DRIVE and PowerClerk Interface Tool to Expedite DER Interconnection Screening Process

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Agenda

- Motivation
- PowerClerk – Clean Power Research
- DRIVE – EPRI
- Hosting Capacity
- Example Process

- The number of interconnection applications continues to rise
- Fast-track screening methods (15% rule) can be conservative or inaccurate
- Detailed impact studies require valuable time and resources

Project Task: Develop a platform to interface CPR's PowerClerk and EPRI's DRIVE tools to expedite the DER Interconnection screening process.

DOE RFP Objective: Reduce processing time to less than 1 week and cost to less than $1000 per application

Interconnection Application Management

- Homegrown or Commercial Product
- Public facing (web based/accessable)
- Inform developers
- Accommodate DER portfolios
- Integrate planning and billing tools
- Automate screening practices
- Access application data

PowerClerk®

Automating energy programs covering a broad range of DERs

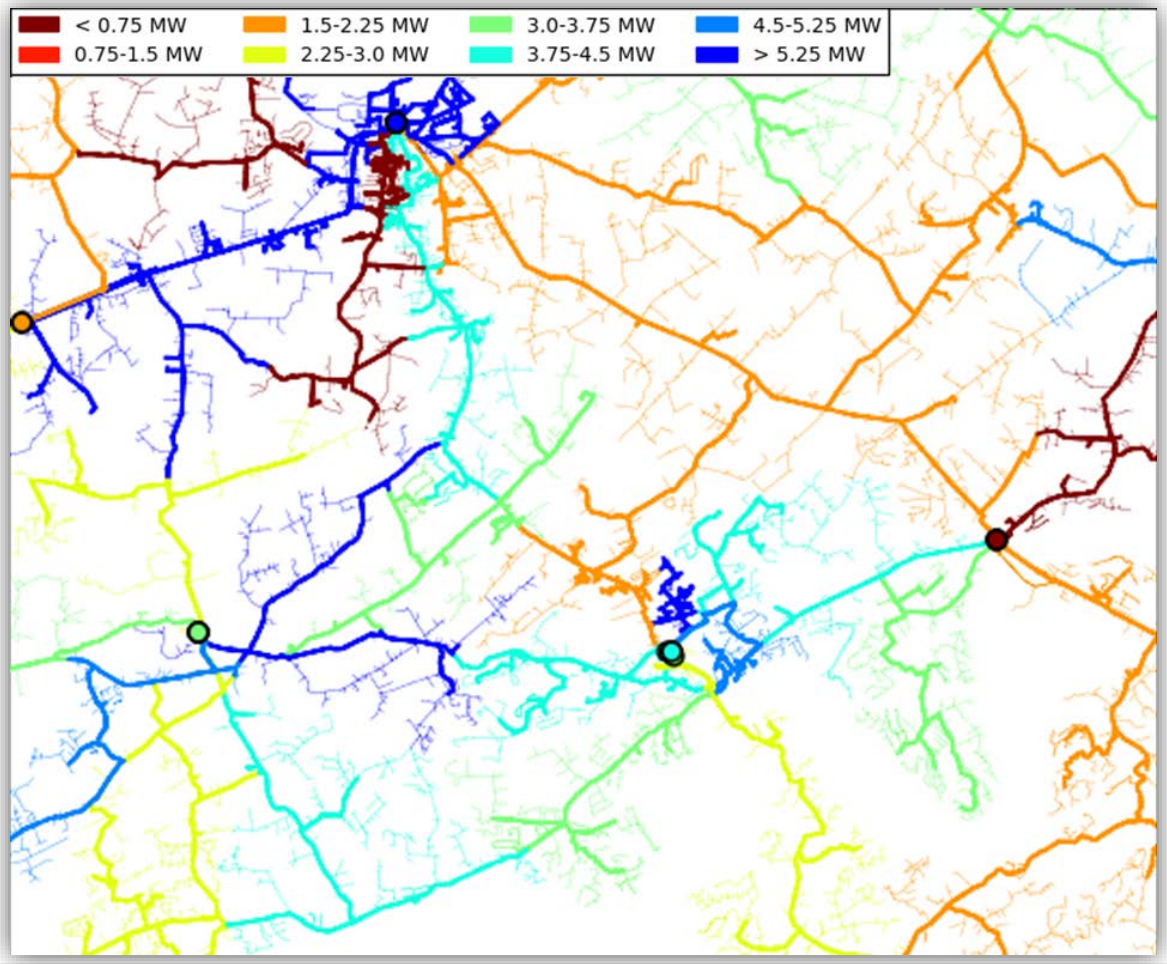
- Over 40 electric utilities managing DER interconnection and incentives
- Enterprise-grade platform providing:
  - Flexible end-to-end form-driven workflow
  - Data accessibility
  - Integration across existing systems

EPRI partnered with Clean Power Research for the DOE SHINES project, but the process is applicable to any Interconnection Application Management system

Primary Functionality of DRIVE

- Calculating hosting capacity

Hosting Capacity is the amount of DER that can be accommodated without adversely impacting power quality or reliability under current configurations and without requiring infrastructure upgrades.



