcomes, customer benefits and impacts
- Fairly allocate costs and ensure needed investments are being made at pace and scale to meet demand and enable clean energy deployment



Solutions

- ✓ **Clear, efficient plan** for where and when investments occur
- ✓ **Transparent** outline of costs and benefits
- ✓ **Balanced approach** to investment and **affordability** for customers

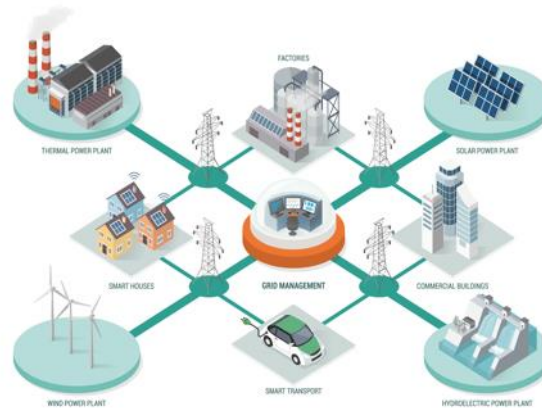
Building a Smarter, Stronger, Cleaner Grid Means



A Ready, Robust and Secure Network

Ensures the network is one step ahead of developer needs and customer adoption

Reinforces the network and leverages technology to drive reliability and resilience



A Flexible and Dynamic Energy System

Leverages distributed resources to meet need, solve grid problems and provide grid resiliency



Customer Empowerment and Action

Provides customers with information and enables options so they can pursue the best solutions for them and the environment

Additional Policy Actions Needed to Deliver Outcomes



Accelerate investment to modernize and optimize the electric network to connect renewables, enable electrification, and build resilience to a changing climate



Expand energy efficiency strategies and programs to increase customer adoption and help decarbonize all homes and businesses



Implement new policies to help decarbonize heat for buildings and industry and help enable innovative clean energy options



Ensure families and businesses can afford their energy bills and easily access energy savings and assistance programs



Train our local workforces to secure jobs in the clean energy economy; provide opportunities to diverse businesses and help secure a home-grown supply chain

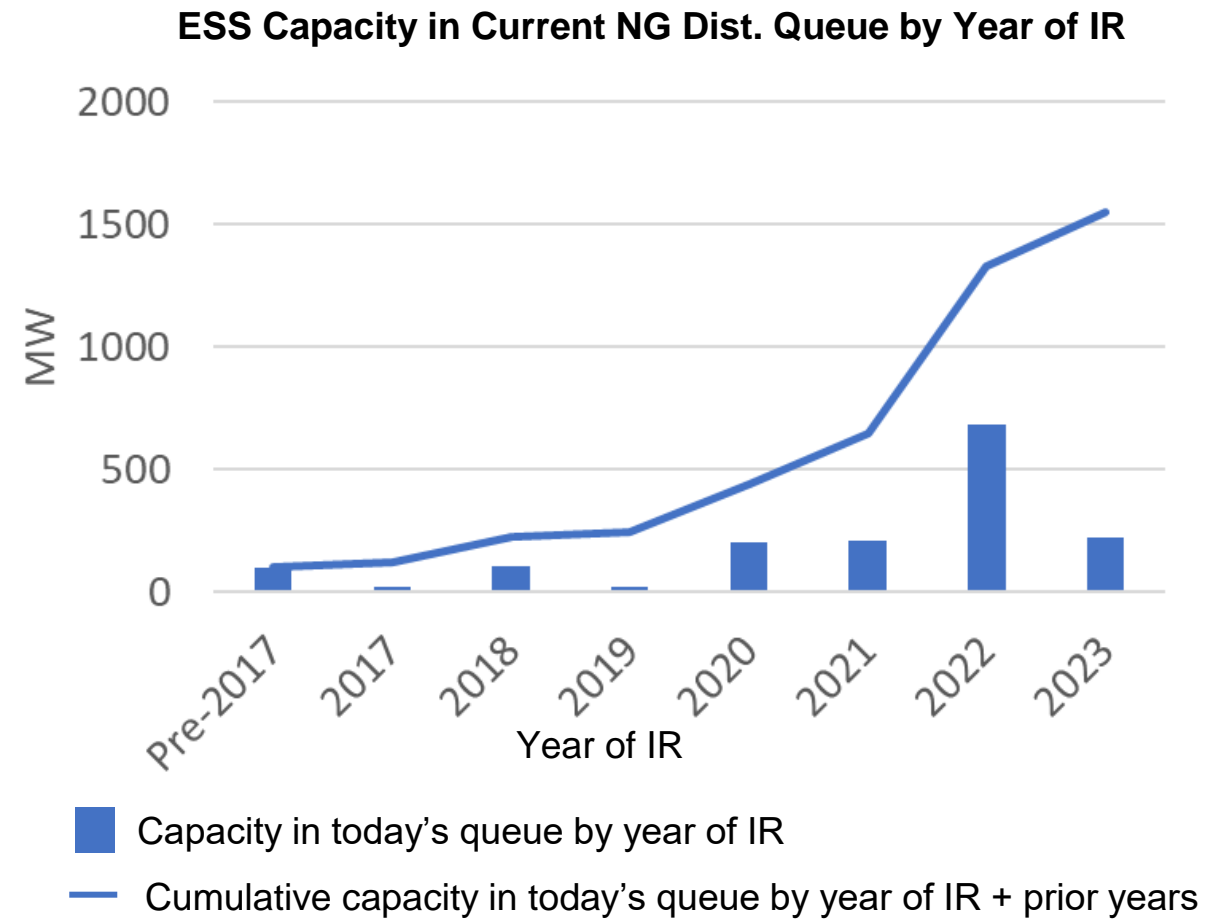
Wholesale Distribution Tariff Working Group Update

