

GRID DATA Repository

- **Find Public Grid Models**
- **Publish Your Innovations**
- **Collaborate with Others**

Topics

1. ARPA-E GRID DATA Program
2. The BetterGrids Repository
3. The Support Community for the Repository

ARPA-E GRID DATA Program



Challenges

- Increasing wind and solar generation
- Decentralization of generation
- Aging infrastructure
- Cybersecurity threats
- Severe weather events

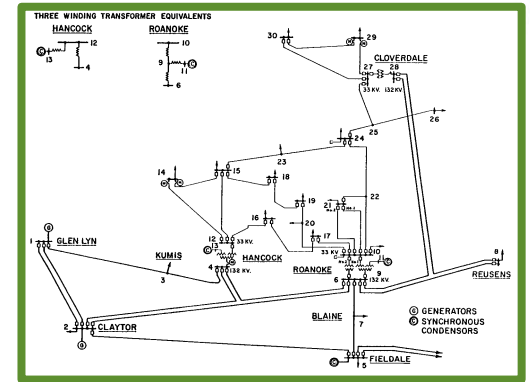
- Need new algorithms for better **Visibility**, **Control** and **Optimization**
- Need good public datasets to test the new algorithms and compare algorithms

Challenges with Real Datasets

- Realistic, large-scale datasets are very valuable but difficult to prepare and use.
 - Every team must negotiate unique data agreement.
 - Base cases from ISO/utilities usually do not converge (substantial cleaning always required).
- Data typically cannot be published in detail in any form.
 - Very difficult to independently verify/replicate results.
 - Results may reflect quality of data more than quality of algorithms.
- ISOs/utilities have limited bandwidth to devote to R&D.
 - Very few teams can put together credible project plans up front.
 - High barrier to entry for those not already in power systems field.

Existing Public Datasets

- There are too few of them
- They are too small
- They are incomplete
- They are too easy
- They are not representative of real systems



GRID DATA Program

Generating Realistic Information for the Development of Distribution And Transmission Algorithms

Duration	2016-2018
Projects	7
Investment	\$11M

Goals

Development of large-scale, realistic, validated, and open-access electric power system network models with the detail required for successful development and testing of new power system optimization and control algorithms.

Project Categories

- I. Transmission, Distribution, and Hybrid Power System Models & Scenarios
- II. Power System Model Repositories


Dataset Creation Pathways

Real Data

- Start with real data, then anonymize, perturb topologies and change sensitive infrastructure asset data as necessary.
- **Risks:**
 - Requires extremely close collaboration with ISOs such that infrastructure is not reconstructable and can be publically released.
 - Datasets may no longer well represent real data.
 - Real data is often messy, incomplete.

Synthetic Data

- Generate via expert input, geographic/road data and data mining.
- Generate new random graph methods for transmission networks.
- Devise statistical metrics (moments of capacity distributions, degree distributions of networks); validate against real data.
- **Risks:**
 - Validation metrics may be incomplete or misleading. (Leading to lack of realism.)



**Open-access, large, realistic,
validated datasets**

BetterGrids Repository



BetterGrids Repository

- **A free library** of public grid model data
- **Supporting research** in grid optimization and reliability
- Enabling grid researchers to **collaborate and share data**
- Supported by a **community of volunteers** led by GridBright
- Funded by the **DOE ARPA-E GRID DATA** Program

Registration Information

Please enter the following information. The fields marked with a * are required.

First name*:

Last name*:

Contact telephone:

Language:

English ▾

Please choose a password and enter it into the box below, and confirm it by typing it long.

Password:

Again to Confirm:

Complete Registration

Describe | Describe | Upload | Verify | License | Complete

Submit: Describe this Item ?

Please fill in the requested information about this submission below. In most browsers, you can use the tab key to move the cursor to the next input box or button, to save you having to use the mouse each time.

Enter the names of the authors of this item.

Authors

Last name, e.g. SmithFirst name(s) + "Jr", e.g. Donald JrAdd More

Enter the main title of the item.

Title *

If the item has any alternative titles, please enter them here.

Other TitlesAdd More

Please provide the version of this submission.