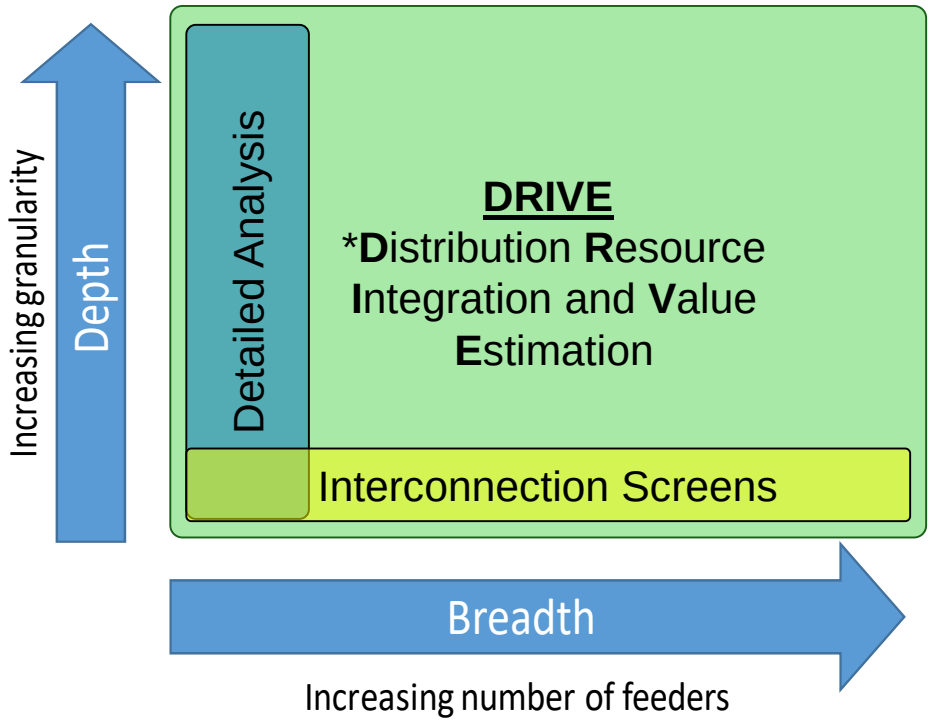
Applications of DRIVE

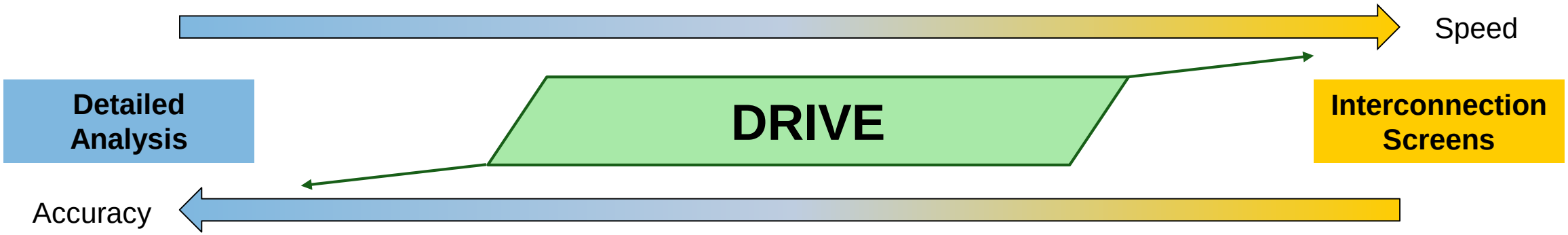
Hosting Capacity:

- Enable DER planning
- Inform developers
- Assist interconnection screening
- Assist operational dispatch

Bridging the Gap in Distribution Planning

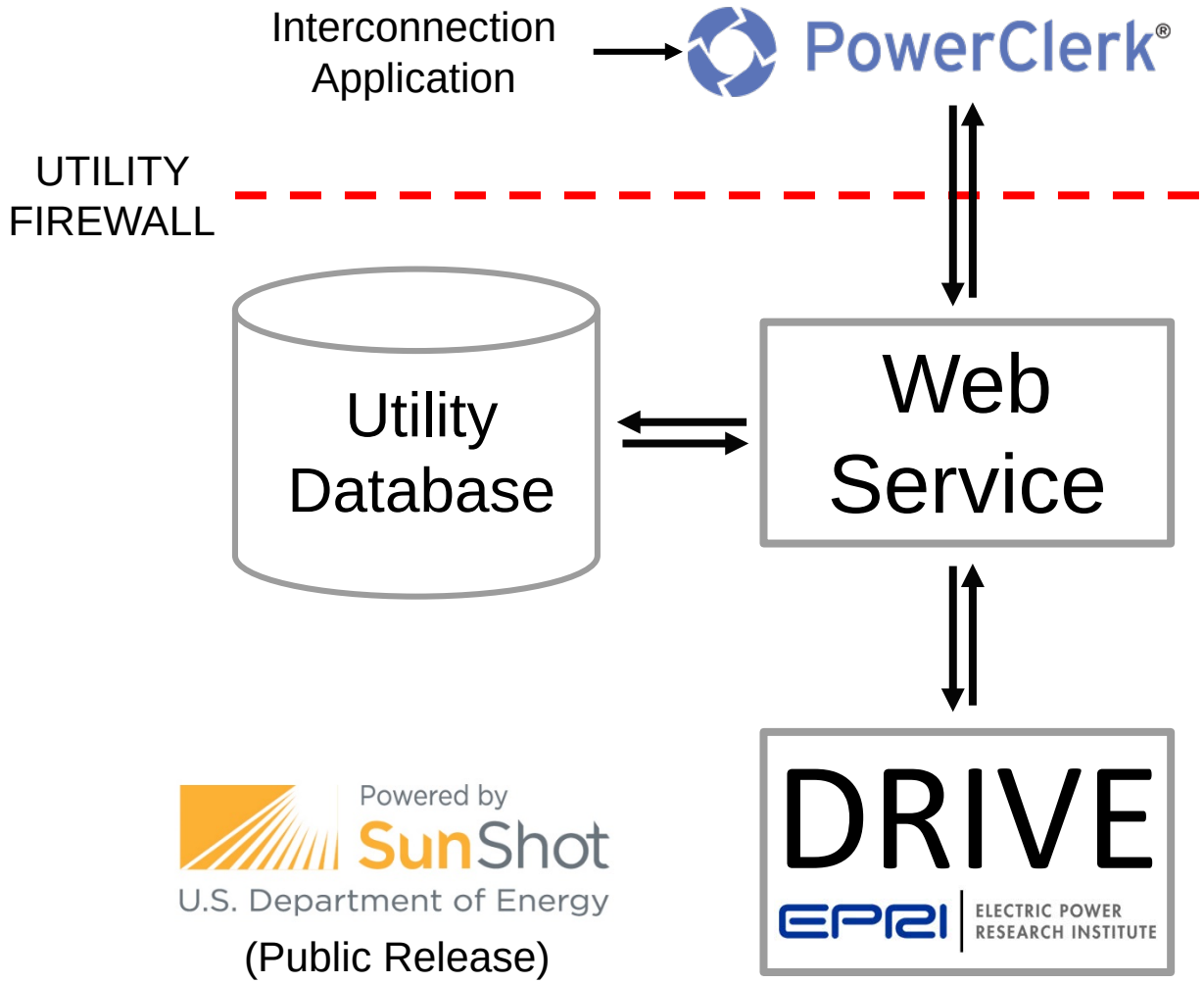
- ***Detailed Analysis*** – use of power system analysis software to understand DG and solar impacts based on stochastic analysis (extensive model-based analysis)
- ***Interconnection Screens*** – such as in FERC SGIP fast-track screening or in CA rule 21 screening procedures (limited model-based analysis)





Automated Interconnection Screening with DRIVE

- Manage Interconnection Applications
- Automate Analysis
- Leverage Existing Methods and Data
- Decrease Time and Cost of Processing



