

# Major Capital Projects<sup>1</sup> - End-of-Project Target Performance

Q4 2018

Project	Description	Direct Capital \$M <sup>2</sup>			In-Service Date	
		Target	Forecast	Actual <sup>3</sup>	Target	Forecast
<b>Transmission</b>						
Sustain Steel Program Defective Damper Replacements	Replace approximately 1,700 miles of defective PPI spacer dampers.	\$ 34.4	\$ 32.7	\$ 30.7	9/30/14	12/28/18
500 kV Spare Transformer Project	Acquire 5 spares and relocate 2 existing transformers to be used as spares. The spares will be placed strategically across the system.	\$ 41.0	\$ 52.0	\$ 51.9	12/31/13	6/30/19
Fleet Mobile Equipment Replacement FY17-19	Heavy duty and specialized vehicle replacement program for FY17-19	\$ 17.2	\$ 16.3	\$ 11.5	9/30/19	9/30/19
Ross - Schultz Fiber Replacement	Replace the obsolete and limited 36 strand fiber with standard 72 strand fiber.	\$ 34.0	\$ 39.4	\$ 27.0	9/15/17	12/21/21
P25 Two-Way Mobile Radio Upgrade	Replace and upgrade the mobile radio system to P25 technology.	\$ 64.5	\$ 69.5	\$ 21.0	9/30/17	12/22/25
Puget Sound Area Northern Intertie (PSANI) Memorandum of Agreement	Install a 500/230 kV transformer bank addition at Raver Substation.	\$ 56.4	\$ 48.9	\$ 35.7	9/30/16	12/2/18
Operational Multi-Gigabit Ethernet Transport (OMET)	Communications upgrade and replacement to ensure adequate capacity and compatibility for emerging requirements.	\$ 43.5	\$ 47.6	\$ 26.8	3/30/17	5/1/21
Paul Substation Shunt Reactor Addition	Install an additional reactor in the Portland area for voltage control.	\$ 9.5	\$ 14.8	\$ 12.8	4/30/16	3/29/19
Spare Transformers for Hub Wind Sites	Add a spare 500/230 kV single phase transformer at John Day, Rock Creek, Slatt and Central Ferry substations.	\$ 18.6	\$ 23.1	\$ 15.6	10/15/18	1/31/19
Kalispell - Hot Springs Fiber	Install fiber optic cable and associated SONET, RAS and transfer trip equipment.	\$ 7.9	\$ 7.3	\$ 4.8	6/30/19	6/30/19
Sundial Land Acquisition	Purchase property for future expansion near the existing Troutdale Substation.	\$ 9.9	\$ 9.9	\$ 9.1	9/30/17	9/30/17
Quenett Creek Substation L0380	Construct new substation and associated line work to serve additional N. Wasco PUD load.	\$ 39.8	\$ 46.5	\$ 17.6	6/30/19	6/30/19
Avangrid Montague I Wind Project	Interconnection facilities for Avangrid's wind project.	\$ 8.9	\$ 9.0	\$ 2.6	12/11/18	7/31/19
UEC Morrow Flat Phase II	Interconnection facilities for Umatilla Electric Cooperative load service request.	\$ 14.9	\$ 15.0	\$ 5.5	9/1/19	9/1/19
Central Oregon Series Capacitor	Add capacitors at Slatt and Bakeoven to support load growth.	\$ 16.5	\$ 9.3	\$ 1.0	2/28/19	3/15/19
Wheatridge Wind	Interconnection for NextEra's Wheatridge wind project.	\$ 8.7	\$ 8.6	\$ -	10/31/19	10/1/20
Summit Ridge Wind	Interconnection for Pattern Energy's Summit Ridge wind project.	\$ 22.2	\$ 19.6	\$ 0.0	6/30/21	6/30/21
Fairview Reactor and Transformer	Install a reactor to address high voltages on the Fairview 230 kV bus and replace an aging transformer.	\$ 11.0	\$ 10.9	\$ 0.0	12/31/21	12/31/21
Mission Critical IT Infrastructure	Completely replace the Dittmer Data Center IT infrastructure.	\$ 15.6	\$ 15.6	\$ 0.0	6/30/22	6/30/22
Steel Lines Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 44.0	\$ 34.3	\$ 14.9	9/30/19	9/30/19
Wood Pole Lines Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 77.5	\$ 62.5	\$ 24.1	9/30/19	9/30/19
Access Roads Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 36.7	\$ 36.7	\$ 14.6	9/30/19	9/30/19
Land and Land Rights Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 10.6	\$ 13.0	\$ 0.6	9/30/19	9/30/19
AC Substations Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 83.4	\$ 105.5	\$ 46.3	9/30/19	9/30/19
DC Substations Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 22.1	\$ 20.2	\$ 4.2	9/30/19	9/30/19

