Integrated Resource Planning at Tacoma Power

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University of Washington
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About Tacoma Public Utilities

- Public, cost-of-service organization; we don’t pay investors
- Part of the community since 1893
- Led by a 5-member Public Utility Board appointed by the mayor and confirmed by the Tacoma City Council
- Services include: **Power**, including Click! Water Rail
Tacoma Power’s Resources

- Hydroelectric Power
- 97% Carbon-Free
- Surplus hydro power
  - Currently sold wholesale
  - Could be used (retail) for electrification of transportation.

Resources

- Tacoma Owned 36%
- Bonneville Contracts 51%
- Conservation 10%
- Other Contracts 3%

Sales to Customers

- Wholesale Sales 40%
- Tacoma’s Load 60%
About the IRP

What is an Integrated Resource Plan?

• A planning tool that
  • Determines whether, when, and which new resources are needed to meet forecasted demand for electricity over the next 20 years.
  • Plans how the utility will comply with conservation and renewable energy requirements of I-937.

• Required by law (RCW 19.280.030)
  • to consider both supply-side resources (like utility-scale generation) and demand-side resources (like conservation) on an equal basis.

• Open to the public
Stakeholder Process

Public Meeting #1
April 19th
1. Tacoma Public Schools
2. Tacoma Community College
3. Bates College
4. WestRock
5. Pierce Conservation District
6. Bonneville Power Administration
7. WA State Department of Commerce

Public Meeting #2
Sept 27th
1. Bates College
2. University of Puget Sound
3. Davita
4. Praxair
5. WestRock
6. Multicare
7. City of Tacoma – Office of Sustainability
8. Northwest Energy Coalition
9. Northwest Power and Conservation Council
10. WA State Department of Commerce

Q1
- Invitation to Participate

Q2
- Present to Senior Management
  Oct 10

Q3
- Present to PUB
  Oct 25

Q4
- Request PUB
  Adopt IRP
  Nov 15
Planning Process

Survey Landscape
• Resources
• Loads
• Policy
• Technology

Identify Need
• Load resource balance
• Resource adequacy

Define Resources
• Generation
• Conservation
• T & D

Analyze Uncertainty
• Sensitivity
• Scenario
• Stochastic

Develop Action Plan
• Portfolio strategy
• Monitor conditions

Repeat every 2 - 4 years!
2015 Annual Load-Resource Balance (2001WY)

Survey Landscape

Identify Need

Define Resources

Analyze Uncertainty

Develop Action Plan

Survey Landscape

Identify Need

Define Resources

Analyze Uncertainty

Develop Action Plan
2-Year Action Plan

1. **Acquire** 9.4aMW conservation
2. **Continue** evaluating BPA products
3. **Learn** from small-scale pilots
4. **Monitor** emerging technologies impacting retail load
5. **Explore** methods to incorporate climate change impacts
What has changed since 2015?
Changes since 2015

- Lower and declining load forecast
  - Declining usage per customer
  - Energy efficiency
  - Codes and standards
  - Adjusted large load assumptions

Firm Energy Load Forecast w/ Conservation

2015 Forecast
2017 Forecast
Changes since 2015

- Lower and declining load forecast
- Lower natural gas price forecast
Changes since 2015

- Lower and declining load forecast
- Lower natural gas price forecast
- **Lower electricity wholesale market price forecast**

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**Mid-C Wholesale Price Forecasts**

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All price forecasts in 2016 dollars
What do these changes mean?

Our forecasted surplus energy is increasing.
The market value of surplus sales is declining.
IRP Questions

• Resource Adequacy
  – Can we meet annual energy needs under critical water conditions?
  – Can we meet monthly/seasonal energy needs 95% of the time?
  – Do we have capacity to meet a 72 hour peak?

• I-937 Compliance
  – How should we meet our renewable portfolio standard obligation?
Annual Adequacy Metric

• Simulated energy supply under critical water conditions exceeds forecasted customer loads over a year.

• Ensures we have enough energy to meet retail demand.
Monthly Adequacy Metric

- Simulated energy supply exceeds forecasted customer loads in every month, 19 times out of 20.
- Ensures we have the capacity to meet customer need as it varies by season and month.
- Worst case scenario
Peak Adequacy Metric

- Simulated energy supply exceeds the highest 72-hour average peak customer load in 19 out of 20 water year simulations.
- Ensures we have the capacity to meet the most pressing peak demand.
- Represents stressful conditions
Renewable Portfolio Standard (RPS) Obligation

I-937 Renewable Requirement and Compliance Strategy

I-937 Renewable Energy Compliance Options:

1. Renewable generation resource
2. Renewable energy credits (RECs)
• Tacoma is **not** projected to need a new generation resource.
• Conservation continues to be Tacoma’s preferred resource.
2017 Action Plan:

1. **Acquire** target of 6.4 aMW of conservation as directed by the Conservation Potential Assessment

2. **Investigate** the value of flexible capacity

3. **Explore** distributed energy resource (DER) planning

4. **Improve** resource planning analytical methodologies
Looking Ahead to the 2019 IRP

NAVIGATING CHANGE AND UNCERTAINTY
Sources of Change and Uncertainty

- Loads
- Resources
- Fuel Costs
- Market Prices
- Energy Policies
Declining load growth is the new normal

Source: Ansergy, 2017

Source: EIA, 2016
Hydroelectric output depends on water conditions

Average **Monthly** Inflows
Contracts represent 55% of our resources and expire by 2028.

- We assume CBH Contracts expire and BPA is renewed.
- This keeps us surplus (on ave.) through the planning horizon.
Natural gas impacts prices and adds uncertainty

We assume a lower gas price forecast

But economics or policy may change that
Wholesale power prices impact customers

Average Market Prices & BPA Contract Rates

- Wholesale power prices impact customers
- Average market prices & BPA contract rates
- 2006 to 2018
- BPA Priority Firm
- Mid-C Actual
- Mid-C Projected


$60 $45 $30 $15 $-

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Loads Resources Fuel Costs Market Prices Energy Policies
Not all carbon policies are equal

Washington GHG Emissions (MMT CO2e)

- Electrification
- Carbon Tax
- Innovation
- Electrification
- Carbon Tax
- Renewable Pipeline
- Increased RPS
- Carbon Tax

Source: WA Department of Ecology
Future of Resource Planning

• DOE Recommendations:
  – **Ensure consistent methods** to evaluate a wide range of DERs (in addition to conservation) and utility scale generation
  – **Consider new investment drivers** in addition to traditional resource adequacy, such as risk management, value-added services or cost reduction.
  – **Develop integrated models** to systematically consider rate design, customer behavior, and distribution networks into the resource planning process.
Thank You