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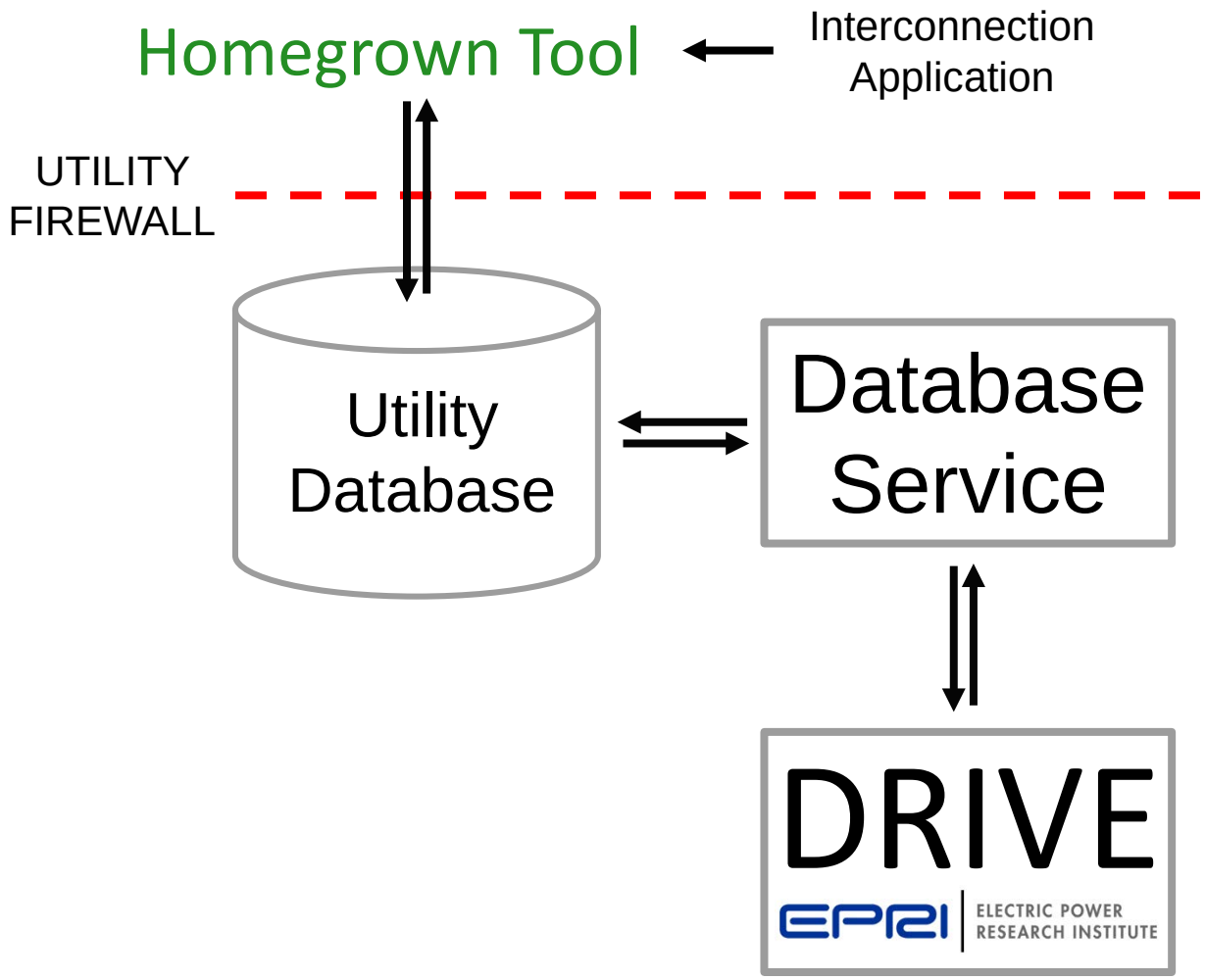
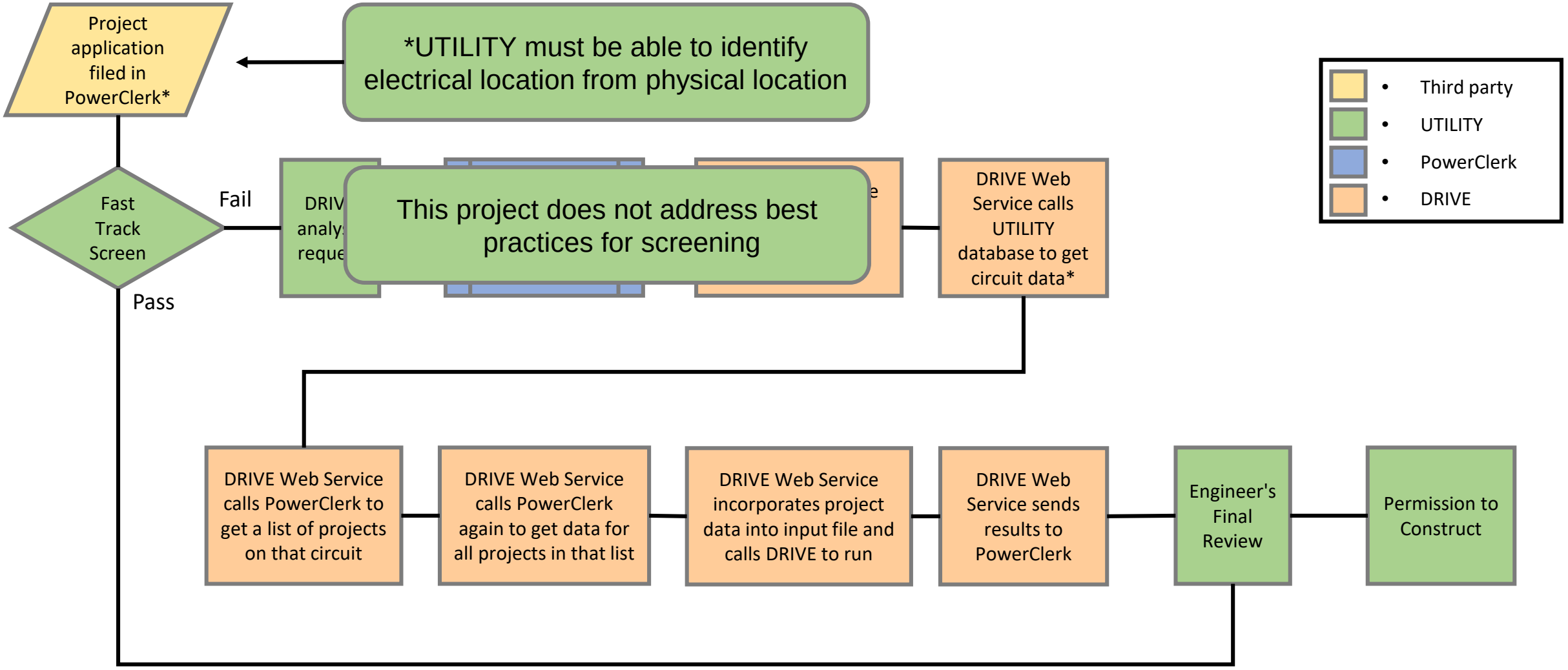


