Distribution Planning Advisory Group

2024 Avista Electric DSP

DPAG 2 – July 2024

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Welcome to DPAG meeting #2 2024

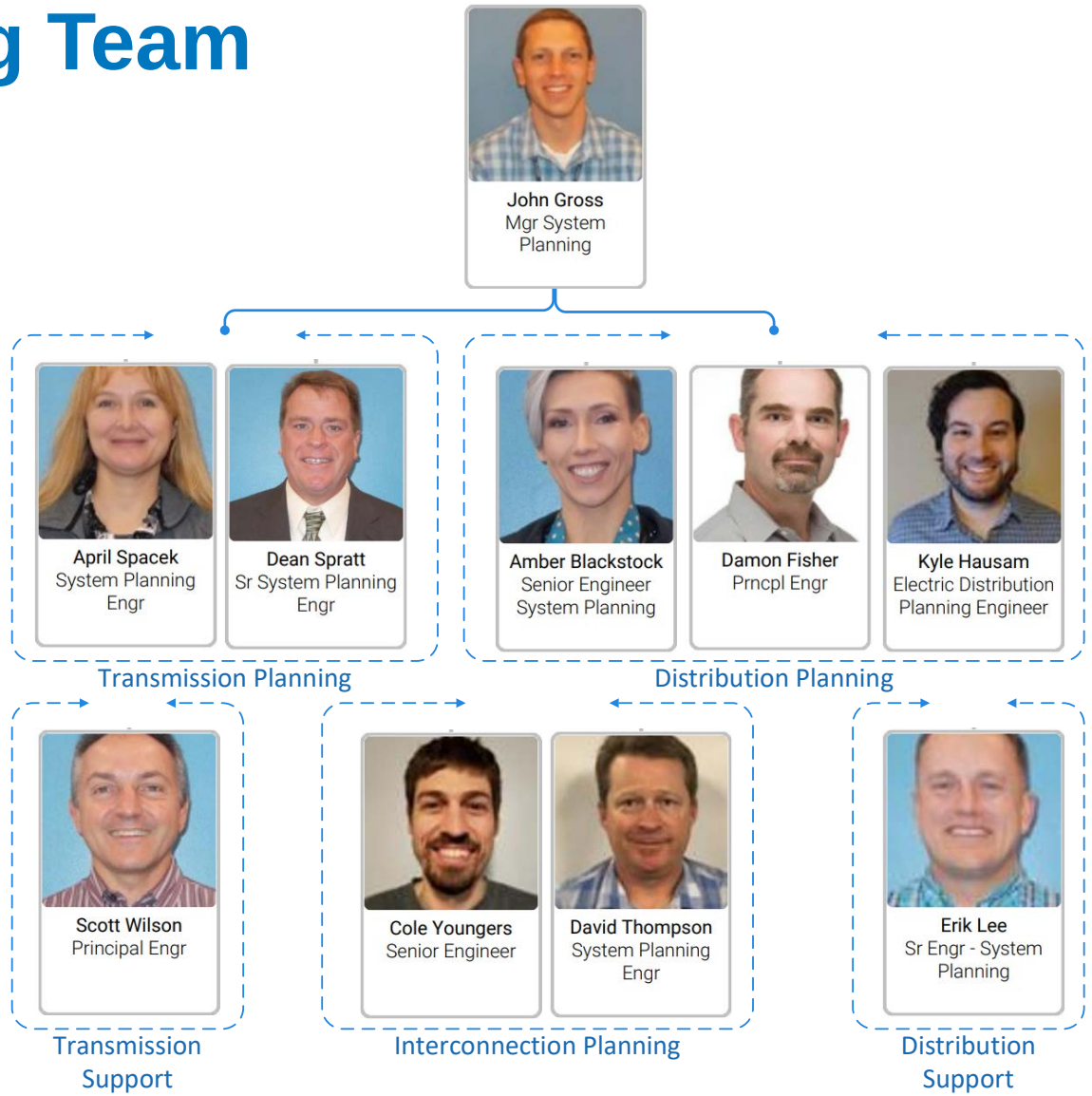
Today's Agenda

Topic	Time
Introductions	9:00am
Meeting Logistics	9:10am
Weather and Planning	9:15am
Interconnection Process	9:20am
Hosting Capacity Maps	10:00am
DER Potential Assessment Maps	10:30am
Next Steps	10:55am
Adjourn	11:00am

Virtual Meeting Reminders

- Please mute mics unless commenting or asking a question
- Raise hand or use the chat box for questions or comments
- Please try not to speak over the presenter or a speaker
- Public meeting – this meeting is being recorded

Avista's Planning Team



Distribution Planning Advisory Group Vision

- Provide expertise and support towards informing a transparent, robust, holistic planning process for electric system operations and investment.
- Contribute to and inform the long-term plan to ensure operational efficiency and customer value are maximized.

