



Innovation for Future Utility Business Model

University of North Dakota

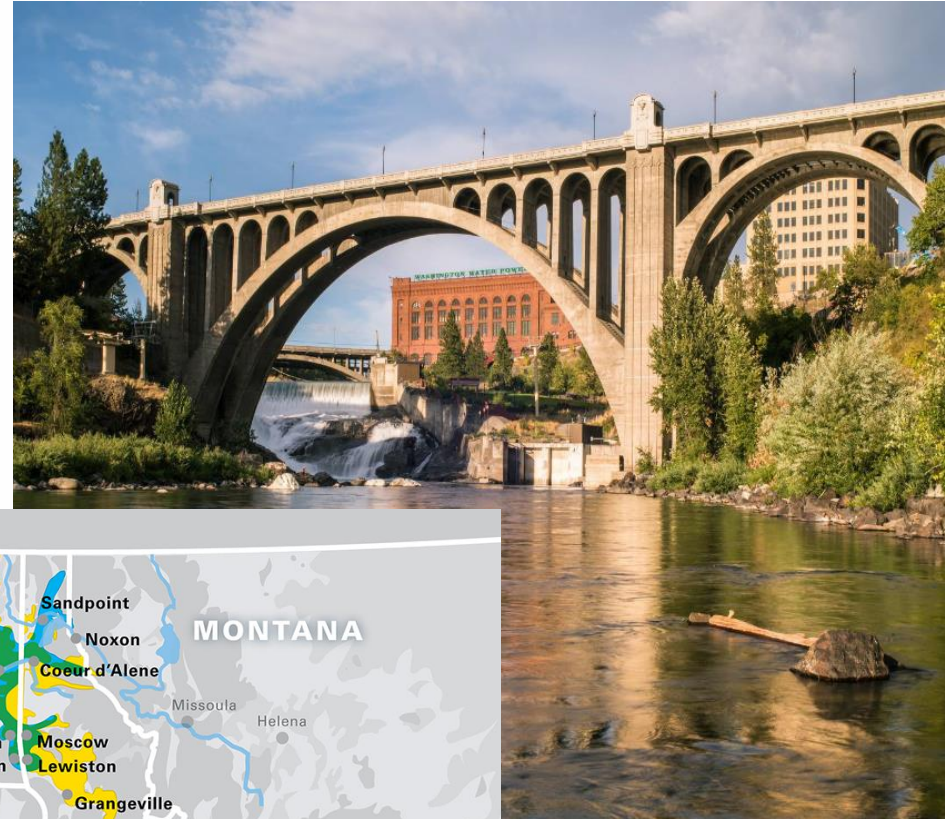
John Z Gibson, P.E.

Avista Utilities Director of Avista Innovation Lab & Chief R&D Engineer

November 2023

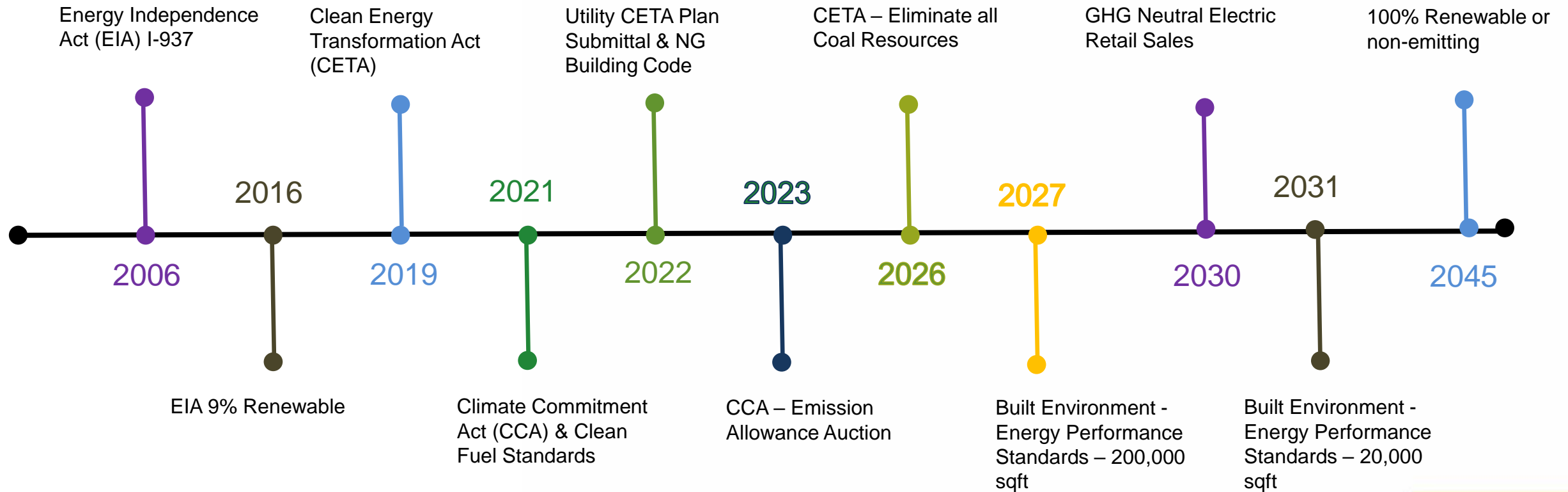
About Avista

- Incorporated in 1889
- Investor-Owned Utility with headquarters in Spokane, Washington
- Over 1,700 employees
- Electric and natural gas service
 - 379,000 electric customers
 - 342,000 natural gas customers

