

# RECLAMATION

*Managing Water in the West*

## **Bureau of Reclamation Renewable Energy Update**

**Fiscal Year 2016, Q1**



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## **Executive Summary**

The Bureau of Reclamation Renewable Energy Update identifies federal and non-federal renewable energy projects currently online or in development on Reclamation land, facilities, and water bodies and highlights current Reclamation renewable activities. The update provides Reclamation-wide and regional summaries, renewable energy portfolios, and project updates as well as a listing of WaterSMART Grant projects that feature a renewable energy component.

The quarterly update is a compilation of monthly updates submitted by regional offices, with input received from area offices. Reclamation personnel, including Daniel Vallejo, Rick Clayton, Robert Ross, Dale Lentz, and James Stauffer were instrumental in developing this document.

## **Renewable Activities**

### **Advanced Hydropower Technology Development Projects**

A 2010 Memorandum of Understanding (MOU) for Hydropower action item, the Departments of Energy and Interior awarded approximately \$17 million in 2011 to 16 projects in order to demonstrate innovative hydropower technologies. Two of the three projects sited on Reclamation infrastructure were brought online in 2015.

The Mile 45 project, developed by Earth by Design on the Reclamation North Unit Main Canal (Oregon), features low-head hydropower technology. The project was acquired by Apple in 2013 and was brought online May 15, 2015.

The Monroe Drop project, developed by Natel Energy also on the Reclamation North Unit Main Canal, demonstrates a modular Schneider Linear hydroEngine. The project was also acquired by Apple in 2014 and was brought online October 29, 2015.

The South Canal, Drop 2 project, developed by Percheron Power, in partnership with the Uncompahgre Valley Water Users Association on the Reclamation South Canal (Colorado) demonstrates an Archimedes hydrodynamic screw system. The project is in development and has received a Lease of Power Privilege (LOPP) Contract.

# Reclamation Renewable Energy Summary

Online Hydropower Facilities	GP		LC		MP		PN		UC		USBR	
	#	MW <sup>1</sup>	#	MW	#	MW	#	MW	#	MW	#	MW
Reserved Facilities	21	1004 <sup>2</sup>	3	2454	10	1910	10	7537	9	1816	53	14721
Transferred Facilities <sup>3</sup>	0	0	10	297	3	452	0	0	10	41	23	790
Other Plants on USBR Facilities	0	0	7	85	0	0	0	0	0	0	7	85
FERC Facilities <sup>4</sup>	7	29	0	0	13	60	27	326	5	50	52	465
LOPP Facilities <sup>5</sup>	1	3	0	0	1	1	0	0	9	38	11	42
<b>Total</b>	<b>29</b>	<b>1036</b>	<b>20</b>	<b>2836</b>	<b>27</b>	<b>2423</b>	<b>37</b>	<b>7863</b>	<b>33</b>	<b>1945</b>	<b>146</b>	<b>16103</b>

In Development FERC Facilities	GP		LC		MP		PN		UC		USBR	
	#	MW	#	MW	#	MW	#	MW	#	MW	#	MW
Licenses	1	15	0	0	2	8	0	0	0	0	3	23
Exemptions	1	1	0	0	0	0	4	2	0	0	5	3
Preliminary Permits (C) <sup>6</sup>	4	8	0	0	0	0	10	27	0	0	14	35
Preliminary Permits (PS) <sup>7</sup>	3	2132	4	3645	1	1250	1	1000	2	800	11	8827
<b>Total</b>	<b>9</b>	<b>2156</b>	<b>4</b>	<b>3645</b>	<b>3</b>	<b>1258</b>	<b>15</b>	<b>1029</b>	<b>2</b>	<b>800</b>	<b>33</b>	<b>8888</b>

In Development LOPP Facilities	GP		LC		MP		PN		UC		USBR	
	#	MW	#	MW	#	MW	#	MW	#	MW	#	MW
Contracts	1	1	0	0	0	0	0	0	2	3	3	4
Preliminary Leases	3	21	0	0	0	0	0	0	1	8	4	29
Posted Solicitations	0	0	0	0	0	0	0	0	1	0.1	1	0.1
Requests for Development (C)	3	3	2	3	2	0.4	0	0	2	13	9	19
Requests for Development (PS)	0	0	0	0	0	0	1	400	0	0	1	400
<b>Total</b>	<b>7</b>	<b>25</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>0.4</b>	<b>1</b>	<b>400</b>	<b>6</b>	<b>24</b>	<b>18</b>	<b>452</b>

<sup>1</sup> Megawatt (MW).

<sup>2</sup> Flatiron (G1 and G2) capacity has been revised.

<sup>3</sup> Power from five of the 23 plants is marketed by the Western Area Power Administration (Western): Deer Creek, Towaoc, McPhee, O'Neill, and San Luis.

<sup>4</sup> Non-federal hydropower facilities developed on Reclamation infrastructure, licensed by the Federal Energy Regulatory Commission (FERC).

<sup>5</sup> Non-federal hydropower facilities developed on Reclamation infrastructure, authorized through a LOPP Contract. Reclamation holds title to the Grand Valley Powerplant LOPP.

<sup>6</sup> Conventional hydropower facilities.

<sup>7</sup> Pump storage hydropower facilities.