Distribution Planning Advisory Group Goals

- Inform stakeholders about the electric system
- Provide greater transparency in planning process
- Provide opportunity for feedback
- Open to all stakeholders
- Flexible to adjustments

Distribution Planning Advisory Group Strategy

	January - March	April - June	July - September	October - December
Meetings	2-3 hours in March	NA	July 24th	October 16th
Topics	• Vender presentation: DER Potential Assessment	• NA	• Interconnections • Hosting capacity • DER Potential	• Weather/Climate, Virtual Power Plants

Interconnection Process

Generation Off-Taker

- Less than 100kVA: Net Metering
  - Retail rates
  - Utility used as a battery
- Less than 80,000kVA: PURPA or 3rd Party
  - Rates set by State or 3rd party private contract
  - Wheel across Avista's system
- More than 80,000kVA: 3rd Party
  - 3rd party private contract
  - Wheel across Avista's system

Generation Interconnection Process

Net Metering =< 100kW
Fast Track (see table) study as necessary
Cluster Studies (anything ineligible for the first two)

Fast Track Eligibility for Inverter-Based Systems		
Line Voltage	Fast Track Eligibility Regardless of Location	Fast Track Eligibility on a Mainline[3] and ≤ 2.5 Electrical Circuit Miles from Substation[4]
< 5 kV	≤ 500 kW	≤ 500 kW
≥ 5 kV and < 15 kV	≤ 2 MW	≤ 3 MW
≥ 15 kV and < 30 kV	≤ 3 MW	≤ 4 MW
≥ 30 kV and ≤ 69 kV	≤ 4 MW	≤ 5 MW

2024 Cluster Study Projects

- 15 Interconnection Customers
  - **4 SGIP (Distribution Projects)**
  - **11 LGIP**
- 7 Cluster Study Areas
- Total MW Output Requested – **1410 MW**
- Resource Types –
  - **Solar**
  - **Storage**
  - **Natural Gas CT**
  - **Wind**

2024 Interconnection Requests (Cluster study)

Interconnection Cluster Number	Cluster Area	Max MW Output	Type	County	State	Point of Interconnection	Customer Requested COD
CS24-01	CA8A - S. Othello	1.08	Solar	Adams	WA	S. Othello 13kV	10/1/2024
CS24-02	CA8D - Third & Hatch	0.5	Storage	Spokane	WA	Third & Hatch 13kV	8/1/2025
CS24-03	CA7 - Big Bend	150	Storage	Adams	WA	Saddle Mountain 115kV	6/17/2031
CS24-04	CA5 - Palouse	100	Storage	Spokane	WA	Benewah 230kV	12/1/2028
CS24-05	CA3A - CDA	203	Natural Gas CT	Kootenai	ID	Rathdrum 230/115kV	10/29/2027
CS24-06	CA3B - Sandpoint	120	Natural Gas CT	Bonner	ID	Bronx 115kV	10/29/2027
CS24-07	CA8B - Othello	2	Solar	Adams	WA	Othello 13kV	12/10/2024
CS24-08	CA7 - Big Bend	199	Solar/Storage	Franklin	WA	AVAHub-04 230kV	6/30/2028
CS24-09	CA8C - Othello	9.5	Solar	Adams	WA	Othello 13kV	8/1/2025
CS24-10	CA1 - West Plains	80	Solar/Storage	Spokane	WA	Spangle 115kV	5/12/2028
CS24-11	CA5 - Palouse	70	Solar	Whitman	WA	Thornton 230kV	10/26/2027
CS24-12	CA5 - Palouse	40	Solar	Whitman	WA	Shawnee-Sunset 115kV	10/26/2027
CS24-13	CA5 - Palouse	95	Solar	Whitman	WA	Benewah-Thornton 230kV	10/26/2027
CS24-14	CA1 - West Plains	40	Solar	Spokane	WA	South Fairchild Tap 115kV	6/30/2027
CS24-15	CA1 - West Plains	300	Wind/Storage	Lincoln	WA	Bluebird Substation 230kV	12/31/2027