Version

Enter the name of the publisher of the previously issued instance of this item.

Publisher

Enter the publisher's URL.

Publisher URL

Enter the standard citation for the previously issued instance of this item.

Citation

Enter the abstract of the item.

Abstract

Please give the date of previous publication or public distribution. You can leave out the day and/or month.

Date of issue *

Month: (No Month)Day:Year:

Select the type(s) of content of the item. To select more than one value in the list, you may have to hold

Type

AnimationArticleBookBook chapterDatasetLearning Object

If the item has any identification numbers or codes associated with it, please enter the types and the ac

Identifiers

ISSN ▾

Perform Task

The following item has been submitted to collection **Complex Review**. Please review the item, check that it meets the criteria for entry into the col controls at the bottom of the page.

Title:	Test Submission 1
Authors:	John, Smith
Keywords:	Smart Grids
Issue Date:	2016

Files in This Item			
File	Description	Size	Format
logout.png	a test file	210.67 kB	image/png View/Open

Approve

If you have reviewed the item and it is suitable for inclusion in the collection, select "Approve".

Reject

If you have reviewed the item and found it is not suitable for inclusion in the collection, select "Reject". You will then be asked to enter a message indicating why the item is unsuitable, and whether the submitter should change something and re-submit.

Do Later

If you wish to leave this task for now, and return to your "My BetterGrids", use this option.

Return Task to Pool

To return the task to the pool so that another user can perform the task, use this option.

Search

Search: All of BetterGrids ▾

for

Go

Current filters: Data Format ▾ Equals ▾

MatPower

X

Start a new search

Add filters:

to the left of the search results.

▾ Equals ▾

▾ | Sort items by Relevance ▾ In order Descending ▾ Authors/recor

Search time: 0.0 seconds).

blisher	Title	Version	Data Format	Feeders	Loads	Bus
inburgh	39 bus New	1	MatPower	-	46	39
it Case	England test					

Submit: Verify Submission ?

Unsubmit | Unsubmit | Upload | Verify | Complete | Complete

Next quite there yet, but nearly!

Please spend a few minutes to examine what you've just submitted below. If anything is wrong, please go back and correct it by using the buttons next to the error, or by clicking on the progress bar at the top of the page.

If everything is OK, please click the "Next" button at the bottom of the page. You can safely check the files which have been uploaded - a new window will be opened to display them.

Authors

Smith, John

Correct one of these

Title

Test 100 bus model

Correct one of these

Other Titles

Test Power and Light

Correct one of these

Version

1.0

Correct one of these

Publisher

Power Research Department US Test University

Correct one of these

Publisher URL

None

Correct one of these

Citation

None

Correct one of these

Abstract

None

Correct one of these

Date of Issue

4-Jan-2017

Correct one of these

Type

Dataset

Correct one of these

Metadata

None

Correct one of these

Subject Keywords

Power Grids

Correct one of these

Data Format

MatPower

Correct one of these

Data Format Version

1

Correct one of these

Model Class

None

Correct one of these

Bus

100

Correct one of these

Generators

25

Correct one of these

Loads

75

Correct one of these

Feeder

None

Correct one of these

Tie Switches

None

Correct one of these

Nodes

None

Correct one of these

Uploaded Files

100busPF.m - Unknown (Unknown)