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<b>In Progress Capital Improvements</b>	<b>GP</b>	<b>LC</b>	<b>MP</b>	<b>PN</b>	<b>UC</b>	<b>USBR</b>
Generator Rewinds	1	0	1	0	1	3 <sup>8</sup>
Turbine Replacements	0	0	1	2	0	3 <sup>9</sup>
<b>Total</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>6</b>

<b>Online Solar Facilities</b>	<b>Region</b>	<b>State</b>	<b>MW</b>
Alamosa	UC	New Mexico	.01
Grand Coulee Warehouse	PN	Washington	.005
Boulder City Regional Office Building	LC	Nevada	.276
Boulder City Regional Office Building (Parking)	LC	Nevada	.006
Hoover Spillway House Renovation	LC	Nevada	.048
River Mountains	LC	Nevada	14
<b>Total</b>			<b>14.35</b>

<b>In Development Solar Facilities</b>	<b>Region</b>	<b>State</b>	<b>MW</b>
First Solar	LC	Nevada	50
San Luis Facility	MP	California	26
Blythe Office	LC	California	0.02
<b>Total</b>			<b>76</b>

<b>In Development Wind Facilities</b>	<b>Region</b>	<b>State</b>	<b>MW</b>
Mohave County Wind Farm	LC	Arizona	500
<b>Total</b>			<b>500</b>

<b>Hydropower Pilot Projects</b>	<b>Region</b>	<b>State</b>	<b>MW</b>
Hydrokinetic Installation on Roza Canal (Instream Energy)	PN	Washington	.01
Low-head Technology Installation on Monroe Drop <sup>10</sup>	PN	Oregon	.3
Low-head Technology Installation on North Unit Irrigation Canal, Mile 45 <sup>11</sup>	PN	Oregon	5
Hydrodynamic Screw Technology Installation on South Canal, Drop 2 <sup>12</sup>	UC	Colorado	1
<b>Total</b>			<b>6</b>

<sup>8</sup> Rewinds are in progress at Yellowtail (G3), Folsom (G3), and Glen Canyon (G5). Rewind work was completed at Spring Creek (G2) October 2015.

<sup>9</sup> Turbine replacements are in progress at Trinity (G1), Palisades (G2), and Minidoka (G9). A turbine replacement project was completed at Glen Canyon (G2) November 2015.

<sup>10</sup> Monroe Drop began commercial operation October 2015 and is included in the Online FERC Facilities statistic.

<sup>11</sup> Mile 45 began commercial operation May 2015 and is included in the Online FERC Facilities statistic.

<sup>12</sup> South Canal, Drop 2 has a LOPP Contract and is included in the LOPP Contracts statistic.

## WaterSMART

Through WaterSMART Grants (formerly Challenge Grants), Reclamation provides 50/50 cost share funding to irrigation and water districts, tribes, states, and other entities with water or power delivery authority. Projects should seek to conserve and use water more efficiently, increase the use of renewable energy, protect endangered species, or facilitate water markets. Projects are selected through a competitive process and the focus is on projects that can be completed within 24 to 36 months that will help sustainable water supplies in the Western United States. For additional information see the [WaterSMART Web site](#).

### WaterSMART Updates

The FY 2016 WaterSMART Water and Energy Efficiency Grant (WEEG) Funding Opportunity Announcement (FOA) was posted November 3, 2015. The closing date for applications is January 20, 2016.

### WaterSMART Summary

All active, FY 2011-2015 WaterSMART WEEG projects that feature a renewable energy component are listed in the table below. Full project summaries are available on the [WaterSMART Web site](#).

	<b>Fiscal Year</b>	<b>Recipient and Project Title</b>	<b>Renewable Component Status</b>
1	2011	Three Sisters Irrigation District <i>Main Canal Pipeline Penstock Hydro Project</i>	Online (8/2014)
2	2011	Pershing County Water Conservation District <i>Humboldt River Automation Metering and Hydropower Project</i>	In development, FERC License
3	2011	Boise Project Board of Control <i>Hydroelectric Project</i>	Online (4/2013)
4	2012	Consolidated Irrigation Company <i>Improve Irrigation Efficiencies and Provide Sustainability</i>	Online (9/2015)
5	2013	Cub River Irrigation Company <i>Middle Ditch Water Conservation &amp; Renewable Energy Piping Project</i>	In development
6	2014	Nevada Irrigation District <i>Hydroelectric Project</i>	In development
7	2014	Rosedale-Rio Bravo Water Storage District <i>Water Conservation, Energy Efficiency, and Solar Power Project</i>	In development
8	2014	Uncompahgre Valley Water Users Association <i>Shavano Falls Hydropower Development</i>	Online (5/2015)