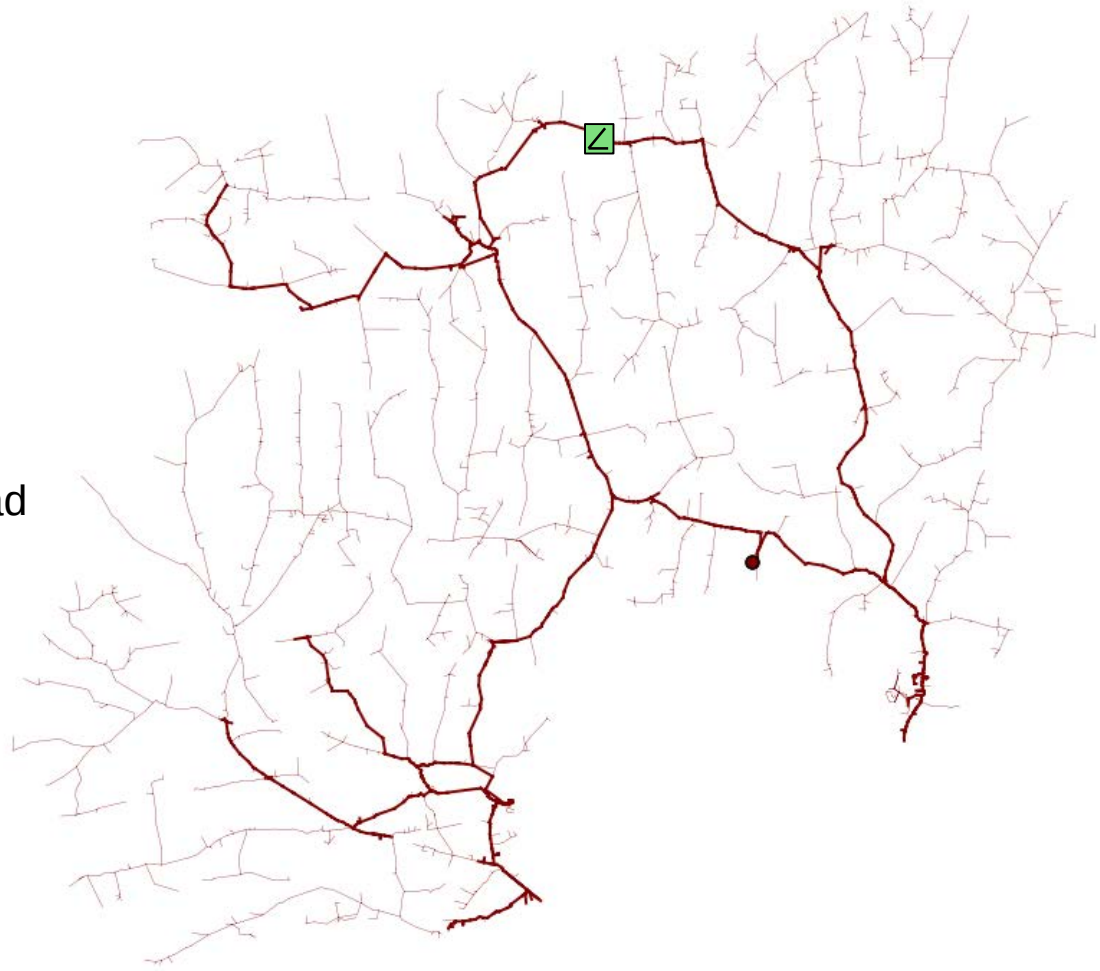
Automated Interconnection Screening DRIVE