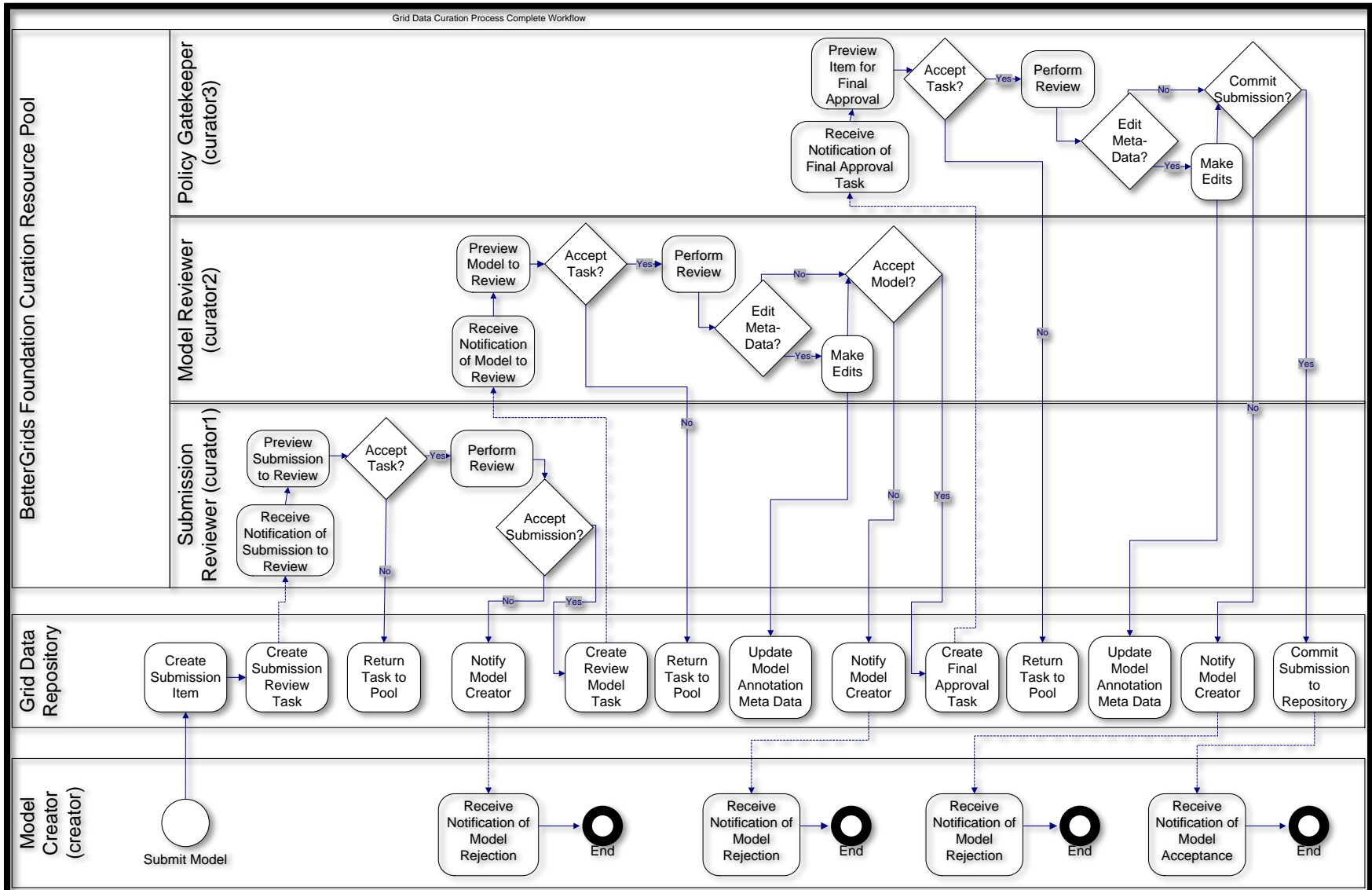
Add or Remove a File

Previous

Cancel Save

Next

Curation Process



The Support Community



BetterGrids Foundation, Inc.

- ## Mission

Operate the GRID DATA Repository in a self-funding manner to support research and education in developing better solutions for grid optimization, control, resiliency, and integration of renewable and distributed resources.

