

Massachusetts Technical Standards Review Group

Quarterly Meeting

March 24, 2022

**The Massachusetts
Technical Standards
Review Group**



Agenda

- 1:00-1:10 Opening Comments**

- 1:10-2:10 Sub-Committee Updates (15 min each)**
 - 1. IEEE 1547 Group
 - 2. ESS Ramp Rates & Schedules Group
 - 3. Dynamic Modeling Group
 - 4. Area Networks Group

- 2:10-2:25 Break**

- 2:25-3:00 Old Business – Open Items from Previous Meeting**
 - 1. Asset (conductors & equipment) rating – as it relates to incorporation of dispatchable ESS

- 3:00-3:45 New Business – New Items Not Previously Discussed**
 - 1. Volume expectations
 - 2. Membership list confirmation
 - 3. Significant vs Moderate change definition; inclusion to Common Guideline
 - 4. Joint Utility Working Group

- 3:45-4:00 Close Out**
 - 1. Call out the next scheduled quarterly meeting date
 - a. June 16
 - b. Sept 22
 - c. Dec 1
 - 2. Send topics for future meetings to Mike or MK
 - 3. Final comments

TSRG Energy Storage SubGroup Update

**The Massachusetts
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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.

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.

Current Status:

- Industry request for data in order to define ESS site design/operation; requesting data on different operating scenarios:
(1) Unscheduled, Unconstrained (2) Unscheduled, Constrained (3) Scheduled, Unconstrained (4) Scheduled, Constrained
- Discussing distribution system challenges relative to Control Center operations and future system planning

Looking Forward:

- EDCs providing further detail on Control Center operations and planning expectations, to frame potential impacts
- Discuss path forward if providing multiple scenarios as noted above, discussing positive & negative impacts to:
 - DG process – study timing, down-queue impacts, etc.
 - Long term planning – capacity reservation impacts to future system planning, electrification, etc.
 - Reliability – Control Center impacts for system management, switching, emergency scenarios, etc.

TSRG 1547 Update

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MA-IEEE 1547 Implementation Roadmap

MA-TSRG Subgroup

Adoption Roadmap

Start Dates are when the investigation starts
 End Dates are target Implementation Dates
 All dates are subject to change