**The Massachusetts
Technical Standards
Review Group**



ESS in National Grid Distribution Queue

- There is 1,550 MW of storage capacity in National Grid's current distribution queue.
- National Grid is in the process of developing tariffs with rates and operational parameters for distribution-connected ESS.



ESS Wholesale Distribution Access Tariff (WDAT) Development

- National Grid is developing a new FERC rate tariff with delivery rates for standalone energy storage system (ESS) charging.
 - Tariff will apply to ESS purchasing energy via National Grid's distribution system for resale in wholesale markets. Tariff will cover rates for load (i.e. charging), not export.
 - Rates will be based on National Grid's MA cost-of-service developed for the upcoming rate case and review of FERC accounts.
- We anticipate the rate will include 3 components:
 1. A customer charge
 2. A connection-level charge capturing local system costs
 3. An on-peak demand charge capturing shared system costs
 - On-peak rates will be shaped based on a review of programmatic periods (e.g., CPS charging windows) versus system peaks and peaks of other rate classes.
 - We have been providing periodic updates and opportunities for feedback to a group of ESS industry stakeholders.
 - We anticipate filing a rate at FERC by the end of this year.

MA State ESS Rate and Operational Parameters Tariff

- National Grid is also in the process of developing a state ESS tariff, to be filed with DPU by October 31, 2023 (statutory deadline).
 - 2022 legislation (H5060) directed utilities to file “at least 1 electric rate tariff which addresses operational parameters, to apply to energy storage systems interconnected to the distribution network.”
- **We anticipate the tariff will include:**
 - **Operating parameters applicable to all distribution-connected ESS (wholesale and non-wholesale).**
 - **T&Cs to integrate current scheduling and curtailment choices into a tariff.**
 - **Rates for non-wholesale charging (i.e., charging not eligible for FERC tariff). We anticipate these rates will use a similar structure and cost basis as the FERC tariff.**
 - **Process improvements for distribution-level ESS connections.**

