

# Generation and Line/Load Interconnection

Expand Program  
Asset Management Strategy

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# Interconnection Strategy Development Steps

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# Generation and Line Load Executive Summary

## Background:

- In 2005, with the Congressional approval of wind tax credits, a number of potential wind generation companies made requests for interconnection to the BPA transmission grid. By 2007, BPA built facilities to connect up to 2,500 MW of wind generation and connected 650 MW. In 2008, 659 MW was connected and in 2009, 795 MW was connected to the FCRPS grid. Bonneville has more than 16,000 MW in additional wind project interconnection requests, many interconnecting in the 2011 through 2016 timeframe. BPA anticipates a total installed wind capability of 3,900 MW by the end of calendar year 2011. In 2010, BPA began construction of several new large substations to meet these interconnection requests. Current projections are 6,200 MW by 2013 interconnected and possibly 8,000 MW total by 2016. Also in the interconnection queue is approximately 800 MW of natural gas, solar, bio-mass and geothermal fueled generation proposed for connection between 2012 and 2016. Much of the wind generation demand is a result of the Renewable Portfolio standards enacted by Oregon and Washington that require an estimated 5,000 MW of renewable generation by 2015. Export to California could add another 2,000-3,000 MW during the same time period.
- In June 2008, Bonneville's first Network Open Season (NOS) received 153 requests from 28 customers for 6,410 MW of new service, about three-fourths for wind energy integration. BPA subsequently offered 1,782 MW of new transmission service on its existing system.

# Generation and Line Load Executive Summary

## ■ Background (Continued)

- Bonneville identified four new Main Grid capital projects from the 2008 NOS: (1) McNary-John Day 500 kV transmission line (part of West of McNary Reinforcements Group 1), (2) Big Eddy-Knight 500 kV transmission line and substation (part of West of McNary Reinforcements Group 2), (3) Central Ferry-Lower Monumental 500 kV Reinforcement (formerly Little Goose Area Reinforcement), and (4) I-5 Corridor 500 kV Reinforcement. Construction of the McNary-John Day 500 kV transmission line is nearly complete and BPA will pursue Big Eddy Knight and Central Ferry – Lower Monumental projects if environmental and economic analysis warrants. The I-5 Corridor project is in the planning stage. If all four projects are constructed they will provide almost 6,000 MW of new transmission service.
- BPA's second NOS window for new transmission service requests in 2009 resulted in 82 service requests resulting in 34 contracts totaling 1,553 megawatts. Of that, approximately 923 megawatts represent wind project interconnection requests. BPA has completed cluster studies for NOS 2010. These requests total 3,759 megawatts, of which 2,993 megawatts is wind. Several projects are being reviewed as a result of these studies including Colstrip West, Colstrip East and the Northern Intertie project. BPA has elected to not hold a NOS in 2011.

# Generation and Line Load Executive Summary

- At the close of 2011 BPA has integrated more than 3,500 MW of Wind Generation.
- Transmission anticipates having 6,000 MWs of wind integrated by the end of 2013.
- Major Transmission Projects approved to move forward for Wind Integration are: John Day-McNary, Big Eddy Knight, Little Goose Area Reinforcement.
- Major Projects under consideration to bolster the grid for wind integration are: Northern Intertie, Cup West and I5.
- A final decision has not been made regarding FY10 NOS projects. There was no NOS held in FY11.
- In FY12, PFIA projects are being restricted to \$45M in an effort to free up resources to complete other high priority work.
- The recent approval of the Celilo Upgrade project will allow up to 700MW of additional PDCI capacity (Requires considerable additional expenditures on the part of all participants).
- The Agency is continuing to discuss and review ideas for NOS reform.
- New Line Load projects continue to be requested but represent a small portion of the Capital Budget

# Key Standards and Procedures

## ■ **LGIP Expand Procedures**

- **Large Generation Interconnection Procedures (LGIP) – BPA OATT Attachment L**
  - Required by FERC order 2003A (revised in 2005) -- requires BPA to enter all generation interconnection requests into a Queue and posted all requests on OASIS
  - Feasibility Study (FES): BPA is required to issue FES study agreement after initial Scoping Meeting; 45 Days for study and 30 days for report review.
  - Interconnection System Impact Study (ISIS): 30 days for issuing Study agreement after review meeting, 90 Days study and 30 days for report review.
  - Facility Study (FAS): 30 days for issuing Study agreement after review meeting, 90/180 Days study and 30 days for report review.
- **National Environmental Protection Act (NEPA) Study**
  - Completion required before the LGIA can be offered and any construction can begin.
  - Studies range from Categorical Exclusion (CX) 1-3 months, to full EIS - 2 years;
  - Tiered ROD most common, which follows wind project permitting and takes 2-3 months after local permits issued to issue BPA Record of Decision (ROD).
- **Project Requirements Diagram (PRD) and Work Plan**
  - After FAS report is issued, Planning prepares the PRD and requests estimates based on the plan of service defined in the PRD's. Typically requires 2-4 months.
  - Final PRD's are issued after internal review of preliminary PRD's and budget level estimates are executed. 1-3 months.
  - Work Plan is reviewed for addition of new project and schedule determined for construction.

