

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

Q3 2015

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 mile of defective PPI spacer dampers.	\$ 34.4	\$ 29.8	\$ 27.7	9/30/14	12/19/17
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	\$ 50.9	\$ 50.1	12/31/13	4/29/16
Fleet Mobile Equipment Replacement FY14-16	Heavy duty and specialized vehicle replacement program for FY14-16	\$ 16.4	\$ 16.4	\$ 2.1	9/30/16	9/30/16
#KC SONET Phase II Spur Healing	Complete the digital microwave and radio conversion in Oregon.	\$ 18.0	\$ 13.1	\$ 12.9	12/31/15	12/29/17
#NC Analog Microwave Replacement	Complete the digital microwave and radio conversion in NW Washington.	\$ 9.5	\$ 8.1	\$ 7.9	12/31/15	12/31/18
Alvey Substation 500 kV Shunt Reactor	Add a 500 kV shunt reactor for voltage stabilization.	\$ 10.9	\$ 7.7	\$ 4.7	4/30/12	12/30/15
NEPA - I-5 Corridor Reinforcement	Conduct NEPA study, preliminary engineering and design.	\$ 85.0	\$ 82.7	\$ 66.8	12/31/15	12/15/15
Big Eddy - Knight (West of McNary Reinforcement Group 2)	New 500 kV substation and 28 miles of 500 kV transmission line.	\$ 180.0	\$ 198.8	\$ 177.0	11/30/14	11/18/16
Synchrophasor Project	5-year effort to acquire, install, test, and implement synchronized Wide Area Measurement (WAM) and control technology at BPA.	\$ 32.5	\$ 31.5	\$ 30.6	9/30/15	9/30/15
Wood Pole Line Sustain Program FY14 - FY15	Implement a stable, sustained wood pole replacement program. The four year plan includes cumulative cost and work plan completion targets.	\$77.9 to \$86.5 for FY14-15	\$ 97.7	\$ 75.6	Achieve 100% of workplan	Achieve 100% of workplan
Steel Lines Sustain Program FY14 - FY15	Implement a stable, sustained steel line replacement program. The four year plan includes cumulative cost and work plan completion targets.	\$25.3 to \$28.1 for FY14-15	\$ 22.0	\$ 19.9	Achieve 100% of workplan	Achieve 73% of workplan
System Protection and Control (SPC) Sustain Program FY14 - FY15	Implement a stable, sustained SPC replacement program. The four year plan includes cumulative cost and work plan completion targets.	\$40.0 to \$44.0 for FY14-15	\$ 49.8	\$ 45.3	Achieve 90% of workplan	Achieve 110% of workplan
Ross - Schultz Fiber Replacement	Replace the obsolete and limited 36 strand fiber with standard 72 strand fiber.	\$ 34.0	\$ 28.2	\$ 8.2	9/15/17	11/16/18
#DC Microwave Analog Spur Replacement	Complete the digital microwave and radio conversion in Northeast Washington.	\$ 39.5	\$ 35.0	\$ 31.1	8/30/17	7/3/17
Central Ferry to Lower Monumental (Little Goose Area Reinforcement)	Construct a 38 mile 500 kV transmission line between Central Ferry and Lower Monumental substations.	\$ 115.0	\$ 111.7	\$ 97.2	12/31/15	12/31/15
Rights-of-Way Access Roads and Land Rights Acquisition Program FY13 to FY15	Implement a stable, sustained ROW program. The three year plan includes cumulative cost and work plan completion targets.	\$63.9 to \$71.0 for FY13-15	\$ 76.5	\$ 62.2	Achieve 100% of workplan	60 to 70% of workplan
P25 Two-Way Mobile Radio Upgrade	Replace and upgrade the mobile radio system to P25 technology.	\$ 64.5	\$ 64.5	\$ 7.0	9/30/17	9/30/17
Switchgear Replacement for Fault Duty FY12	Replace under-rated switchgear identified in annual screening process.	\$ 14.9	\$ 18.7	\$ 18.6	12/31/14	9/30/15

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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.	\$ 275.8	\$ 275.4	\$ 194.7	12/20/15	12/20/15
Pacific DC Intertie Upgrade - Line Work		\$ 40.0	\$ 81.0	\$ 40.4	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	\$ 56.4	\$ 6.0	9/30/16	9/30/16
Lower Valley Area Reinforcement (Hooper Springs)	Construct substation and 24 miles of line to address reliability issues in the Lower Valley Area.	\$ 63.8	\$ 63.7	\$ 21.7	9/30/17	9/30/17
AC Substations Sustain Program FY13-15	Implement a stable AC substation equipment replacement program. The 3 year plan includes cumulative cost and scope/schedule targets.	Up to \$51.0 for FY13-15	\$ 66.5	\$ 51.5	Deliver 100% of workplan	Deliver 100% of workplan
PSC/Telecom Sustain Program FY13-15	Implement a stable PSC/Telecom equipment replacement program. The 3 year plan includes cumulative cost and scope/schedule targets.	Up to \$43.8 for FY13-15	\$ 37.1	\$ 31.9	Deliver 100% of workplan	Deliver 80% of workplan
#JC Microwave Upgrade	Complete the digital conversion for the upper part of the #JC communications ring.	\$ 13.5	\$ 8.5	\$ 4.4	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	\$ 9.4	3/30/17	12/28/18
McNary Substation - Additional 500 kV Transformer	Install an additional transformer bank to handle increased loading.	\$ 20.2	\$ 20.2	\$ 2.4	5/30/17	12/29/17
Umatilla Electric Cooperative (UEC) Line and Load Requests	Construct Longhorn Substation Annex and add three bays at McNary Substation.	\$ 65.0	\$ 70.0	\$ 43.0	7/30/16	7/22/16
Paul Substation Shunt Reactor Addition	Install an additional reactor in the Portland area for voltage control.	\$ 9.5	\$ 9.4	\$ 2.2	4/30/16	12/16/16
Raver Substation - Replace Reactor	Replace the failed 180 MVAR reactor with a 300 MVAR unit.	\$ 7.2	\$ 6.3	\$ 1.9	6/30/15	9/30/15
Control House Upgrades	Expand or replace ten substation control houses to replacing failing or inadequate units.	\$ 13.3	\$ 14.7	\$ 1.0	6/15/16	3/1/19
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	\$ 18.6	\$ 0.1	10/15/18	10/15/18
<b>Federal Hydro</b>						
Grand Coulee and Hungry Horse SCADA Replacement	Replace SCADA systems at Grand Coulee and Hungry Horse.	\$ 46.8	\$ 69.3	\$ 44.0	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.	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.	\$ 123.0	\$ 123.0	\$ 0.1	12/2/23	12/31/29