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	<b>Fiscal Year</b>	<b>Recipient and Project Title</b>	<b>Renewable Component Status</b>
9	2014	Oxford Reservoir and Irrigation Company <i>Innovative Energy Production and Irrigation Efficiencies</i>	In development
10	2014	Elephant Butte Irrigation District <i>Water-Habitat-Energy-Nexus</i>	In development
11	2014	Davis and Weber Counties Canal Company <i>Main Piping and Small Hydro Project</i>	In development
12	2014	Fremont Irrigation Company <i>Extension to Improve Irrigation Efficiency and Provide Sustainability</i>	In development
13	2014	Richmond Irrigation District <i>Upper High Creek Canal Enclosure and Hydropower Development Project</i>	In development
14	2015	Bella Vista Water District <i>Renewable Energy, Advanced Metering Infrastructure, and Water Conservation Improvements</i>	In development
15	2015	Uncompahgre Valley Water Users Association <i>South Canal Drop 4 Hydropower Development</i>	Online (6/2015)
16	2015	Navajo Agricultural Product Industry <i>Create and Implement a Comprehensive Water Management Web-Based Tool for Ordering and Delivering Irrigation Water</i>	In development
17	2015	Three Sisters Irrigation District <i>Main Canal Pipeline and Micro Hydro Generation Project</i>	In development
18	2015	Cameron County Irrigation District No. 6 <i>Conversion of the Saldana Canal into Pipeline, Elimination of the Saldana Pump by Construction of Aerial Crossing and Solar Powered Second Lift Pump</i>	In development
19	2015	Santa Cruz Irrigation District No. 15 <i>Shotcrete Lining of the N-Canal, Installation of a VFD at Pump-15, and Wind Powered Alternative at Pump 15</i>	In development
20	2015	Davis and Weber Counties Canal Company <i>Canal Piping and Hydro Project</i>	In development
21	2015	Davis and Weber Counties Canal Company <i>Secondary Water Irrigation Metering and Hydro Project</i>	In development
22	2015	Marion Upper Ditch Company <i>Main Canal Pipeline and Micro Hydro Generation Project</i>	In development

# Great Plains Renewable Energy Updates

## FERC Projects

**Project:** Clark Canyon Dam  
**Developer:** Clark Canyon Hydro, LLC  
**Status:** Preliminary Permit (P-14677)

On December 4, 2015, FERC filed the “Notice of Application Tendered for Filing with the Commission, Soliciting Additional Study Requests, Intent to Waive Parts of the Pre-Filing Three Stage Consultation Process, and Intent to Waive Scoping.” Per the filing, the Clark Canyon Dam Environmental Assessment will be available for review by May 1, 2016.

Reclamation is currently conducting design review with Clark Canyon Hydro, LLC.

Concurrently, Senate Bill 1103, which, in part, reinstates the terminated Clark Canyon Dam FERC License (P-12429), was reported to the Senate Committee on Energy and Natural Resources on September 9, 2015.

## LOPP Projects

**Project:** Granby Dam  
**Developer:** Northern Water Conservancy District  
**Status:** LOPP Contract

The powerhouse foundation, building structure, bifurcation, and penstock installation are complete. Equipment installation, including two horizontal turbine-generator units, will begin spring of 2016 and continue through June of 2016.

**Project:** Pueblo Dam  
**Developer:** Southeastern Colorado Water Conservancy District, Colorado Springs Utilities, and Board of Water Works of Pueblo, Colorado  
**Status:** Preliminary Lease

The draft Pueblo Dam LOPP Environmental Assessment was released for public comment December 22, 2015. Public comments are due January 15, 2016. The Assessment can be accessed on the [Eastern Colorado Area Office website](#).

**Project:** Yellowtail Afterbay



**Developer:** Crow Tribe  
**Status:** Preliminary Lease

Project Management Team meetings were held in November and December. The next meeting is scheduled for January 28, 2016.

Based on a 25% project design, National Environmental Policy Act (NEPA) compliance is expected to take eight months (assuming limited complications and environmental impacts). At this time, the Tribe has not identified a power customer or powerline route.

Western is currently evaluating what impacts (if any) the Yellowtail Afterbay project will pose on Reclamation Yellowtail facility operations. This evaluation will help inform Yellowtail Afterbay operating criteria, to be developed by Reclamation, Western, and the Tribe.

**Project:** Helena Valley Pumping Plant  
**Developer:** Helena Valley Irrigation District  
**Status:** Preliminary Lease

The final Helena Valley Pumping Plant LOPP Environmental Assessment was published on December 11, 2015 and a Finding of No Significant Impact (FONSI) was signed by the Montana Area Office Manager on December 16, 2015. The Assessment and FONSI can be accessed on the [Montana Area Office website](#).

A draft LOPP has been transmitted to the District for review.

## Lower Colorado Renewable Energy Updates

### Solar Projects

**Project:** River Mountains  
**Developer:** Southern Nevada Water Authority and SunEdison  
**Status:** Online

The 14 MW array began generating power in January. Generation will help offset the Authority's River Mountains Water Treatment Facility energy demand.

## Mid-Pacific Renewable Energy Updates

### Solar Projects

**Project:** San Luis Facility  
**Developer:** San Luis Renewables, LLC  
**Status:** In Development

The draft San Luis Solar Project Environmental Assessment and FONSI were released for public comment on December 14, 2015. Public comments are due January 15, 2016. The Assessment and FONSI can be accessed on the [Mid Pacific Region website](#).

Per the draft Assessment and FONSI, proposed project capacity is 26 MW.

## Pacific Northwest Renewable Energy Updates

### FERC Projects

**Project:** Monroe Drop  
**Developer:** Apple  
**Status:** Online (P-14430)

Monroe Drop began commercial operation on October 29, 2015.

Project received funding through the 2011 Advanced Hydropower Technology Development FOA. The FOA (jointly funded by Reclamation and the Department of Energy through the 2010 Hydropower MOU) awarded funding to demonstrate new hydropower technologies.

Located on the North Unit Main Canal (12.5 miles south of Madras, Oregon), the Monroe Drop project features a modular Schneider Linear hydroEngine, developed by Natel Energy.

# Upper Colorado Renewable Energy Updates

## LOPP Projects

**Project:** South Canal (Drop 2)  
**Developer:** Uncompahgre Valley Water Users Association  
**Status:** LOPP Contract

The Lessee has requested written Reclamation approval to commence construction. Reclamation has evaluated and rejected the request, as not all construction authorization requirements (per the Lease Contract) have been satisfied. Project is currently on hold while the Lessee and Percheron Power secure additional funding.

