Current Distribution System Planning Processes


PACIFIC POWER

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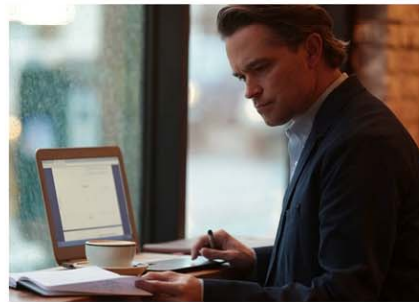
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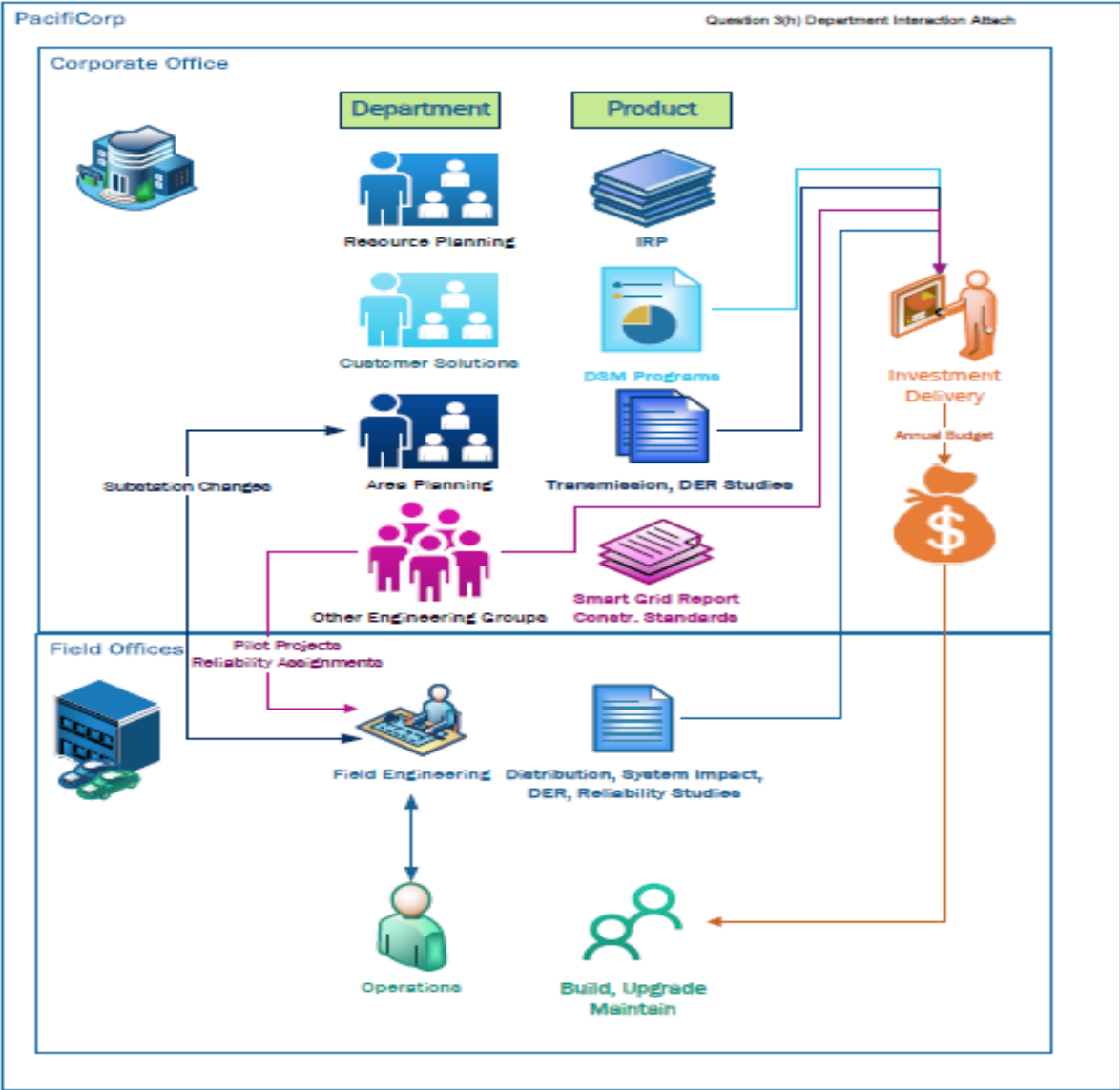
