

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

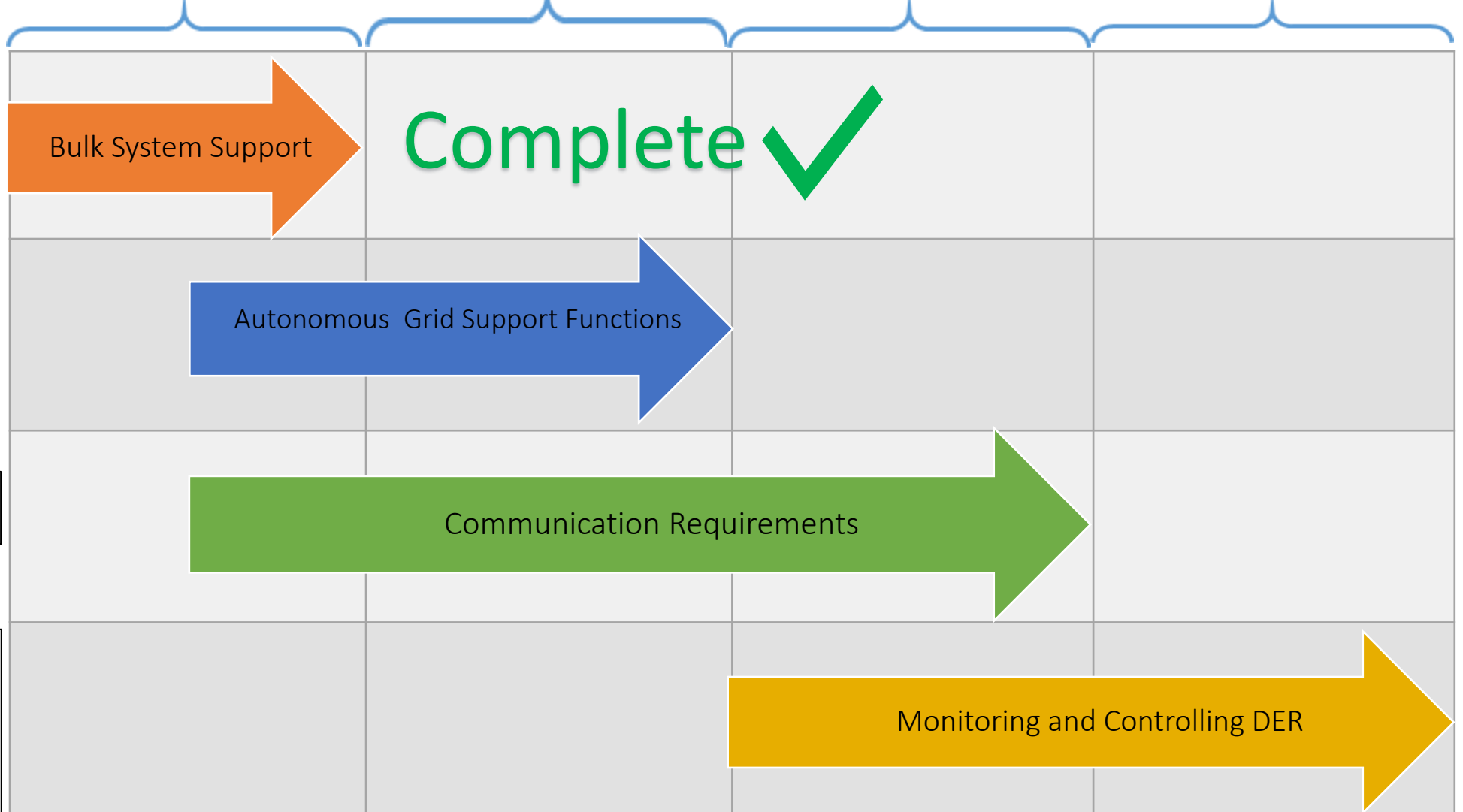
Phase 4
 Q1'23 – Q2'26

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

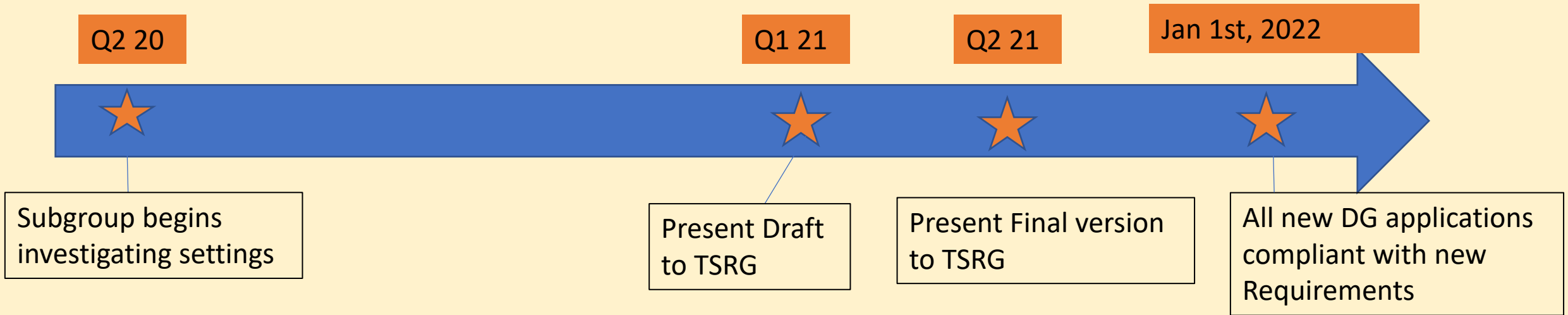
Fixed Power Factor
 Volt-Watt
 Volt-VAR

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



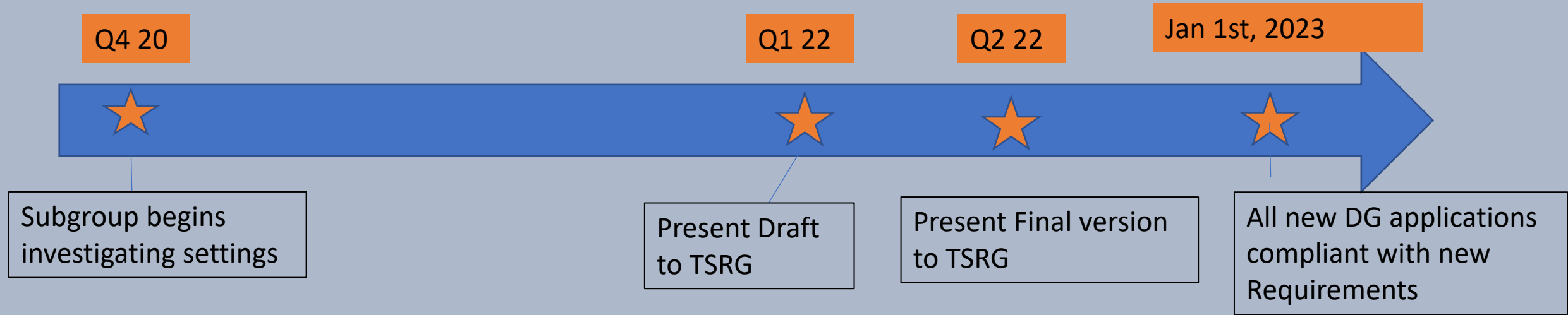
Deliverables:

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.

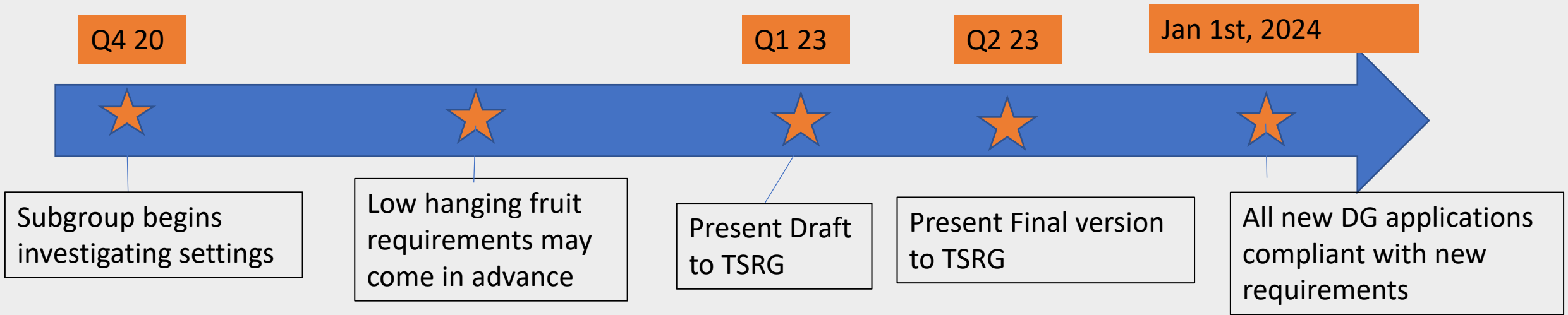
External Engagement Learning

External Engagement	What	Special Thanks
Developer Community	<p>How can it help the developer community? Can it reduce Cost and Time to interconnect? Where has this been successfully implemented in the US?</p> <ul style="list-style-type: none"> • Developer showed how Reactive power functions allowed for projects to be approved that would have otherwise failed. • Developers showed where reactive power functions are being used in other places in the U.S. • Solar Developers Recommend: <ol style="list-style-type: none"> 1-Developers would prefer that utilities leverage the reactive power functionality of inverters and allow for support voltage on the grid. Implementation of “no-harm” curve especially increases hosting capacity benefits for small scale residential systems. 2-System impact studies and ISAs should include a maximum curtailment assessment if site specific settings are to be implemented. Such analysis significantly affects the developer’s ability to finance projects. 