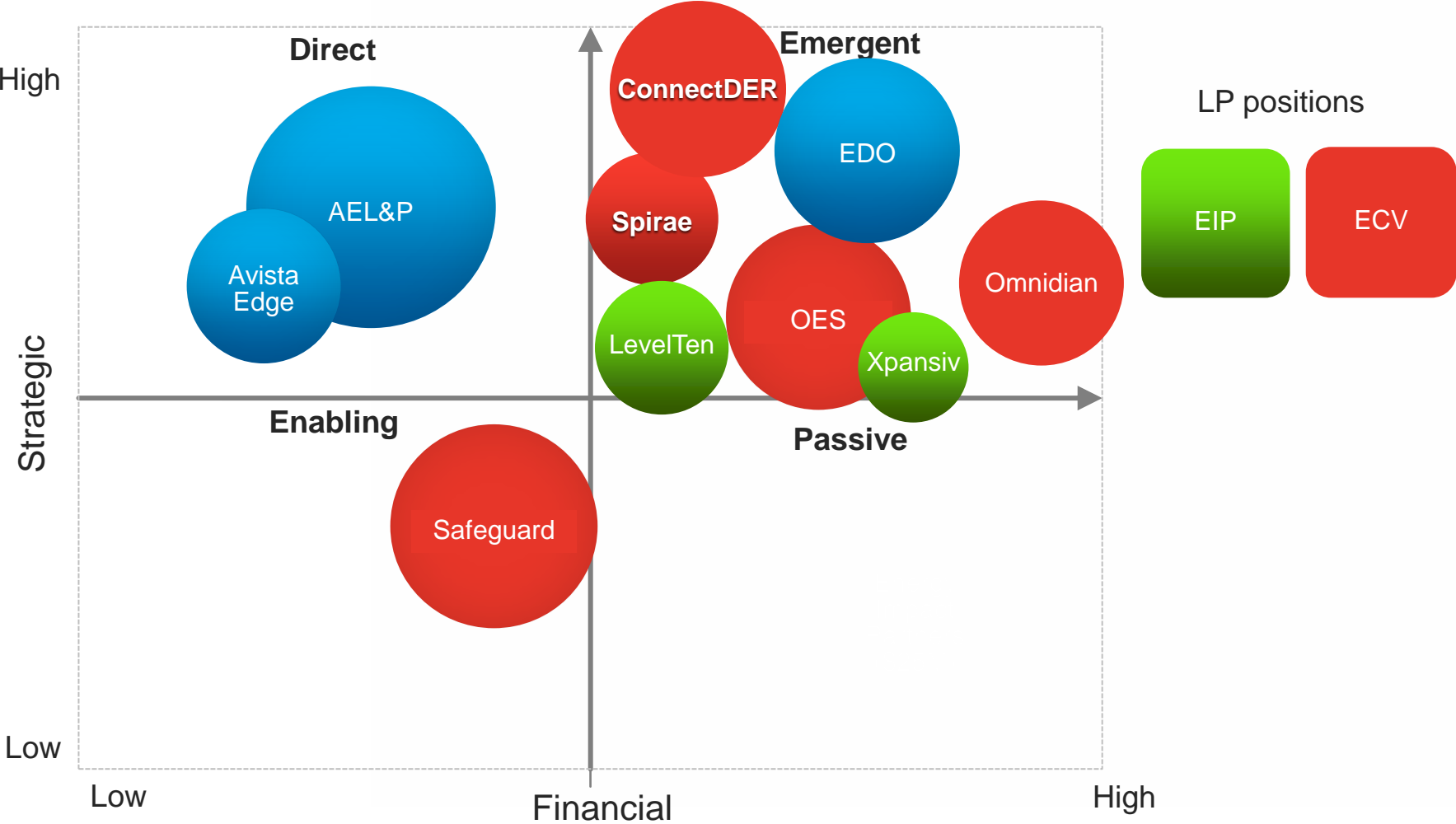


Avista's Regulator Climate

Washington's Legislative Agenda



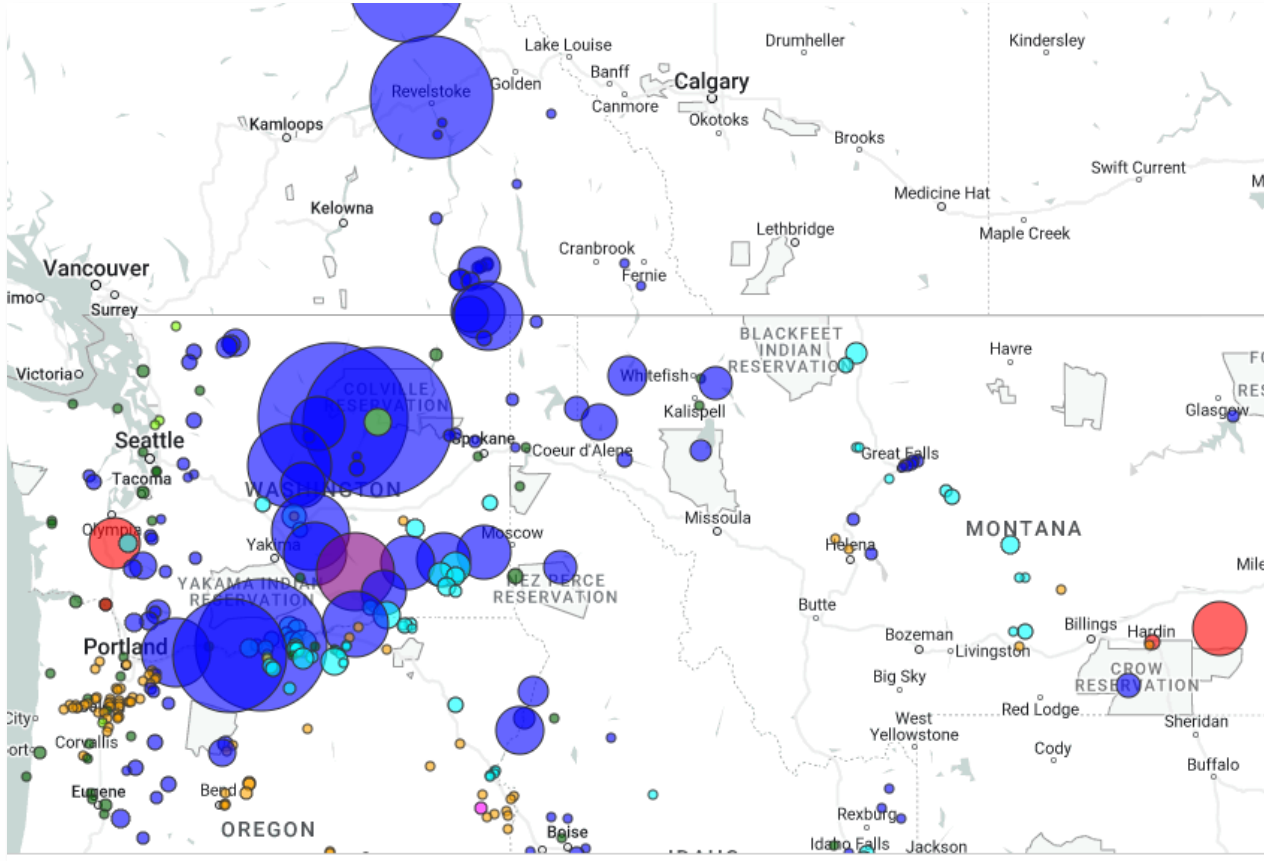
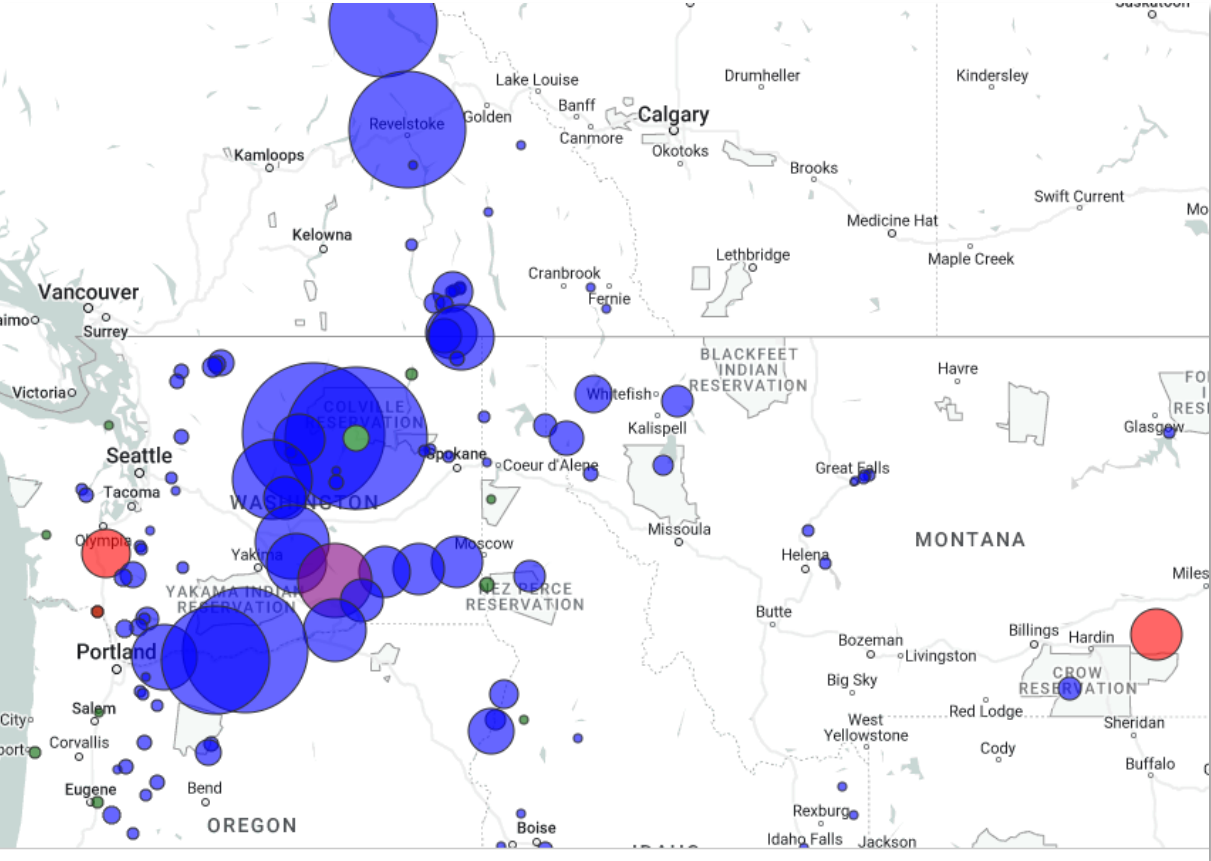
Avista's Strategic Investments