**Project:** South Canal (Drop 5)  
**Developer:** Uncompahgre Valley Water Users Association  
**Status:** LOPP Contract

The South Canal (Drop 5) LOPP Environmental Assessment and FONSI are complete and the LOPP Contract was executed on November 5, 2015. Construction was authorized on November 17, 2015 with expected completion in late spring 2016.

The Assessment and FONSI can be accessed on the [Upper Colorado Environmental Assessments website](#).

**Project:** San Juan-Chama Project  
**Developer:** Albuquerque Bernalillo County Water Utility Authority  
**Status:** Posted Solicitation

Currently, the Authority is coordinating project funding and logistics. |

## **Appendix – Regional Renewable Energy Portfolios**

## Great Plains Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
<b>RECLAMATION OWNED AND OPERATED</b>												
WY	Online	Alcova		Wyoming	USBR	Conventional	41,400.00					1955
CO	Online	Big Thompson		Eastern Colorado	USBR	Conventional	4,500.00					1959
WY	Online	Boysen		Wyoming	USBR	Conventional	15,000.00					1952
WY	Online	Buffalo Bill		Wyoming	USBR	Conventional	18,000.00					1992
MT	Online	Canyon Ferry		Montana	USBR	Conventional	50,001.00					1953
CO	Online	Estes		Eastern Colorado	USBR	Conventional	45,000.00					1950
CO	Online	Flatiron (Unit 1, 2, 3)		Eastern Colorado	USBR	Conventional/Pump Storage	94,500.00					1954
WY	Online	Fremont Canyon		Wyoming	USBR	Conventional	66,800.00					1960
CO	Online	Glendo		Wyoming	USBR	Conventional	38,000.00					1959
CO	Online	Green Mountain		Eastern Colorado	USBR	Conventional	26,000.00					1943
WY	Online	Guernsey		Wyoming	USBR	Conventional	6,400.00					1928
WY	Online	Heart Mountain		Wyoming	USBR	Conventional	5,000.00					1948
WY	Online	Kortes		Wyoming	USBR	Conventional	36,000.00					1950
CO	Online	Marys Lake		Eastern Colorado	USBR	Conventional	8,100.00					1951
CO	Online	Mt. Elbert PS		Eastern Colorado	USBR	Pump Storage	200,000.00					1981
WY	Online	Piilo Butte		Wyoming	USBR	Conventional	1,600.00					1929
CO	Online	Pole Hill		Eastern Colorado	USBR	Conventional	38,238.00					1954
WY	Online	Seminole		Wyoming	USBR	Conventional	51,750.00					1939
WY	Online	Shoshone		Wyoming	USBR	Conventional	3,000.00					1992
WY	Online	Spirit Mountain		Wyoming	USBR	Conventional	4,500.00					1994
MT	Online	Yellowtail		Montana	USBR	Conventional	250,000.00					1966
<b>FEDERAL ENERGY REGULATORY COMMISSION PROJECTS</b>												
WY	Online	Garland Canal	3031	Wyoming	Shoshone I.D.	Conventional	2,610.00					10/9/1981
MT	Online	Lower Turnbull Drop	12597	Montana	Turnbull Hydro, LLC	Conventional	7,700.00	6/21/2005				7/28/2006
OK	Online	McGehee Creek Dam	8492	Oklahoma Texas	McGehee Creek Authority	Conventional	175.00	7/26/1984				6/23/1986
CO	Online	Ruedi Dam	3603	Western Colorado	City of Aspen	Conventional	3,200.00					9/8/1983
CO	Online	Sugarloaf Dam	3819	Eastern Colorado	SFS Hydropower Ltd.	Conventional	2,800.00					11/18/1982
MO	Online	Tiber Dam	3574	Montana	Tiber Montana LLC	Conventional	7,500.00					11/20/1990
MT	Online	Upper Turnbull Drop	12598	Montana	Turnbull Hydro, LLC	Conventional	5,300.00	6/24/2005				6/21/1997
MT	License	Gibson Dam	12478	Montana	Gibson Dam Hydroelectric Company, LLC	Conventional	15,000.00	10/28/2003				7/28/2006
MT	Exemption	Mary Taylor Drop	14294	Montana	Turnbull Hydro, LLC	Conventional	890.00	9/23/2012				1/12/2012
WY	Preliminary	Deer Creek Drop	14370	Wyoming	Willwood Irrigation District	Conventional	780.00	3/6/2012				6/28/2012
NE	Preliminary	Medicine Creek Dam	13648	Nebraska Kansas	Twin Valleys Public Power District	Conventional	800.00	12/30/2009				6/15/2010
WY	Preliminary	Willwood Diversion Dam	13423	Wyoming	Willwood Irrigation District	Conventional	2,000.00	4/6/2009				7/7/2009
MT	Preliminary	Clark Canyon Dam	14677	Montana	Clark Canyon Hydro, LLC	Conventional	4,700.00	4/20/2015				9/18/2015
WY	Preliminary	Black Canyon Pumped Storage Project	14087	Wyoming	Black Canyon Hydro, LLC	Pump Storage	700,000.00	1/25/2011				7/15/2011
WY	Preliminary	Medicine Bow Pumped Storage	13836	Wyoming	Medicine Bow Hydro, LLC	Pump Storage	400,000.00	8/30/2010				12/3/2010
MT	Preliminary	Square Butte Pumped Storage	13349	Montana	Square Butte Hydro LLC	Pump Storage	1,032,000.00	12/23/2008				7/23/2012
<b>LEASE OF POWER PRIVILEGE PROJECTS</b>												
CO	Online	Carter Lake Outlet		Eastern Colorado	Northern Water Conservancy District	Conventional	2,600.00	5/7/2009				11/24/2009
CO	Contract	Granby Dam	LP11-3	Eastern Colorado	Northern Water Conservancy District	Conventional	700.00	4/20/2011				6/26/2012
CO	Preliminary	Pueblo Dam	LP11-4	Eastern Colorado	Southeastern Colorado Water Conservancy District, Colorado Springs Utilities, and Board of Water Works of Pueblo, Colorado	Conventional	7,010.00	4/20/2011				2/27/2012
MT	Preliminary	Yellowtail Afterbay		Montana	Crow Tribe	Conventional	9,000.00	1/11/2012				3/6/2015
MT	Preliminary	Helena Valley Pumping Plant		Montana	Helena Valley Irrigation District	Conventional	4,800.00	9/13/2013				8/20/2015
MT	Request for Development	A Drop		Montana	Turnbull Hydro, LLC	Conventional	1,000.00	6/1/2014				