More interconnection context

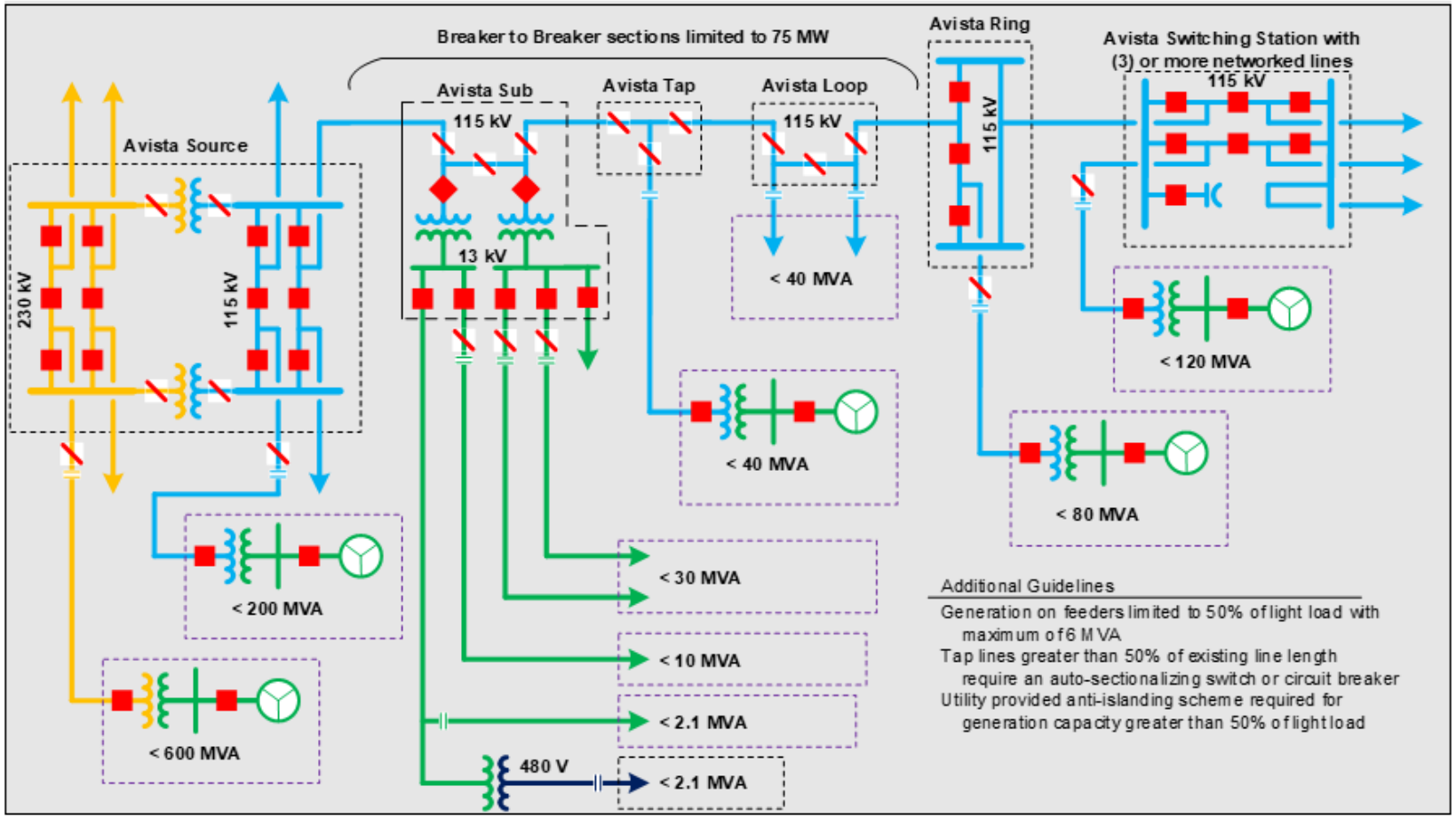
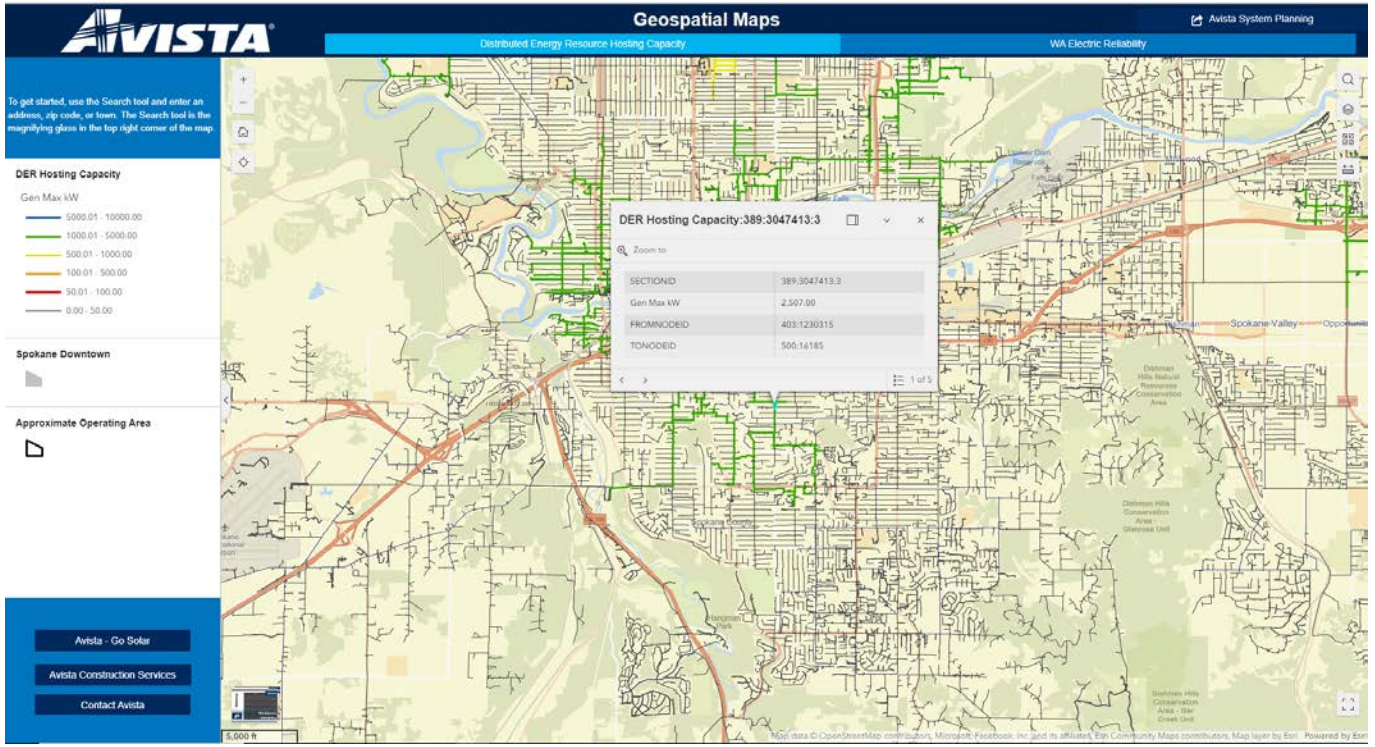