Pacific Northwest Resource Mix – Supply

Regions Resource Mix 1988

Regions Resource Mix 2023

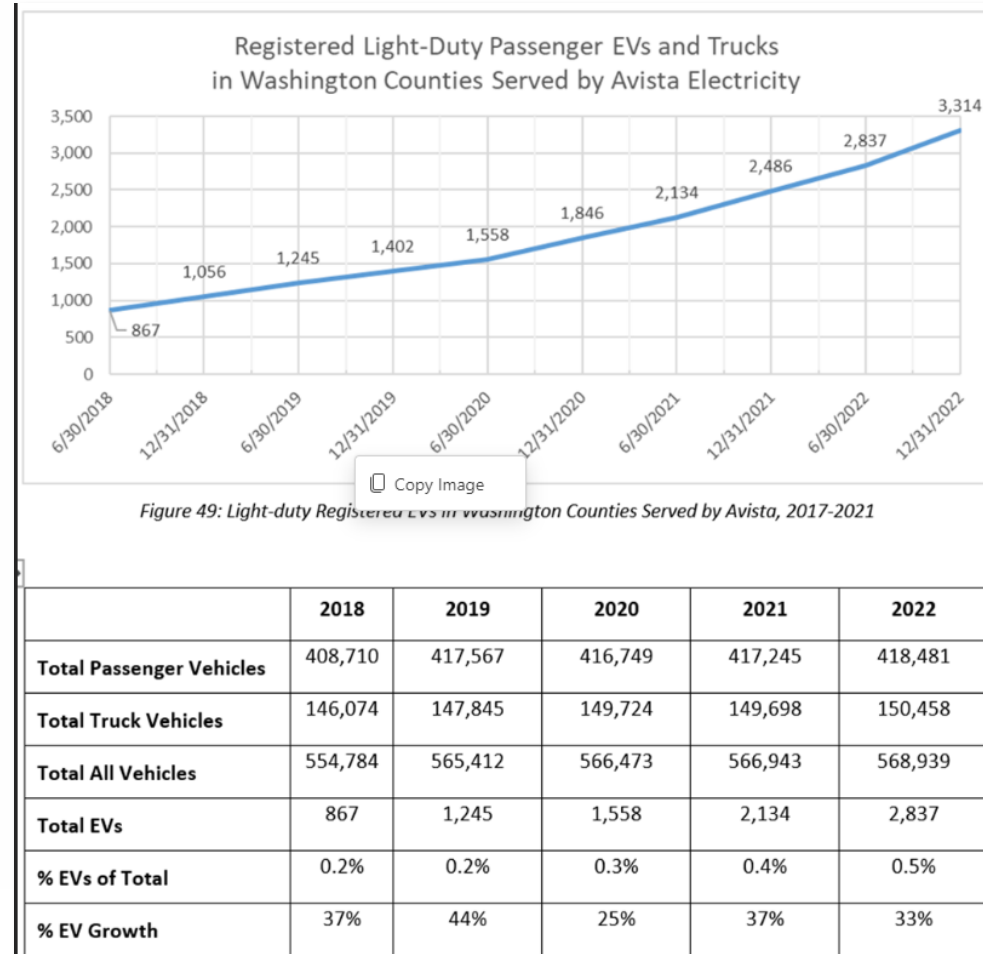
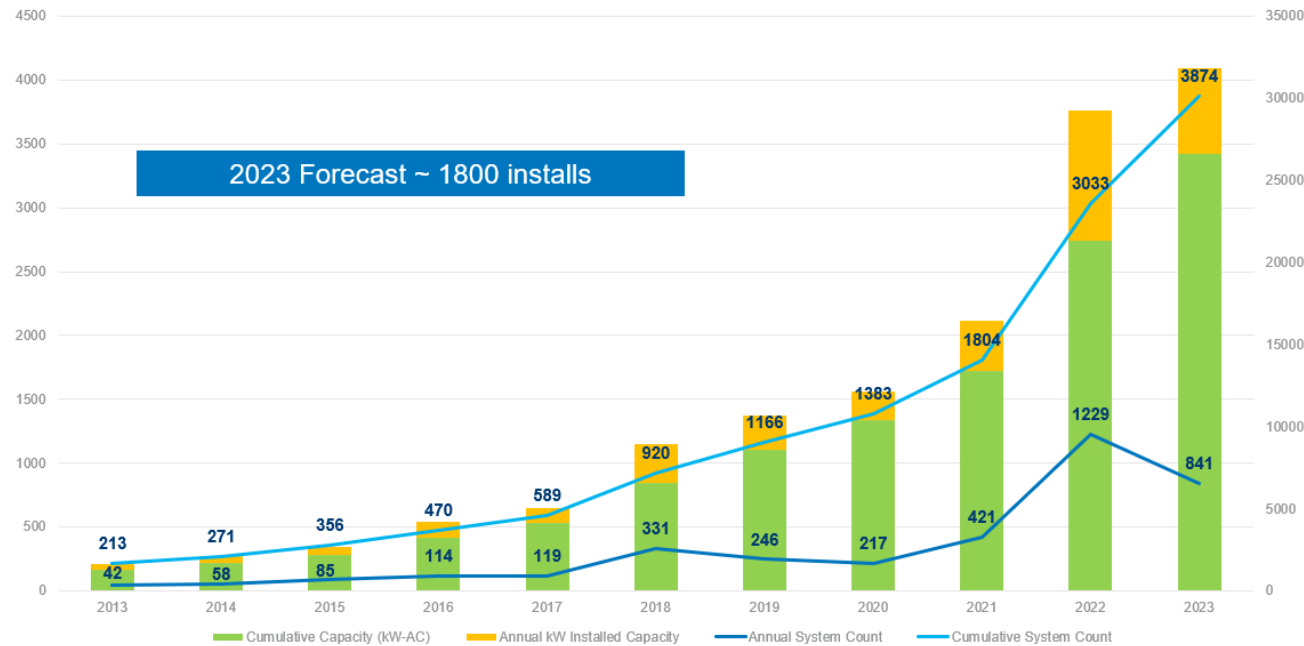


Avista's Customer Adoption

Solar and EV

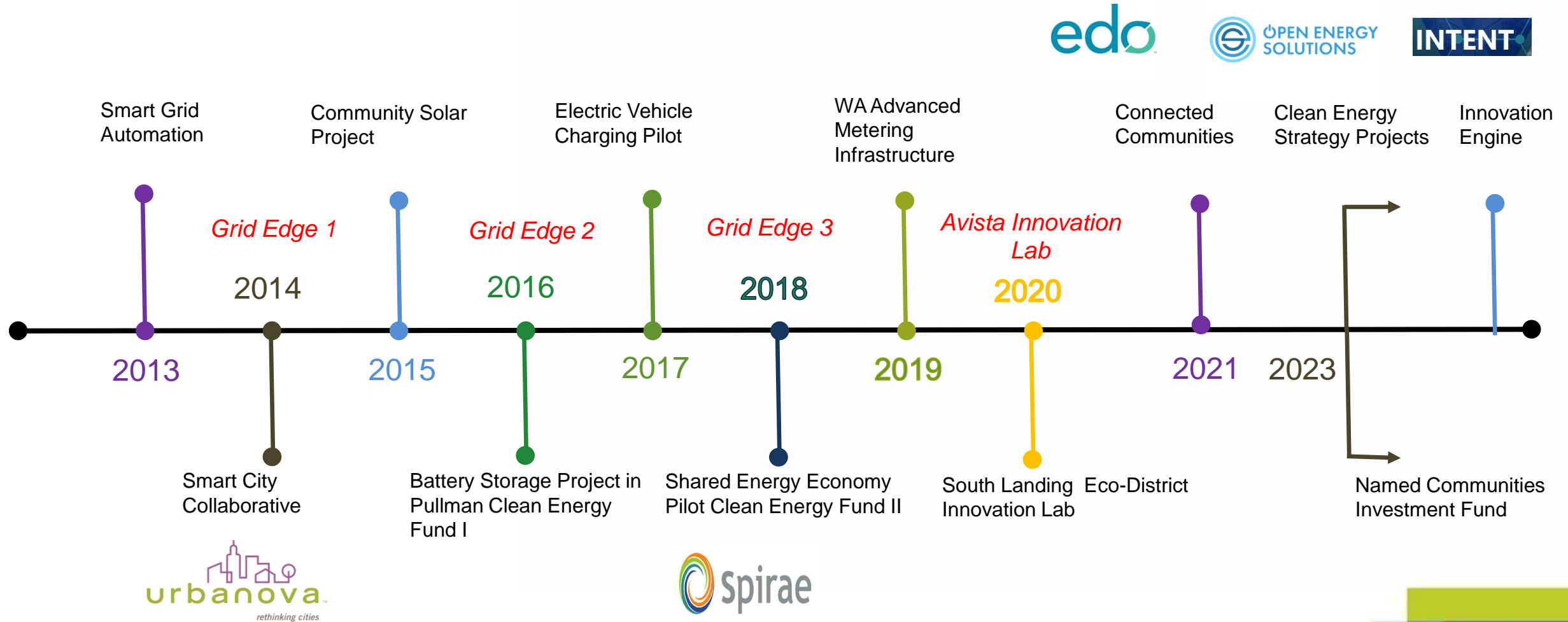
Solar Adoption Continues to Grow

WA installed capacity 23.18 MW (cap: 48.1 MW)
ID installed capacity 3.41 MW (cap: .593 MW)