Phase 1
 Q2'20 – Q1' 22

Phase 2
 Q4'20 – Q1'23

Phase 3
 Q4'20 – Q1'24

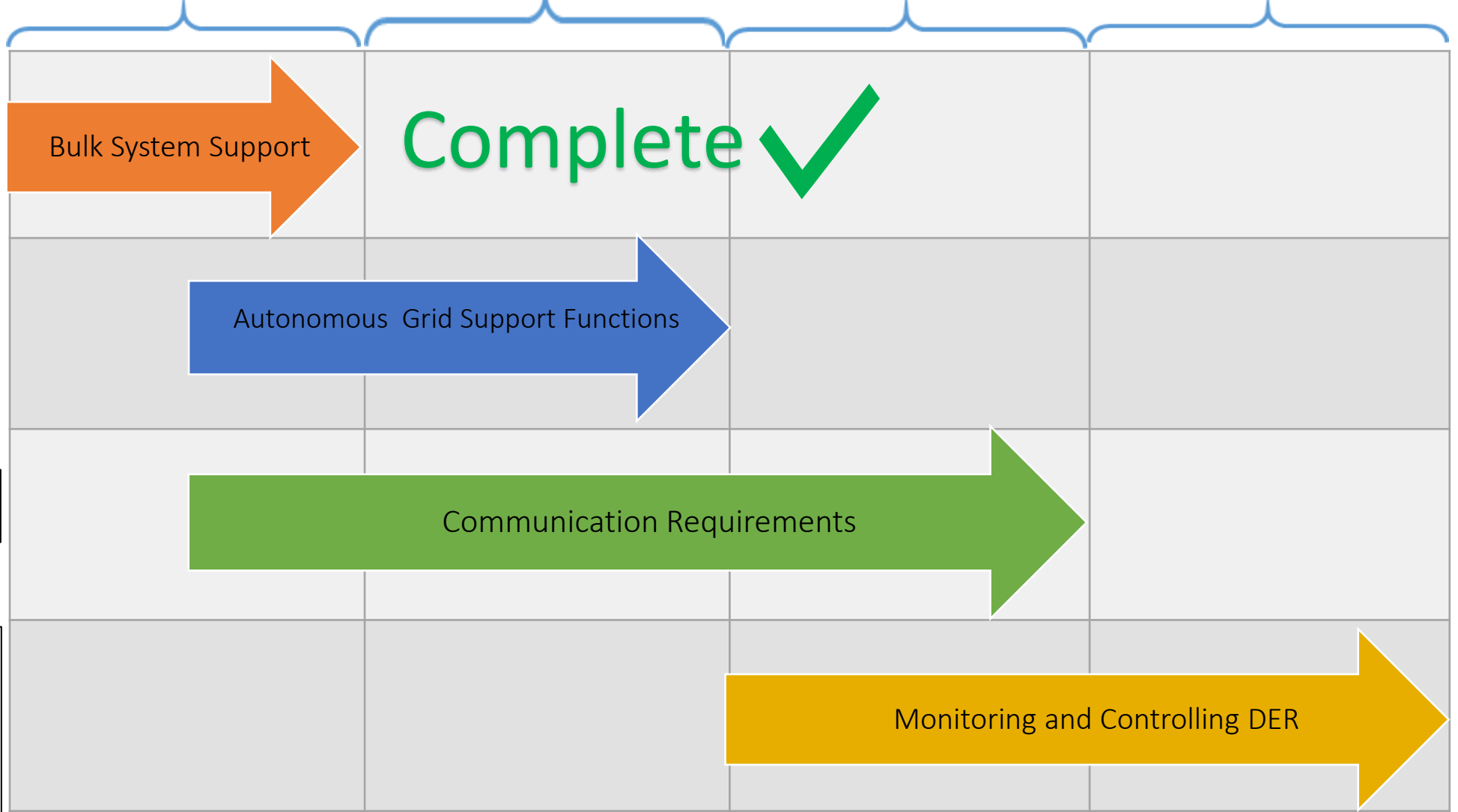
Phase 4
 Q1'23 – Q2'26

Anti-Islanding
 Frequency-Watt
 Low/High Frequency
 Mandatory Trip (Ride-Through)
 Low/High Voltage Mandatory
 Trip (Ride-through)
 Reconnect on Restoration
 Ramping after setting