# Key Standards and Procedures (cont)

## ■ **LGIP Expand Procedures (cont.)**

### • **PAR Initiated**

- After PRD is finalized and budget level cost estimates are prepared, a Project Authorization Request (PAR) is submitted to initiate the AIS process leading to project being placed in work plan. A separate business case is required if direct costs > \$2.5M. Requires 2 to 6 months.
- An Engineering and Procurement (E&P) agreement is initiated for large projects to the customer after the AIS process is complete. E&P funding is at customer's risk – if project does not execute an LGIA.
- With Executed E&P and PAR submittal, the project is listed in the work plan

### • **LGIA Offered and Executed**

- The final Interconnection Agreement (LGIA) cannot be executed until Capital Project Authorization process and the NEPA review (ROD signed) have been completed.
- With Executed LGIA, remaining funds are committed and construction of the project is allowed

### • **Timeline –**

- The FERC LGIP timeline is 14 months for the study phase taking into account all steps in the process outlined. (SGIP is several months shorter.)
- The studies are averaging 2 years with BPA study delays and extensions.
- BPA advises customers that two years are required to complete studies and execute a contract to initiate design (fund and list the project in the work plan).
- Impacts of huge work load and added PAR processes may result in longer schedules to complete projects
- An Owner-Engineer project may require additional time to initiate project.

# Key Standards and Procedures (cont)

## ■ **SGIP and Integration Expand Procedures; Line / Load Procedures**

- **Small Generation Interconnection Procedures (SGIP) – BPA OATT Attachment N**
  - Defined under FERC order 2006, similar to LGIP but for interconnection requests <20 MW
  - Studies - typically 6 months to complete studies (assuming no main grid impacts)
  - NEPA Review / Approval is required
  - Work Plan schedule and PAR Approval is required (with accompanying time concerns)
  - Completion of interconnection work ranges from 6 to 12 months, 12 months minimum and longer for main grid impacts.
- **Generation Integration Requests**
  - For projects connecting to BPA customer utilities [example – A biogas gen project connects to Klickitat PUD's 69 kV system that connects to BPA at Rock Creek 230 kV. KPUD is in BPA BAA, so BPA provides the metering and telemetry to integrate into the BPA control system.]
  - Similar study and construction schedules as for SGIP
  - May include facilities constructed and owned by customer utility
- **Line/Load Interconnection Procedures (LLIP) – BPA OATT Attachment J**
  - Applied for new load service, service upgrades, or interconnecting lines for load service
  - BPA developed internal procedures similar to study and construction schedules as for LGIP or SGIP for small projects
  - Most projects are requested by BPA load serving customers.
  - Formal LLIP is a major cultural change for traditional customers accustomed to same year construction, may now fall into 2-year work plan process
  - New procedures developed to streamline customer projects for meter installations only.

NOS – Note the network open season addresses transmission service. The GI queue is a separate study and workload issue



# Asset Description (Expand)

## ■ **Generation and Line/Load Interconnection Assets**

### • **FERC Definitions:**

- Network Additions – Additions to the BPA system BPA funded or Customer financed (up-front capital provided by customer, with transmission service credits)
- Interconnection Facilities – BPA owned assets at a customer facility or as otherwise deemed not network. Customer funds and receives no credits.
- Direct Assigned Facilities – Customer owned facilities constructed by BPA, funded by the customer.

### • **Generation projects (LGIP and SGIP) usually have 2 types of asset additions:**

- Network Additions - New network facilities (substations, line additions, etc) and upgrades (line upgrades, communications system additions, control center additions, etc)
- Interconnection Facilities – control, meters and communications equipment additions at the customer facilities.

### • **Integration projects** - can include the same asset classes, but also involve BPA customer (intervening host utility) upgrades (not a BPA asset).

### • **Line / Load projects**

- Line additions can be a customer owned line terminated in a BPA facility where the BPA facility upgrades are treated as network assets, but the line itself is customer owned
- Line built as a network addition between BPA and another utility that is then a network addition
- Connections to new load service facilities owned by the customer (BPA portion is treated as Interconnection Facilities)
- Misc line and equipment upgrades to support increased load service (Network Addition)

# Asset Description (cont)

- **Control Center Additions :**
  - Generation projects, whether large or small, interconnection or integration impact operating systems with limited outage windows – both Dittmer and Munro
  - Dittmer Control Center (with Munro CC as back-up) handles all of the generation dispatch duties, including AGC, Voltage support.
  - Dittmer and Munro each integrate the generation project into transmission system Dispatch control (SCADA) and related monitoring systems (SER and Phasor Measuring Units )
  - RAS system revisions are required for most generation projects
  - Wind projects include the variable generation control system (VELMA) interface and control
  - Generation additions to the control centers require detailed scheduling plans to address the many systems impacted with limited outage windows while maintaining operations.
- **Communications Additions**
  - Communication additions are required for all generation projects and many customer facilities additions.
  - Several sites and systems may be impacted for each project.
- **Scheduling System (Commercial Accounts):**
  - Generation projects are required to set-up generation accounts
  - All loads and generation must set-up scheduling system accounts for generation estimate and transmission service
  - All new loads and generation accounts are linked to metering, impacting metering services and billing systems

# Customers and Stakeholders Served

- **Generation Interconnection Customers (Developers and Independent Power Producers)**
  - Merchant operators that sell the generation into the market daily, weekly or longer term, or
  - Sell the output rights long term (Power purchase agreements), or
  - Sell the project to a load serving utility (many projects now using this model, as ownership has advantages for rates recovering by the State Public Utility Commissions), or
  - Operating Utility is developer
- **Purchasers of Generation connected to BPA-TS**
  - BPA-PS purchases – Power Services power purchase contracts with merchant plants
  - BPA Customer Utilities – Direct purchasers by utilities served by PS
  - NW Utilities – Other NW utilities purchasing power for delivery to their load not in BPA-TS BAA
  - External Utilities served via Interties (California utilities, etc)
- **Federal and State Stakeholders**
  - Federal Incentives for renewable energy development – primarily the federal Production Tax Credits
  - State Incentives – renewable portfolio standards required for utilities and PURPA incentives for small generation projects
  - Environmental reviews, including siting concerns for the public
- **Traditional load service customers** - Northwest utility customers, intertie utility customers and large load customers