Figure 1: Generation Point of Interconnection Guideline

Generation Capacity	Point of Interconnection
<50kVA	Avista provided transformer
≥50kVA	Three phase required
≥100kVA	
≥1MVA	Transformer cannot serve load
≥2.1MVA	No end use customers connected to the same feeder
≥6MVA	Aggregate feeder capacity limited to 50% of light load
≥10MVA	Multiple feeders required
≥20MVA	
≥30MVA	115kV POI required[2]
≥40MVA	Switching Station with circuit breakers required
≥75MVA	
≥80MVA	Switching station with 3 or more lines
≥120MVA	230/115kV Station required
≥200MVA	230kV POI required

Hosting Capacity Maps

- A pre-analyzed map used to convey the existing ability of the grid to support a need.
- Needs can be Load, Generation, Storage etc.
- Guide those needs to suitable locations on the grid
- Facilitate the incorporation of those needs



Hosting Capacity Maps Criteria

- Generation (typically PV)
  - Typical Screens to apply
    - Voltage
    - Line Loading
    - Minimum daytime load
    - Reverse Flow
    - Line Phasing

Generator Characteristics Source:

	Inverter	Induction Machine	Synchronous Machine
General Characteristics	Commonly current source-like (strictly, voltage regulated, current controlled) in grid-tied mode; voltage source in stand-alone mode, sometimes within the same unit. Low inertia (capable of very high-speed response).	Inherently current source; can be made to act as voltage source with external excitation. High inertia (relatively slow response).	Voltage source. High inertia.
Fault-Current Capabilities	Low (typically <1.2X normal current).	Medium (6X normal current).	High (10X normal current).
Power Quality	Total harmonic distortion and DC injection must be controlled; controllable power factor.	Low total harmonic distortion; power factor must be corrected.	Low total harmonic distortion; controllable power factor.
Examples	Fuel cells, PV, microturbines, some wind turbines	Some wind turbines, CHP	Solar thermal electric, diesel generators, traditional utility generators

Hosting Capacity Maps Criteria

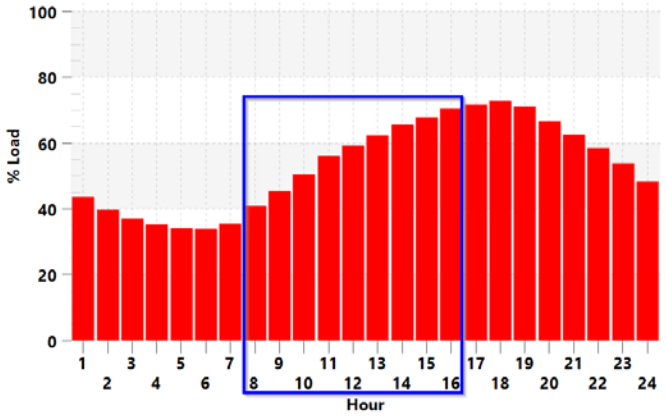
- Storage (typically Li Ion)
  - Load and Source (net load)
  - Typical Screens to apply
    - Voltage
    - Line Loading
    - Transformer Loading
    - Minimum daytime load
    - Reverse Flow
    - Line Phasing