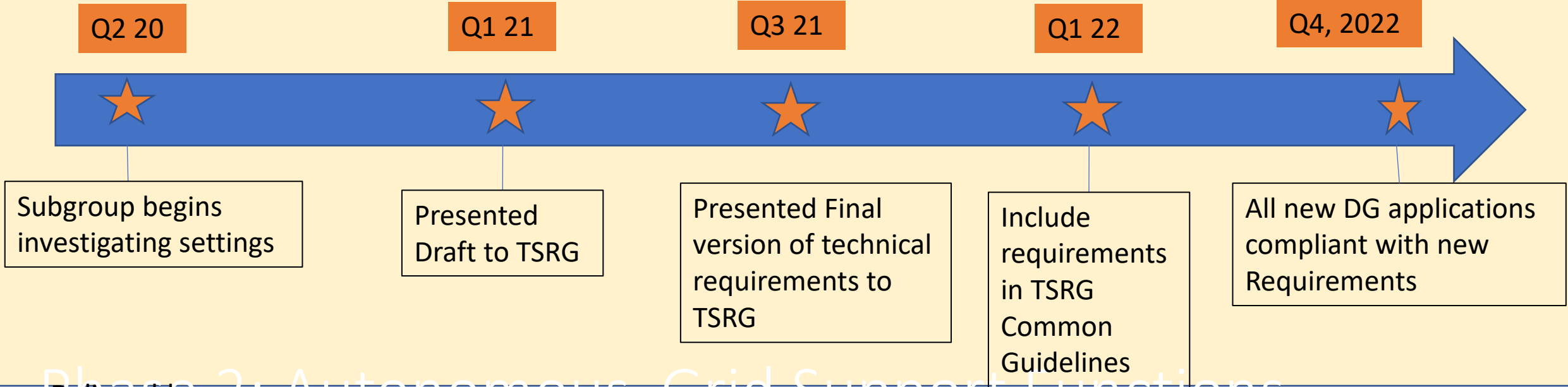
Fixed Power Factor
 Volt-Watt
 Volt-VAR

Communication Requirements
 for DER in MA

Limit Maximum Power Active
 Mode
 Set Active Power Mode
 Scheduling Power Value & Modes
 DER Disconnect and Re-Connect
 Dynamic Reactive Current Support



Phase 1 Bulk System Support



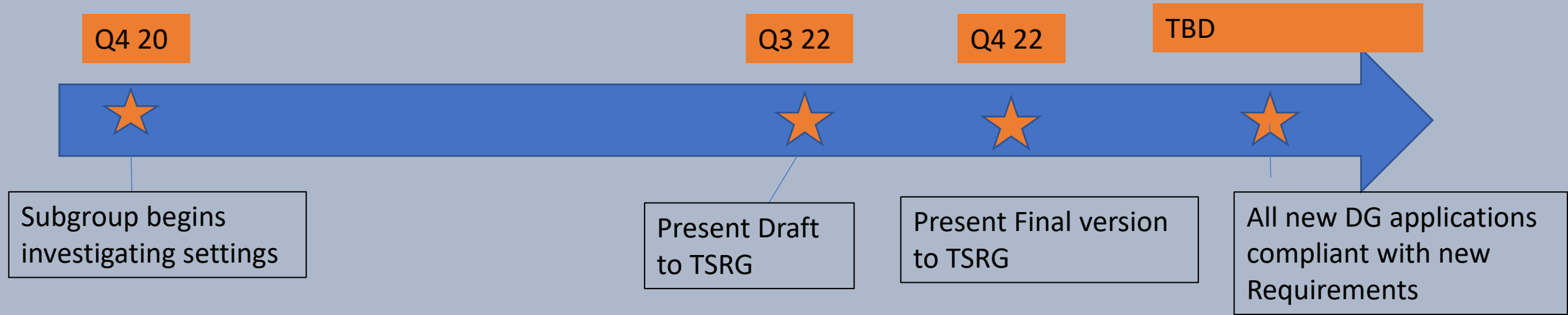
Deliverables:

https://drive.google.com/file/d/10iB8_x91g_J1PEsZiOugn2JwkK8HSSRh/view

Challenges:

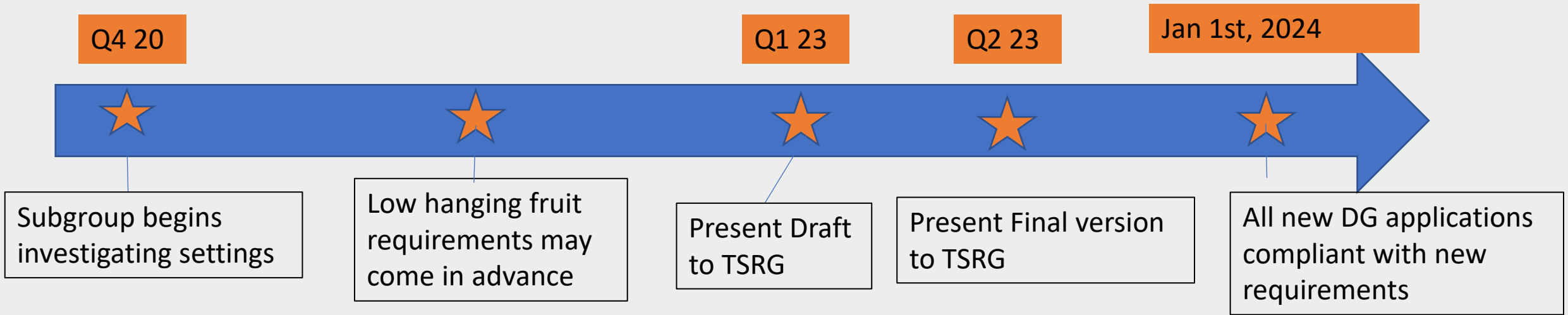
- The Inverter manufacturing community represented through FIGII believes it will take more than 1 year for 80% of inverter models to be certified to IEEE 1547.
- This is concerning from a Bulk System level prospective.
- Bradley Marszalkowski, from NE-ISO has begun investigating alternatives.

Phase 2: Autonomous Grid Support Functions

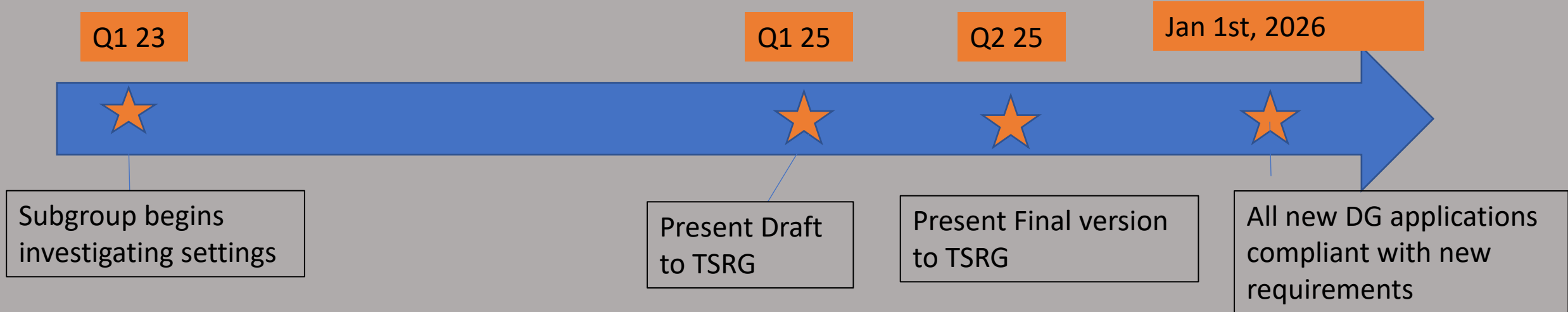


- We are in the part 1 of this Phase, “Let’s not reinvent the Wheel” the objective is to identify best practices and follow them when and where possible.
- Part 2, will focus on solving questions that have not been addressed.

Phase 3: Communication Requirements



Phase 4: Monitoring and Controlling DER



TSRG Dynamic Modeling

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Dynamic Modeling Group

Sub-Committee Updates

Presenter: Amir Mosaddegh

March 24, 2022

Outline

Dynamic Modeling Subgroup made 4 sessions during the past quarterly meeting, with the below major RAID (Risk/Action/Issue/Decision) log items to discuss:

- Establish the subgroup mission statement, meeting schedule, and milestones
- Confirm Group members and guest participants
- Involve industry manufacturers
- Customer process for obtaining models
- Minimum list of needs from manufacturer to begin analysis
- EDC elaboration on study components and Model validation
- defining study need/prompt
- Standardize documentation requirements
- ISO requirements document