Eversource - MA Interconnection Automation

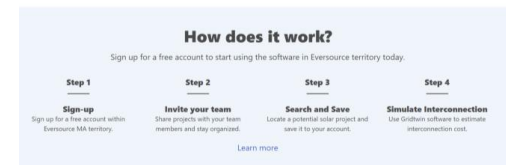
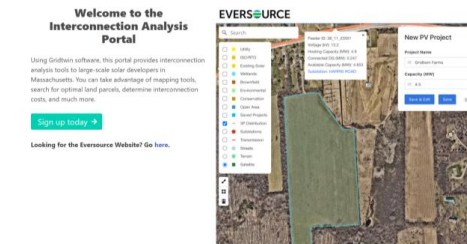
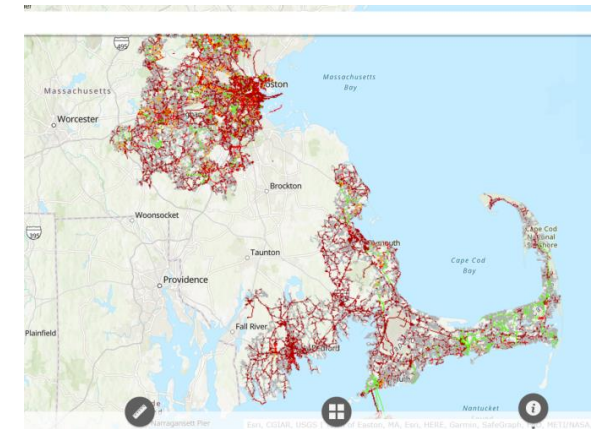
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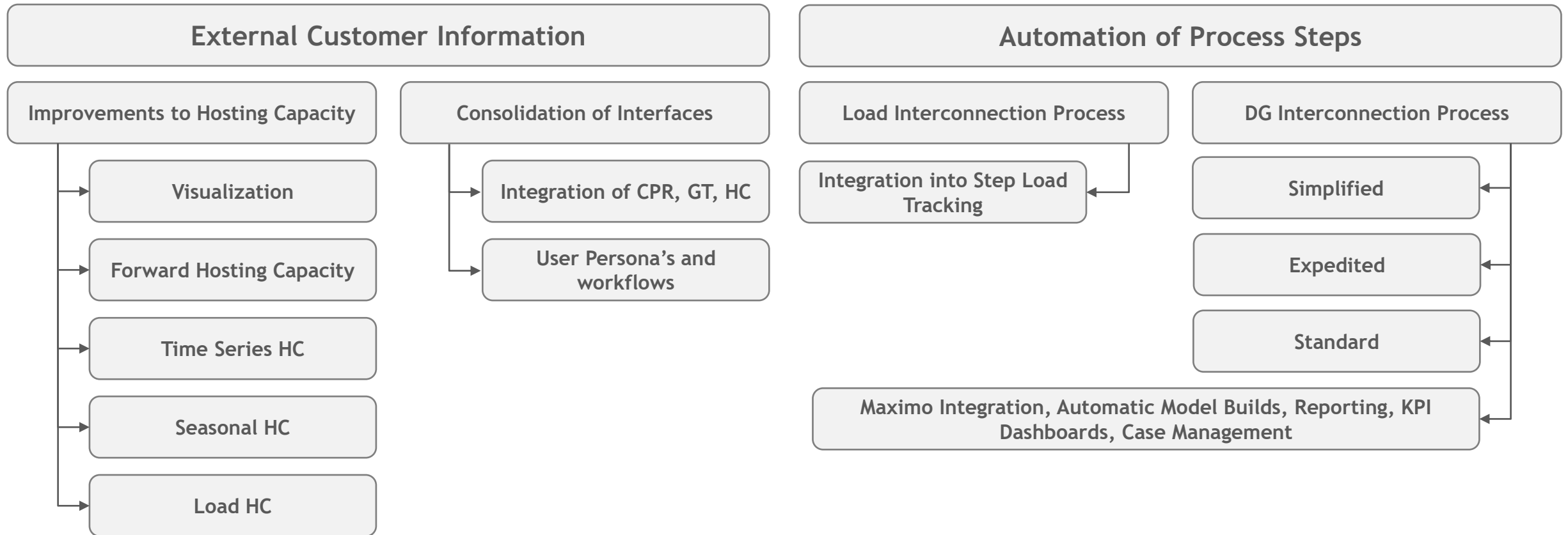
Interconnection Automation – Overview

Challenges

- The Company currently provides four (4) different tools/websites for developers to use and guide them through their interconnection process
- Workload of DG interconnections is up more than 200% in CT and NH with MA being slammed as is.
- Developers and regulators are demanding “dynamic” interconnection of resources
- Hosting Capacity data does not show future HC nor can it be used to evaluate storage or load interconnections
- Developers of battery storage asking for time series
- Promises made to the DPU