### Great Plains Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
MT	Request for Development	Johnson Drop		Montana	Turnbull Hydro, LLC	Conventional	700.00	6/1/2014				
MT	Request for Development	Woods Drop		Montana	Turnbull Hydro, LLC	Conventional	900.00	6/1/2014				

## Lower Colorado Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
<b>RECLAMATION OWNED AND OPERATED</b>												
AZ	Online	Davis		Yuma	USBR	Conventional	255,000.00					1951
AZ/NV	Online	Hoover		Lower Colorado	USBR	Conventional	2,078,800.00					1936
AZ	Online	Parker		Yuma	USBR	Conventional	120,000.00					1943
<b>RECLAMATION OWNED AND OPERATED BY OTHERS</b>												
AZ	Online	Arizona Falls Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional	750.00					1902
AZ	Online	Cross Cut Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional	3,000.00					1914
AZ	Online	Horse Mesa Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional/Pump Storage	129,000.00					1927
AZ	Online	Morrison Flat Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional/Pump Storage	60,000.00					1926
AZ	Online	New Waddell Pump/Generating Plant		Phoenix	Central Arizona Water Conservation District	Pump Storage	45,000.00					1993
CA	Online	Senator Wash Pump/Generating Plant		Yuma	Imperial Irrigation District	Pump Storage	7,200.00					1966
AZ	Online	Siphon Drop Powerplant		Yuma	Yuma County Water User's Association	Conventional	4,600.00					1926
AZ	Online	South Consolidated Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional	1,400.00					1912
AZ	Online	Stewart Mountain Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional	10,400.00					1930
AZ	Online	Theodore Roosevelt Powerplant		Phoenix	Salt River Valley Water User's Association	Conventional	36,020.00					1973
<b>OTHER PLANTS ON RECLAMATION FACILITIES</b>												
AZ	Online	C.C. Craigin Dam and Powerplant	2304	Phoenix	Salt River Project	Conventional	3,000.00					1965
AZ	Online	Drop Five Powerplant		Yuma	Imperial Irrigation District	Conventional	4,000.00					1982
AZ	Online	Drop Four Powerplant		Yuma	Imperial Irrigation District	Conventional	19,600.00					1941
AZ	Online	Drop One Powerplant		Yuma	Imperial Irrigation District	Conventional	6,000.00					1984
AZ	Online	Drop Three Powerplant		Yuma	Imperial Irrigation District	Conventional	9,800.00					1941
AZ	Online	Drop Two Powerplant		Yuma	Imperial Irrigation District	Conventional	10,000.00					1953
AZ	Online	Pilot Knob Powerplant		Yuma	Imperial Irrigation District	Conventional	33,000.00					1961
<b>FEDERAL ENERGY REGULATORY COMMISSION PROJECTS</b>												
NV	Preliminary	Blue Diamond Pumped Storage Project	14344	Regional Office	The International Consortium of Energy Managers	Pump Storage	450,000.00	1/6/2012	7/11/2012			
NV	Preliminary	Eldorado Pumped Storage Project	13861	Regional Office	Eldorado Pumped Storage, LLC	Pump Storage	400,000.00	10/13/2010	2/3/2012			
AZ	Preliminary	Longview Pumped Storage Project	14341	Regional Office	Longview Energy Exchange, LLC	Pump Storage	2,000,000.00	1/3/2012	5/4/2012			
AZ	Preliminary	Verde Pumped Storage Project	14061	Phoenix	Arizona Independent Power	Pump Storage	795,000.00	1/12/2011	8/15/2011			
<b>LEASE OF POWER PRIVILEGE PROJECTS</b>												
AZ	Request for Development	Laguna Dam		Yuma		Conventional	2,200.00	1/28/2013				
AZ	Request for Development	Santa Rosa Canal		Phoenix	Marcopa-Stanfield Irrigation and Drainage District	Conventional	375.00	9/4/2012				
<b>SOLAR PROJECTS</b>												
NV	Online	Boulder City Regional Office Building		Regional Office	Boulder City Regional Office Building		276.36					
NV	Online	Boulder City Regional Office Building (parking)		Regional Office	Boulder City Regional Office Building		5.97					
NV	Online	Hoover Spillway House Renovation		Regional Office	Boulder City Regional Office Building		48.00					Aug-13
NV	Online	River Mountains		Regional Office	Southern Nevada Water Authority and SunEdison		14,000.00					Jan-16

