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October 8, 2019

MEMORANDUM

TO: Council Members

FROM: Gillian Charles

SUBJECT: Briefing on regional energy future from an independent power producer perspective

BACKGROUND:

Presenter: Orijit Ghoshal, Invenergy - Senior Manager, Regulatory Affairs

Summary: The region is facing a near-term future that includes early coal unit retirements, potential resource adequacy shortfalls, and state-level clean energy policies spurring new renewable and/or carbon-free resource development in unprecedented quantities. The Council often hears directly from the utilities - through their integrated resource plans (IRPs) - how they plan to navigate through this new realm of energy policy and resource portfolio development. Another important role is that of the independent power producer (IPP), a non-utility entity who develops, owns, and generates electricity for sale to a third party (often a utility through a long-term power purchase agreement). At the October Council Meeting, Council Members will hear from Orijit Ghoshal, senior manager of regulatory affairs at Invenergy, how IPPs see their role in the ever-evolving regional energy future.

Invenergy is a Chicago-based IPP with an international portfolio of wind, solar pv, natural gas, and battery storage resources. Invenergy's presence in the region includes existing projects such as Gray's Harbor (natural gas facility in Washington), and Vantage and Judith Gap (wind projects in Washington and Montana, respectively). Invenergy is currently partnered

with Facebook and PacifiCorp to develop two solar projects in Prineville, Oregon to support Facebook's data center. Totalling 100 MW in capacity, the projects are expected to be operational in 2020.

Relevance: As the Council assesses the region's existing system, future power supply adequacy, and the 2021 Power Plan, it is important to consider the role of IPPs in new resource development.

Workplan: A.4 Generation Resources – developing resource reference plants and data sets for the 2021 Plan

More Info: <https://invenergy.com/>



Regional Energy Future from IPP Perspective

Orijit Ghoshal – 10/16/2019

World's leading privately held sustainable energy company

CORE BUSINESS

Invenergy

Our Foundation

Developing and operating sustainable energy projects around the world



Wind

94 projects
14,081 megawatts



Solar

28 projects
3,216 megawatts



Storage

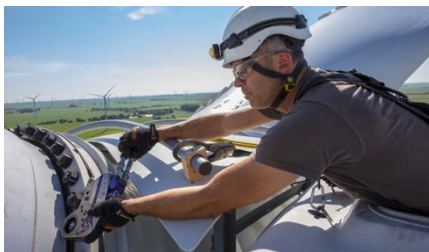
13 projects
653 megawatt hours
250 megawatts



Natural Gas

11 projects
5,641 megawatts

DIVERSIFIED SOLUTIONS



Invenergy Services

Award-winning asset management and operations with an owner's mindset



Invenergy Edge

Turnkey solutions for facility and fleet owners that deliver cost savings, reliability and sustainability



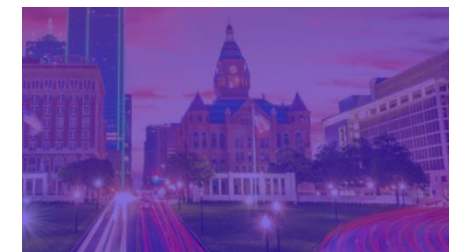
Invenergy Transmission

Experience building 400+ miles of transmission infrastructure to bring power to market