Avista's Business to Invent

Avista's Projects of Grid Edge Journey of Discovery



Avista Innovation Lab – Mission, Vision & Values

Mission

Leverage Industry Expertise with a State-of-the-Art Innovation Lab to Deliver a Better Energy Future for all Customers

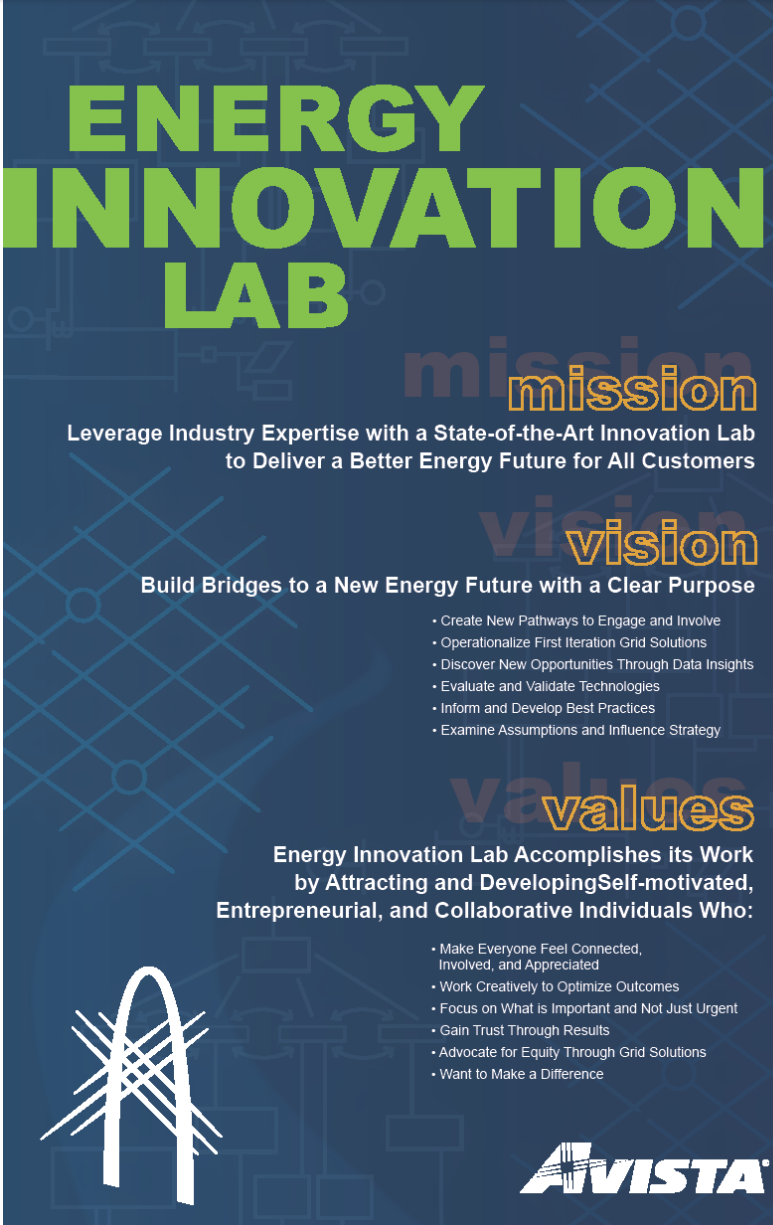
Vision

Build Bridges to a New Energy Future with a Clear Purpose

- Create New Pathways to Engage and Involve
- Operationalize First Iteration Grid Solutions
- Discover New Opportunities Through Data Insights
- Inform and Develop Best Practices
- Examine Assumptions and Influence Strategy

Values

Energy Innovation Lab Accomplishes its Work by Attracting and Developing Self-motivated, Entrepreneurial, and Collaborative Individuals



ENERGY INNOVATION LAB



mission
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vision
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- Operationalize First Iteration Grid Solutions
- Discover New Opportunities Through Data Insights
- Evaluate and Validate Technologies
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values
Energy Innovation Lab Accomplishes its Work by Attracting and Developing Self-motivated, Entrepreneurial, and Collaborative Individuals Who:

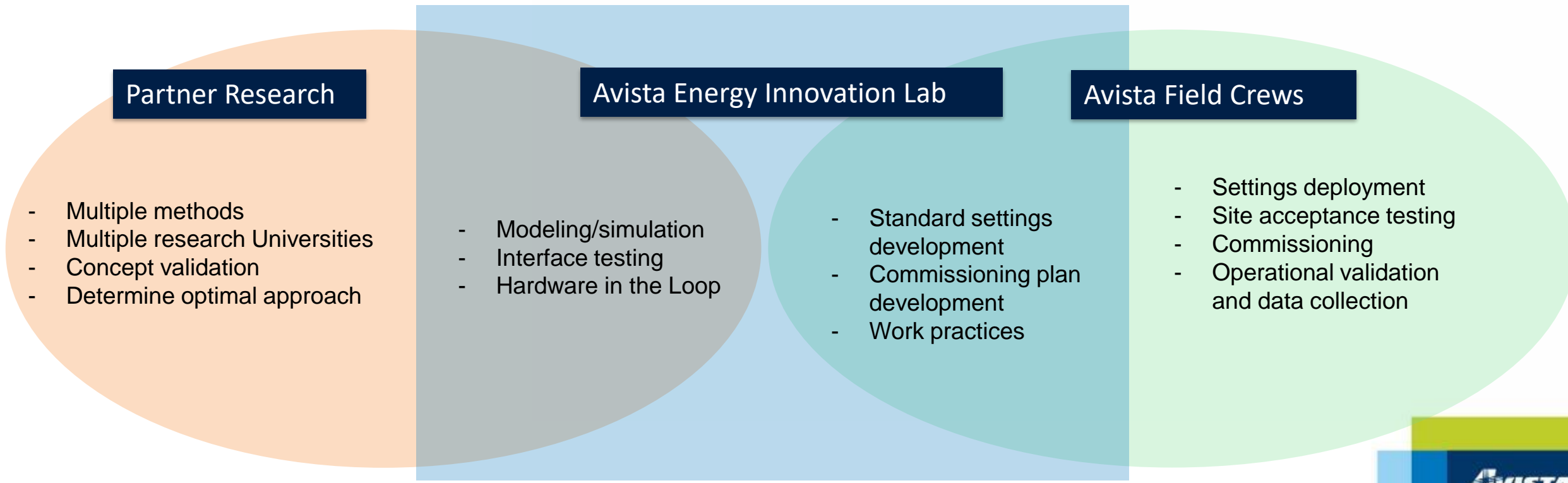
- Make Everyone Feel Connected, Involved, and Appreciated
- Work Creatively to Optimize Outcomes
- Focus on What is Important and Not Just Urgent
- Gain Trust Through Results
- Advocate for Equity Through Grid Solutions
- Want to Make a Difference



Avista Innovation Lab – Working with Partners

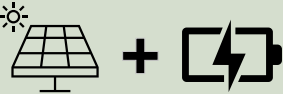
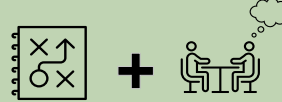
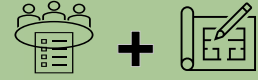

Avista’s Innovation does not conduct research.
We operationalize the good ideas from industry, universities and national labs.

