

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

Q4 2017

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	\$ 33.5	\$ 33.8	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	\$ 51.9	\$ 51.3	12/31/13	6/30/19
Fleet Mobile Equipment Replacement FY14-16	Heavy duty and specialized vehicle replacement program for FY14-16	\$ 16.4	\$ 12.5	\$ 12.5	9/30/16	7/30/17
Fleet Mobile Equipment Replacement FY17-19	Heavy duty and specialized vehicle replacement program for FY17-19	\$ 17.2	\$ 17.2	\$ 0.9	9/30/19	9/30/19
#KC SONET Phase II Spur Healing	Complete the digital microwave and radio conversion in Oregon.	\$ 18.0	\$ 13.4	\$ 13.3	12/31/15	12/30/19
#NC Analog Microwave Replacement	Complete the digital microwave and radio conversion in NW Washington.	\$ 9.5	\$ 9.3	\$ 8.3	12/31/15	10/1/20
Big Eddy - Knight (West of McNary Reinforcement	New 500 kV substation and 28 miles of 500 kV transmission line.	\$ 180.0	\$ 195.1	\$ 195.1	11/30/14	9/30/17
Ross - Schultz Fiber Replacement	Replace the obsolete and limited 36 strand fiber with standard 72 strand fiber.	\$ 34.0	\$ 39.5	\$ 21.2	9/15/17	11/16/20
#DC Microwave Analog Spur Replacement	Complete the digital microwave and radio conversion in Northeast Washington.	\$ 39.5	\$ 35.7	\$ 35.3	8/30/17	7/15/18
P25 Two-Way Mobile Radio Upgrade	Replace and upgrade the mobile radio system to P25 technology.	\$ 64.5	\$ 72.0	\$ 15.3	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	\$ 36.4	\$ 29.8	9/30/16	12/2/18
Lower Valley Area Reinforcement (Hooper Springs)	Construct substation and 24 miles of line to address reliability issues in the Lower Valley Area.	\$ 63.8	\$ 68.3	\$ 23.0	9/30/17	12/30/18
#JC Microwave Upgrade	Complete the digital conversion for the upper part of the #JC communications ring.	\$ 13.5	\$ 13.9	\$ 11.7	9/1/18	12/30/18
Operational Multi-Gigabit Ethernet Transport (OMET)	Communications upgrade and replacement to ensure adequate capacity and compatibility for emerging requirements.	\$ 43.5	\$ 43.5	\$ 21.3	3/30/17	9/29/20
Paul Substation Shunt Reactor Addition	Install an additional reactor in the Portland area for voltage control.	\$ 9.5	\$ 14.8	\$ 12.6	4/30/16	6/15/18
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	\$ 20.3	\$ 6.0	10/15/18	1/31/19
PMU Additions FY15-17	Install additional phasor measurement units to monitor system performance to comply with NERC/WECC standards.	\$ 7.6	\$ 7.5	\$ 7.0	9/30/2018 and	10/27/17
Midway-Grandview No. 1 Line Upgrade	Rebuild 25 mile line to avoid risk of thermal overload.	\$ 18.6	\$ 10.1	\$ 6.4	4/30/18	4/30/18
Kalispell - Hot Springs Fiber	Install fiber optic cable and associated SONET, RAS and transfer trip equipment.	\$ 7.9	\$ 7.3	\$ 0.5	6/30/19	6/30/19
Sundial Land Acquisition	Purchase property for future expansion near the existing Troutdale Substation.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	9/30/17	12/31/17
Quenett Creek Substation L0380	Construct new substation and associated line work to serve additional N. Wasco PUD load.	\$ 39.8	\$ 38.7	\$ 0.9	6/30/19	6/30/19
Avangrid Montague I Wind Project	Interconnection facilities for Avangrid's wind project.	\$ 8.9	\$ 8.9	\$ 0.3	12/11/18	12/11/18

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UEC Morrow Flat Phase II	Interconnection facilities for Umatilla Electric Cooperative load service request.	\$ 14.9	\$ 14.5	\$ 0.1	6/1/2018 and 9/1/2019	6/1/2018 and 9/1/2019
Central Oregon Series Capacitor	Add capacitors at Slatt and Bakeoven to support load growth.	\$ 16.5	\$ 16.3	\$ 0.0	2/28/19	2/28/19
Steel Lines Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$6.0 to \$8.0	\$ 13.4	\$ 13.4	9/30/17	9/30/17
Wood Pole Lines Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$29.0 to \$36.0	\$ 47.0	\$ 47.0	9/30/17	9/30/17
Access Roads Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$16.0 to \$21.0	\$ 17.0	\$ 17.0	9/30/17	9/30/17
Land and Land Rights Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$5.0 to \$7.0	\$ 2.0	\$ 2.0	9/30/17	9/30/17
AC Substations Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$57.0 to \$71.0	\$ 62.1	\$ 62.1	9/30/17	9/30/17
System Telecommunications Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$16.0 to \$20.0	\$ 19.2	\$ 19.2	9/30/17	9/30/17
Power Systems Control Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$13.0 to \$17.0	\$ 12.9	\$ 12.9	9/30/17	9/30/17
System Protection and Control Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$15.0 to \$20.0	\$ 15.2	\$ 15.2	9/30/17	9/30/17
Control Center Sustain Program FY 2017	One-year asset replacement plan based on asset strategy analysis.	\$6.0 to \$8.0	\$ 7.5	\$ 7.5	9/30/17	9/30/17
<b>Federal Hydro</b>						
Grand Coulee and Hungry Horse SCADA Replacement	Replace SCADA systems at Grand Coulee and Hungry Horse.	\$ 46.8	\$ 73.7	\$ 58.0	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.	\$ 26.3	\$ 26.3	\$ 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>	\$ 0.6	12/2/23	12/31/30
Grand Coulee Exciter Replacements G1-G18	Replace the excitation equipment for all 18 units.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.4	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.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.6	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	\$ 12.1	9/30/24	3/31/24