# Status of Interconnection Expand Program

- **Generation Interconnection.**
  - **LGIP Study procedures** - In place now for 5 years now (SGIP for 3 years).
  - **Number of GI requests** – has slowed in 2011. (See graph and chart in following slides)
    - Study backlog continues to be a problem
  - **Status of Study Process**
    - BPA has initiated a GI-NOS reform to help streamline GI study completions and accommodate the more complicated NOS study process.
  - **Study Process complications**
    - NEPA process and customer state /local permitting:
      - Local Permitting (by Developer) needs to be completed before NEPA study can be completed (except for BPA initiated EIS)
      - Environmental (NEPA) study must be completed prior to offering LGIA and construction, and technically, BPA cannot offer a final plan of service (POS) until the NEPA review has been completed.
    - Final PRD and estimates subject to POS from Customer, and AIS process for approval
  - **From a MW capacity view:**
    - Completed studies for over 15,500 MW, (not including study work for some withdrawn requests) of over 24,000 MW in queue (LGIP/SGIP) presently
    - Mostly wind projects, though some solar demand in 2011
    - Approximately 1700 MW thermal and 3500 MW wind generation has been connected since 2000

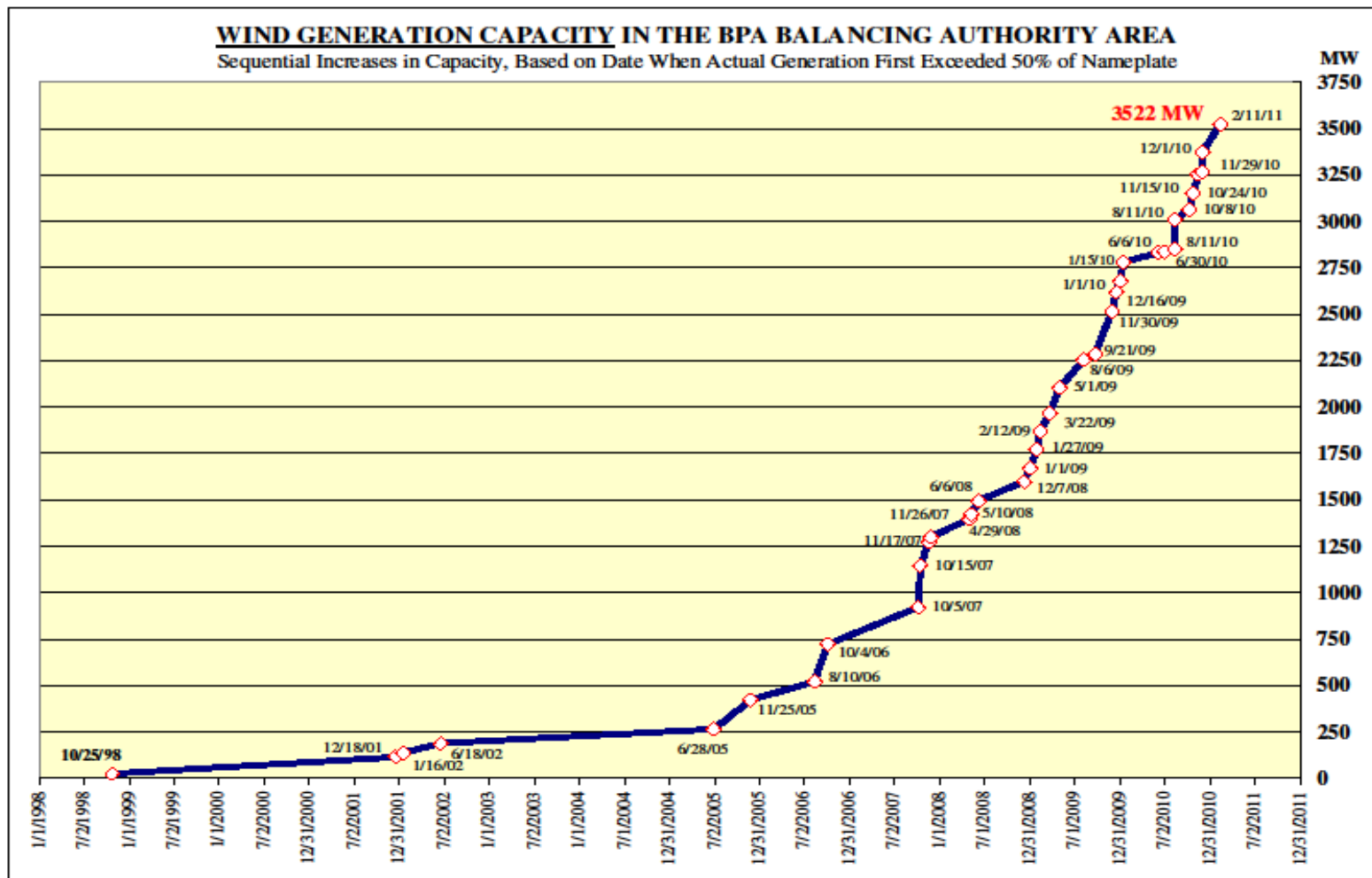
# Status of Interconnection Expand Program (cont)