Example Application Screening

Two 13.2 kV distribution feeders

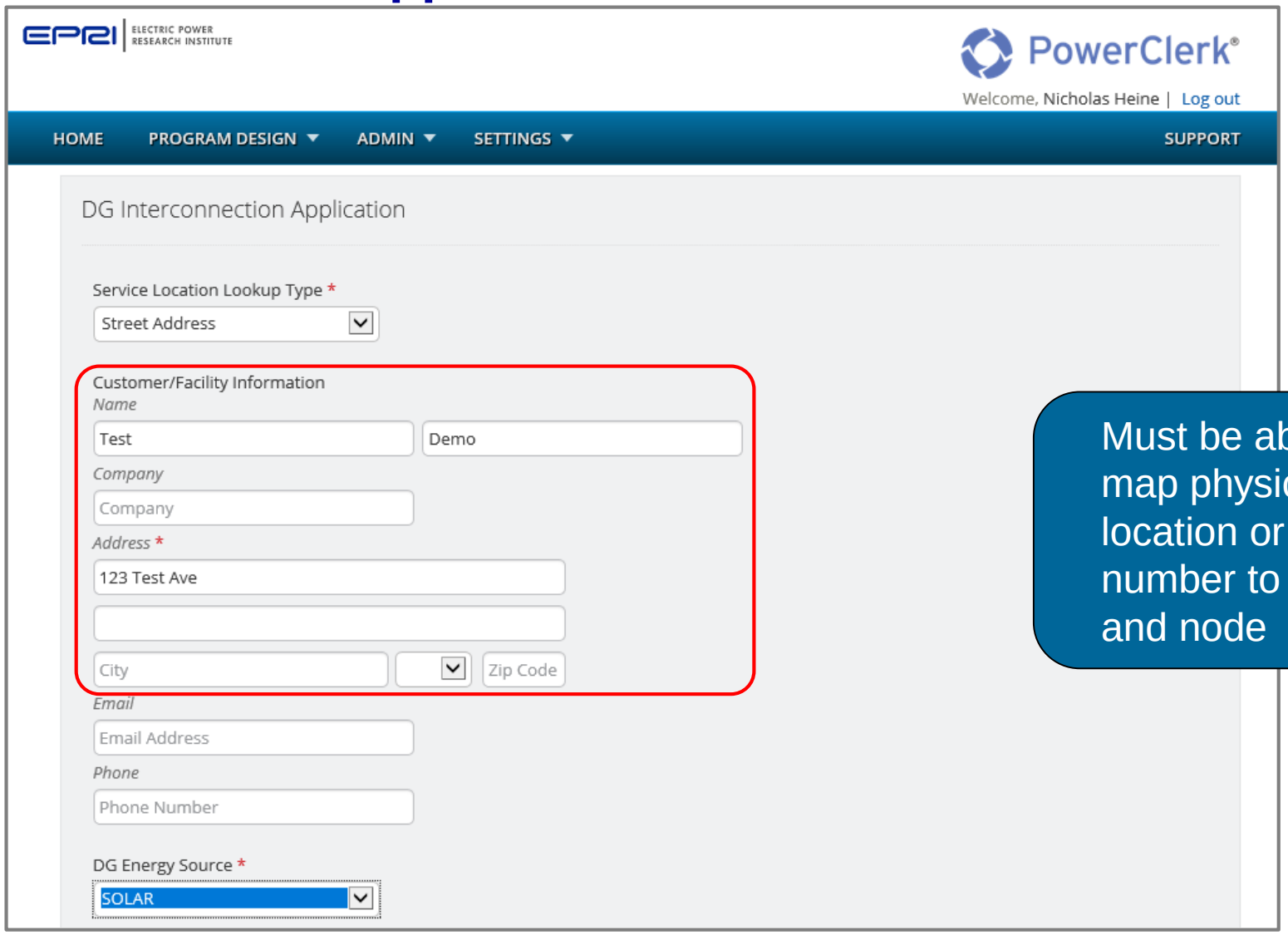
5.0 MW Peak Load



3.7 MW Peak Load

Example with 13.2 kV Test Circuits

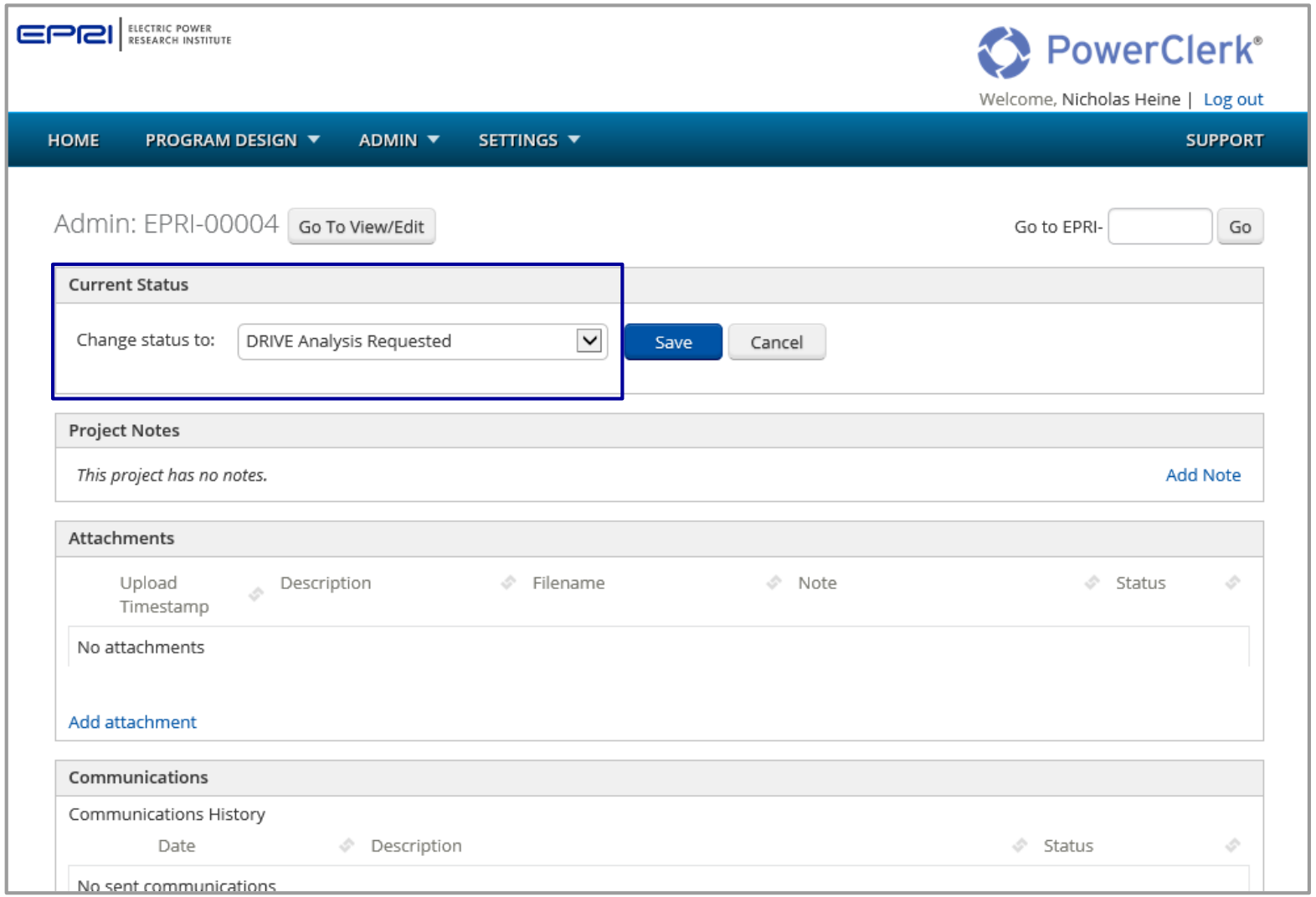
Step 1: An interconnection application is filed