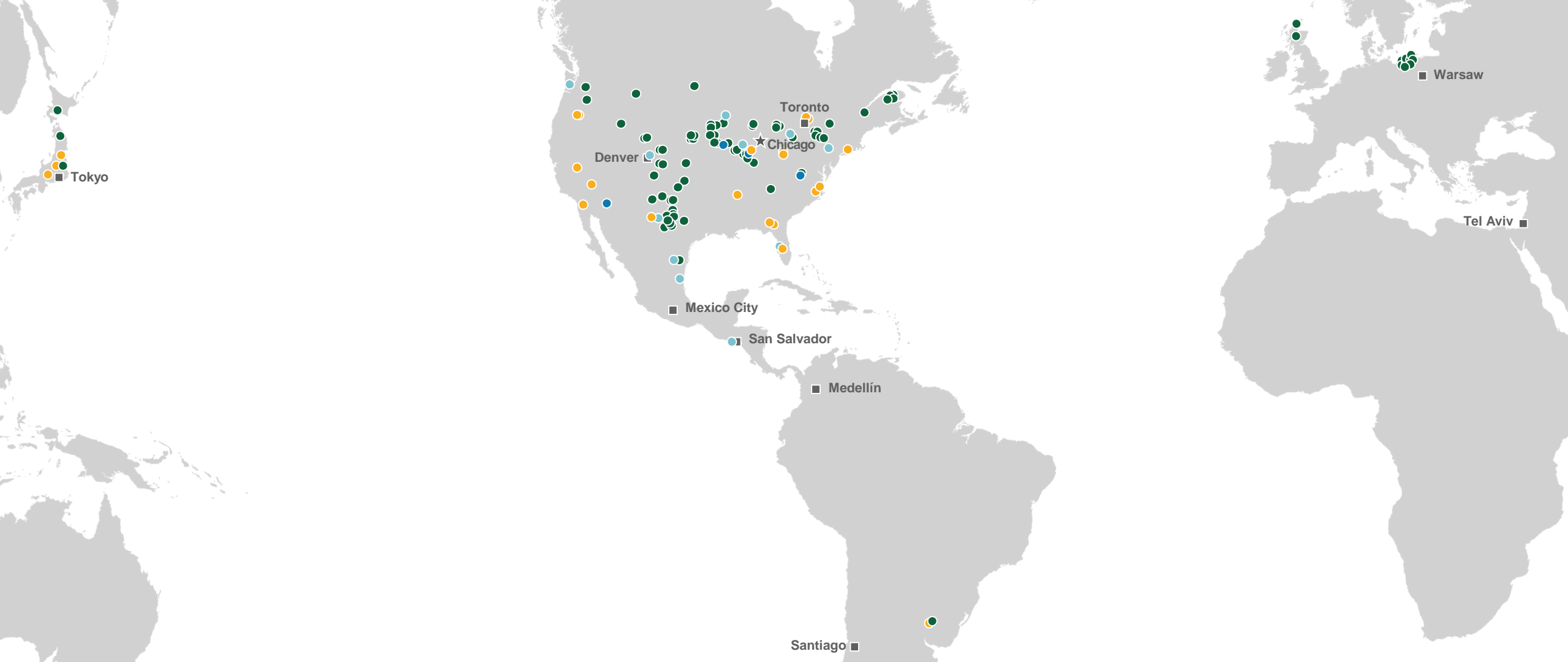
Invenergy Clean Water

Tackling the next sustainability challenge with an emerging water desalination business



ENERGIZE VENTURES

Investing in digital solutions that drive affordability, reliability and security for energy and industry



