

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

Q4 2016

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	\$ 34.4	\$ 29.1	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	6/30/17
Fleet Mobile Equipment Replacement FY14-16	Heavy duty and specialized vehicle replacement program for FY14-16	\$ 16.4	\$ 13.3	\$ 9.0	9/30/16	9/30/17
#KC SONET Phase II Spur Healing	Complete the digital microwave and radio conversion in Oregon.	\$ 18.0	\$ 13.5	\$ 13.3	12/31/15	12/29/17
#NC Analog Microwave Replacement	Complete the digital microwave and radio conversion in NW Washington.	\$ 9.5	\$ 9.1	\$ 8.2	12/31/15	12/31/18
Alvey Substation 500 kV Shunt Reactor	Add a 500 kV shunt reactor for voltage stabilization.	\$ 10.9	\$ 9.8	\$ 8.9	4/30/12	12/30/16
NEPA - I-5 Corridor Reinforcement	Conduct NEPA study, preliminary engineering and design.	\$ 85.0	\$ 92.8	\$ 84.0	12/31/15	9/29/17
Big Eddy - Knight (West of McNary Reinforcement Group 2)	New 500 kV substation and 28 miles of 500 kV transmission line.	\$ 180.0	\$ 197.5	\$ 191.0	11/30/14	11/30/17
Ross - Schultz Fiber Replacement	Replace the obsolete and limited 36 strand fiber with standard 72 strand fiber.	\$ 34.0	\$ 30.0	\$ 11.2	9/15/17	11/16/18
#DC Microwave Analog Spur Replacement	Complete the digital microwave and radio conversion in Northeast Washington.	\$ 39.5	\$ 34.9	\$ 34.4	8/30/17	7/3/17
P25 Two-Way Mobile Radio Upgrade	Replace and upgrade the mobile radio system to P25 technology.	\$ 64.5	\$ 60.4	\$ 11.8	9/30/17	12/21/21
Pacific DC Intertie Upgrade - Station Work	Modernize the Celilo converter terminal and upgrade capacity from 3100 MW to 3220 MW for north to south power flow with a future upgrade path to 3800 MW.	\$ 290.5	\$ 280.2	\$ 280.2	12/20/15	9/30/16
Pacific DC Intertie Upgrade - Line Work		\$ 40.0	\$ 79.8	\$ 77.3	10/31/17	10/31/17
Puget Sound Area Northern Intertie (PSANI) Memorandum of Agreement	Install a 500/230 kV transformer bank addition at Raver Substation.	\$ 56.4	\$ 36.3	\$ 25.0	9/30/16	12/2/17
Lower Valley Area Reinforcement (Hooper Springs)	Construct substation and 24 miles of line to address reliability issues in the Lower Valley Area.	\$ 63.8	\$ 65.9	\$ 19.7	9/30/17	11/30/18
#JC Microwave Upgrade	Complete the digital conversion for the upper part of the #JC communications ring.	\$ 13.5	\$ 10.1	\$ 6.8	9/1/18	9/1/18
Operational Multi-Gigabit Ethernet Transport (OMET)	Communications upgrade and replacement to ensure adequate capacity and compatibility for emerging requirements.	\$ 43.5	\$ 43.5	\$ 15.9	3/30/17	12/28/18
McNary Substation - Additional 500 kV Transformer	Install an additional transformer bank to handle increased loading.	\$ 20.2	\$ 27.8	\$ 26.4	5/30/17	5/30/17
Umatilla Electric Cooperative (UEC) Line and Load Requests	Construct Longhorn Substation Annex and add three bays at McNary Substation.	\$ 65.0	\$ 65.0	\$ 65.0	7/30/16	7/30/16
Paul Substation Shunt Reactor Addition	Install an additional reactor in the Portland area for voltage control.	\$ 9.5	\$ 10.2	\$ 9.9	4/30/16	12/16/16
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	\$ 18.9	\$ 6.7	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	\$ 7.7	\$ 3.1	9/30/18	9/30/18

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Midway-Grandview No. 1 Line Upgrade	Rebuild 25 mile line to avoid risk of thermal overload.	\$ 18.6	\$ 13.1	\$ 3.6	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	\$ 0.1	6/30/19	6/30/19
Steel Lines Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$25.5 to \$28.5	\$ 14.5	\$ 14.5	9/30/16	9/30/16
Wood Pole Lines Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$47.5 to \$52.5	\$ 36.6	\$ 36.6	9/30/16	9/30/16
Access Roads Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$16.0 to \$18.0	\$ 7.8	\$ 7.8	9/30/16	9/30/16
Land and Land Rights Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$9.5 to \$10.5	\$ 5.9	\$ 5.9	9/30/16	9/30/16
AC Substations Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$52.5 to \$58.5	\$ 46.0	\$ 46.0	9/30/16	9/30/16
System Telecommunications Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$17.0 to \$19.0	\$ 12.0	\$ 12.0	9/30/16	9/30/16
Power Systems Control Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$20.0 to \$22.0	\$ 19.2	\$ 19.2	9/30/16	9/30/16
System Protection and Control Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$32.0 to \$36.0	\$ 24.6	\$ 24.6	9/30/16	9/30/16
Control Center Sustain Program FY 2016	One-year asset replacement plan based on asset strategy analysis.	\$9.5 to \$10.5	\$ 6.9	\$ 6.9	9/30/16	9/30/16
<b>Federal Hydro</b>						
Grand Coulee and Hungry Horse SCADA Replacement	Replace SCADA systems at Grand Coulee and Hungry Horse.	\$ 46.8	\$ 69.2	\$ 52.5	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.	\$ 123.0	\$ 123.0	\$ 0.3	12/2/23	7/2/29
Grand Coulee Exciter Replacements G1-G18	Replace the excitation equipment for all 18 units.	\$ 50.6	\$ 26.6	\$ 0.3	12/2/23	7/2/29
Grand Coulee Governor Replacements G1-G18	Replace the governors and related equipment for all 18 units.	\$ 10.9	\$ 10.9	\$ 0.2	12/2/23	7/2/29
Grand Coulee Transformer Replacements G11-G18	Replace 24 single-phase transformers in the Right Powerhouse.	\$ 32.5	\$ 32.6	\$ 0.5	10/31/18	12/1/24
Grand Coulee - Keys Pump Generating Station - Reliability	Replacements and upgrades to maintain current station capability.	\$ 66.6	\$ 66.3	\$ 10.1	9/30/24	9/30/24
Grand Coulee G22 - G23 Wicket Gate Replacements	Replace the deteriorating wicket gates.	\$ 9.0	\$ 7.9	\$ 4.1	11/1/18	11/1/18