Must be able to map physical location or account number to a circuit and node

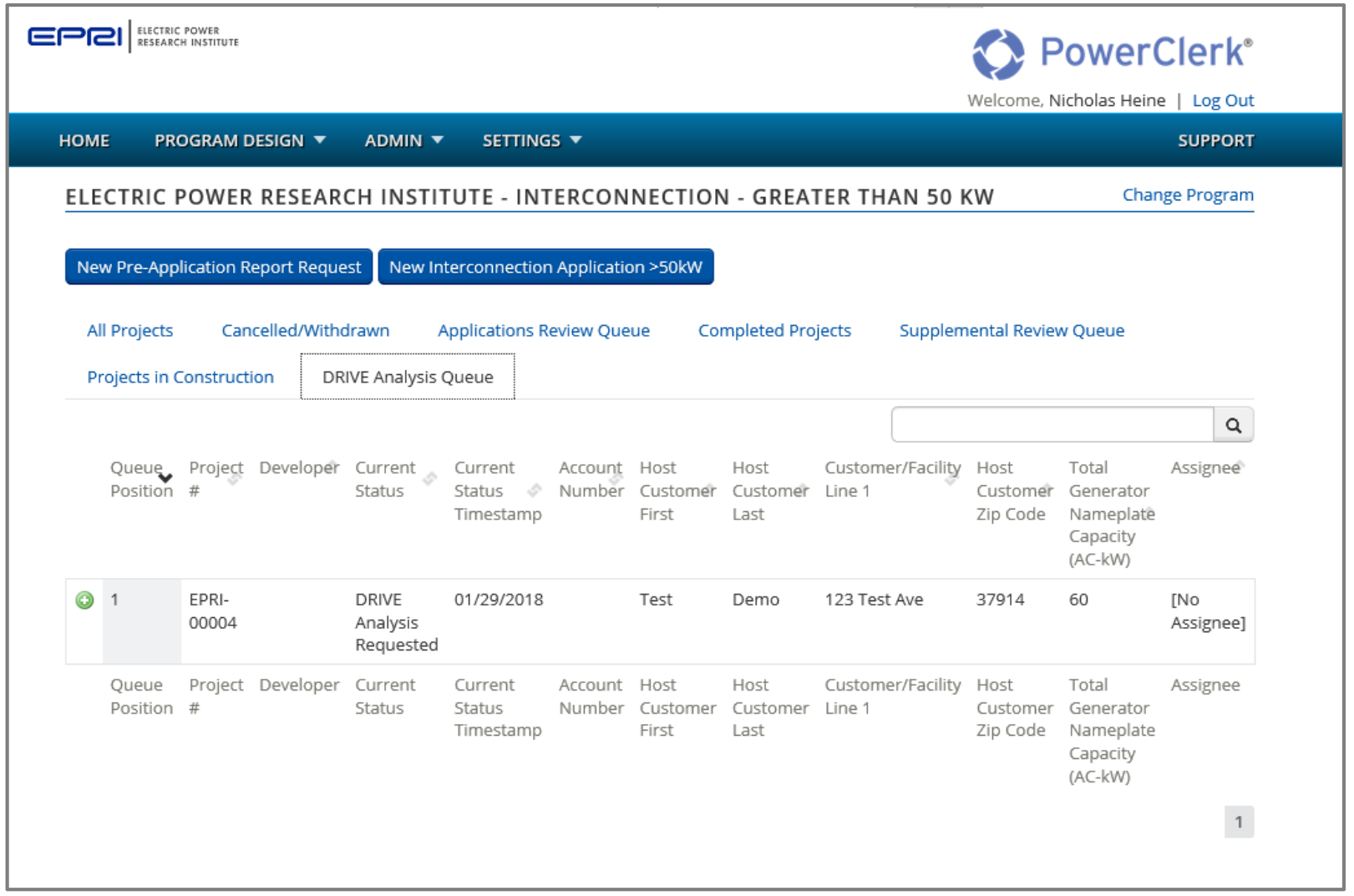
Example with 13.2 kV Test Circuits

A utility administrator flags the project for review with DRIVE



Example with 13.2 kV Test Circuits

DRIVE Web Service finds the project in the Analysis Queue



Example with 13.2 kV Test Circuits

Web Service requests the project data with PowerClerk API method

Web Service will get DRIVE files for the identified Circuit

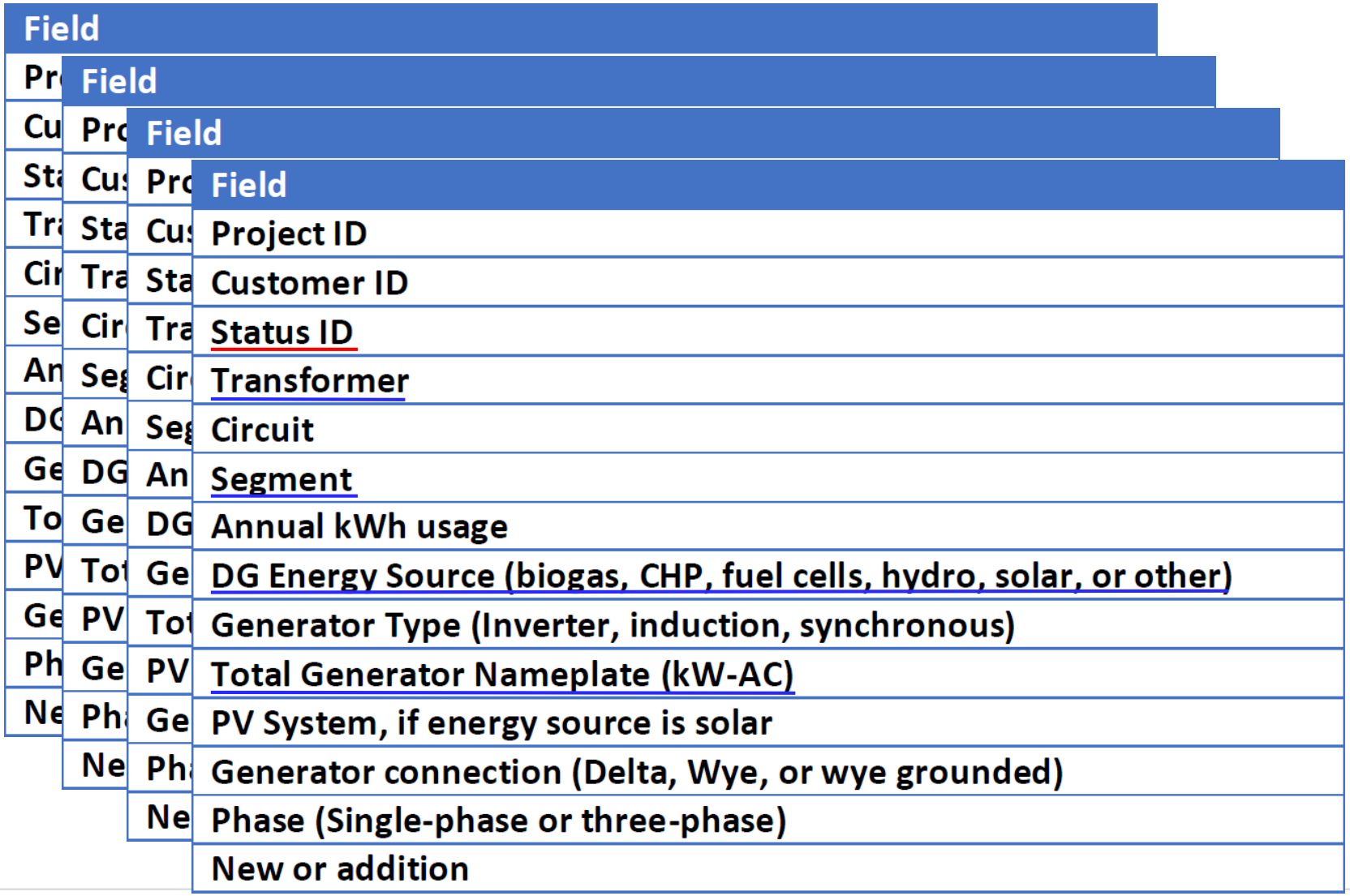
Field
Project ID
Customer ID
Status ID
Transformer
Circuit
Segment
Annual kWh usage
DG Energy Source (biogas, CHP, fuel cells, hydro, solar, or other)
Generator Type (Inverter, induction, synchronous)
Total Generator Nameplate (kW-AC)
PV System, if energy source is solar
Generator connection (Delta, Wye, or wye grounded)
Phase (Single-phase or three-phase)
New or addition

Example with 13.2 kV Test Circuits

Web Service requests other same-circuit projects and data

Same-circuit projects can have a variety of statuses, including: under review, permission to construct, permission to operate, etc. with time stamp prior to current project