Invenergy

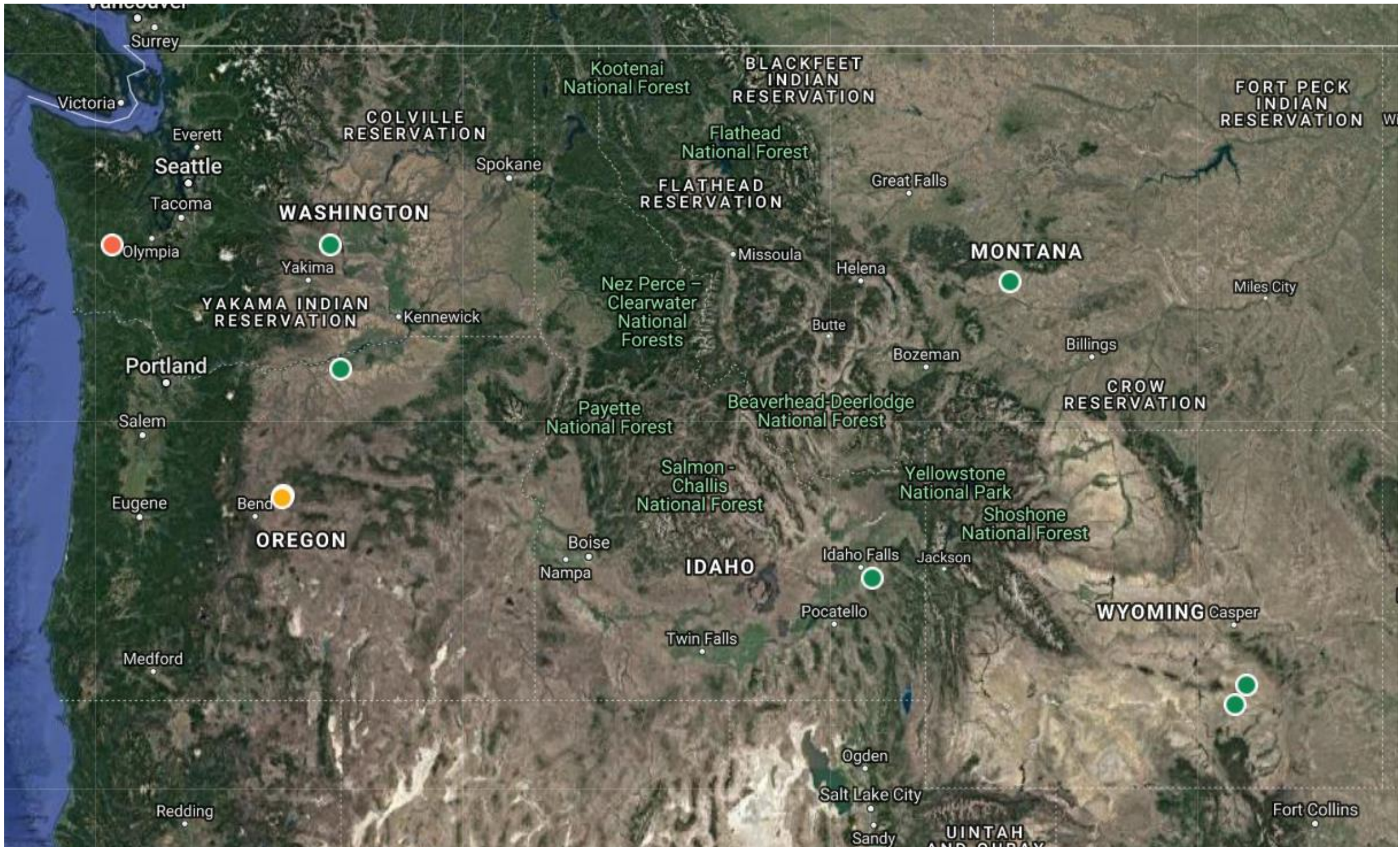
145+
Projects
Developed

23GW
Capacity
Developed

\$33Bil+
Completed
Transactions

5Mil
Homes
Powered

4.9Mil
Cars off the
Road Equivalent













Step 1:
Excavation Work
Begins



Step 2:
Foundation is
Started



Step 3:
Concrete is
Poured



Step 4:
Tower Sections
are Delivered



Step 5:
Attach Base to
Tower Foundation



Step 6:
Complete Erecting
the Tower



Step 7:
Attach the Nacelle
& Turbine Blades



Step 8:
Underground
Cables are
Trenched In



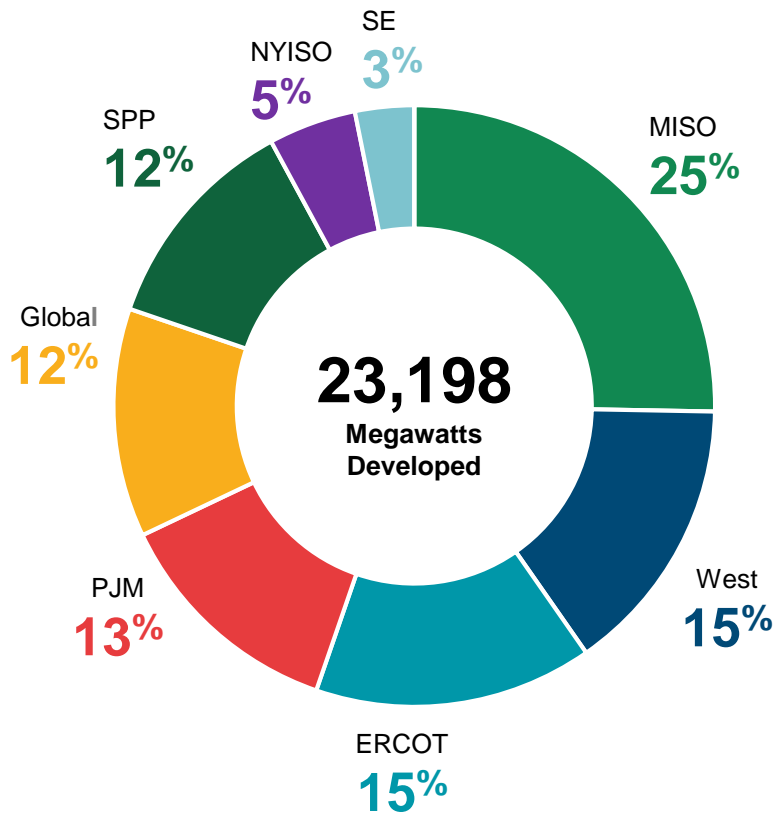
Step 9:
Complete Access
Roads



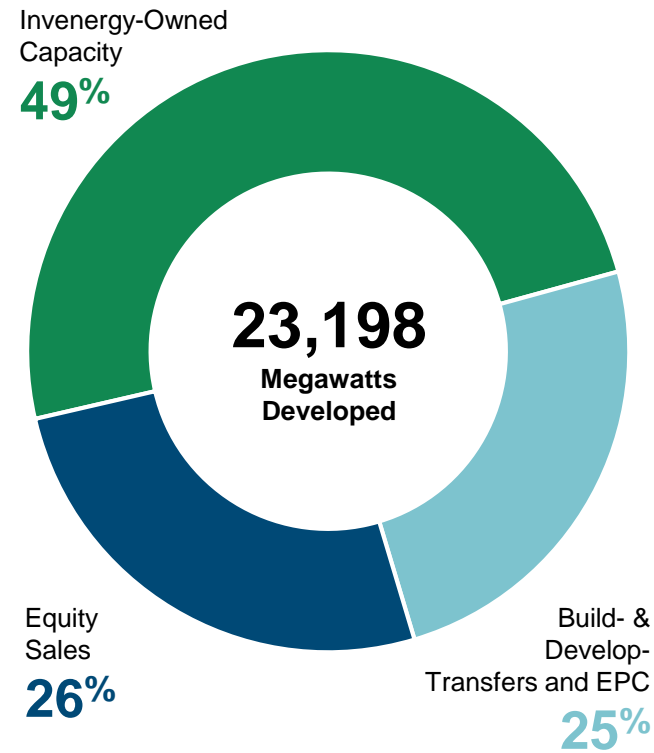
Step 10:
Wind Farm is
Operational