## ■ Generation Interconnection (cont)

- 1,600 MW under construction
- Construction Status:
  - LGIA's or E&P executed for all FY12 projects
  - PAR / AIS initiated with E&P executed for all FY12 project starts, FY13 submitted
  - Large Generation projects (Central Ferry / LSR & Shepherds Flat - \$145M) will be completed in FY12.
  - New Starts for FY12-13 are mostly small projects.
  - FY13 new starts may be impacted by the Federal PTC extension or lack thereof.
  - Line/ Loads projects are not presently forecasted, other than in high level OMB/IPR numbers
- Graph next slide shows the rapid completion of wind projects onto the grid
- Slide 12 shows the longer range outlook for wind development in the NW that is likely to connect to the BPA grid

Note: BPA Project schedule must coordinate with Customer schedule. The Customer project is usually one or more orders of magnitude more costly. Example: A 200 MW wind project may require a new 230 kV substation at \$12M, but the wind project cost is ~\$400M.

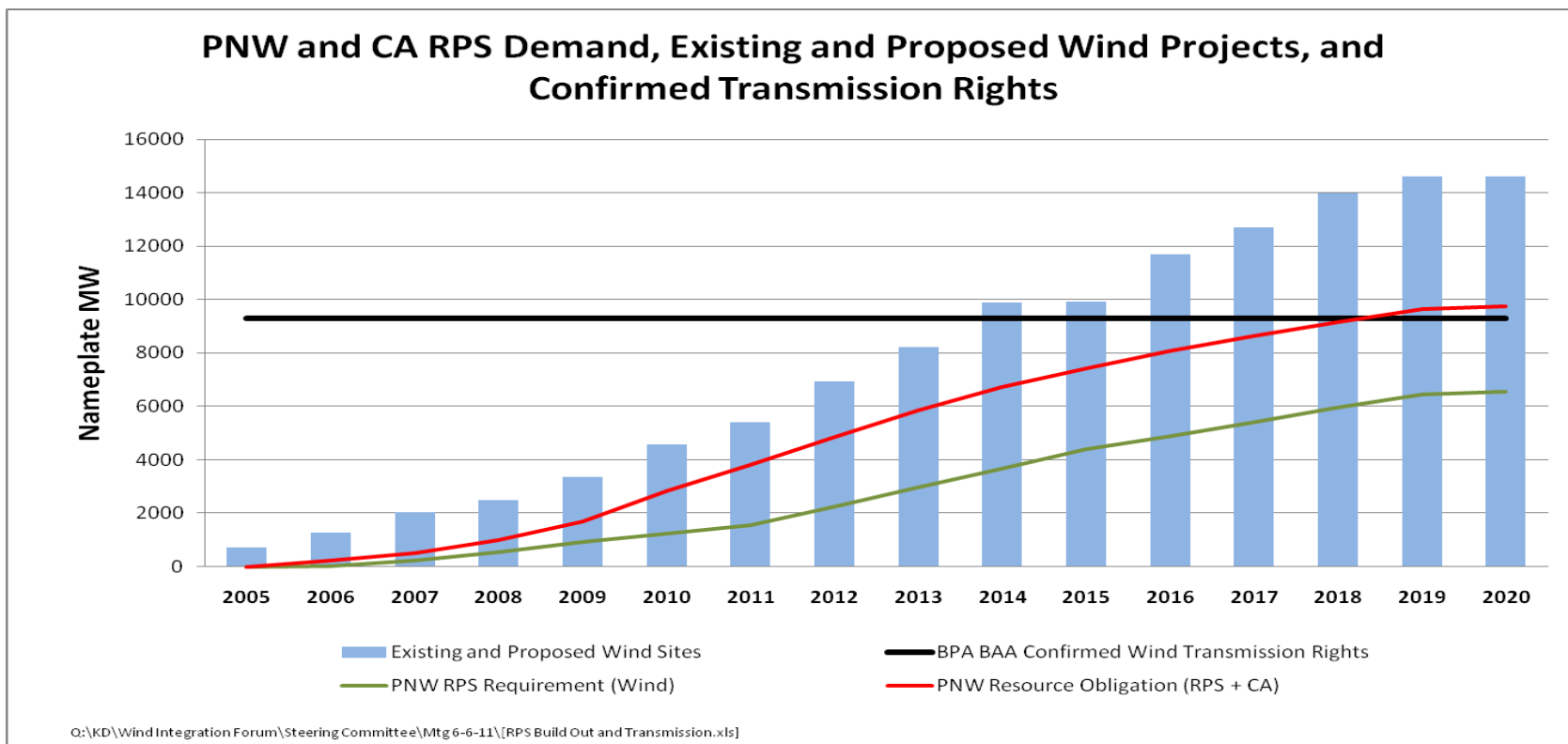
# Status of Interconnection Expand Program (cont)



WIND\_InstalledCapacity\_current.xls 3/15/2011

# Status of Interconnection Expand Program (cont)

- **PNW and CA RPS targets would require ~10,000 MW of installed NW wind by 2020.**
  - **Nearly 6,000 MW currently operating or under construction.**
- **At least 14,400 MW of supply between existing projects and interconnection requests.**
  - **Significant excess supply relative to 2020 regulatory demand.**
  - **BPA has offered ~ 9,300 MW of transmission service to wind projects.**