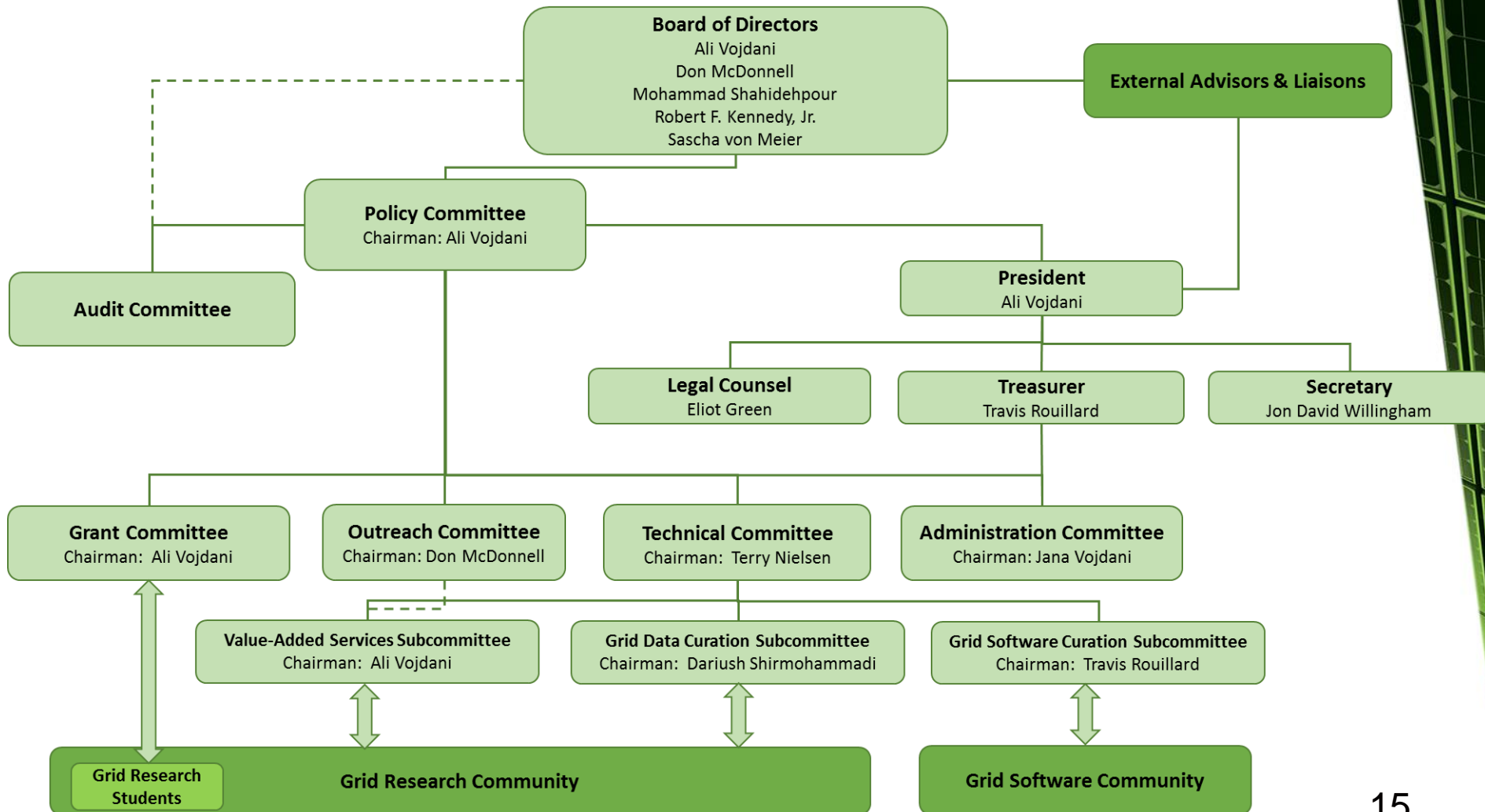
- ## Vision

Grid researchers have the essential test data they need to develop better grid solutions.

- ## Strategy

1. Engaging a community of volunteers to operate the Repository and govern BetterGrids.
2. Creating value-added grid research solutions that are free to the research community and competitively priced for commercial uses.
3. Connecting grid research students with experienced entrepreneurs to improve Tech-to-Market success.
4. Organizing annual fundraising events.
5. Making grants to research students developing better grid solutions.