Complete

On Track

To be Discussed

Establish the subgroup mission statement, meeting schedule, and milestones

Subgroup mission statement

- Work with inverter manufacturers & commercially available modeling software developers to develop inverter models
- No steady state modeling
- Transmission systems/analysis as a secondary focus
- The output will be agreed upon best practice for dynamic modeling of DG connection to the EPS
- Elements common to all EDCs will be incorporated into the TSRG Common Guidelines

Meeting schedule

- Every Month

Major Milestones

- Assemble subject matter expert and group member opinion
- Current-State processes Analyzed – Identify areas of concerns
- Potential solutions identified with benefits analysis
- Potential commonalities and necessary difference identification
- Incorporate to common Guideline and EDC technical standards

Confirm Group members and guest participants

- Members are a combination of EDCs' reps, Industry reps, and State reps
- Guests were invited/are going to be invited as needed.

Involve Industry Manufactures

- Their challenges in creating customized models, limitations, etc.

Customer process for obtaining models

- Discussed the process of obtaining models and affirmed the need for abiding to a PSCAD model checklist before model submission to the EDCs.
 - Outcome: Developing Checklist to be shared with TSRG Group upon completion.

Is this the correct inverter model, manufacturer, model version as stated in the one-line diagram?		Developer to confirm before submission.
Does the PSCAD inverter model contain all necessary libraries?	Please clarify what the necessary libraries are.	
Does the PSCAD model match the GSU, grounding configuration etc. until the PCC with the one-line diagram?	Our impression is that the PSCAD analysis does not require GSU / grounding configuration. If it does, could you please explain in what circumstance it is needed? Additionally, could you give us a demonstration of a PSCAD file where there is a GSU and grounding configuration included?	
Does the PSCAD model package contain necessary user manual with instructions?	What contents do EDCs need included in the user manual?	When developers ask for PSCAD files, they should confirm that there is a user manual included.
Does the model have an SPOV function? What is the default SPOV setpoint? •What are the possible ranges of SPOV setpoints that the inverter is capable of? •Does the model package have instructions on how to enable and disable the SPOV setpoints? •Does the model package have instructions on how to change the SPOV setpoints for mitigation purposes?	In our understanding, the Figure 3 TOV curve in IEEE 1547-2018 Section 7.4 seems to be a curve which we expect inverter manufacturers to conform to. What setpoints are you referring to relevant to this curve?	
Does the model implement the required OV/UV/OF/UF ISO_NE settings?		Developers to confirm with manufacturer.
Does the model work at 60 Hz?		Developers to confirm with manufacturer when requesting PSCAD.
Does the model turn off within 2 seconds after modeling a loss of source?	Is this covered by active anti-islanding detection?	Developers to confirm that PSCAD is equipped with anti-islanding protections.
Does the model have anti-islanding module implemented for Risk of Islanding testing?		
Does the PSCAD inverter model have the following options? •1 Does the model have a way to scale output? •2 Does the model have the reactive power functions required by IEEE 1547-2018, including constant power factor mode, constant reactive power mode, voltage-reactive power mode, and active power-reactive power modes •3 Does the inverter model have the capability to change the real/reactive power output?	Is scaling output a way to avoid using multiple PSCAD models (e.g. modeling multiple string inverters together as one)? Points 2 and 3 seem interrelated.	

Model Validation

- Identified components needed of inverter models to begin the study (Checklist)

EDC Elaboration on study components and model validation

- Identified topics to be studied as part of dynamic analysis (LROV, GFOV, and ROI)
- Identified issues are being seen with models

Defining study need/prompt

- What dictates that a study required (TOV and ROI screening/threshold definition)

Standardize documentation requirements (to be discussed)

- Derating letters
- Coordinate on a standardized letter/format for initial application
- Project agnostics

ISO requirement document (to be discussed)

- Explore opportunities to standardize ISO requirements with EDC requirements

Questions

Break
Resuming at 2:20

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Significant vs Moderate Change

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Project Changes

Background:

As part of the interconnection process, customers may request to make changes to their designs at any time. In accordance with the tariff these changes are to be assessed by the EDC to determine whether the change is Significant or Moderate. The following defines these terms and the associated impacts to the DG application.