Expertise, Flexibility Across Markets & Project Structures

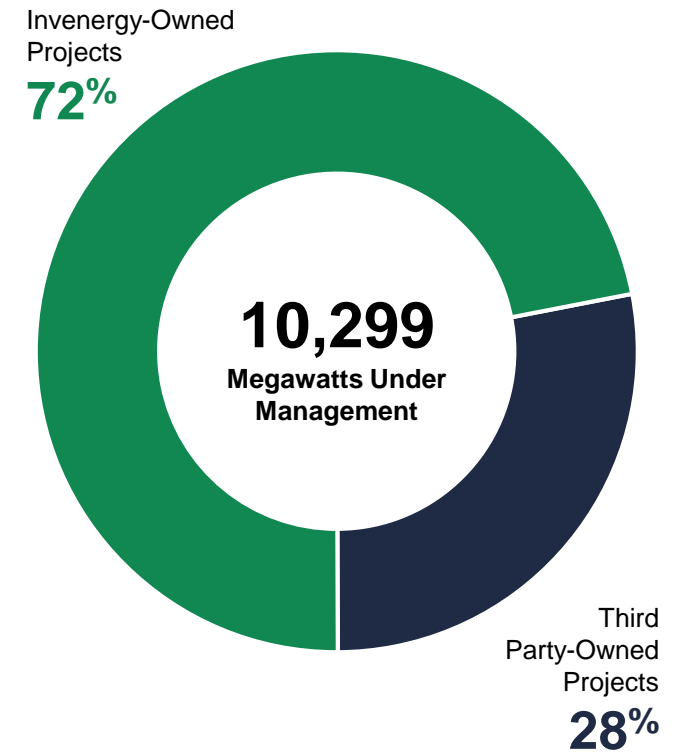
MARKETS



PROJECT OWNERSHIP



OPERATIONS





Projects

Operating, in construction & contracted



653

Megawatt Hours



13

Projects

Development pipeline



5,000+

Megawatt Hours



Renewable Integration

Developed co-located batteries that help smooth and shape wind and solar generation profiles, making it easier for utilities to manage intermittent resources.



Flexible Capacity

Partnered with MidAmerican to install a battery within four months, providing peak capacity that is instantly dispatched, and capable of stacking a variety of value-added grid applications.