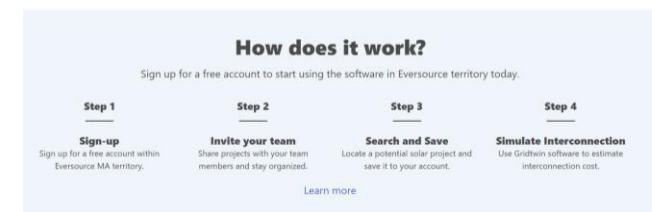
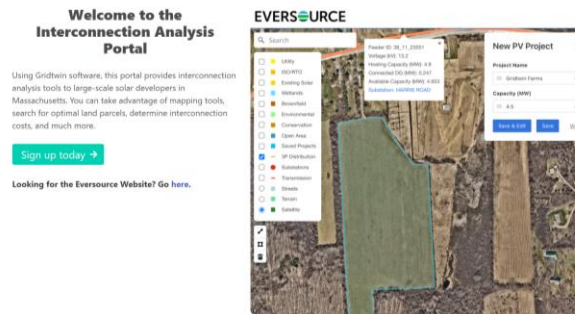
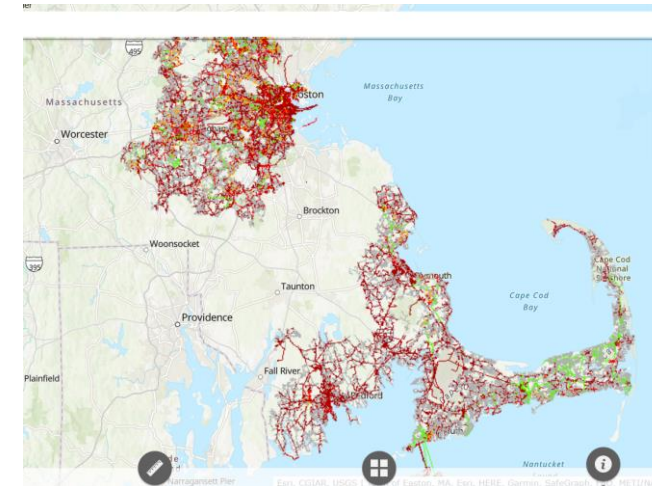


Key Work Areas



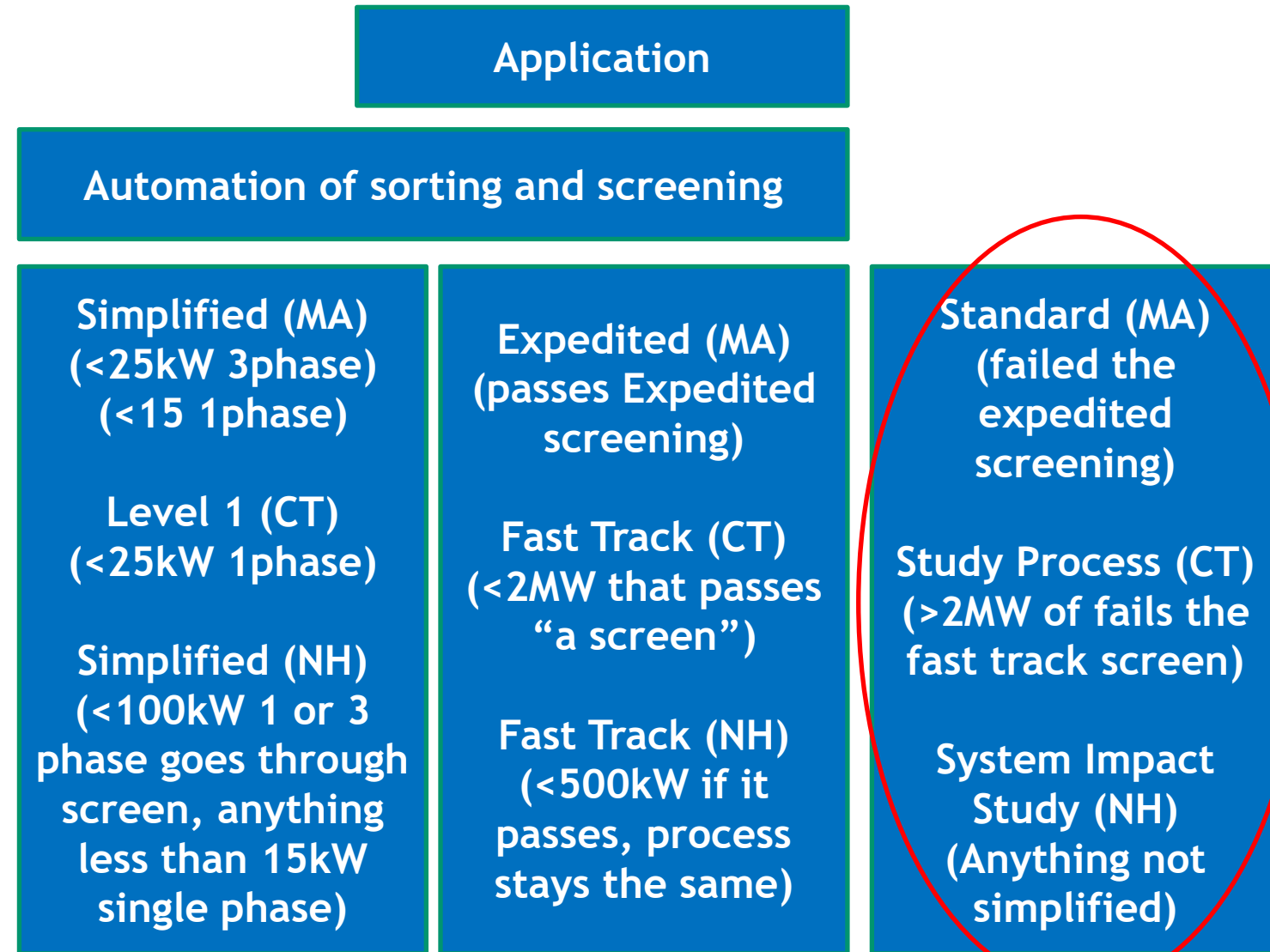
External Interface Consolidation - Key requirements and Objectives