Significant Change: A change is considered Significant if it meets the EITHER of following criteria

- Customer Impact: Results of studying the change may have an adverse impact to other customers in queue. Examples of effects to others in queue include, but are not limited to, reducing electrical capacity availability, causing the need for new cost obligations, causing delay to either study or construction timelines, etc.

OR

- Engineering Impact: The change modifies the fundamental design intent of the original application to such an extent that majority of the engineering analyses of the original SIS must be re-performed (ex. load flow, protective device analyses, substation assessment, etc).

Significant changes will require a new application.

Moderate Change: A change is considered Moderate if it meets BOTH of the following criteria:

- Customer Impact: The change has no possibility of impact to other customers. Either confirmed through the fact that no other applications are after the subject project in queue or confirmed by engineering review of the proposed change.

AND

- Engineering Impact: The change modifies the original application requiring performance of engineering analyses of the original SIS to be re-performed (ex. load flow, protective device analyses, substation assessment, etc).

Moderate changes will require additional study time and may require additional funds to be collected.

Above based on National Grid Change Process, which can be found [HERE](#)

Next step – Coordinate into TSRG Common Guideline

Joint Utility Group

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Introduction of MA Joint Utility Group to TSRG

Prepared by:
National Grid
Eversource
Until

March 24th.

Agenda

- The Vision
- The Values
- The Governance Structure
- Collaboration with TSRG and Other Stakeholders
- The Planned Subjects and Topics for discussion in 2022