Multiple Planning Processes / Drivers
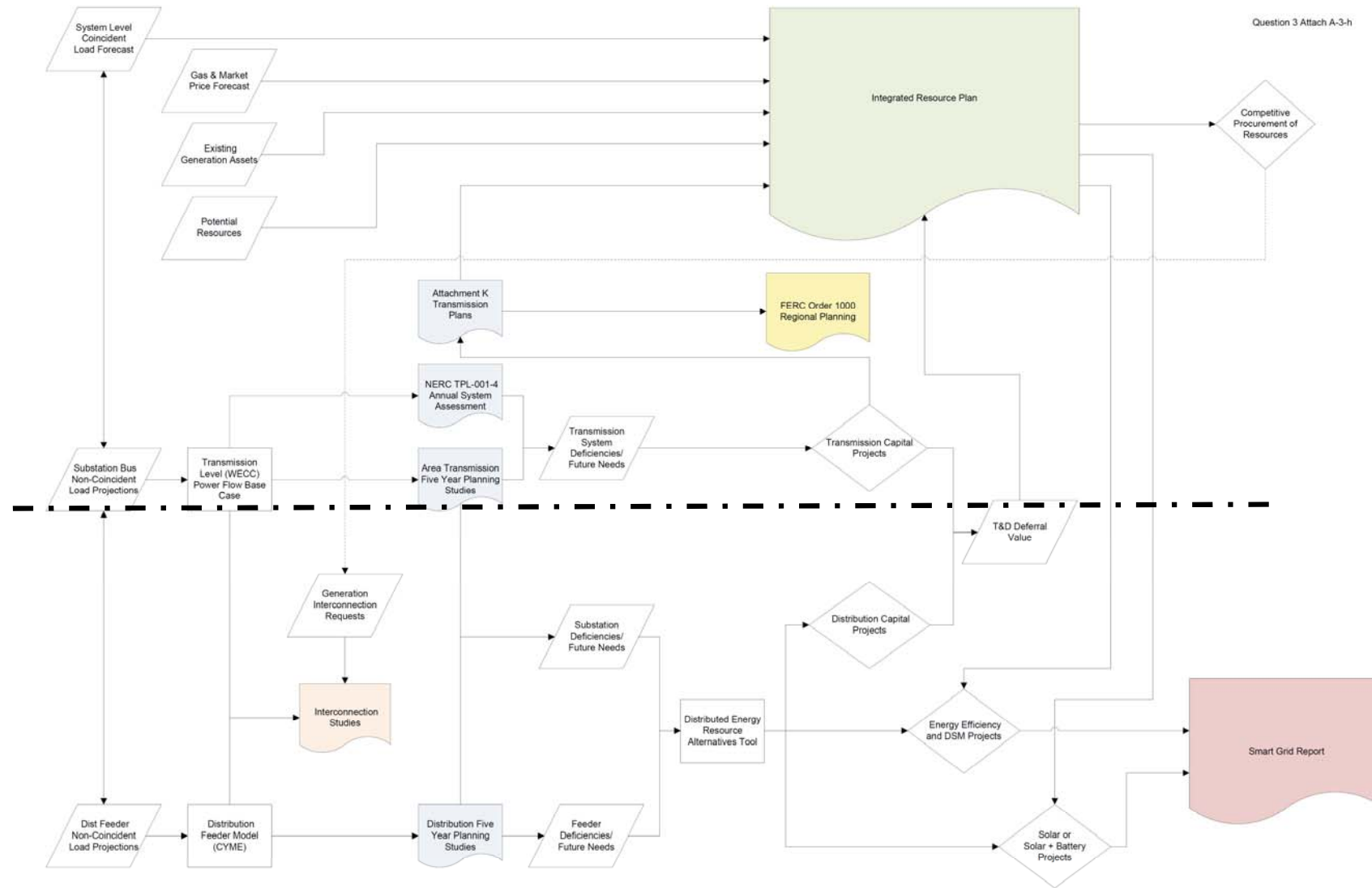
Distribution system studies are a component of the larger planning process, providing input into many other studies and processes