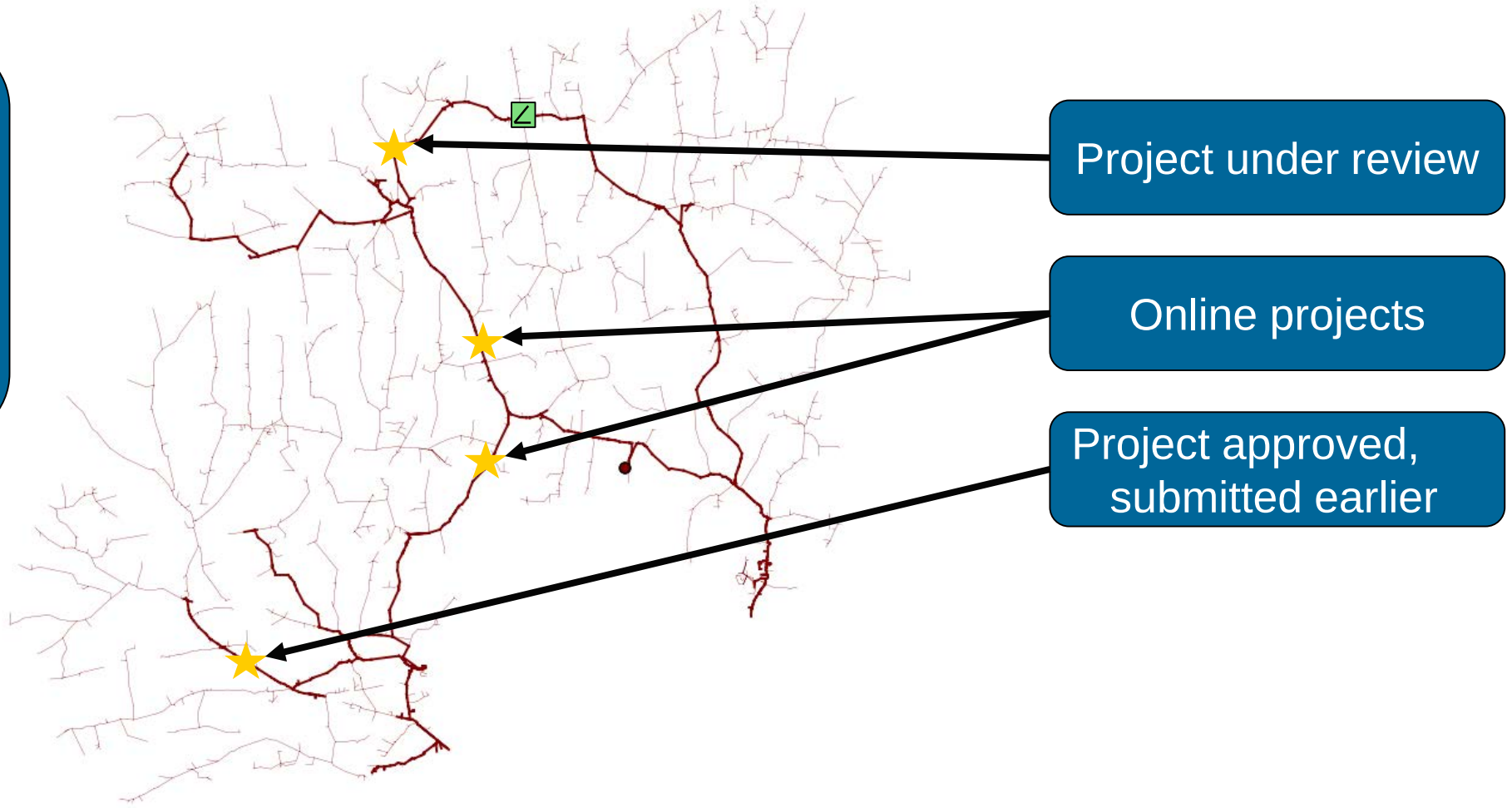
Web Service incorporates pertinent project data into DRIVE input files



Example with 13.2 kV Test Circuits

Web Service executes hosting capacity analysis for project under review

The project under review and all other same-circuit projects are incorporated into DRIVE input files and considered ‘Existing DERs’ in the analysis

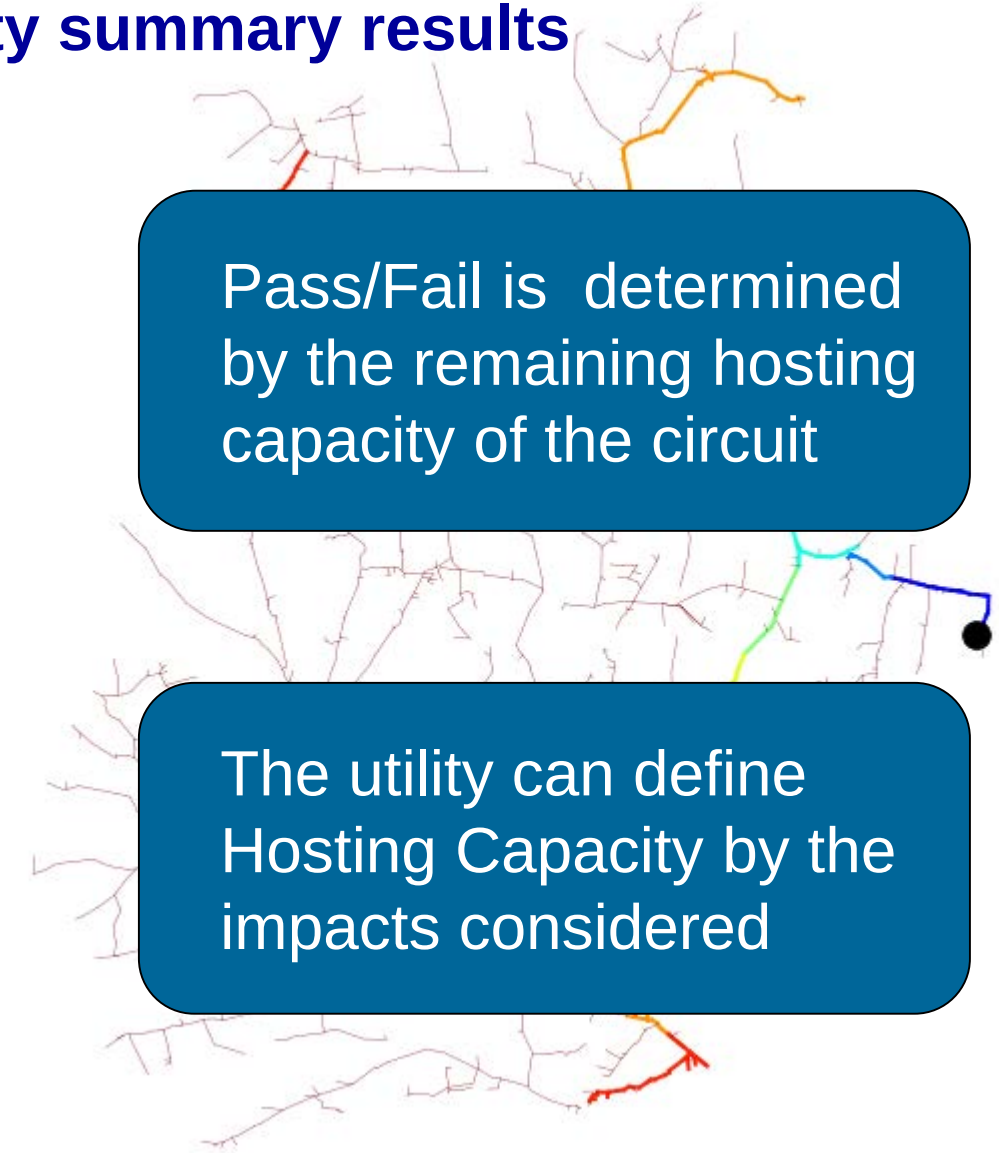


Example with 13.2 kV Test Circuits

Web Service interprets hosting capacity summary results

Impacts Considered

- Voltage
  - Primary overvoltage
  - Primary voltage change
  - LTC/Regulator tapping
- Thermal
  - Feeder Level
  - Substation Level
- Protection
  - Element fault current
  - Breaker relay reduction of reach
  - Sympathetic breaker relay tripping
  - Reverse power flow
  - Unintentional islanding
  - 3V0
  - Operational Flexibility