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<b>Transmission - continued</b>						
System Telecommunications Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 32.0	\$ 30.2	\$ 8.7	9/30/19	9/30/19
Power Systems Control Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 40.7	\$ 37.9	\$ 11.3	9/30/19	9/30/19
System Protection and Control Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 40.7	\$ 40.8	\$ 11.5	9/30/19	9/30/19
Control Center Sustain Program FY18-19	Two-year asset replacement plan based on asset strategy analysis.	\$ 12.7	\$ 12.5	\$ 3.8	9/30/19	9/30/19
<b>Federal Hydro</b>						
Grand Coulee and Hungry Horse SCADA Replacement	Replace SCADA systems at Grand Coulee and Hungry Horse.	\$ 46.8	\$ 70.0	\$ 62.6	9/30/15	9/1/20
Grand Coulee Pre Overhaul - Winding Replacement G19, G20	Replace the stator core and windings on units G19 and G20.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 2.0	5/31/13	12/31/18
Grand Coulee Stator Windings, Cores and Spare G1-G18	Replace 14 stator cores and windings. G4,5,7,9 were previously replaced.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.7	12/2/23	9/29/2038
Grand Coulee Exciter Replacements G1-G18	Replace the excitation equipment for all 18 units.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.6	12/2/23	12/31/30
Grand Coulee Governor Replacements G1-G18	Replace the governors and related equipment for all 18 units.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.4	12/2/23	12/31/30
Grand Coulee Transformer Replacements G11-G18	Replace 24 single-phase transformers in the Right Powerhouse.	\$ 32.5	\$ 57.2	\$ 0.7	10/31/18	12/2/24
Grand Coulee - Keys Pump Generating Station - Reliability	Replacements and upgrades to maintain current station capability.	\$ 66.6	\$ 66.3	\$ 20.0	9/30/24	3/31/24
Grand Coulee G22 - G23 Wicket Gate Replacements	Replace the deteriorating wicket gates.	\$ 9.0	\$ 9.0	\$ 7.5	11/1/18	9/29/20
Grand Coulee Firehouse	Build a stand-alone fire station to replace the facility currently housed in the pump-generating plant.	\$ 14.6	\$ 15.8	\$ 7.0	1/1/18	8/29/19
Grand Coulee Left and Right Powerhouse Cranes	Replace the four bridge cranes in the left and right powerhouses.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	6/29/19	3/1/22
Grand Coulee Penstock Stoplogs	Procure an additional set of stoplogs to support the overhaul work in the left and right powerhouses.	\$ 9.2	\$ 9.2	\$ 0.3	12/31/18	12/29/19
Grand Coulee Third Powerhouse Roof	Replace the third powerhouse roof, including seismic, lighting and safety upgrades.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.6	10/1/19	10/1/19
The Dalles Transformer Replacements	Replace 7 transformer banks - TA, T1, T3, T5, T6, T7, T8	\$ 37.0	\$ 37.0	\$ 22.3	5/9/19	6/4/21
The Dalles Fish Unit Breaker Replacement	Replace the two fish attraction unit breakers and associated bus work.	\$ 12.8	\$ 12.8	\$ 4.9	9/30/19	5/1/20
The Dalles Emergency Gantry Crane Replacement	Replace the emergency intake gantry crane.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.9	9/1/22	9/1/22
McNary Governor Replacement	Upgrade the 14 governors in the McNary powerhouse with digital controls.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 2.3	1/29/18	4/27/23
McNary 4160/480V Station Service Upgrade	Replace and upgrade the station service distribution system.	\$ 36.0	\$ 53.1	\$ 45.6	12/3/18	6/28/19
McNary Turbine Design and Replacement	Replace turbine runners 1 - 14 and rewind units 5, 13 and 14.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 5.6	6/30/31	6/30/31