Hosting Capacity Maps Criteria

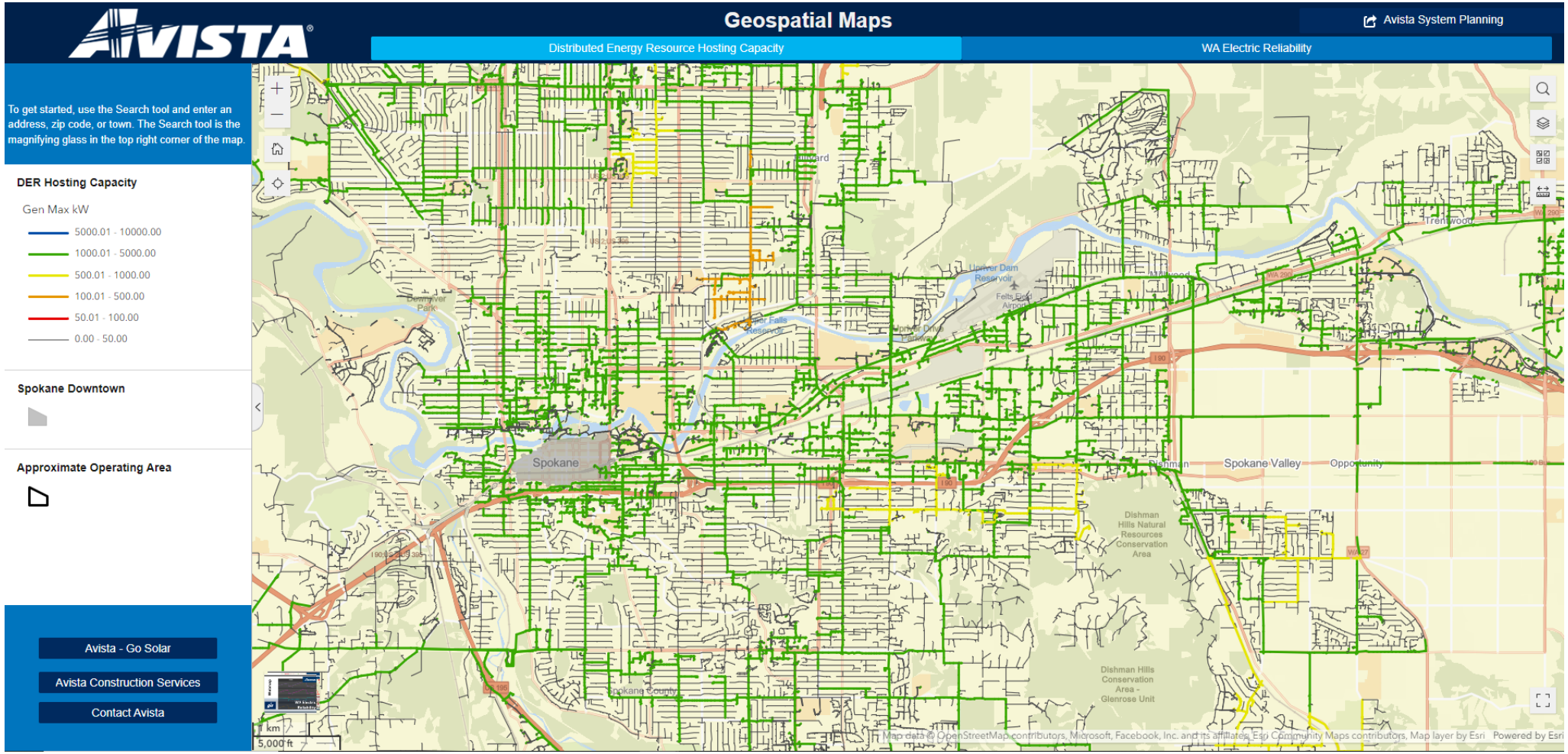
- Load
  - Electric Vehicles
  - Typical Screens to apply
    - Voltage
    - Line Loading
    - Transformer Loading
    - Line Phasing

Hosting Capacity Map at Avista

- Shows available solar generation capacity
- 3 Phase lines limited to 50% of the minimum daytime load (8am to 4pm)
- Single phase lines limited to 50kW
- Non-SCADA limited to 50KW
- https://www.myavista.com/about-us/integrated-resource-planning/distribution-planning-advisory-group



PV Hosting Capacity Map [Map]



Hosting Capacity at Avista

- Still many decisions to make
  - Refresh cadence
  - Granularity of reported information
    - ~500,000 unique sections in the model that can have a hosting capacity analysis
  - Minimum number of parameters to evaluate that give the best understanding of hosting capacity.
  - Generation, Load, Storage, all three?