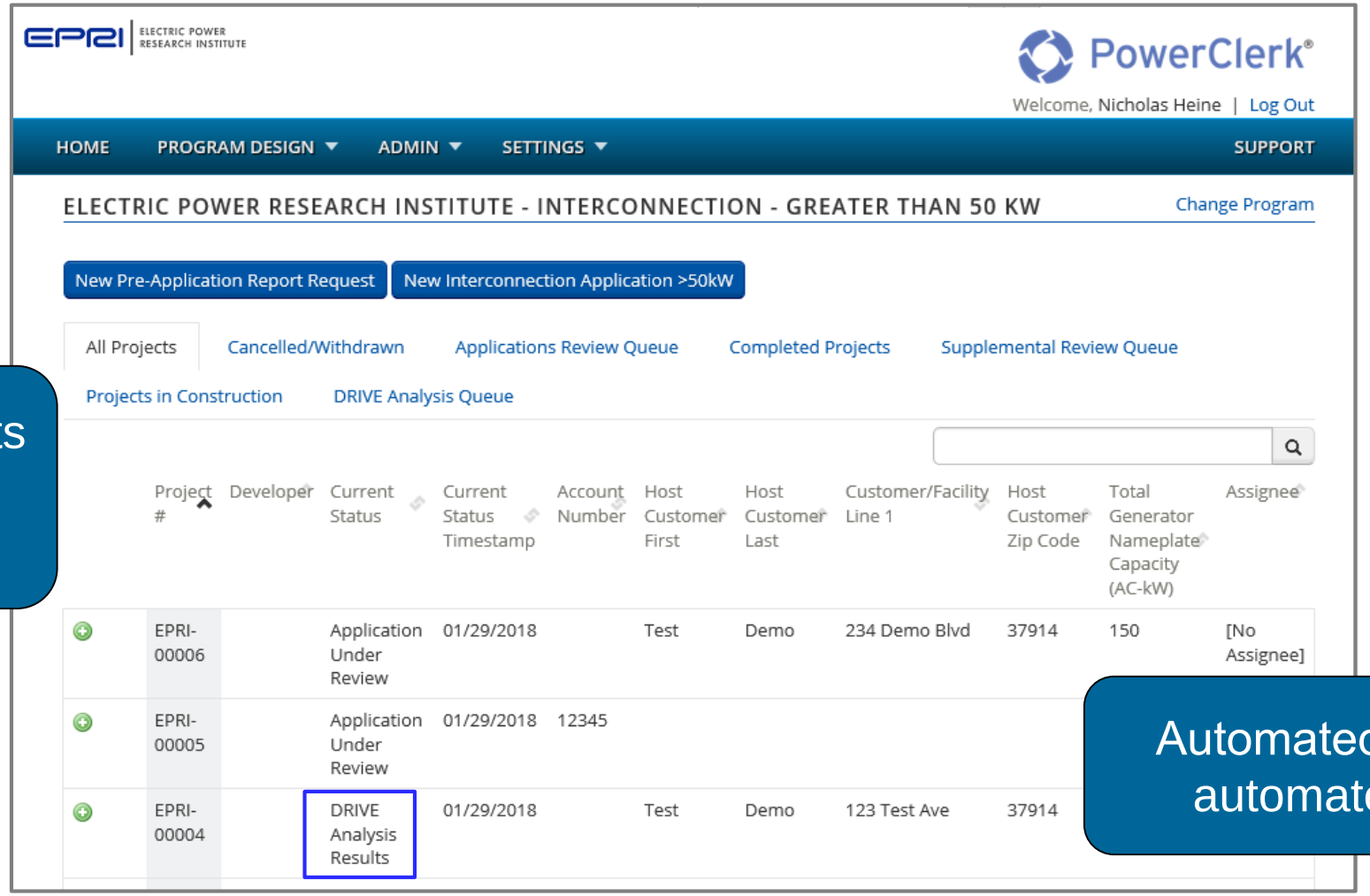
Pass/Fail is determined by the remaining hosting capacity of the circuit

The utility can define Hosting Capacity by the impacts considered

Example with 13.2 kV Test Circuits

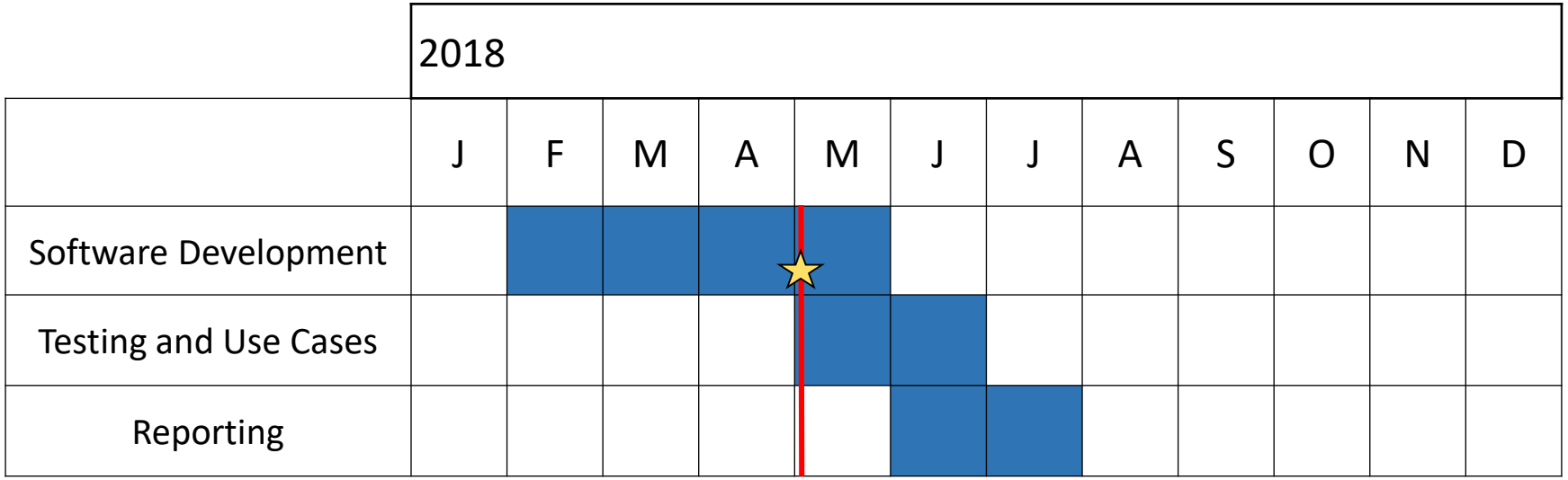
Web Service submits DRIVE results with PowerClerk API method

Submitting results updates the project status



Automated analysis ≠ automated approval

Next Steps



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