

Northwest Power and Conservation Council
Power Committee
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Montana Transmission and Resources Panel

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Montana vs. Pacific Northwest Wind Cost Comparison

- Prepared by Pascoe Energy with assistance from NPCC staff
 - Completed December 2016
- Resource costs from 7th Power Plan and PowerFin
- Levelized energy costs delivered to utilities in Washington and Oregon

Montana vs. Pacific Northwest Wind Cost Comparison

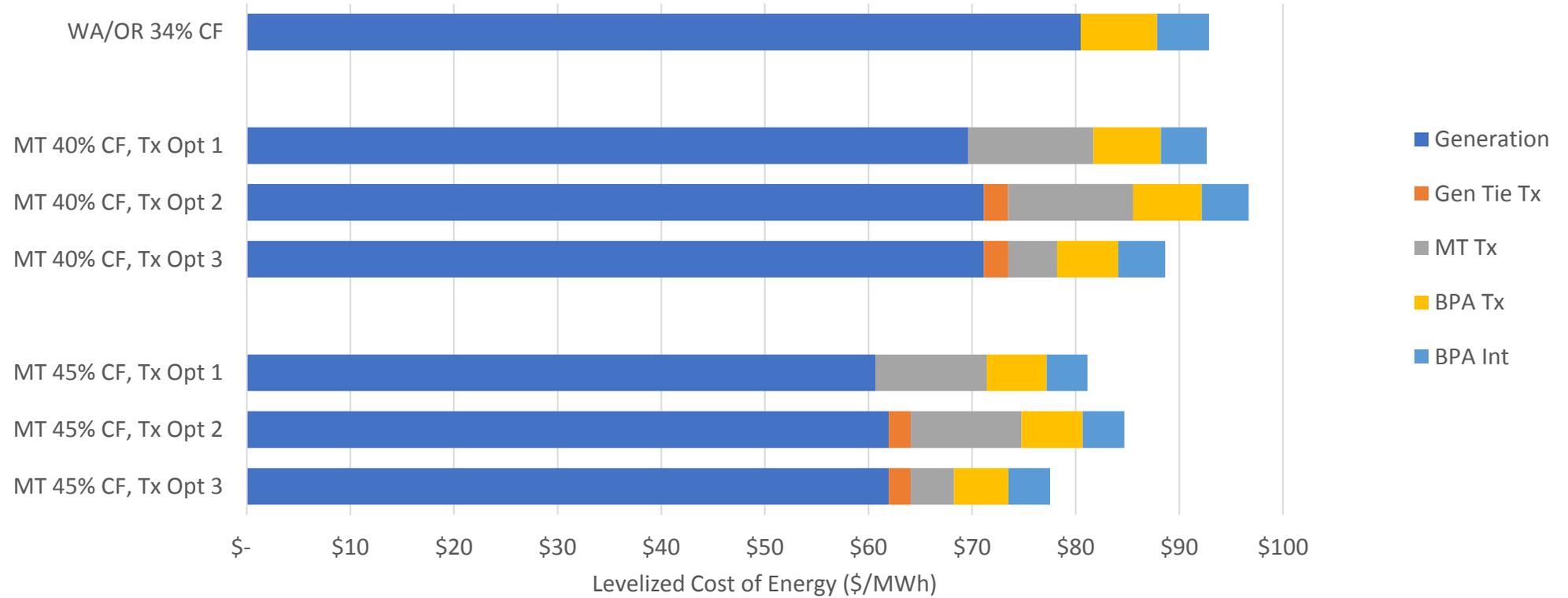
- Wind Capacity Factors
 - WA/OR: 34%
 - MT: 40% and 45%
- Wind Capacity Values
 - WA/OR: 0% and 10%
 - MT: 0%, 10%, 30% and 50%

Montana vs. Pacific Northwest Wind Cost Comparison

- Transmission Costs
 - WA/OR: one wheel on BPA
 - MT Opt 1: wheels on NWE and BPA
 - MT Opt 2: gen tie plus wheels on PSE CTS, BPA MT Intertie and BPA
 - MT Opt 3: gen tie plus upgrades to CTS/BPA MT Int and BPA (M2W)
- Integration Costs
 - WA/OR and MT: BPA integration charges