- Primary navigation shall happen on a map-based interface
- Map shall provide the user a variety of different layers
- Simulation Mode with User accounts
- Application process accessible from maps
- Updated visualization of data and reporting
- Integration between existing applications and data



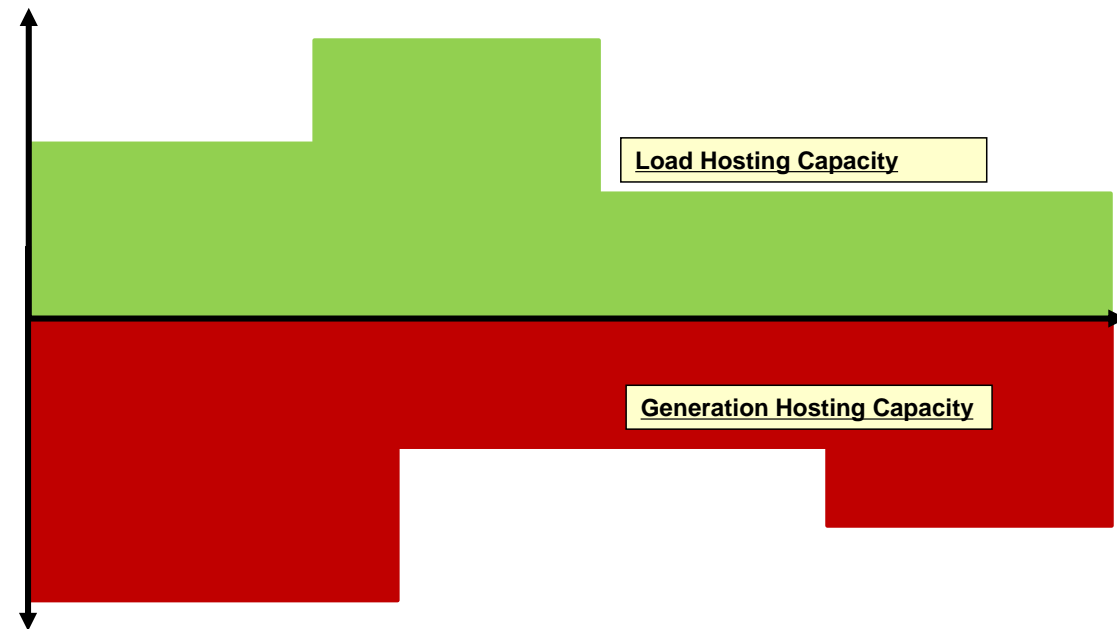
Automatic Interconnection - Key requirements and Objectives

- Automation can be applied to DER that are BTM and <1 MW
- Automation should consider project with a valid queue. Queue must be tracked in Power clerks
- Validation of application data is complete
- Customer notification of agreement and study agreement
- Canned messages that go to the customer



Hosting Capacity (HC) - Key requirements and Objectives

- Load and DG HC
- Seasonal HC
- Time Series HC
- Forward HC
- Visualization of HC
- Data cleanup



Concept of Time Series, Load and Generation Hosting Capacity

Closing

- **Next meetings**
 - Mar 15, 2023
 - Jun 8, 2023
- **Please send any topic requests for future meetings to Chair and/or Vice Chair**
 - Michael.Porcaro@nationalgrid.com
 - mkale@newleafenergy.com