Partner Collaboration Model

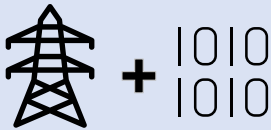

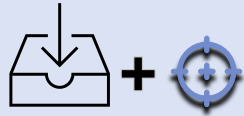
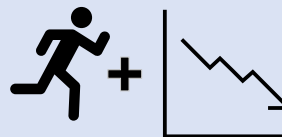


Avista Innovation Lab Program Model

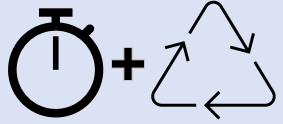
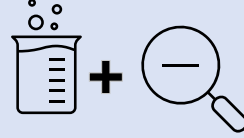
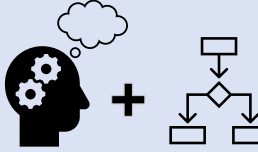
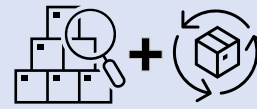
Strategic Initiatives

 <p>Shared Energy Services Customer product and services hosted and exchanged across the utility infrastructure</p>	 <p>Strategic Planning Utility clean energy roadmap aligned with public, and private partnerships</p>	 <p>Demonstrations Utility work practices, standards and artifacts required for safe and reliable energy exchanges</p>	 <p>Workforce Development Utility incorporates hosted products and services within operational workforce development</p>
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Capital Efficiency

 <p>Digital Infrastructure Utility digital architecture key infrastructure upgrades</p>	 <p>Capital Allocation Public and private funding aligned towards Digital infrastructure</p>	 <p>Work Practices Review Standards, Work Practices and Artifacts Required for Delivery</p>	 <p>Economic Efficiency Review Standards, Work Practices and Artifacts Required for Delivery</p>
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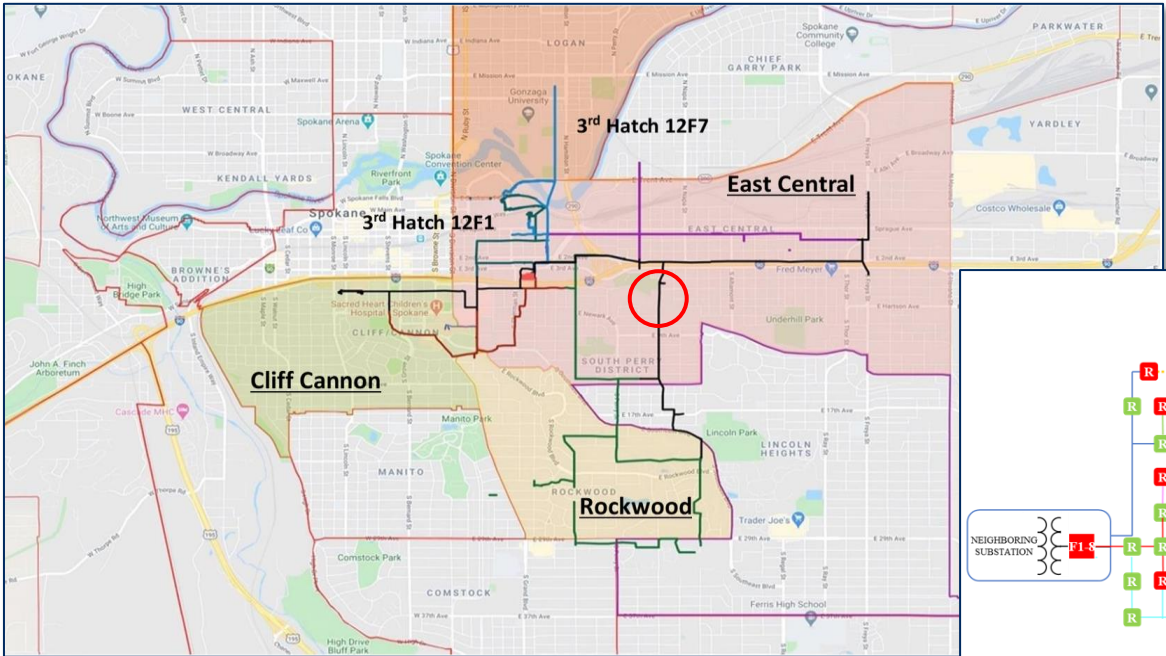
Regional Energy Ecosystem

 <p>Outsource Services Innovation lab ecosystem of services to align investment to utility transformation</p>	 <p>Utility Proof Work with venture capital to validate, and recommend system improvements to the product</p>	 <p>System Integration Integrate product or services within the simulation environment to operations</p>	 <p>Commercialization Work incubator and accelerator for the product offering</p>
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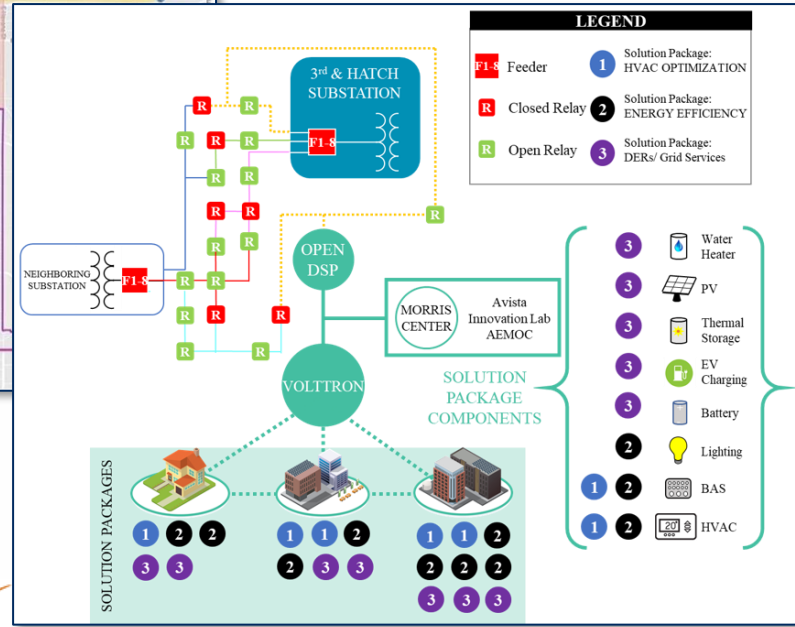


Connected Communities – Strategic Project

Site Location



Technology Components



- ✓ \$11.2M program (6.5M DOE grant + partner contributions).
- ✓ The project will unlock demand flexibility up to 2.25 MW using flexible loads in the buildings augmented by DERs.
- ✓ EE measures will save up to 900 MWh/yr.
- ✓ Emissions reductions will be up to 650,000 lb CO₂e/yr.
- ✓ Improve resiliency of grid in face of changing climate



CEF2 Shared Energy Economy – Strategic Project



Solar PV

- 2 rooftops
- 100 kW each
- Smart Inverters

Building Load Controls

- 2 buildings
- Load Flexibility while Grid Connected
- Load Management while Islanded