BetterGrids Leadership Team

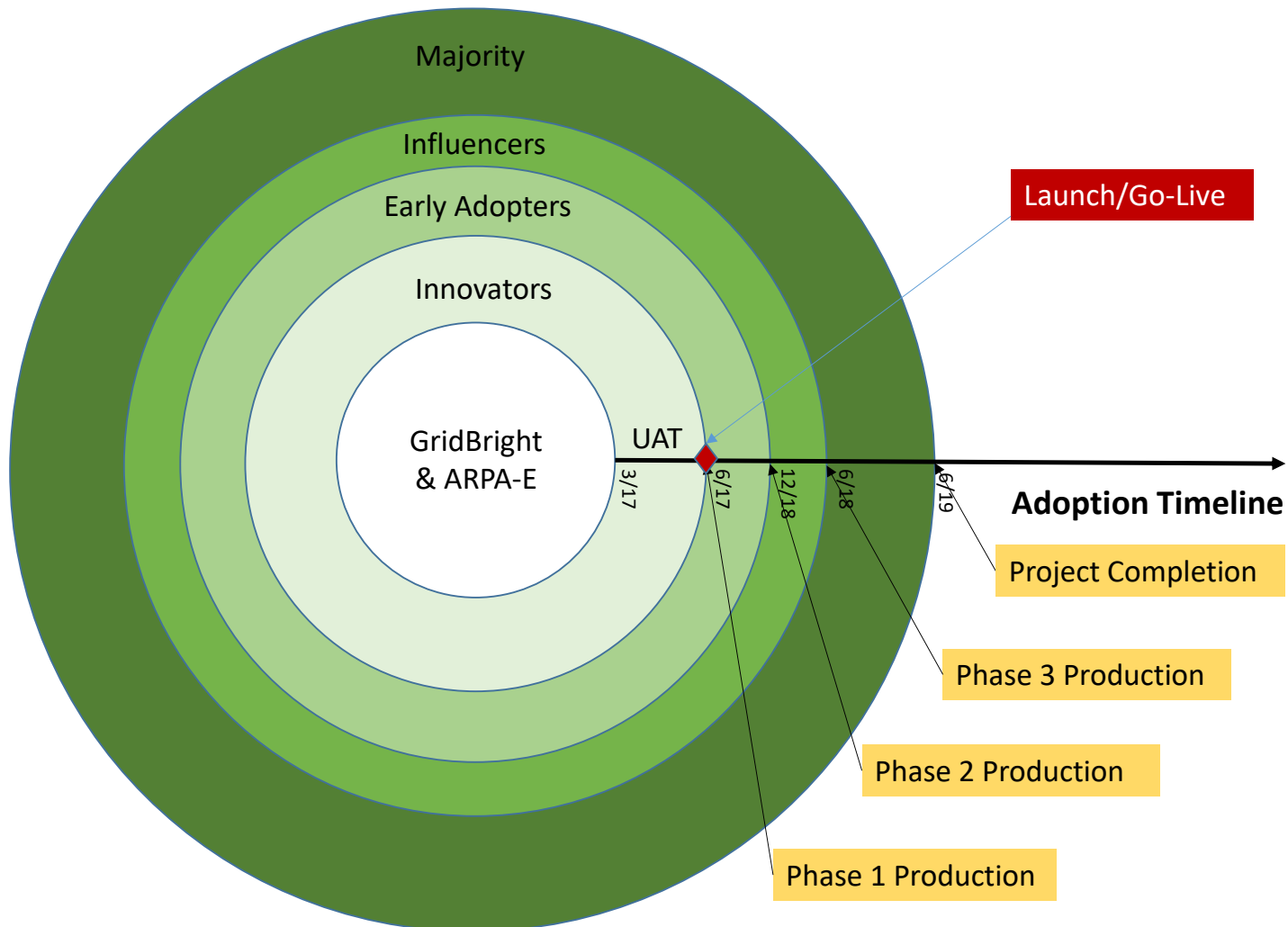


Organizations Engaged*



*Organizations that are participating in various BetterGrids committees and/or have provided valuable input to creation of the GRID DATA Repository.

Go-Live and Adoption Timeline



Join the Community

- Visit www.bettergrids.org & Join Mailing List for updates
- Follow us on LinkedIn (BetterGrids)
- Follow us on Twitter (@BetterGridsOrg)
- Join our discussion group on LinkedIn (BetterGrids)
- Contact us at info@BetterGrids.org to volunteer
- Contribute data
- Propose value-added services
- Spread the word
- Make donations