Grid Support

From microgrid development to utility T&D deferral, we can provide localized peak capacity, backup power & voltage support.



400 Miles

Transmission line constructed

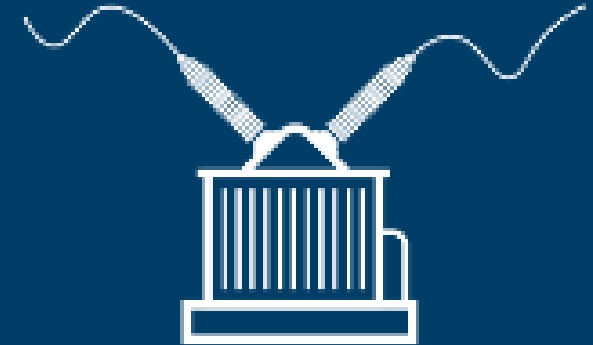
230 Miles

Transmission line operated



2,000 Miles

Distribution line operated,
connecting end users to
clean electricity

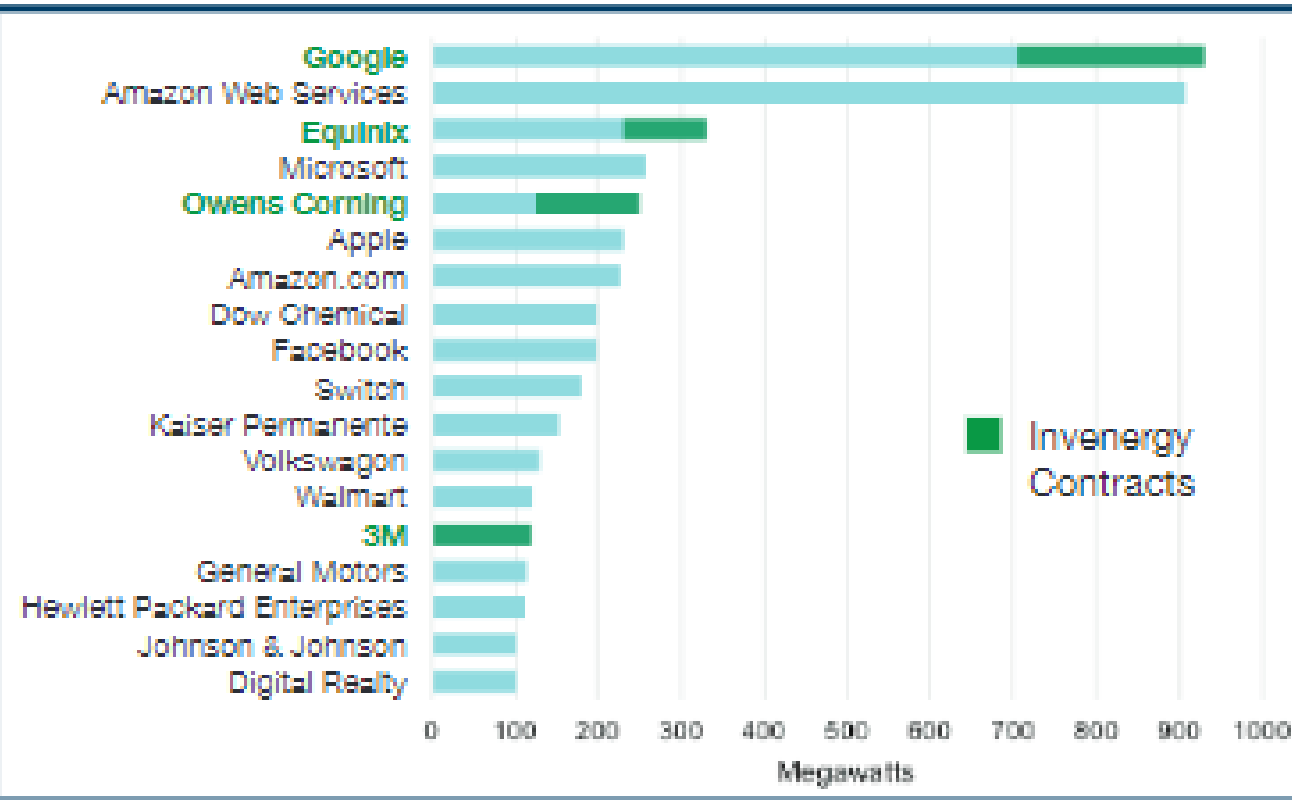


80

GSU transformers built

60

Substations built



Invenergy Contracts with Largest US Corporate Buyers

Total MWs Signed to Date
 (Source: Bloomberg New Energy Finance)

To date, Invenergy has executed contracts with corporations to provide more than 1,500 MWs of off-site renewable energy. Since 2015, Invenergy has contracted more MWs with C&I customers than any other developer.