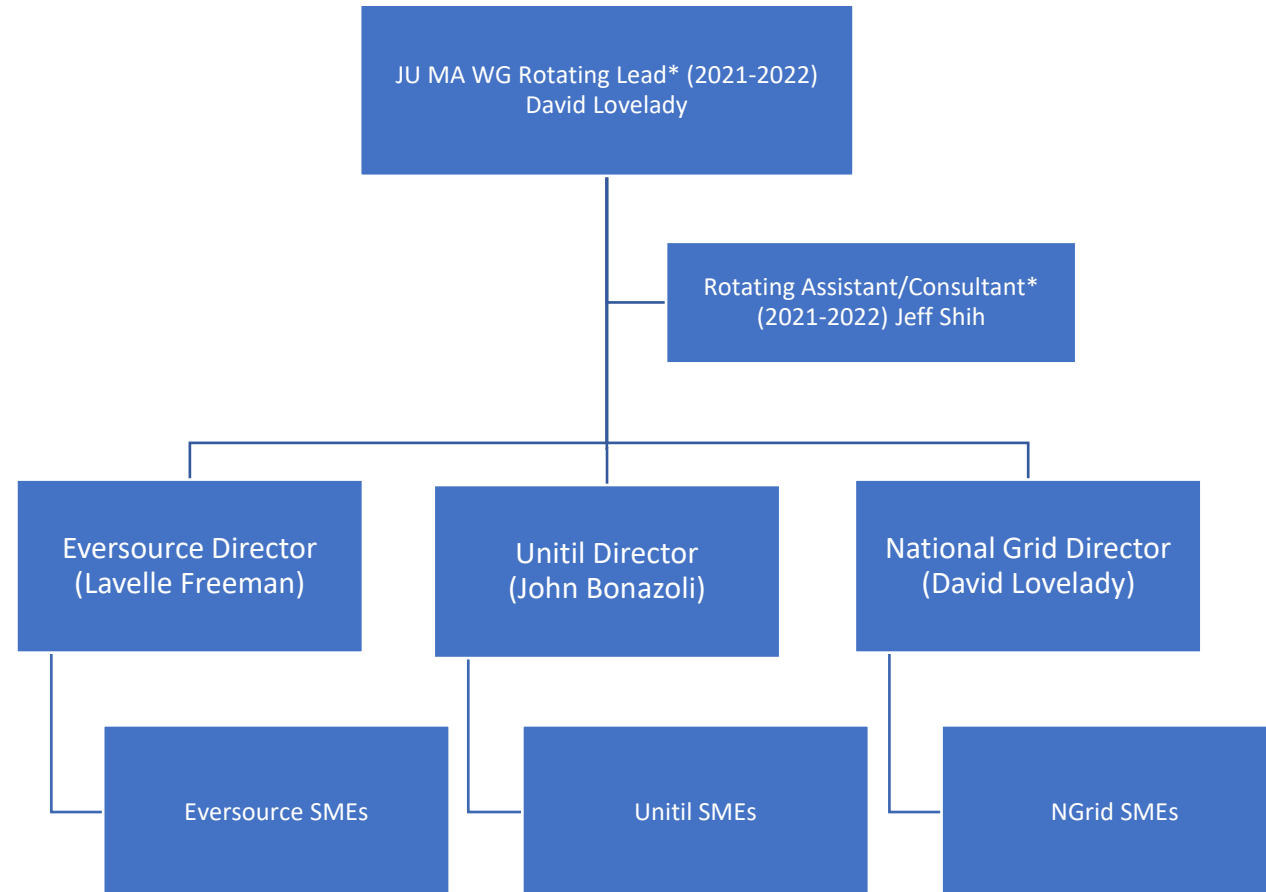
Vision

- Closer **strategic collaboration** between **National Grid, Eversource and Until**
- Coordinate and drive efforts within **monthly ad hoc planning and operations EDC-only meetings**
- Drive **engagement with TSRG with one unified Joint Utility voice**
- **Collaborate with external stakeholders** (e.g. developers) on a frequent basis to achieve a better understanding of shared needs and objectives, with an **emphasis on DG & Storage interconnections** to advance state clean energy goals.
- Drive **more proactive positions with DPU and ISO-NE**
- Acknowledge **each utility is its own company and as such can differ on certain subjects, if necessary**, i.e., different grid structures will drive different needs
- **Focus mostly on DER related issue at the distribution level** and will connect/coordinate with entities such as other WGs or ISO-NE on Transmission issues as needed.

Value

- Ensuring efficiency, consistency, and affordability from joint decisions/filings for all stakeholders
- Ensure consistent planning and operational practices when practical and possible
- Prioritization of topics to tackle based on the commonality of needs across all stakeholders
- Gain greater insights from the other utility peers, share lessons learned and best practices

Governance Structure



***Lead Director and assistant rotated between each utility on 2 yearly cycle**

Collaboration with TSRG and Other Stakeholders

TSRG

- Work with TSRG to incorporate their inputs on critical DG interconnection standard into JU's strategic plans and directions.
- Inform TSRG the major policy directions and agenda from JU group to align two WGs' DG policy planning.

Other Stakeholders

- JU WG will engage and communicate with other stakeholders in terms of any critical regulatory, policy, program development with stakeholders such as DPU, DOER, AGO, NECEC, Developers, and ISO-NE.

Planned Subjects and Topics for discussion in 2022

Subject	Topic
Future Planning	MassCEC studies, plans and next steps
Markets	FERC 2222
	DSO Model
	SMART
	Clean Peak & DCM DOER Proposal
	Impacts of storage in ISO markets
DER Integration	Neighborhood resiliency
	NWAs
	DERMS (curtailment & utility M&C)
	ISO-State queue management
	19-55 interconnection non tech aspects
Technology	Order 20-69 (DERMS,VVO etc)
	Beneficial electrification (EV, Heat etc)
	FLISR
	Pilot projects i.e. solar curtailment
Data Sharing	Connecticut NWA data sharing issue
Performance Tracking	DOER Beneficial Elec KPIs
	DERMS KPIs
	GM KPIs



Any Questions?