Planning Processes and Study Horizons

- Area planning and distribution five year studies
  - Evaluate limiting conditions on equipment (e.g., transformers, regulators, reclosers, wires)
  - Seasonal peak and minimum load conditions, 20% exceedance
  - Limiting credible distributed generation dispatch cases
  - 5 / 10 year horizon

- Long term resource planning (IRP, etc.)
  - Average system peak loads, 50% exceedance
  - Ensure ability to meet adequacy requirements in all hours, not just credible extremes
  - 20 year horizon

- Transmission level studies (NERC TPL, FERC Order 1000)
  - Meet specific system performance criteria for peak and credible stressed conditions
  - Bulk power transmission across larger areas
  - 1, 5 and 10 year horizon

Distribution Planning Studies

- Periodic Five Year Planning Studies
  - All distribution system planning studies are completed on a 5 year cycle. Studies can vary in frequency class from one to five.
    - Class 1 studies are scheduled to be updated each year. Class 5 studies are scheduled to be updated every five years.
  - Study schedules are evaluated each year and studies may be shifted to occur sooner or later depending on a number of factors

- Ad-hoc Studies
  - Typically driven by load, generation interconnection service or transmission service requests
  - Study is generally focused on a limited area, and the immediate effects of the request on reliability and load service

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Distribution Plan Underlying Drivers

- Net load changes
  - Constantly changing loads from customer driven needs such as adding a operational shift, major renovations, closures, new load requests or generation
  - Planning for the future customer needs and preferences
  - Feeder and substation seasonal peak loads and growth rates
  - Feeder and substation minimum and daylight minimum loads
  - Anticipated block load additions (short term and high probability)
  - Electric vehicle adoption targeted studies
  - Generation scenarios (high and low output)
- Reliability
  - Outage Data Collection for Reliability Analysis
  - Cost Effective Improvements

- Distribution resources
  - Net metering projects
    - As of December 2019 there was 77 MW of net-metering over ~7,500 projects
    - Pending: 7 MW from 253 projects
  - Oregon and FERC jurisdictional interconnections
    - As of December 2019 there was 261 MW
    - Pending: 67 MWs
  - Oregon Community Solar Program
    - Currently have 11 applications
- Preparing the grid for the future
  - Substation and feeder SCADA analog and status capability upgrades
  - Bi-directional controls and protection

As the uses of the delivery system changes the number of credible scenarios rapidly expand. For example, light loading conditions.

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Distributed Energy Resource Planning Studies and Tools

Studies

- Conservation Potential Assessment (CPA)
  - Energy Efficiency
  - Demand Response
- Private Generation
  - Reciprocating Engines
  - Micro-turbines
  - Small Hydro
  - Solar Photovoltaics
  - Small Wind
- Bulk Energy Storage Study

Tools

- Transmission
  - Production cost model (GRIDVIEW)
  - Power flow model (PSS/E)
  - SCADA / PI Historian
  - ASPEN
- Distribution
  - Power flow model (CYME)
  - CYME Gateway (Data)
  - FAAR/Fastmap
  - Reliability model (GREATER, FIRE)
  - SCADA / PI Historian
  - DER Screening tool
  - ASPEN
- Customer
  - Production/load resource meters
  - AMI meters

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Distribution Planning Process Opportunities

- More dynamic and holistic view to inputs and outputs
  - DER
  - EV
  - Customer preferences
  - Policy and opportunity driven trends
  - Integration with neighborhood/community/city plans and goals
- Improve planning models, information and assumptions
  - Continued development of customer load data, with much higher granularity possible than in legacy tool
  - Richer dataset for better precision of customers' uses through application of AMI data analytics
  - DER Screening Tool → DER Impact Tool (Locational Planning)
- Improve system operation and flexibility
- Modernize the energy grid / increased deployment of advanced technologies
- Customer side solutions
- More efficient utilization of existing system capacity