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<b>Federal Hydro - continued</b>						
Bonneville Powerhouse 1 Main Unit Breakers and Station Service	Replace oil-filled original equipment breakers and reconfigure and modernize the station service.	\$ 42.0	\$ 36.0	\$ 21.0	4/20/18	10/1/21
Bonneville Generator Coolers	Replace and upgrade the generator coolers in both powerhouses.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	3/1/23	3/1/23
Bonneville Powerhouse 2 Oil/Water Separators	Replace and upgrade the turbine pit oil/water separator system.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.6	8/3/20	3/31/21
John Day Turbine Hub Upgrades	Rebuild and upgrade up to five turbine runner hubs. Four additional hubs may be rebuilt under a future amendment to this project.	\$ 39.3	\$ 33.7	\$ 7.0	12/31/18	7/17/22
John Day Draft Tube Bulkheads and Intake Gates	Purchase two sets of draft tube bulkheads and one set of intake gates for additional de-watering.	\$ 11.9	\$ 11.9	\$ 9.9	9/4/18	10/12/18
John Day Emergency Gantry Crane Replacement	Replace the 348 ton emergency intake gantry crane.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 8.7	2/1/20	2/1/20
John Day SQ Board Replacements	Replace SQ and SU electrical boards, switchgear and related equipment.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.2	8/1/22	8/1/22
John Day Powerhouse Roof Replacement	Replace the powerhouse roof.	\$ 7.9	\$ 7.9	\$ 0.4	1/1/22	1/1/22
Dworshak U3 Stator and Coolers	Replace the winding, core and air coolers.	\$ 18.2	\$ 14.2	\$ 13.6	6/1/17	7/4/18
Ice Harbor Turbine Runner Replacement	Replace poor condition turbine runners in units 1, 2 & 3 with a more fish-friendly design.	\$ 97.0	\$ 103.6	\$ 62.0	3/31/20	12/31/21
Ice Harbor Stator Winding Replacements	Replace the stator windings for units 1,2 and 3.	\$ 22.5	\$ 15.5	\$ 9.0	3/31/20	2/25/21
Lower Granite DC System and LV Switchgear	Upgrade DC system, governor oil pump system and low voltage switchgear.	\$ 9.9	\$ 9.9	\$ 1.1	9/30/22	9/30/22
Lower Monumental U1 Linkage Refurbishment	Refurbish turbine linkage and rewind generator.	\$ 14.8	\$ 20.0	\$ 12.8	3/1/16	10/25/18
Hungry Horse Crane Replacements	Replace two powerhouse bridge cranes, forebay gantry crane, machine shop crane and valve house crane.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.7	9/30/20	5/27/21
Black Canyon Third Generating Unit	Add a third generating unit at Black Canyon. The capacity of the unit will be between 10 and 15 MW.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 7.2	12/31/14	9/1/21
Black Canyon Switchyard Replacement	Replace and relocate the switchyard.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	5/1/19	5/1/23
Palisades Turbine Rehabilitation and Runner Replacement	Replace the turbine runners and rehabilitate the turbines on the four Palisades units.	\$ 28.8	\$ 31.0	\$ 30.8	5/31/16	TBD
Willamette Valley and Lost Creek GDACS	Install Generic Data Acquisition and Control Systems to replace existing SCADA systems.	\$ 9.0	\$ 9.0	\$ 5.4	1/1/20	1/1/20

<b>Facilities</b>						
Ross HMEM Garage	Construct a Heavy Mobile Equipment Mechanic facility on the Ross Complex.	\$ 25.5	\$ 23.6	\$ 2.5	12/31/19	12/31/19

<b>Summary</b>			
Transmission	\$ 874.9	\$ 889.6	\$ 413.7
Federal Hydro	565.8	623.1	376.3
Facilities	25.5	23.6	2.5
<b>Total</b>	<b>\$ 1,466.2</b>	<b>\$ 1,536.3</b>	<b>\$ 792.5</b>

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