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<b>Federal Hydro - continued</b>						
Grand Coulee G22 - G23 Wicket Gate Replacements	Replace the deteriorating wicket gates.	\$ 9.0	\$ 9.0	\$ 4.4	11/1/18	9/29/19
Grand Coulee Firehouse	Build a stand-alone fire station to replace the facility currently housed in the pump-generating plant.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 4.4	1/1/18	4/30/18
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	6/29/19
Grand Coulee Penstock Stoplogs	Procure an additional set of stoplogs to support the overhaul work in the left and right powerhouses.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.2	12/31/18	12/31/18
Chief Joseph Turbine Runner Replacements Units 1 - 16	Replace the turbine runners and rehabilitate the turbines on units 1 - 16.	\$ 166.0	\$ 181.9	\$ 173.2	9/30/17	10/5/17
Chief Joseph Governor Replacement	Upgrade the 27 governors with digital controls and replace associated equipment.	\$ 10.7	\$ 10.7	\$ 8.7	8/19/17	10/2/17
The Dalles Transformer Replacements	Replace 7 transformer banks - TA, T1, T3, T5, T6, T7, T8	\$ 37.0	\$ 35.8	\$ 7.0	5/9/19	6/4/21
The Dalles Fish Unit Breaker Replacement	Replace the two fish attraction unit breakers and associated bus work.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.4	9/30/19	5/1/20
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	4/30/21
McNary 4160/480V Station Service Upgrade	Replace and upgrade the station service distribution system.	\$ 36.0	\$ 53.1	\$ 35.6	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>	\$ 4.8	6/30/31	6/30/31
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	\$ 15.6	4/20/18	3/20/18
Bonneville Generator Coolers	Replace and upgrade the generator coolers in both powerhouses.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.1	3/1/23	3/1/23
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	\$ 32.6	\$ 3.8	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	\$ 9.1	\$ 9.0	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>	\$ 1.0	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>	\$ 0.8	8/1/22	8/1/22
Dworshak U3 Stator and Coolers	Replace the winding, core and air coolers.	\$ 18.2	\$ 14.7	\$ 9.3	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	\$ 97.0	\$ 45.6	3/31/20	12/31/20
Ice Harbor Stator Winding Replacements	Replace the stator windings for units 1,2 and 3.	\$ 22.5	\$ 15.5	\$ 3.2	3/31/20	9/1/20
Lower Granite U1 Linkage Upgrade	Upgrade the U1 turbine linkage to restore full Kaplan capability.	\$ 7.6	\$ 8.0	\$ 6.7	9/9/16	11/30/17
Lower Monumental U1 Linkage Refurbishment	Refurbish turbine linkage and rewind generator.	\$ 14.8	\$ 16.8	\$ 10.2	3/1/16	5/31/18

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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	10/30/20
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>	\$ 7.1	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>	\$ -	5/1/19	4/23/21
Palisades Turbine Rehabilitation and Runner Replacement	Replace the turbine runners and rehabilitate the turbines on the four Palisades units.	\$ 28.8	\$ 30.2	\$ 30.0	5/31/16	5/31/17
Willamette Valley and Lost Creek GDACS	Install Generic Data Acquisition and Control Systems to replace existing SCADA systems.	\$ 9.0	\$ 9.0	\$ 3.6	1/1/20	1/1/20
<b>Facilities</b>						
Ross HMEM Garage	Construct a Heavy Mobile Equipment Mechanic facility on the Ross Complex.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	12/31/19	12/31/19
Ross Maintenance Headquarters	Construct a maintenance HQ office building, high-bay structure and lay-down storage area on the Ross complex.	\$ 20.6	\$ 20.5	\$ 17.5	12/31/17	11/3/17

<b>Summary</b>			
Transmission	\$ 959.0	\$ 976.9	\$ 703.2
Federal Hydro	689.5	725.7	463.1
Facilities	20.6	20.5	17.8
<b>Total</b>	<b>\$ 1,669.1</b>	<b>\$ 1,723.1</b>	<b>\$ 1,184.1</b>

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