3- Per project curtailment analysis using third party consultants is overly time consuming 4- Developers would prefer that standard curves be adopted. It allows them to slightly oversize the inverters to provide headroom for reactive power without curtailment of real power 	<p>Long Road Energy- Radha Soorya Nexamp-Mike Wall Sunrun- Steven Rymsha Borrego Energy Mrinmayee Kale</p>

External Engagement Learning

External Engagement	What	Special Thanks
Forum on Inverter Grid Integration Issues (FIGII) Meeting	<p>How can we work together to simplify the study and verification process?</p> <ul style="list-style-type: none">• Recommended URP- Utility required profile, common file format from EPRI. EPRI has a guiding document for using this file. https://www.epri.com/research/products/000000003002020201.• Inverter Manufacturers indorse creating a standard PSCAD modeling standard for the Commonwealth. ISO-NE offered their standard as a reference.• HECO has the best practices in testing and verification according to the Inverter manufacturers.	Brian Lydic-IREC
EPRI	<p>EPRI offered free Resources: Common Questions: https://publicdownload.epri.com/PublicAttachmentDownload.svc/AttachmentId=75307 Current Status of Equipment and Practices: https://publicdownload.epri.com/PublicAttachmentDownload.svc/AttachmentId=75308 Distribution Integration: https://publicdownload.epri.com/PublicAttachmentDownload.svc/AttachmentId=75309 Terms: https://publicdownload.epri.com/PublicAttachmentDownload.svc/AttachmentId=75310</p>	Devin Van Zandt Aminul Huque

Phase 3: Communication Requirements



Phase 4: Monitoring and Controlling DER