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<b>Federal Hydro - continued</b>						
Grand Coulee Exciter Replacements G1-G18	Replace the excitation equipment for all 18 units.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.1	12/2/23	6/30/29
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>	\$ 0.1	12/2/23	12/3/23
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>	\$ 0.3	10/31/18	12/31/22
Grand Coulee - Keys Pump Generating Station - Reliability	Replacements and upgrades to maintain current station capability.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.6	9/30/24	9/30/24
Grand Coulee G22 - G23 Wicket Gate Replacements	Replace the deteriorating wicket gates.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 0.3	11/1/18	11/1/18
Chief Joseph Turbine Runner Replacements Units 1 - 16	Replace the turbine runners and rehabilitate the turbines on units 1 - 16.	\$ 166.0	\$ 161.9	\$ 134.3	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	\$ 5.0	8/19/17	8/6/17
The Dalles Transformer Replacements	Replace 7 transformer banks - TA, T1, T3, T5, T6, T7, T8	\$ 37.0	\$ 35.3	\$ 0.6	5/9/19	5/9/19
McNary Main Unit 1-4, 7-12 Stator Winding Replacement	Replace stator windings that are over 50 years old.	\$ 80.0	\$ 86.5	\$ 78.1	12/31/14	12/1/15
McNary Governor Replacement	Upgrade the 14 governors in the McNary powerhouse with digital controls.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.9	1/29/18	4/2/18
McNary 4160/480V Station Service Upgrade	Replace and upgrade the station service distribution system.	\$ 36.0	\$ 45.1	\$ 7.1	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.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 4.2	4/20/18	3/20/18
John Day Governor Upgrade	Upgrade of the governors with digital controls and replacement of associated components.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 5.4	10/26/16	7/7/16
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.	\$ 39.3	\$ 39.3	\$ 0.6	12/31/18	6/30/19
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	\$ 17.2	10/1/18	10/1/18
Lower Granite U1 Linkage Upgrade	Upgrade the U1 turbine linkage to restore full Kaplan capability.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.0	9/9/16	9/9/16
Lower Monumental U1 Linkage Refurbishment	Refurbish turbine linkage and rewind generator.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 1.5	3/1/16	5/31/17
Hungry Horse Station Service Replacement	Replace station service switchgear distribution board/feeder cables and upgrade relay protection/metering.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 7.2	1/31/15	9/30/16
Hills Creek Powerhouse Turbine and Unit Rehabilitation	Replace turbine runners and generator windings on units 1 and 2 at Hills Creek.	\$ 24.1	\$ 23.2	\$ 16.3	8/12/14	4/4/16
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.	N/A <sup>4</sup>	N/A <sup>4</sup>	\$ 7.1	12/31/14	12/31/18
Palisades Turbine Rehabilitation and Runner Replacement	Replace the turbine runners and rehabilitate the turbines on the four Palisades units.	\$ 28.8	\$ 32.7	\$ 24.9	5/31/16	5/31/16

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<b>IT</b>						
IT Virtualization and Consolidation Project (IVC)	Replace and modernize server infrastructure for non-critical business systems.	\$ 21.8	\$ 28.4	\$ 27.5	9/30/14	9/30/15
Columbia Vista Short Term Replacement (CV-STR)	Replace the current hydro modeling functionality and associated database tool.	\$ 7.1	\$ 7.2	\$ 6.3	9/25/15	9/25/15

<b>Facilities</b>						
Eastside Alternate Operating Facility	Spokane-area facility for redundant transmission and power scheduling functions and alarm monitoring.	\$ 17.5	\$ 24.0	\$ 22.1	9/30/14	9/30/15
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	\$ 17.1	\$ 15.1	12/31/13	9/30/15
Ross Maintenance Headquarters	Construct a maintenance HQ office building, high-bay structure and lay-down storage area on the Ross complex.	\$ 15.5	\$ 15.5	\$ 0.7	8/1/17	12/12/17

<b>Summary</b>			
Transmission	\$ 1,646.8	\$ 1,714.4	\$ 1,155.4
Federal Hydro	688.7	724.0	360.9
IT	28.9	35.6	33.8
Facilities	47.2	56.6	37.9
<b>Total</b>	<b>\$ 2,411.6</b>	<b>\$ 2,530.6</b>	<b>\$ 1,588.1</b>

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