## Lower Colorado Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
NV	In Development	First Solar		Regional Office	First Solar Development, LLC		50,000,000	Jun-14				
CA	In Development	Blythe Office Solar Installation		Regional Office	USBR		19,000					
<b>WIND PROJECTS</b>												
AZ	In Development	Mohave County Wind Farm		Regional Office	BP Wind Energy North America		500,000,000					





### Mid-Pacific Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
CA	Request for Development	A-C3 (Panicker Drop)		Lahontan Basin	Truckee Carson Irrigation District	Conventional	125.00	2014				
CA	Request for Development	V-C2 (Lewis Wasteway)		Lahontan Basin	Truckee Carson Irrigation District	Conventional	250.00	2014				
<b>SOLAR PROJECTS</b>												
CA	In Development	San Luis Facility		South Central California	San Luis Renewables, LLC		26,000,000	8/5/2011				

## Pacific Northwest Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
<b>RECLAMATION OWNED AND OPERATED</b>												
ID	Online	Anderson Ranch		Snake River	USBR	Conventional	40,000.00					1950
ID	Online	Black Canyon		Snake River	USBR	Conventional	10,200.00					1925
ID	Online	Boise River Diversion		Snake River	USBR	Conventional	3,450.00					1912
WA	Online	Chandler		Columbia Cascades	USBR	Conventional	12,000.00					1956
WA	Online	Grand Coulee		Columbia Cascades	USBR	Conventional/pump Storage	6,809,000.00					1941
OR	Online	Green Springs		Columbia Cascades	USBR	Conventional	17,290.00					1960
MT	Online	Hungry Horse		Columbia Cascades	USBR	Conventional	428,000.00					1952
ID	Online	Mindoka		Snake River	USBR	Conventional	27,700.00					1942
ID	Online	Palisades		Snake River	USBR	Conventional	176,564.00					1957
WA	Online	Roza		Columbia Cascades	USBR	Conventional	12,937.00					1958
<b>FEDERAL ENERGY REGULATORY COMMISSION PROJECTS</b>												
ID	Online	American Falls	2736	Snake River	Idaho Power Co.	Conventional	92,400.00				3/31/1975	1975
ID	Online	ARROWROCK DAM	4656	Snake River	Big Bend Irrigation District, et. al.	Conventional	15,000.00		8/15/1983		3/27/1989	Mar-10
ID	Online	CASCADE	2848	Snake River	Idaho Power Co.	Conventional	12,420.00				2/17/1981	3/4/1985
WA	Online	COWICHE	7337	Columbia Cascades	Yakima-Tieton ID	Conventional	1,470.00				7/6/1984	1986
ID	Online	Dietrich Drop	8909	Snake River	Big Wood Canal Company	Conventional	4,770.00	3/7/1985			5/22/1987	1989
WA	Online	ELTOPIA BRANCH CANAL	3842	Columbia Cascades	East, Quincy, & South, Columbia Basin ID's	Conventional	2,200.00				12/9/1981	1982
WA	Online	ESQUATZEL POWER	12638	Columbia Cascades	Green Energy Today LLC	Conventional	900.00	1/4/2006			6/6/2008	Apr-12
ID	Online	FARGO DROP NO. 1	5042	Snake River	Boise Project Board of Control	Conventional	1,100.00				10/23/1981	Jun-13
ID	Online	FELT HYDRO	5089	Snake River	Fall River Rural Cooperative	Conventional	7,450.00				9/9/1983	1985
ID	Online	ISLAND PARK	2973	Snake River	Fall River Rural Electric	Conventional	4,800.00	7/8/1983			10/19/1988	1982
ID	Online	Little Wood Reservoir	7427	Snake River	Little Wood Irrigation District	Conventional	3,000.00				4/13/1984	1989
ID	Online	LOW LINE NO. 8 ARENA DROP	5056	Snake River	Boise Project Board of Control	Conventional	385.00	6/10/1981			10/23/1981	Apr-12
WA	Online	MAIN CANAL HEADWORKS	2849	Columbia Cascades	East, Quincy, & South, Columbia Basin ID's	Conventional	26,000.00				11/16/1981	1987
ID	Online	MIle 28	10552	Snake River	Contractor's Power Group	Conventional	1,500.00	12/2/1987			8/12/1992	1996
OR	Online	MITCHELL BUTTE LATERAL	5357	Snake River	Owyhee ID et. al.	Conventional	1,880.00		2/26/1982		12/14/1984	1990
WA	Online	Mora Drop Hydro	3403	Snake River	Boise Kuna Irrigation District et. Al	Conventional	1,900.00				12/18/1980	9/15/2006
WA	Online	ORCHARD AVENUE	7338	Columbia Cascades	Yakima-Tieton ID	Conventional	1,441.00				7/6/1984	1986
OR	Online	OWYHEE DAM	4354	Snake River	Gem I.D., Owyhee I.D., & Ridgeview I.D	Conventional	4,340.00				5/9/1984	1985
OR	Online	OWYHEE TUNNEL NO. 1	4359	Snake River	Gem ID et. al.	Conventional	8,120.00				2/28/1986	6/1/1983
WA	Online	POTHOLE EAST CANAL	3843	Snake River	East, Quincy, & South, Columbia Basin ID's	Conventional	2,400.00				12/9/1981	1982
WA	Online	POTHOLE EAST CANAL HEADWORKS	2840	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	6,500.00				9/24/1982	1991
WA	Online	QUINCY CHUTE	2937	Columbia Cascades	East, Quincy, & South, Columbia Basin ID's	Conventional	9,367.00				8/20/1982	1983
WA	Online	RUSSEL D SMITH REC 22.7	2926	Columbia Cascades	East, Quincy, & South, Columbia Basin ID's	Conventional	6,100.00				3/27/1980	1982
WA	Online	SUMMER FALLS	3295	Columbia Cascades	East, Quincy, & South, Columbia Basin ID's	Conventional	92,000.00				8/14/1981	1983
WA	Online	TIETON DAM	3701	Columbia Cascades	Yakima-Tieton Irrigation District	Conventional	13,600.00				6/27/1991	2007
OR	Online	45-Mile	13817	Columbia Cascades	Apple, Inc.	Conventional	5,000.00	7/16/2010			12/17/2010	5/13/2015