Battery Energy Storage

- 500 KW / 1500 KWH
- 167 KW / 337 KWH
- Grid Forming Inverters

Microgrid Control System

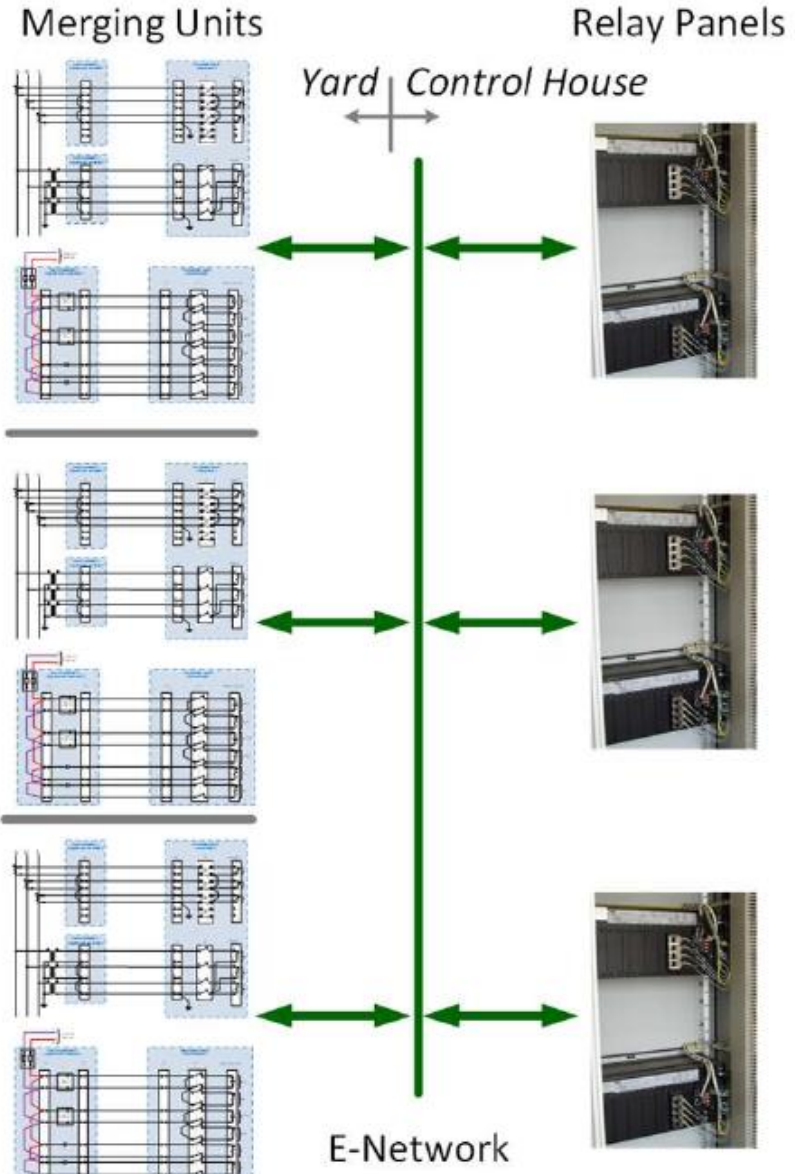
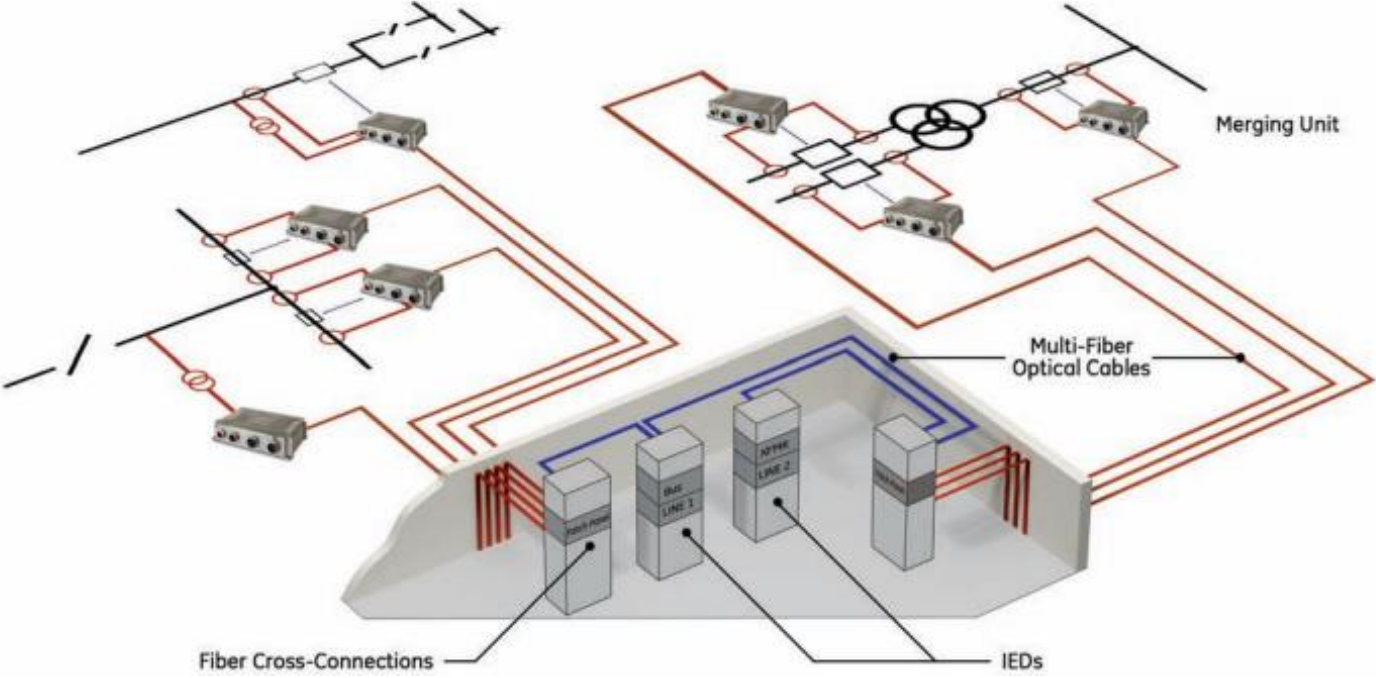
Utility DMS

DER Optimization

Digital Substation Pilot – Capital Efficiency

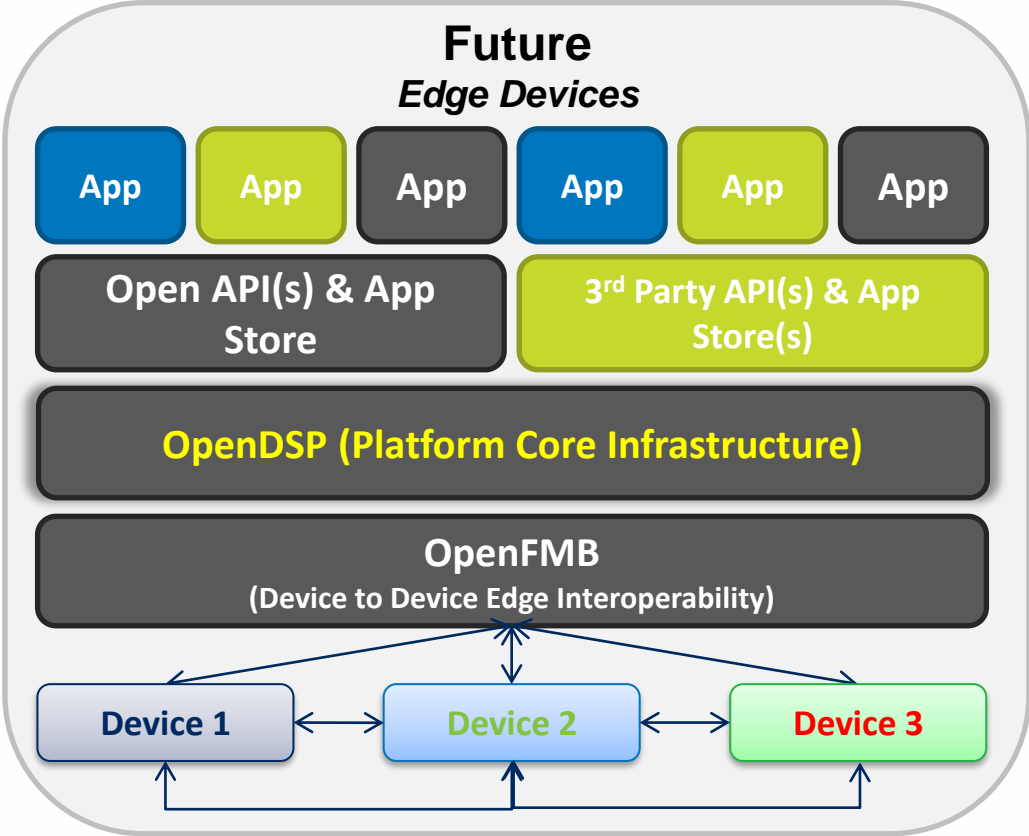
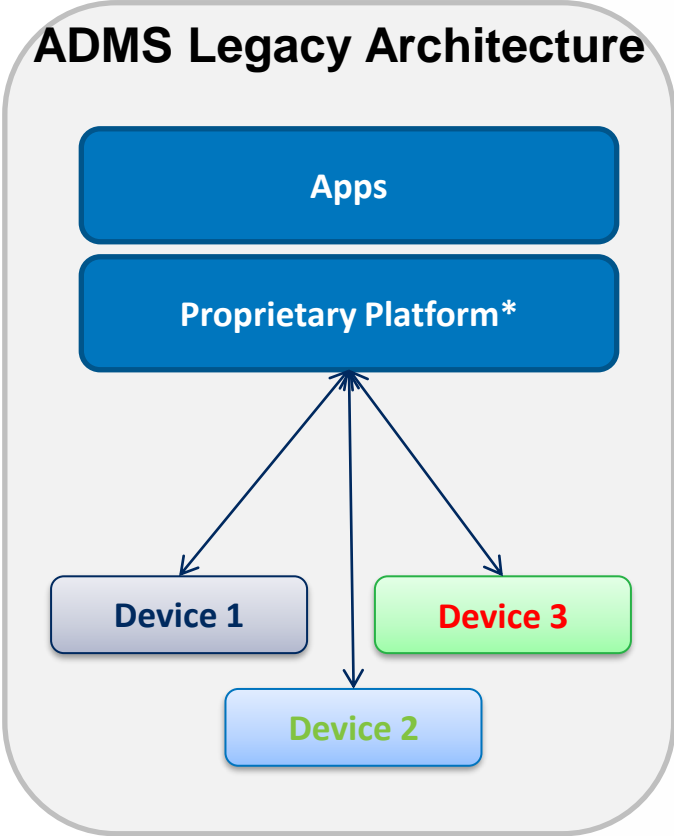
- A **Digital Substation** utilizes digital secondary systems, where CT/PT and control signals are digitized in the yard near the measurement point, and a fiber optic network communicates those signals back to the relays in a time-synchronized manner at high speed.