# Generation Expand Projects FY12-14

## ■ FY 2012 Projects:

- Young's Creek Hydro (8 MW) SnoPUD Integration – 11/1/11 Commissioning by SnoPUD
- S. Hurlburt (Shepherds Flat Phase 2) (290 MW), In Service achieved 10/1/2011, commercial target 2/1/2012.
- Longview Fiber (55 MW) Integration – 12/15/2011 target, add meters, TM
- Lower Snake Wind (PSE) (GI 284-5, new Central Ferry, 1st phase – 343 MW) – 12/1/2011 In Service, Commercial 2/2012
- Energetics Solar (4 MW) GI 387, 2/2012, Solar near LaPine OR
- Outback Solar (4 MW) GI 376 5/1/2012 – Solar near LaPine OR .
- Windy Flats 3 (Rock Ck GI 222, 100 MW) Commercial 5/2012 – Meter addition
- Horse Shoe Bend (Shepherds Flat Phase 3) (290 MW), Commercial target 6/1/2012.
- Horse Butte Wind (Uamps Idaho GI 374, 100 MW) 8/1/2012 – E&P funded, In Service Target 8/2012 with BPA design and construction
- Nippon Biomass (Port Angeles 20 MW) GI 319, Commercial 8/2012 – E&P issued

**Total for FY2012 – 1217 MW**

## ■ FY 2013 Projects:

- Miller Ranch (122 MW) GI 233, In Service 12/2012 – E&P signed, Project funded, design nearly complete, PPA signed.
- Antelope Ridge (Elkhorn GI 206, 104 MW) Delayed to 2/1/2013, permitting issues – E&P funded
- LaPine Biomass (BioGreen 65 MW) GI 394, 2/2013
- Outback Solar (Obsidian 5 MW) GI 377, 3/2013
- Coyote Crest (GHPUD 100 MW) GI 313, 10/2012 In Service, 3/2013 Commercial
- Christmas Vly Solar (8 MW) GI 385, 3/1/2013 Delayed by Customer
- Longview Fiber Ph 2 (35 MW) Integration – 8/2013 target, add meters, RTU, Etc

**Total for FY2013 – 469 MW**



# Generation Expand Projects FY12-14

## ■ **FY 2014 Projects:**

- Summit Ridge (Lotus Group GI 345, 201 MW) Target 12/2013 CAB Approved 11/2011
- Montague 1 (Slatt 230 Addition GI 238, 200 MW) Target 12/2013 - Design funded
- Golden Hills (200 MW) GI 99, delayed to 12/1/2013 – Design complete, construction on hold by customer request. LGIA signed.
- Eight Mile Canyon (78 MW) GI 255, 12/2013 – E&P funded, revised LGIA Req'd
- Whistling Ridge (Saddleback 70 MW) GI 108, 4/2014
- Montague 2 (Slatt 230 Addition GI 238, 200 MW) Commercial 6/2014 - E&P funded, construction on hold by Iberdrola request.
- Goodnoe Hills Add'n (enXco 56 MW) GI 131, Remaining of LGIA, Issues with PAC on ownership

**Total for FY2014 – 1004 MW**

## ■ **Large Gen Projects FY 15 and Beyond:**

- Longhorn 500/230 Substation (Slatt area) Target 12/2014 – Total 1200 MW GI, 1000 MW PTSA's, Customer ready to fund \$14M for transformers, Business Case Approved, possible 1000 MW by 2019
- Stanfield 500/230 Substation Target 2015 – first project to add 201 MW (Heppner Wind) would connect at new Longhorn Substation at 500 kV.

# Forecasted LGI Capital Costs for FY12-18

Gen Cash and Spend PROJECT NAME (CSE's - As of: 12/xx/2011)	MW	Date in Service	CSE	Total Deposits	Network	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
<b>NOTE: For BPA-I Internal Use Only - DO NOT Distribute beyond Transmission Services</b>													
<b>Projects for FY12:</b>													
N. Hurlburt (Shepherds Flat) Phase 1 GI 118 (Slatt 230 kV)	250	8/2011	Cherilyn	\$34,000,000	\$32,800,000	\$20,000,000	\$4,000,000	On Line					
Longview Fibre Biofuel	55	12/2011	Laura O'Keavyn/ James	\$500,000			\$250,000	\$250,000					
S. Hurlburt (Shepherds Flat Phase 2) GI 118 (Slatt 230 kV)	290	2/2012	Cherilyn	\$1,500,000	\$200,000	\$500,000	\$500,000	\$500,000					
Lower Snake Wind Ph 1 part 1 GI 284-5	250	3/2012	Steve E	\$102,000,000	\$100,000,000	\$41,000,000	\$50,500,000						
Windy Flats 3 (West) GI 222 (Rock Creek Substation)	100	5/2012	Steve E	\$100,000	\$0		\$100,000						
Horse Shoe Bend (Shepherds Flat Ph 3) GI 118 / 291 (Slatt 230 kV)	290	6/2012	Cherilyn	\$3,000,000	\$1,500,000		\$500,000	\$2,500,000					
Horse Butte Wind GI 374 (UAMPS)	100	8/2012	Cherilyn	\$5,000,000	\$1,000,000	\$1,000,000	\$2,500,000	1,500,000					
Small Gen for 2012 (7 projects: Young's Creek Hydro, Energetics,	39	2012	James Hall	\$500,000	\$1,500,000	\$100,000	\$300,000	100,000					
<b>Projects for FY2013:</b>													
Coyote Crest GI 313 (PeEl North)	100	10/2012	Cherilyn	\$3,800,000	\$2,700,000	\$1,300,000	\$2,000,000						
Lower Snake Wind Ph 1 part 2GI 284-5	91	12/2012	Steve E	\$1,300,000			\$1,300,000						
Golden Hills (BPAE) GI 99 (John Day 230kV Substation)	200	12/2012	Cherilyn	\$5,100,000	\$4,350,000	\$1,000,000	\$1,500,000	\$1,400,000					
Miller Ranch GI 233 (Rock Creek via White Creek)	150	12/2012	Steve E	\$1,800,000	\$200,000	\$400,000	\$500,000	\$400,000					
Antelope (Elkhorn) Wind GI 206 (LaGrande)	110	2/2013	Page Andrews	\$4,500,000	\$3,100,000	\$500,000	\$2,000,000	\$2,000,000					
Eight Mile Canyon GI 255 (Willow Creek PH 2)	78	8/2013	Cherilyn	\$1,260,000	\$200,000	\$180,000	\$500,000	\$400,000					
Summit Ridge GI 345 (New Sub, BE-Redmond 230 kV)	200	8/2013	Cherilyn	\$10,500,000	\$9,100,000		\$3,000,000	\$4,500,000	3,000,000				
Whistling Ridge GI 108 (Midway - North Bonneville 230 kV line)	70	8/2013	Cherilyn	\$5,900,000	\$5,100,000	\$200,000	\$2,000,000	\$3,500,000					
Small Gen for 2013 (7 projects: GreenWing Solar, Sayrs Wind,	145	2013	James Hall	\$700,000				\$300,000	\$400,000				
<b>Projects for FY14:</b>													
Iberdrola Montague I GI 238 (Slatt 230 kV)	200	10/2013	Cherilyn	\$7,800,000	\$6,700,000	\$500,000	\$800,000	\$4,500,000	\$2,000,000				
Grouse Creek Wind GI 326 (Wasatch Wind)	42	2/2014	Cherilyn	\$3,100,000	\$1,700,000		\$500,000	\$1,000,000	\$1,800,000				
Radar Ridge (Naselle substation add'n) ENW	100	3/2014	Cherilyn	\$2,400,000	\$900,000		\$400,000	\$500,000	\$1,500,000				
Montague II G0239	200	6/2014	Cherilyn	\$900,000					\$900,000				
Invenergy GI 361 (Stanfield 500 kV)	201	9/2014	Kevlyn	\$35,000,000	\$33,000,000		\$1,000,000	\$14,000,000	\$14,000,000	\$6,000,000			