## Pacific Northwest Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
OR	Online	Monroe Drop	14430	Columbia Cascades	Apple, Inc.	Conventional	300.00	7/2/2012	3/26/2013	2/18/2015		10/29/2015
ID	Exemption	FARGO DROP NO. 2	5040	Snake River	Boise Project Board of Control	Conventional	175.00			10/23/1981		
ID	Exemption	MAIN CANAL NO. 10	5041	Snake River	East, Quincy, & South, Columbia Basin I.D.'s	Conventional	500.00			10/23/1981		
ID	Exemption	MAIN CANAL NO. 6	5038	Snake River	East, Quincy, & South, Columbia Basin I.D.'s	Conventional	1,055.00			10/23/1981		
ID	Exemption	WALDVOGEL BLUFF	5043	Snake River	Boise Project Board of Control	Conventional	300.00	6/30/1981		12/23/1981		
WA	Preliminary	16.4 Wasteway	14349	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	1,750.00	7/29/2011	3/26/2013			
WA	Preliminary	46A Wasteway	14351	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	1,600.00	7/29/2011	3/26/2013			
WA	Preliminary	Mason Dam Hydro	12686	Snake River	Baker County	Conventional	3,400.00	4/25/2006	5/26/2010			
WA	Preliminary	McKay Dam	14546	Columbia Cascades	Houtama Hydropower, LLC	Conventional	2,300.00	8/13/2013	2/6/2014			
WA	Preliminary	PEC 1973 Drop	14316	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	2,200.00	11/8/2011	3/26/2013			
WA	Preliminary	Pinto Dam	14380	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	3,400.00	4/4/2012	10/10/2012			
WA	Preliminary	Scotenehy Inlet Drop	14318	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Conventional	1,700.00	5/31/2011	3/26/2013			
OR	Preliminary	Unity Dam by Warm Springs Hydro	14576	Snake River	Warm Springs Hydro, LLC	Conventional	800.00	1/13/2014	6/16/2014			
WA	Preliminary	Warm Springs Dam	13570	Snake River	Ted Sorenson	Conventional	2,700.00	8/12/2009	2/22/2010			
WA	Preliminary	Wicklup Dam Hydro	12965	Columbia Cascades	Synthotics	Conventional	7,150.00	8/17/2007	5/15/2008			
WA	Preliminary	Banks Lake Pumped Storage Project	14329	Columbia Cascades	Grand Coulee Project Hydroelectric Authority	Pump Storage	1,000,000.00	11/30/2011	8/22/2013			
<b>LEASE OF POWER PRIVILEGE PROJECTS</b>												
ID	Request for Development	Cat Creek Energy Pump Storage Facility		Snake River	Cat Creek Energy, LLC	Pump Storage	400,000.00	11/5/2014				
<b>SOLAR PROJECTS</b>												
WA	Online	Grand Coulee Solar		Columbia Cascades	Grand Coulee		4.70					Oct-12
<b>PILOT PROJECTS</b>												
WA	Testing	Instream Energy Roza Division Hydrokinetics		Columbia Cascades	Instream Energy	Hydrokinetics	10.00					Aug-13