IEC-61850
MMS (SCADA)
GOOSE (Control wires)
Sampled Values (CT/PT)



ADMS Phase Zero – Capital Efficiency

How do we move a legacy operational technology to the demands on the grid transformation?



Legend

 Vendor-specific

 3rd Party

 Open-Source



INTENT – Ecosystem

INTENT

Advancing Energy and Decarbonization Technologies in the Inland Northwest (WA, ID)

What is an NSF Engines Program?



➤ **Robust partnerships**

Deep collaborations across a wide range of partners, including industry, academia, government, nonprofits, civil society and communities of practice.



➤ **Accountable leadership**

Strong, CEO-led organization with accountability to a governance board, regional stakeholders and NSF.



➤ **Regional economic impact**

Co-design and co-creation of R&D and translation activities with direct impact on the end users in the Engine's region of service.



➤ **Culture of innovation**

A nimble organization that engages in use-inspired R&D that adapts to changing societal and economic needs.



➤ **Inclusion at all levels**

Diversity, equity, inclusion, and accessibility, or DEIA, are intentionally and meaningfully embedded at all levels in leadership, R&D, and workforce development activities.

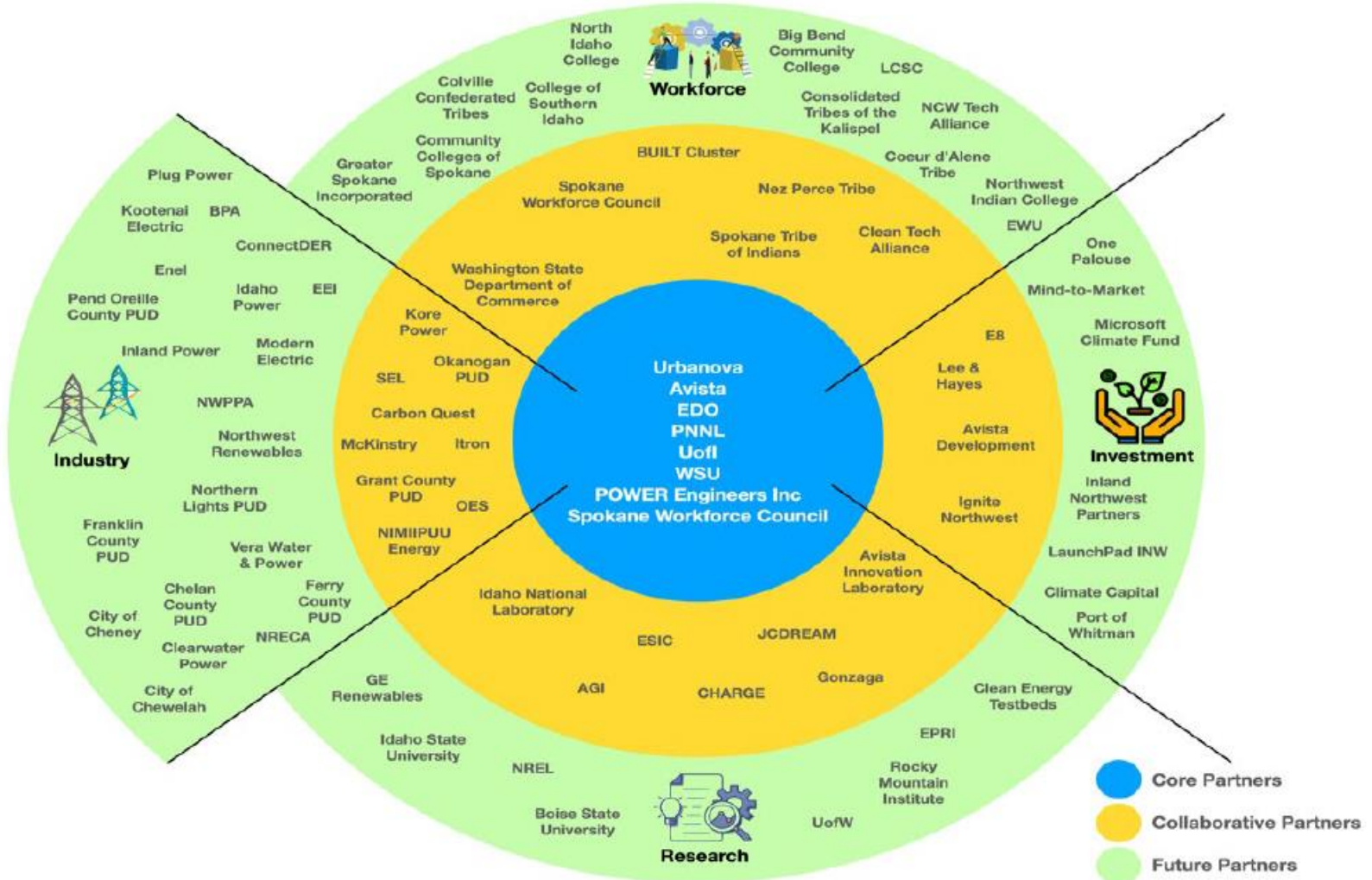


➤ **Comprehensive workforce development**

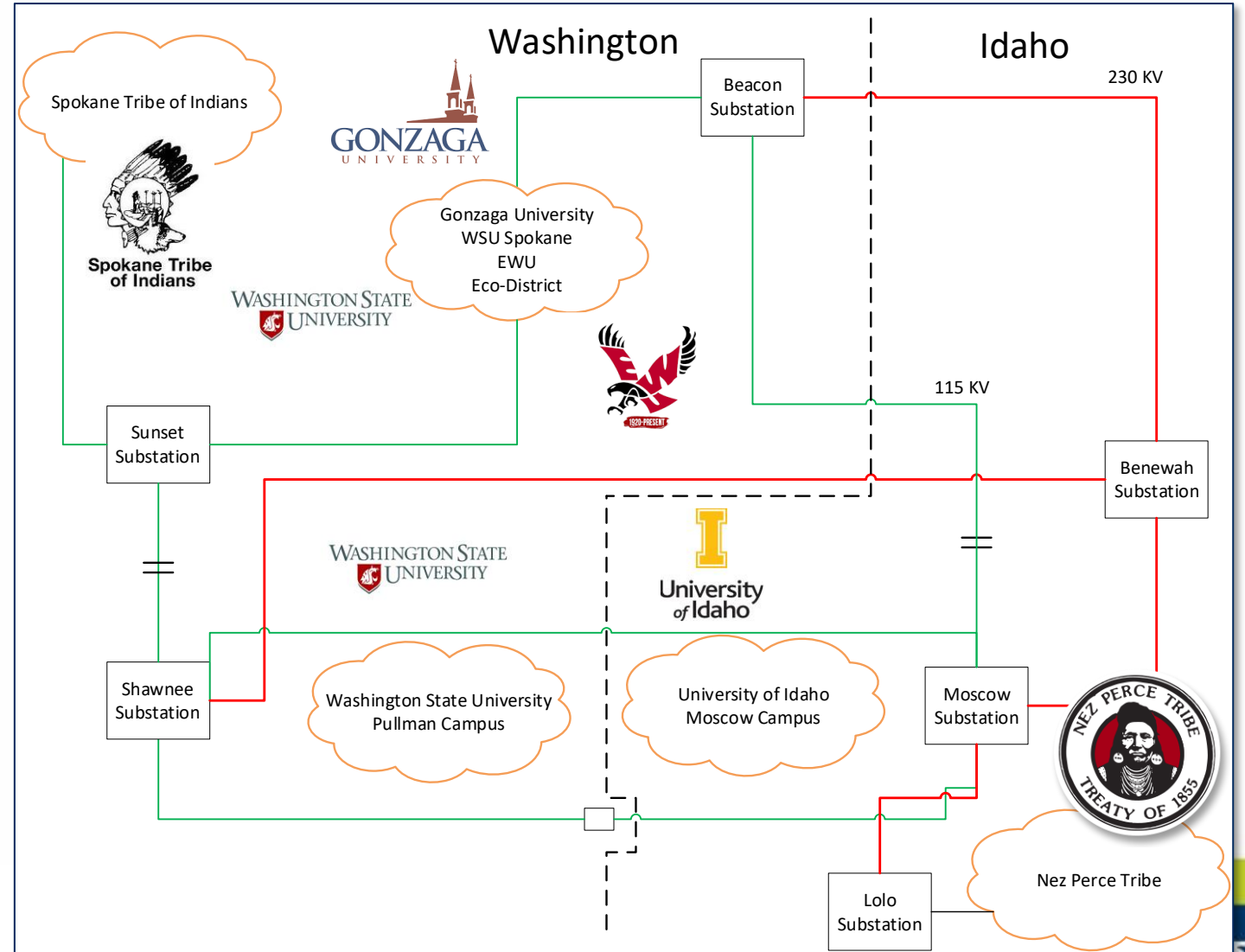
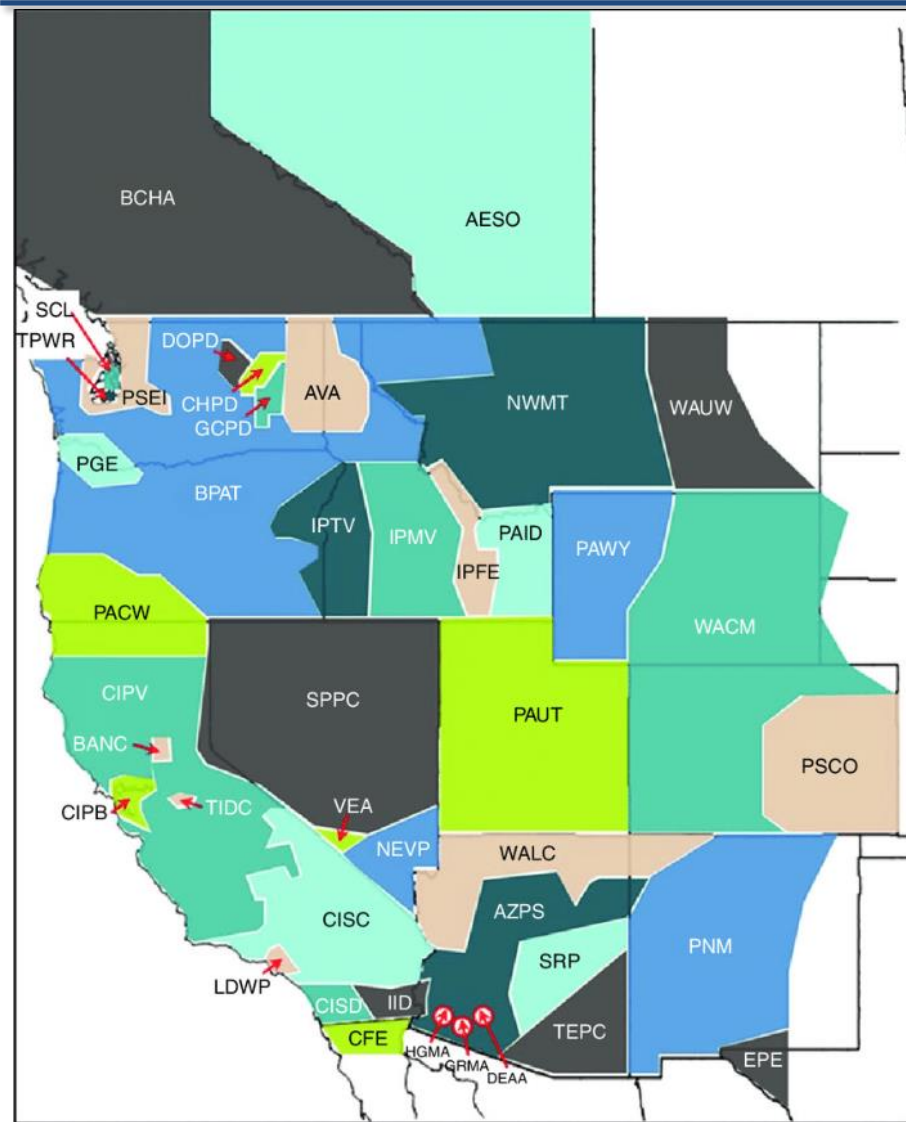
Workforce development initiatives to train and educate technicians, researchers, practitioners, and entrepreneurs to meet regional workforce needs.

INTENT – Ecosystem

Regional Ecosystem



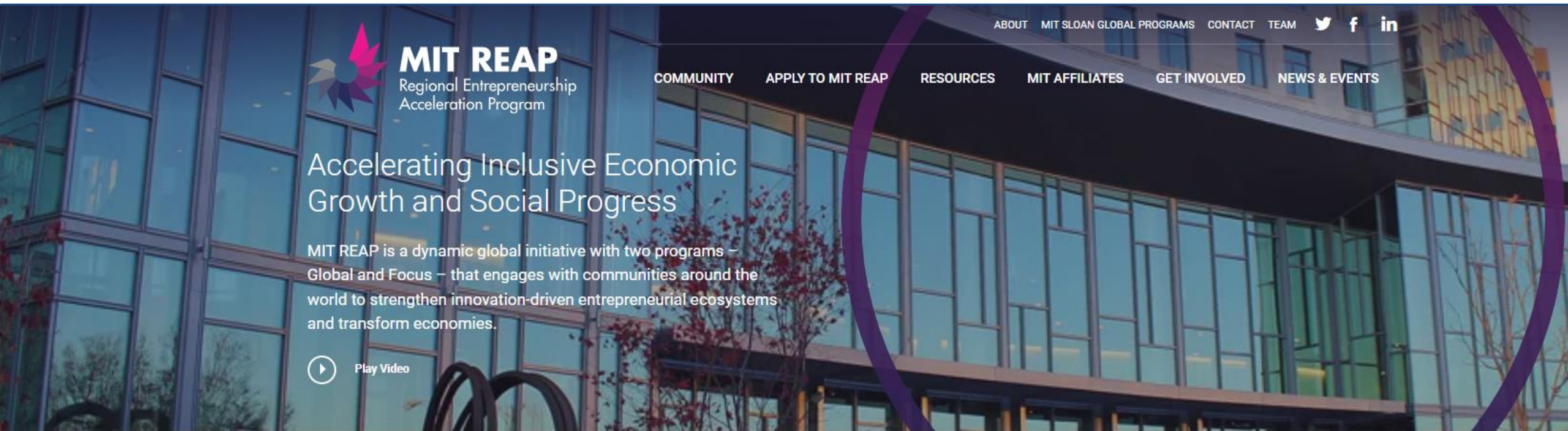
Regional Energy Platform – Ecosystem



What value proposition exists in DER's participating in balancing services?

Questions

NSF Training Program



- You have a terrific opportunity to turbocharge your game with the help of MIT Regional Entrepreneurship Acceleration Program (REAP)
 - World leaders in helping communities around the world strengthen innovation-driven entrepreneurial ecosystems and transform economies
 - Thought leaders in understanding what it takes to “bootstrap” innovation ecosystems