

EPRI maps out power system of the future

Technology is changing the way electricity is produced, delivered and used. And the Electric Power Research Institute is paying close attention.

“New products and services are moving power and information in new directions,” EPRI President and CEO Mike Howard told a group of Bonneville Power Administration staff in August.

Smaller, faster and more affordable electronics and information technology are driving the change.

“We’re seeing rapid growth of solar and other new technologies that provide consumers more comfort, control and choice,” Howard said.

EPRI expects the pace of innovation to continue. “We will see as much innovation in the next eight years as we’ve seen in the last 25,” said Howard.

Last year, EPRI rolled out its “Integrated Grid” concept that aims to provide utilities with a roadmap to optimally incorporating distributed energy resources like solar and demand-side technologies, such as sensors and electric vehicles, into planning and operations of the grid.

“We need an all-inclusive power system that can maximize the value of distributed resources and all of our assets going forward,” Howard explained.

EPRI views a dynamic power system as the backbone to a connected grid that makes best use of local energy production across a network with distributed generation resources, intelligent devices and appliances.

But the power system of the future poses some challenges. With consumer behavior and technology shifting load (energy demand) profiles, operators and utilities are facing system capacity decisions.

“We’re more peak-driven today, and are becoming energy rich and capacity poor,” Howard said.

Simply put, energy is the amount of electricity that’s consumed by every device, light or appliance that’s plugged in and turned on. Whereas capacity is the maximum output the power system can deliver to meet the demand for energy. On a moment-by-moment basis, utilities and system operators ensure there’s enough available capacity to serve



On Aug. 12, EPRI President and CEO Mike Howard shared the research organization’s Integrated Grid Initiative with a group of BPA staff and executives.

homes, schools, hospitals, businesses and industries and still have some left in reserve. But during times of peak demand, like on hot summer days when air conditioners are blasting, and cold winter nights when heating is needed most, a lack of capacity can result in brownouts (a drop in voltage or power supply to reduce energy load) or blackouts. Historically, capacity needs have been met by building new power plants and transmission lines. But today, capacity markets and demand response are alternatives. In a capacity market, participants can bid for additional energy supply or demand reduction resources. With demand response, end users can provide relief to the system by reducing their consumption during periods of peak demand.

“The bottom line,” Howard said, “is that a digital economy is even more dependent on reliable, high-quality electricity because a blink-of-an-eye outage can cost millions. So we must focus on keeping the power system strong as we continue to deploy new technologies.”

A key benefit of EPRI’s Integrated Grid concept is that it provides a framework for utilities to map out the capital investments and operational changes needed to successfully integrate distributed energy resources and demand-side technologies.

“It’s about taking a holistic approach,” Howard pointed out. “Everything has to work together if we’re going to optimize our use of energy.”



To learn more about EPRI's Integrated Grid Initiative, now in its third phase, visit integratedgrid.epri.com.

Dike breach offers salmon and steelhead new habitat

With BPA financial support, a private landowner in Columbia County, Ore., breached a Columbia River dike allowing river water to once again, fill a historical tidal wetland.

The 60-acre property known as Batwater Station is located north of Rainier on the Oregon side of the Columbia River near Crims Island. The property is home to endangered Columbian white-tailed deer, painted turtles, red-legged frogs and many types of birds. And now since the breach, juvenile salmon and steelhead can also call the tidal wetland home.

"I'm really excited about watching this project come together," said property owner Karin Hunt. "I've wanted to improve the wetland since 1995 and now it's finally happening."

With money from BPA along with help from the Lower Columbia Estuary Partnership, the Lower Columbia River Watershed Council and the Columbia Soil Water & Conservation District, Hunt returned approximately 26 acres of her property back to a tidal wetland.



Construction crews remove a section of dike to allow the Columbia River to flood 26 acres of privately-owned land near Rainier, Ore. BPA paid for the dike removal to improve habitat for juvenile salmon, steelhead and other wildlife.

"When you think about it, every juvenile salmon and steelhead from the Columbia and Snake rivers goes by here. So this habitat and others in the area we've restored can have a big impact on their survival," said Jenni Dykstra, a field restoration ecologist with the Lower Columbia Estuary Partnership. "Tidal wetlands like this give small fish a place to rest, eat, grow and hide from predators before going to sea. We think it makes a big difference."