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<b>Federal Hydro - continued</b>						
Grand Coulee Firehouse	Build a stand-alone fire station to replace the facility currently housed in the pump-generating plant.	\$ 14.6	\$ 14.6	\$ 1.5	1/1/18	1/1/18
Chief Joseph Turbine Runner Replacements Units 1 - 16	Replace the turbine runners and rehabilitate the turbines on units 1 - 16.	\$ 166.0	\$ 176.0	\$ 156.3	9/30/17	9/30/17
Chief Joseph Governor Replacement	Upgrade the 27 governors with digital controls and replace associated equipment.	\$ 10.7	\$ 10.7	\$ 7.2	8/19/17	4/7/17
The Dalles Transformer Replacements	Replace 7 transformer banks - TA, T1, T3, T5, T6, T7, T8	\$ 37.0	\$ 35.8	\$ 1.3	5/9/19	5/9/19
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>	\$ -	9/30/19	9/30/19
McNary Governor Replacement	Upgrade the 14 governors in the McNary powerhouse with digital controls.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 2.2	1/29/18	4/30/19
McNary 4160/480V Station Service Upgrade	Replace and upgrade the station service distribution system.	\$ 36.0	\$ 45.1	\$ 27.5	12/3/18	12/3/18
Bonneville Powerhouse 1 Main Unit Breakers and Station Service	Replace oil-filled original equipment breakers and reconfigure and modernize the station service.	\$ 42.0	\$ 34.1	\$ 13.6	4/20/18	3/20/18
John Day Governor Upgrade	Upgrade of the governors with digital controls and replacement of associated components.	\$ 10.7	\$ 8.9	\$ 8.9	10/26/16	6/30/16
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.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.1	12/31/18	11/5/22
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	\$ 8.5	\$ 5.5	9/4/18	7/26/17
John Day Emergency Gantry Crane Replacement	Replace the 348 ton emergency intake gantry crane.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.8	2/1/20	2/1/20
Dworshak U3 Stator and Coolers	Replace the winding, core and air coolers.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 4.4	6/1/17	7/3/17
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	\$ 32.1	3/31/20	3/31/20
Ice Harbor Stator Winding Replacements	Replace the stator windings for units 1,2 and 3.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.5	3/31/20	4/1/19
Lower Granite U1 Linkage Upgrade	Upgrade the U1 turbine linkage to restore full Kaplan capability.	\$ 7.6	\$ 4.1	\$ 3.4	9/9/16	4/1/17
Lower Monumental U1 Linkage Refurbishment	Refurbish turbine linkage and rewind generator.	\$ 14.8	\$ 16.6	\$ 8.0	3/1/16	5/31/17
Hungry Horse Station Service Replacement	Replace station service switchgear distribution board/feeder cables and upgrade relay protection/metering.	\$ 8.1	\$ 7.5	\$ 7.5	1/31/15	7/30/16
Hills Creek Powerhouse Turbine and Unit Rehabilitation	Replace turbine runners and generator windings on units 1 and 2 at Hills Creek.	\$ 24.1	\$ 22.1	\$ 19.2	8/12/14	10/3/16
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.	\$ 36.8	\$ 40.5	\$ 7.1	12/31/14	9/1/19
Black Canyon Switchyard Replacement	Replace and relocate the switchyard.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ -	5/1/19	5/1/19

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Palisades Turbine Rehabilitation and Runner Replacement	Replace the turbine runners and rehabilitate the turbines on the four Palisades units.	\$ 28.8	\$ 30.2	\$ 29.6	5/31/16	5/31/17
Willamette Valley and Lost Creek GDACS	Install Generic Data Acquisition and Control Systems to replace existing SCADA systems.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.8	1/1/20	1/1/20

<b>Facilities</b>						
Tri Cities Maintenance Headquarters and Franklin Yard	Construct Tri-Cities maintenance HQ, heat line for spare transformers and a spare parts yard at Franklin.	\$ 14.2	\$ 17.3	\$ 17.3	12/31/13	7/29/16
Ross HMEM Garage	Construct a Heavy Mobile Equipment Mechanic facility on the Ross Complex.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ -	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	\$ 19.1	\$ 4.3	12/31/17	12/15/17

<b>Summary</b>			
Transmission	\$ 1,443.8	\$ 1,386.9	\$ 1,165.4
Federal Hydro	911.8	914.5	409.5
IT	-	-	-
Facilities	34.8	36.4	21.6
<b>Total</b>	<b>\$ 2,390.4</b>	<b>\$ 2,337.8</b>	<b>\$ 1,596.5</b>

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