# Forecasted LGI Capital Costs for FY12-18

Small Gen for 2014 (5 projects: Chapin Mtn. Connor Ridge, Port	80	2014	James Hall	\$500,000					\$250,000	\$250,000		
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Projects for FY15:													
Saddle Mtn. Wind	150	10/2014	Cberilyn	\$10,500,000	\$9,100,000			\$3,000,000	\$4,500,000	3,000,000			
Juniper Canyon 2 GI 242 / 420 (Big Horn IV)	160	12/2014	Steve E/ Kevlyn	\$10,900,000	\$8,400,000	\$100,000	\$300,000	\$2,400,000	\$4,500,000	\$3,600,000			
Jordan Butte Ph 1 (Longhorn substation)	300	12/2014	Cberilyn	\$57,000,000	\$51,000,000		\$2,000,000	\$10,000,000	\$31,000,000	\$14,000,000			
Desert Claim Wind Project (at BPA Bettas Road substation)	159	7/2015	Cberilyn	\$3,400,000	\$1,900,000			\$400,000	\$1,500,000	\$1,500,000			
Projects for FY16-8:													
Bakeoven Wind GI 367 PH 1 (Maupin 230 kV)	202	10/2015	Cberilyn	\$12,700,000	\$11,400,000		\$500,000	\$2,200,000	\$4,000,000	\$4,000,000	\$2,000,000		
Jordan Butte Ph 2 (Longhorn substation)	300	6/2016	Cberilyn	\$3,000,000						\$500,000	\$2,000,000		
Bakeoven Wind GI 368 PH 2 (Maupin 230 kV)	101	4/2016	Cberilyn	\$1,500,000	\$200,000					\$500,000	\$1,000,000		
Pomeroy 1 GI 328 (Central Ferry 500/230 Add'n)	250	6/2017	Steve E	\$3,000,000	\$1,500,000					\$500,000	\$2,500,000		
Invenergy GI 389-90 (Stanfield 500/230 kV)	414	9/2017	Kevlyn	\$25,000,000	\$33,000,000					\$1,000,000	\$5,000,000	\$14,000,000	\$5,000,000
Ella Butte Ph 3	300	2017	Cberilyn	\$3,000,000							\$500,000	\$2,000,000	\$500,000
Lower Snake Wind Ph 2 285-6 (new Central Ferry 500/230)	200	2018	Cberilyn	\$3,000,000								\$500,000	\$2,000,000
Ella Butte Ph 4	300	2018	Cberilyn	\$3,000,000								\$500,000	\$2,000,000

Deposits Forecast SUMMARY (Includes Overheads): \$330,160,000

Construction Forecast SUMMARY (with Overheads):  
less 33% Overhead Amount

\$88,780,000	\$78,950,000	\$55,350,000	\$89,150,000	\$34,850,000	\$13,000,000	\$17,000,000	\$9,500,000
\$22,030,800	\$25,393,500	\$18,265,500	\$22,819,500	\$11,500,500	\$4,290,000	\$5,810,000	\$3,135,000
<b>\$44,729,200</b>	<b>\$51,556,500</b>	<b>\$37,084,500</b>	<b>\$46,330,500</b>	<b>\$23,349,500</b>	<b>\$8,710,000</b>	<b>\$11,390,000</b>	<b>\$6,365,000</b>

Construction Forecast SUMMARY (without Overheads):

IPR Forecasts:

FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18
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# GI Capital Expenditure History and Forecast