- Many utilities have already posted maps. Similar yet different. Best map?

https://www.energy.gov/eere/us-atlas-electric-distribution-system-hosting-capacity-maps

Distributed Energy Resource (DER) Potential Study

- Stated goal: Determine a reasonable potential of new generation, storage, and controllable load impacts on a localized basis (census block)
- The study is a requirement of Avista's 'Clean Energy Implantation Plan' (CEIP)
- Contract awarded to Applied Energy Group (AEG) via RFP process
  - with Cadeo & Vedant as subcontractors to AEG
- Project started June 2023 with a completion date of June 2024

DER Potential Study Scope

- Electric Vehicles: For each Washington census block, Consultant shall estimate electric vehicle demand (“Estimated Demand”) for every five (5) years, beginning in 2025 through 2050
  - Residential & commercial charging for vehicle classes 1-8
  - Consultant shall use the best literature available to develop a probable electrification forecast (“Forecast”) for medium and heavy-duty vehicles using Classes 3 – 8 as a baseline scenario

- New Generation and Storage: Consultant shall evaluate the impact for potential customer-owned solar, storage, and other renewable generation by census block and distribution feeder, for every five (5) years beginning in 2025 through 2050
  - Residential and Commercial Solar
  - Residential and Commercial Storage
  - Other Renewables (i.e., wind, small hydro, fuel cell, internal combustion engines (ICE)

DER Potential Study

- Data Description
  - Lots of data delivered.
    - Adoption 560,000 rows
    - Impact 104,000,000 rows
  - Still being digested.

6.1 Adoption Output Structure

The team will produce an adoption output file with the following structure:

- **Scenario.** Reference or High Incentive.
- **Year.** The calendar year.
- **Census Block Group.** The census block group from the 2020 decennial census.
- **State.** Washington State.
- **Customer Class.** Residential, non-residential.
- **DER Measure.** LDV BEV, LDV PHEV, MDV BEV, HDV BEV, Level 1 EVSE, Level 2 EVSE, DCFC EVSE, Solar PV, Storage, or Wind.
- **Number Adopted.** The count of service points that adopt the DER measure for each combination of the segments above.
- **Size Adopted.** The total size of the DER Measure adopted (i.e., nameplate kW) for each variety of the segments above.