MT vs WA/OR Wind Cost Comparison

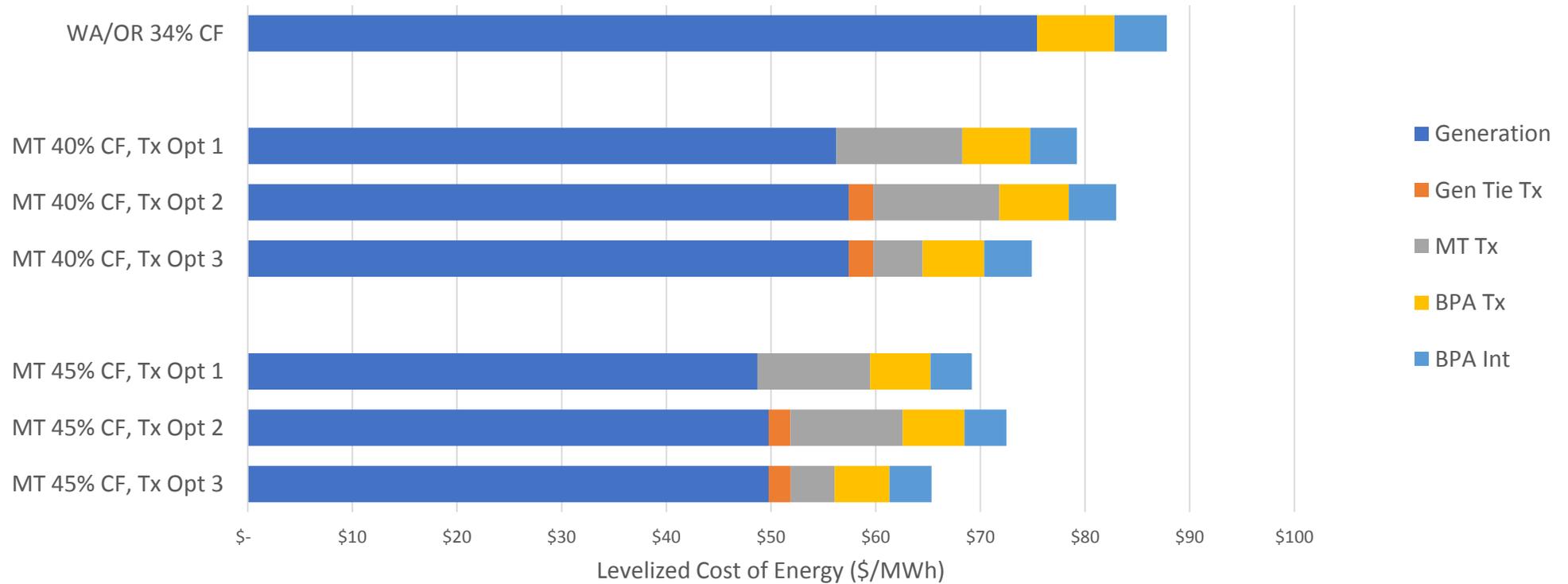
Capacity Credit: WA/OR - None, MT – None
Full PTC



MT vs WA/OR Wind Cost Comparison

Capacity Credit: WA/OR - 10%, MT - 30%

Full PTC



Colstrip 1& 2 Replacement Analysis

- Prepared by E3 Consulting for Absaroka Energy, developer of the Gordon Butte Pumped Storage Hydro (PSH) Project
 - Completed December 2016
- Two alternatives to replace PSE's share of Colstrip 1&2 energy (250 aMW) and capacity (300 MW)
 - PNW Alternative
 - 736 MW PNW Wind for energy and some capacity (5% capacity value)
 - 263 MW Aero CT for remaining capacity
 - MT Alternative
 - 548 MW MT Wind for energy and some capacity (25% capacity value)
 - 163 MW Gordon Butte PSH for remaining capacity and shaping

Colstrip 1& 2 Replacement Analysis

MT Alternative provides substantial benefits to PSE customers:

- **\$300 million** reduction in CapEx
- **\$53 million** reduction in annual levelized costs
 - **\$481 million** NPV over 25 years
- **\$24/MWh** reduction in levelized energy costs (250 aMW)