	FY07 Actuals	FY08 Actuals	FY09 Actuals	FY10 Actuals	FY11 Actuals
<b>Generation Interconnection Projects</b>	<b>\$53,073,236</b>	<b>\$2,589,395</b>	<b>\$12,831,077</b>	<b>\$41,992,271</b>	<b>\$62,055,832</b>
	FY12 Budget	FY13 Budget	FY14 Budget	FY15 Budget	FY16 Budget
<b>Generation Interconnection Projects</b>	<b>\$32,259,398</b>	<b>\$32,265,000</b>	<b>\$28,350,000</b>	<b>\$20,250,000</b>	<b>\$20,250,000</b>
	FY17 Budget	FY18 Budget	FY19 Budget	FY20 Budget	FY21 Budget
<b>Generation Interconnection Projects</b>	<b>\$20,250,000</b>	<b>\$25,920,000</b>	<b>\$25,920,000</b>	<b>\$25,920,000</b>	<b>\$25,920,000</b>

Note1: Examples of projects represented in the “Actuals” column above include Jones Canyon, Klondike Wind, White Creek Wind,, Shepherds Flat, Central Ferry, Leaning Juniper, Kittitas Valley Wind, and Windy Flats,

# Customer Line-Load Expand Projects FY12-14

## ■ **FY 2012 Projects:**

- L0316 Line Terminal for PacifiCorp McNary – Wallula #2 line (PacifiCorp)
- L0276 St. Clair Tap to Olympia – South Tacoma No. 1 Loop (Puget Sound Energy)
- L0324 Knights Bridge Substation and Area Metering Project (Canby Utility Board)
- L0282 Interchange Metering and Transfer Trip to Support Tacoma's retermination of its S. Tacoma-Cowlitz 230kV line (Tacoma Power)
- L0286 Terminate BPA's Tanner Tap line in PSE's new Mt. Si Substation (Puget Sound Energy)
- L0308 Re-establish an emergency intertie between Tacoma Power's Potlatch lines and BPA's Shelton-Kitsap #2 line (Peninsula Light Company)
- L0293 Interconnect PacifiCorp's new Vantage-Pomona Heights 230kV line to BPA's Vantage Substation (PacifiCorp)
- L0281 Interconnect Grant's Larson substation to BPA's Columbia 230 kV substation with a new 230 kV transmission line (Grant County PUD #2)

## ■ **FY 2013 Projects:**

- L0219 Construct 230 kV line terminal at Keeler Substation for PGE (Portland General Electric)
- L0323 Add 500kV Bay at Ashe for new City of Richland Project Aurora Load (City of Richland)
- L0317 Tap Fidalgo – Lopez 69kV line on Decatur island for Opalco (Orcas Power & Light Cooperative)

## ■ **FY 2014 Projects:**

- None presently scheduled

# Assessment of transmission expansion risks

Twenty-nine risks were identified and defined by program managers and lead expansion program staff under the guidance of ERM. Thirteen SMEs were then asked to score the impact and likelihood of the risks. The risks below are the most important risks relevant to the Generation and Line/Load Interconnection program.

Risk	Risk Description	Impact	Likelihood	Risk criticality (Impact*Likelihood)
<b>Lack of staffing</b>	Lack of staffing (BFTE & CFTE) compared to staffing needs leads to delays or errors in work products	3.46	4.15	14.38
<b>Evolving NERC/WECC reliability standards</b>	Evolving NERC/WECC reliability standards leads to the need to revise plans of service, delays in developing plans, or scope/cost increases in the plans to meet the new standards	3.25	3.92	12.73
<b>Public resistance to transmission siting</b>	Public resistance to transmission facility siting leads to unexpected project delays and cost over runs	3.3	3.6	11.88
<b>Business/political pressure to revise project schedules</b>	Business and/or political pressure to accelerate schedules on certain projects delays other projects, requires extensive project rescheduling, and increases overall annual costs of project execution	3.17	3.75	11.88
<b>Uncertainties related to wind integration</b>	Uncertainties surrounding the effects of wind generation integration on the power system and delays associated with development of policies and technical solutions for mitigating those operational effects leads to continued delays in executing LGIA contracts and completing plans of service	3.23	3.46	11.18
<b>Environmental constraints on siting</b>	Environmental constraints on transmission facility siting leads to unexpected project delays and cost over runs	3.33	3.33	11.11
<b>Uncertainty in generation development patterns</b>	Lack of predictability in new generating resource development leads to an inability to develop accurate long-term plans for BPA's load service areas	3.17	3.5	11.08
<b>Lack of user acceptance of new work processes</b>	Lack of user acceptance of new work processes leads to delays in process execution and unnecessary rework resulting in inability to meet schedule requirements	2.73	3.82	10.41
<b>Incomplete internal review of plans of service</b>	Incomplete internal review of preliminary plans of service creates delays in final plan development, unnecessary rework and increased costs	2.91	3.55	10.31
<b>Load forecast uncertainty</b>	Uncertainty or inconsistency in load forecasts leads to an inability to develop accurate long-term plans for BPA's load service areas	3.18	3.18	10.12
<b>EP&amp;C contractors fail to perform</b>	New Owner-Engineer and EP&C contractors fail to perform to schedules leading to delayed project execution and accumulating backlogs of incomplete interconnection work	3.22	3.11	10.02
<b>Inability to "group" generation integration request studies</b>	Inability to "group" generation integration requests versus providing individual analysis of each case creates multiple studies being created in the same area versus one study for a group of requests, leading to delays in meeting schedules and higher study costs	3	3.33	10.0
<b>Unexpected changes in renewable portfolio standards and tax incentives</b>	Unexpected changes in renewable portfolio requirements leads to abrupt changes in renewable resource generator development patterns and transmission service demands.	3	2.92	8.75
<b>Changes in transmission tariff requirements</b>	Changes in transmission tariff requirements, such as ATC methodology, leads to inadequate plans, delays in developing the plans, or scope/cost increases in the plans to meet the new standards	3	2.89	8.67

