PacifiCorp Planning





PACIFICORP

POWERING YOUR GREATNESS

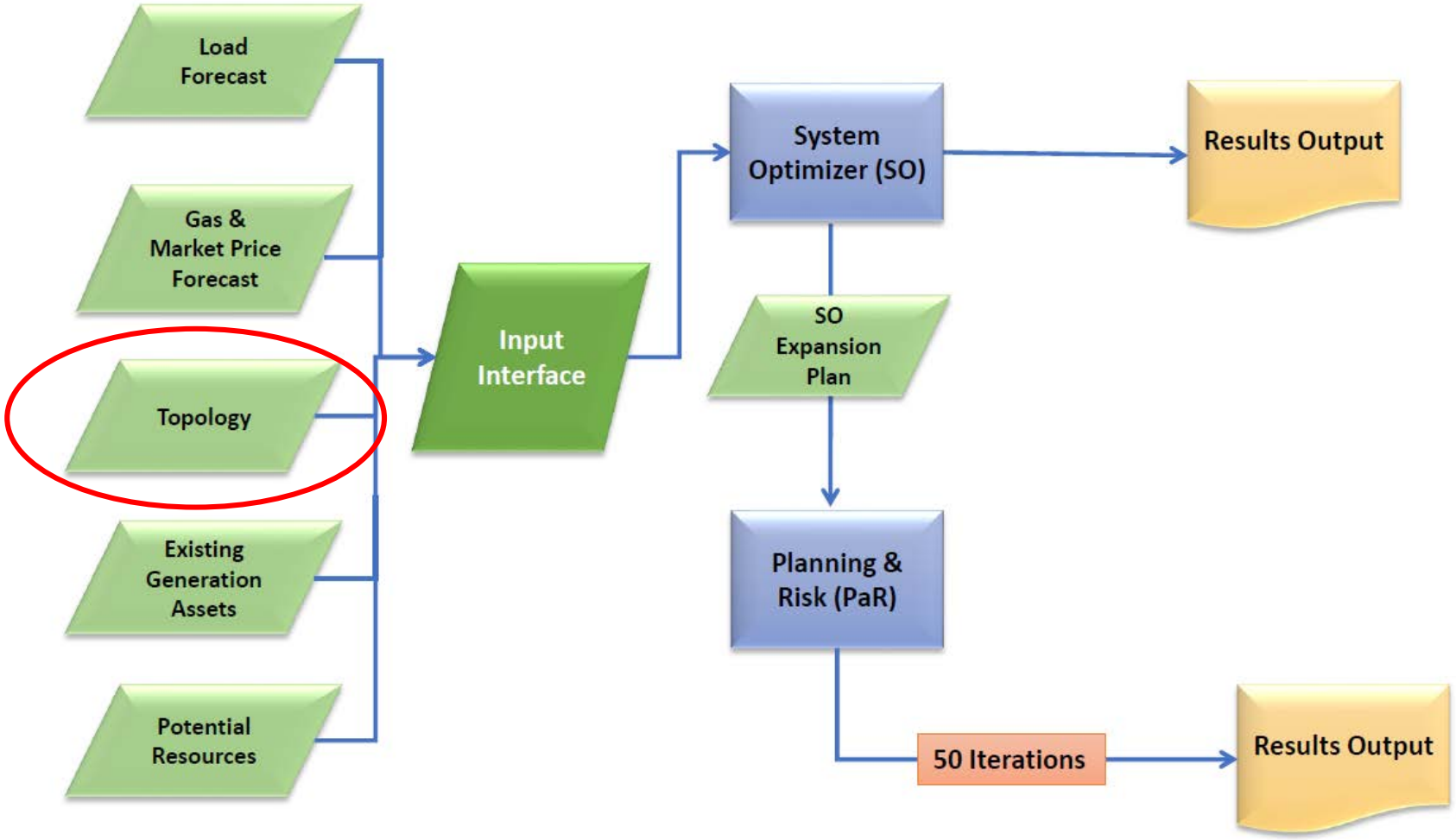
PacifiCorp Transmission Planning Studies

- Integrated Resource Plan
- NERC TPL-001-4 Annual System Assessment
- Local Area Transmission and Subtransmission Five Year Studies
- Generation Interconnection Requests
- Transmission Service Requests

Integrated Resource Plan and Transmission

- Wind and solar resources are locationally specific
- Locational resources can drive the need for new transmission lines
- Development of resources takes 1 to 2 years, development of transmission can take as long as 10 to 14 years or more
- Timing disconnect drove PacifiCorp to include transmission in the resource plan
- PacifiCorp planning works with the resource planning team to provide transmission needs associated with possible resource additions by location prior to any scenario analysis
- Transmission information is included in the resource plan scenario analysis in development of the preferred portfolio

Integrated Resource Planning Process



Transmission Projects and Drivers

Transmission Line and Substation Projects

- TPL Assessment and Five Year Study
- Large load and resource requests
- Neighboring utilities
- Enhance system capacity
- Improve system reliability

Replacing Equipment (transformers, circuit breakers, disconnect switches)

- TPL Assessment and Five Year Study
- Existing or New customer load growth
- Aging or obsolete equipment
- Neighboring utilities
- Modernize grid

NERC TPL – Security vs. Reliability

TPL-001-4 Annual Transmission Planning Assessment

- The assessment evaluates system performance under the conditions defined in NERC TPL-001-4 mandated by FERC/NERC/WECC.
- 1, 5 and 10 year horizon focusing on the Bulk Electric System (BES) 100 kV and above.
- Bus level topology, peak and off-peak snapshot cases.
- Projects developed from this assessment are critical for the reliability of the BES and required to comply with NERC TPL performance standard.

- Prevent system performance issues (thermal overloads, voltage concerns and stability) that could potentially lead to widespread outages across an interconnection
- Contingencies based on severity of impact, not probability of event
- Reducing customer outage frequency/duration is not a focus of the Standard requirements

NERC TPL – Oregon Projects

- Transmission Transformer Capacity
  - Sams Valley 500-230 kV Substation
  - Grants Pass 230-115 kV Capacity Increase and Reconfiguration
  - Driscoll 230-115 kV Transformer
- Transmission Line Capacity
  - Medford Area 230 kV
  - NE Portland 115 kV
- Bus Configuration Changes
  - Malin 230 kV breaker addition
  - Hazelwood 115 kV ring bus and tie line upgrade
  - Roundup (Pendleton) 69 kV configuration
- Other
  - Meridian RAS Expansion
  - Circuit Breaker Fault Interrupting Capability

Local Area Transmission and Subtransmission Planning

Area Planning – Five Year Studies

- Five year horizon focusing on distribution substation, sub-transmission 115 kV and 69 kV.
- Local system models are created using “natural” load growth and minor sensitivities for block loads additions.
- This study is used to evaluate the local system against PacifiCorp, NERC and WECC operability and reliability criteria.
- Projects developed from these studies are mainly related to transmission operations, serving customer load growth, customer reliability and flexibility for restoration.

Area Planning Studies – Oregon Projects

- Transmission Line Capacity
  - Bend Area 69 kV
  - Corvallis Area 115 kV
  - Hood River Area 69 kV
  - Klamath Falls Area 69 kV
  - Lebanon Area 115 kV
  - Lyons – Santiam Area 69 kV
  - Warm Springs – Madras Area 69 kV
- Distribution Substation Transformer Capacity Increase
  - Approximately 20 substation transformer projects in Oregon planned across 10-year horizon.