## Upper Colorado Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
<b>RECLAMATION OWNED AND OPERATED</b>												
CO	Online	Blue Mesa		Western Colorado	USBR	Conventional	86,400.00					1967
CO	Online	Crystal		Western Colorado	USBR	Conventional	31,500.00					1978
NM	Online	Elephant Butte		Albuquerque	USBR	Conventional	27,945.00					1940
UT	Online	Flaming Gorge		Provo	USBR	Conventional	151,500.00					1963
WY	Online	Fontenelle		Provo	USBR	Conventional	10,000.00					1968
AZ	Online	Glen Canyon		Western Colorado	USBR	Conventional	1,320,000.00					1965
CO	Online	Lower Molina		Western Colorado	USBR	Conventional	5,589.00					1962
CO	Online	Morrow Point		Western Colorado	USBR	Conventional	173,334.00					1971
CO	Online	Upper Molina		Western Colorado	USBR	Conventional	9,936.00					1962
<b>RECLAMATION OWNED AND OPERATED BY OTHERS</b>												
UT	Online	Causey Powerplant		Provo	Weber Basin Water Conservancy District	Conventional	1,900.00					1999
UT	Online	Deer Creek Powerplant		Provo	Provo River Water Users Association	Conventional	4,950.00					1958
UT	Online	Gateway Powerplant		Provo	Weber Basin Water Conservancy District	Conventional	4,275.00					1958
UT	Online	Lower Spanish Fork Powerplant		Provo	Strawberry Water User's Association	Conventional	250.00					1937
CO	Online	Madhee Powerplant		Western Colorado	Dolores Water Conservancy District	Conventional	1,283.00					1992
UT	Online	Onsted Powerplant		Provo	Purchased from PacifiCorp in 1990	Conventional	10,300.00					1904
UT	Online	Payson Powerplant		Provo	Strawberry Water User's Association	Conventional	400.00					1941
CO	Online	Towaoc Powerplant		Western Colorado	Dolores Water Conservancy District	Conventional	11,495.00					1994
UT	Online	Upper Spanish Fork		Provo	Strawberry Water User's Association	Conventional	3,900.00					1909
UT	Online	Wanship Powerplant		Provo	Weber Basin Water Conservancy District	Conventional	1,900.00					1958
<b>FEDERAL ENERGY REGULATORY COMMISSION PROJECTS</b>												
UT	Online	Echo Dam	3755	Provo	City of Bountiful	Conventional	4,500.00			11/30/1981		12/7/1984
NM	Online	El Vado Dam	5226	Albuquerque	County of Los Alamos	Conventional	8,000.00			1/4/1982		10/31/1985
CO	Online	Navajo Dam	4720	Western Colorado	City of Farmington	Conventional	30,000.00					10/15/1985
UT	Online	Pineview Dam	4597	Provo	Weber-Box Elder Conservancy District	Conventional	1,800.00					3/16/1984
CO	Online	Vallecito Dam	3174	Western Colorado	Pramigan Resources & Energy, Inc.	Conventional	5,880.00					10/5/1983
UT	Preliminary	Lake Powell Hurricane Cliffs Pumping Plant	12966	Regional Office	State of Utah	Pump Storage	300,000.00	8/21/2007		5/20/2011		5/1/1989
CO	Preliminary	Plateau Creek Pumped Storage	14426	Western Colorado	Dolores Water Conservancy District	Pump Storage	500,000.00	5/10/2012		10/1/2012		
<b>LEASE OF POWER PRIVILEGE PROJECTS</b>												
CO	Online	Grand Valley Project		Western Colorado	Grand Valley Water Users Assoc., Orchard Mesa Irrigation Dist., PSCO	Conventional	3,000.00					1933
CO	Online	Jackson Gulch Dam		Western Colorado	Mancos Water Conservancy Dist.	Conventional	260.00					1995
UT	Online	Jordanelle Dam		Provo	Central Utah Water Conservancy Dist., Heber Light and Power	Conventional	13,000.00	7/2/1999				2008
CO	Online	Lemon Dam		Western Colorado	Florida Water Conservancy District	Conventional	120.00					1988
CO	Online	South Canal (Drop 1)		Western Colorado	Uncompahgre Valley Water Users and the Delta-Montrose Electric Association	Conventional	4,000.00	8/26/2009				3/16/2012
CO	Online	South Canal (Drop 3)		Western Colorado	Uncompahgre Valley Water Users and the Delta-Montrose Electric Association	Conventional	3,500.00	8/26/2009				3/16/2012
CO	Online	South Canal (Drop 3)		Western Colorado	Uncompahgre Valley Water Users and the Delta-Montrose Electric Association	Conventional	3,500.00	8/26/2009				8/1/2013

## Upper Colorado Renewable Portfolio

State	Project Status	Project Name	FERC ID	Area Office	Operating Entity	Hydropower Type	Capacity (kW)	Project Initiation Date	Preliminary Permit or Lease Date	Exemption or CE Date	License or Lease Date	Online Date
CO	Online	Ridgway Dam		Western Colorado	Tri-County Water Conservancy District	Conventional	7,000.00	6/2/2010			2/6/2012	4/3/2014
CO	Online	Shavano Falls		Western Colorado	Uncompahgre Valley Water Users Association	Conventional	2,800.00	8/21/2013	1/27/2014		6/18/2014	6/24/2015
CO	Online	South Canal (Drop 4)		Western Colorado	Uncompahgre Valley Water Users Association	Conventional	4,800.00	8/21/2013	5/14/2014		9/8/2014	6/24/2015
CO	Contract	South Canal (Drop 5)		Western Colorado	Uncompahgre Valley Water Users Association	Conventional	2,400.00	3/3/2015	6/18/2015		11/5/2015	
UT	Preliminary	Spanish Fork Flow Control Structure	LP11-2	Provo	Central Utah Water Conservancy District, Strawberry Water users Association, and South Utah Valley Electric Service District	Conventional	8,000.00	5/11/2011	3/9/2012			
NM	Posted Solicitation	San Juan Chama Project	LP12-1-000	Albuquerque	Albuquerque Bernalillo County Water Utility Authority	Conventional	100.00	7/6/2012				
CO	Request for Development	Rifle Gap Dam		Western Colorado		Conventional	341.00	4/1/2013				
UT	Request for Development	Diamond Fork		Central Utah Project Completion Act Office	Central Utah Water Conservancy District	Conventional	12,214.00	Nov-14				
<b>PILOT PROJECTS</b>												
CO	Contract	South Canal (Drop 2)		Western Colorado	Percheron Power, LLC, Uncompahgre Valley Water Users Association	Hydrodynamic Screw	987.00	5/27/2014	7/29/2014	9/17/2014	12/17/2014	