Northwest Need

Thermal Retirements

- Due to economics
- Due to policies

Changing Flows

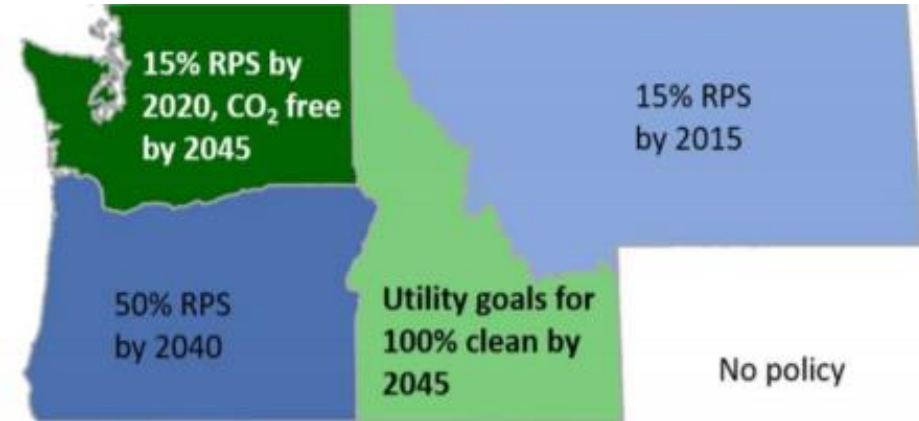
- California and BC changes
- Distributed resources

Weather Patterns

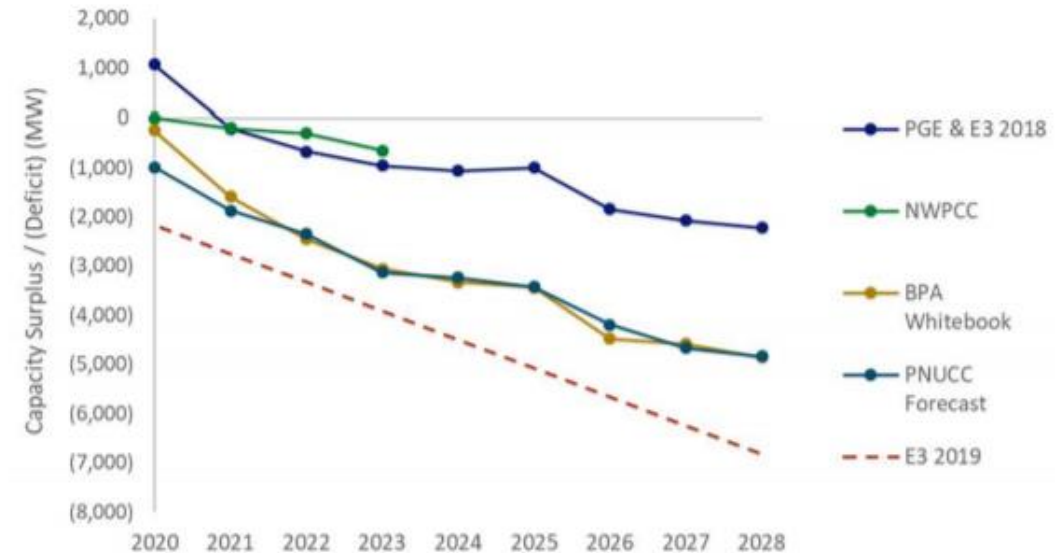
- Low pressure systems provide triple whammy
- Peak conditions differ within region

BPA's Role

- Increasing O&M costs, decreasing market prices
- Preference slices expire in 2028



NW Capacity Surplus / Deficit in Recent Studies



Northwest Challenges

Siting

- Low-hanging fruit has been picked
- Intersectionality

Resources

- Solar cost curve
- Long-duration storage

Transmission

- BPA's dominance
- Lack of new independent transmission