# Assess Risks to meeting the objectives

- Customer Requested Projects (Line / Load process) Procedure Summary
  1. New procedures were established in 2008 similar to LGIP/SGIP for traditional Customers:
    - Modeled after merchant line procedures of 2004
    - Establish queue procedures for customer requests (previously, customer projects were treated as pop-up and timelines varied)
    - Each project studied in queue order and part of Planning work load
    - Study Timelines specified
  2. Construction schedules follow the multi year work plan
    - Multi year process a result of plan-design-build EPIP
    - Contract / agreement for funding (by Customer or BPA) must be executed to add to Work Plan
    - PM determines project schedule in Work Plan and tracks project similar to all other projects
- Impact to customers (Risk assessment)
  - In the past, most requests from Customer utilities were made without much advance studies on their part.
  - Traditionally, BPA Customer Service Engineers worked with customers before formal request were made for line/load additions.
  - New LLIP process requires customers to consider BPA timelines in their decision process/timelines. Customer response to new procedures were not initially positive. Most understand the need for advance planning on their part, but still expect a more flexible BPA response to their requests.

# Assess Risks to meeting the objectives

- **Generation Interconnection Requests**
  - **Process and Risk Assessment for Large GI:**
    - Typical thermal generation projects take some 3-4 years or more to plan and build, so the study process and BPA additions are not a schedule issue (BPA process is 2-3 years to build after project approved.)
    - Wind projects have a 12-18 month construction process from time project is committed (customer financing), much less than the 2-3 year BPA timeline. Solar projects may be constructed in 12 months or less.
    - BPA has accommodated this with the E&P process in the past prior to final PRD's issued, but the new approval processes requires final PRD, now extending construction timeline.
    - Multi-year work plan can extend customer requested projects schedule due to lack of visibility during planning stage.
    - PAR/AIS and Business Case approval process is still a bottleneck, potentially adding several months delay
    - Future generation projects need to be in the work plan, similar to the OMB process, before funding approved
    - Large work load requires contracting of more work and has disrupted work process and flow.
    - Lack of planning resources and more complicated studies have increased study completion times (24 months or more now)
  - **Process and Risk Assessment for Small GI:**
    - New solar, small wind and biomass projects, some funded in part by States/public renewable grants, are expecting 12-15 month study to energization – like many of our line/load customer projects
    - Already have had a couple of political reactions to BPA's lengthy study and construction timelines
    - TPC has implemented a new process using standardized estimates to expedite the interconnection process, and in some cases allowing customer to construct and own metering and telemetering.



# Strategy Considerations

## ■ **FERC Compliance for Generation Interconnection**

- The main driving force for our studies is compliance with FERC order 2003A, 2006 and Order 661A for wind generation.
  - Long term, BPA should seek revision of the LGIP (and possibly SGIP) process to allow for a more manageable study process
- GI Backlog still a concern. GI Reform is now underway as part of the NOS-GI Reform effort being discussed with our customers.
  - Seeking customer input on proposed changes
  - Eventually will be seeking FERC approval of changes
  - Time horizon is next 12-18 months

## ■ **Customer Compliance for Line / Load Interconnection**

- The main considerations for customer studies is BPA's long-term relationship with customers and compliance with FERC order 890.
- CSE's now working with the customers on the new study procedures.
  - Customer Service engineers are being proactive and available to our customers to assure early attention to customer planning needs.
  - Planning staff has been made available to study the requests in a timely manner.

# Strategy Considerations (continued)

- **Construction (Expand) of Interconnection Projects**
  - A system is needed to manage all projects (including Interconnection projects) in a timely manner. Present systems are focused on internal BPA projects.
  - Reliance on Contracted construction has required adequate BPA staffing to assure the volume of work assigned to the O-E and EPC contractors can be completed to the satisfaction of BPA and Customers.
  
- **Staffing constraints**
  - Planning and Customer Service Engineering Staff. The current and projected level of interconnection requests are still being managed by the existing staff. Hopefully, NOS/GI Reform will address the need for a streamlined processes for the LGIP and SGIP procedures to reduce study volume.

# Interconnection (Expand) Strategies

- **Asset Vision:**
  - Proposed revision of internal procedures (short term) and the tariff (long term) will allow BPA to return to timely completion of studies, and studies are performed with reasonable assumptions for Generation additions.
  - Customer (line – load) requests are studied timely and Customers are satisfied with the results. In doing this, BPA continues to fulfill its commitment to the region to provide an adequate, efficient, economical and reliable power supply.
  
- **Process Goals**
  - BPA's response to customer Line / Load requests meets customer and tariff requirements and conforms with internal business practices
  - Studies and construction meet tariff and internal schedules for customer Line / Load projects willing to commit to take service
  - Documented lessons learned are available so that every cost-effective effort is made to ensure that new projects are designed and constructed for long and reliable service life

# Next Steps

- Continue NOS/GI Reform Effort
- Continue to refine the GI and Line / load Program Business Cases
- Continue to work with strategic capability and Demand planning process to include PFIA and wind projects specifically in long range forecasting
- Continue to streamline TPMI process to include the customer driven projects (PFIA) including the GI projects.