Before construction began this summer, project partners completed two years of hydrological studies to ensure that a reconnected wetland would work. Construction crews then carved at least 1000 feet of new tidal channels complete with logs strategically placed to attract beaver. Then in mid-August, a large track hoe removed 85 feet of the 70-year-old dike and the river water flowed in.

Approximately 95 percent of Columbia County is privately owned, so finding landowners who are willing to breach dikes for fish and wildlife isn't easy.

"Landowners have to believe that they're doing the right thing for the environment," said Margaret Magruder, coordinator for the Lower Columbia River Watershed Council. "Yes, we want landowners, but we only want them as long as we're not intruding on them or upsetting economic livelihoods and cultural traditions."

Hunt's home is near the wetland so she's excited to see what types of fish and wildlife the wetland will attract. She says this is just her small way of helping the local environment.

"You might even call it good karma. I'm giving back to mother earth after she has been so good to us," Hunt said.

Big Eddy-Knight 500 kV line nears completion with Columbia River crossing

Helicopters flying rope across the Columbia River provided an unusual sight for those watching the final stages of construction on the Big Eddy-Knight 500-kilovolt transmission line this summer. BPA's latest high-voltage project, near The Dalles, Ore., brings innovation to building transmission.

The new line, which spans 28 miles, will provide another path for power to cross between Oregon and Washington. Most importantly, it will bring added capacity to an area that has seen rapid growth in renewable resources and has become a hot spot for energy intensive data centers.

The Big Eddy-Knight project adds 42 circuit miles of high-voltage wires and 128 new towers to the BPA system, with each tower carrying two circuits. The first is the new BE-K line, which connects the existing Big Eddy Substation just east of The Dalles, Ore., with the new Knight Substation in Goldendale, Wash. The second is a rebuilt portion of the Harvalum-Big Eddy 230 kV line. While the second line will operate at 230 kV, the towers, conductor and hardware are being constructed at 500 kV to provide additional capacity if the need arises in the future.

The \$200 million project started on the drawing board of Transmission's Project Engineering group back in 2008. What really stands out about the project design is the Columbia River Gorge crossing. The design team had to create towers that could withstand wind and ice storms while supporting nearly 300,000 pounds of bare wires.



A helicopter tows a rope across the Columbia River, near The Dalles, Ore., during construction of the new Big Eddy-Knight 500 kV line. The helicopter flew rope across the river to start stringing at the line's river crossing.

During extreme weather conditions, the dead-end towers can experience over 1 million pounds of force. The team also had to be conscious to create a tower using the least amount of steel because BPA not only pays for the steel but pays per pound for its installation.

The river crossing consists of three towers — two dead-end towers in either state and one suspension tower on the Oregon side. This is unique because usually there are four to five towers for every mile of line. In the crossing, there are just three towers for 1.2 miles of line with the actual river crossing spanning nine-tenths of a mile.

The Oregon suspension tower stands at an impressive 420 feet tall. To put this in perspective, it is nearly twice as tall as those on either side. However, the tower still weighs less than both of its neighboring towers due to BPA's custom design.

For observers, the biggest attraction of the river-crossing construction was definitely the stringing. While this may have been the most exciting to watch, it definitely provided

the Wilson Construction crew a lot of headaches to complete.

In order to string one conductor across the Gorge, a helicopter first had to fly a light rope through a sheave, a wheel that guides the rope, on the suspension tower and then connect it to the tower on the opposite side of the river. Then came the process of pulling a series of heavier rope and steel cable back and forth across the river until the conductor could finally be pulled through the sheave and into place. For perspective, the river crossing has 18 conductors and two optical ground wires, cables that provide both grounding and communication functions.

If that wasn't challenging enough, the location provided a number of complications. First, the helicopter could only fly when the wind was blowing less than a constant 15 mph. For those of you who have enjoyed outings in the Gorge to watch the wind surfers, you know this is a rare occurrence. Then there was the coordination of traffic underneath the helicopter work. This meant finding a time when there were no barges or trains scheduled to pass below the project as well as coordinating with the Oregon Department of Transportation to temporarily shut down Interstate 84. And yet, against all the odds, the team completed the stringing in under two months and on time.