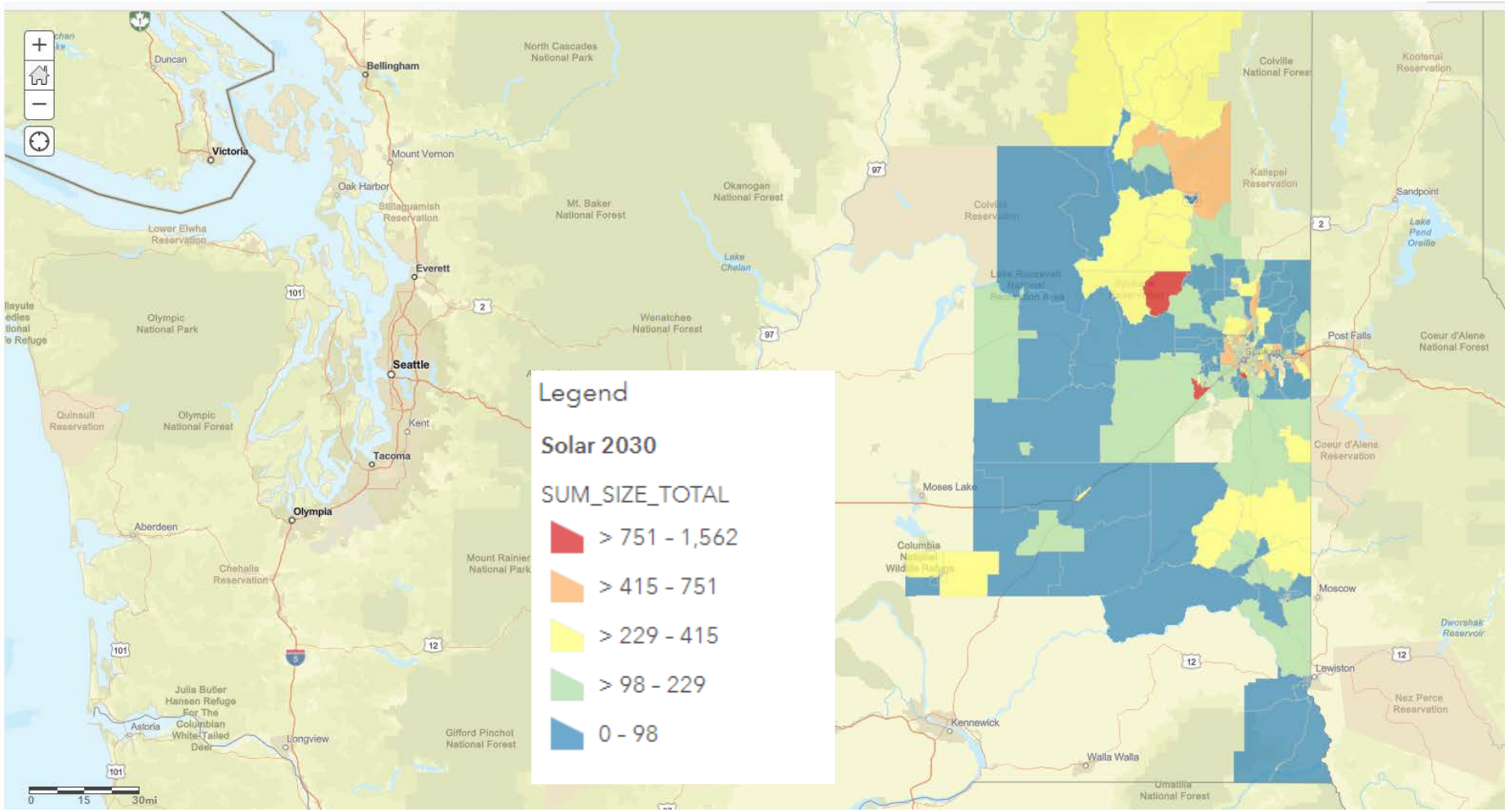
6.2 Load Impact Output Structure

The team will produce a file with load impact output file with the following structure:

- **Scenario.** Reference or High Incentive.
- **Year.** The calendar year.
- **Month.** Month of the year.
- **Day Type.** Weekday or Weekend.
- **Hour Ending.** Hour of Day, 1-24.
- **Census Block Group.** The census block group from the 2020 decennial census.
- **State.** Washington State.
- **Customer Class.** Residential, non-residential.
- **DER Measure.** LDV BEV, LDV PHEV, MDV BEV, HDV BEV, Level 1 EVSE, Level 2 EVSE, DCFC EVSE, Solar PV, Storage, or Wind.
- **kWh.** The average number of hourly kWh for each combination of the segments.
- **Ancillary services kW.** Hourly kW for ancillary services for each variety of the segments.

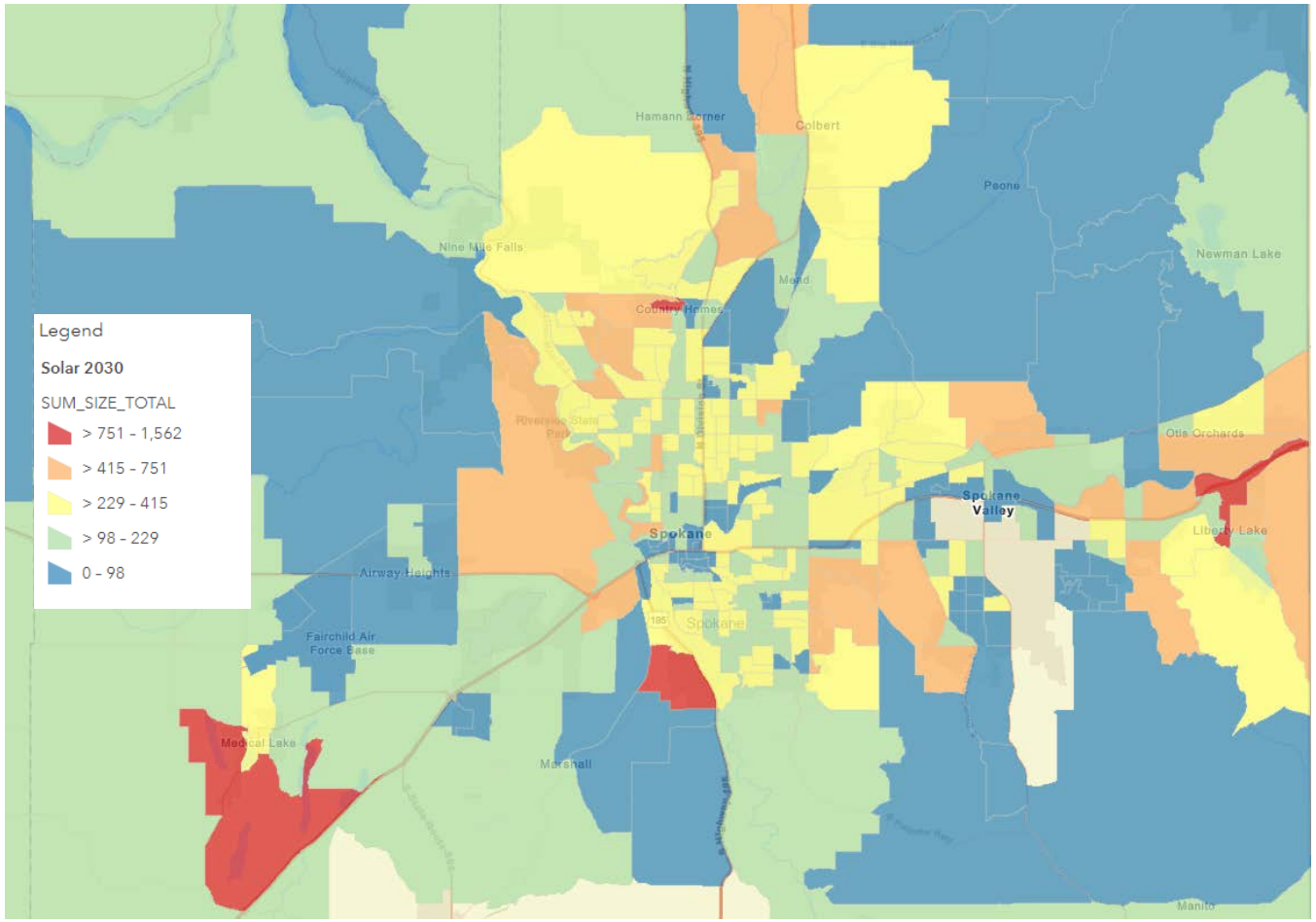
DER Potential map

- PV 2030



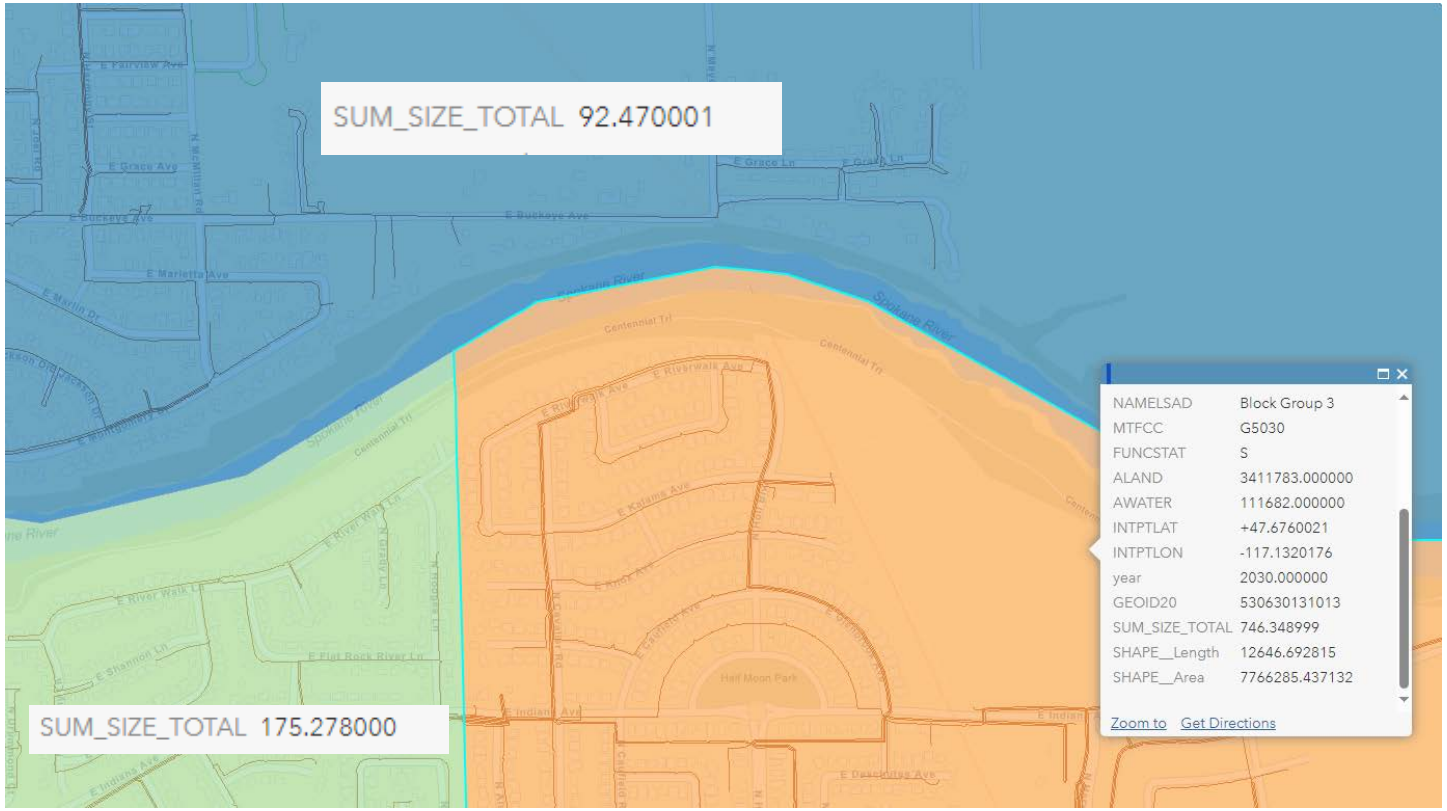
DER Potential map

- PV 2030 Spokane Area



DER map / Hosting map Possibilities

- A heat map highlighting the difference between capacity and expected DER?
- Create an assessment model that includes DER potential.



Questions?

Next steps

- Continue to improve the Hosting Capacity Map.
- Develop an approach to using the DER potential study results in the upcoming system assessment (2025.)
- If you have a topic suggestion, please send it to- DistributionPlanning@avistacorp.com