"The Wilson crew excels at communication and has been a great team to work with," says BPA project manager Nathan Mullen, a civil engineer in Project Engineering. "The team worked in all conditions to make sure this project got completed, including stringing in 112-degree weather. They made sure the river crossing construction was a success."

After being approved in 2011, construction was completed in September. This is a major milestone for a project that will bring additional transmission capacity to the region. With the lines expected to be in service by the end of the calendar year, BPA and its customers will be benefiting soon.

To view photos of the stringing, please visit BPA's Facebook page.

Public Involvement [Updates & Notices]

BPA PROJECTS

BP-16 Rate Case [Regionwide]

BPA conducted a consolidated power and transmission rate proceeding, BP-16, to set rates for the fiscal year 2016–2017 rate period. The formal rate-setting process culminated in the filing of a final rate proposal, including the administrator's record of decision, with the Federal Energy Regulatory Commission in late July. BPA requested approval for

the rates to be effective Oct. 1, 2015. For information, go to www.bpa.gov/goto/BP16.

BPA Visitor Center grand opening celebration

BPA invites the public to the ribbon-cutting ceremony for the new visitor center with Elliot Mainzer, BPA administrator, on Oct. 7, 2015. The visitor center, housed in the public BPA Library, provides a fun, informative and interactive experience for visitors of all ages. With hundreds of historic photographs, dozens of films and interactive

maps and games, the visitor center gives unprecedented insight into BPA's history, geographical reach, business and youth education. For more information about the event, go to www.bpa.gov/goto/LibraryVisitorCenter.

POWER

Alcoa Remand Public Process [Regionwide]

BPA accepted public input and comment to assist in its response to the decision issued Sept. 18, 2014, by the U.S. Court of Appeals for the Ninth Circuit. The ruling in *Industrial Customers of Northwest Utilities, et al. v. Bonneville Power Administration* related to BPA's contracts with its direct service industry customers. In its decision, the court instructed BPA to address four specific questions regarding service to Alcoa and the recovery of funds. BPA issued a draft record of decision on Sept. 4, 2015. BPA will accept comments through Oct. 9, 2015. Comments received during this period will assist BPA in its decision-making before issuing a final record of decision on Dec. 11, 2015. For more information, go to www.bpa.gov/power/pl/regionaldialogue/implementation/Documents/DSI.SHTML.

TRANSMISSION

Midway-Moxee Rebuild and Midway-Grandview Upgrade Transmission Line Project [Benton and Yakima counties, Wash.]

BPA issued a draft environmental assessment for the proposed Midway-Moxee Rebuild and Midway-Grandview Upgrade project in July. The 115-kV lines, which are deteriorating due to age and exposure to weather, need to be rebuilt to ensure reliable electric service. BPA is the lead agency on the draft EA and the Bureau of Land Management is a cooperating agency. BPA accepted comments on the draft EA through Sept. 29, 2015. For more information, go to www.bpa.gov/goto/MidMoxGrand.

I-5 Corridor Reinforcement Project [Cowlitz, Clark counties, Wash.; Multnomah County, Ore.]

BPA published a project update with new information about the projected need for the line, as well as non-wires measures that could be used to relieve some of the congestion that the line is designed to address. BPA continues to conduct surveys and studies to determine the potential impacts of the project. We expect to release a final environmental impact statement in late 2015, followed by a record of decision in 2016. If BPA decides to build the project, it would then focus on negotiating acquisition of the required easements from property owners and obtaining permits. For more information, go to www.bpa.gov/goto/i5.

ENVIRONMENT, FISH AND WILDLIFE

Melvin R. Sampson Hatchery, Yakima Basin Coho Project [Kittitas County, Wash.]

BPA will initiate scoping on a proposal to fund the Confederated Tribes and Bands of the Yakama Nation to build and operate a hatchery near Ellensburg, Wash. The hatchery would rear up to 200,000 coho salmon for harvest and to aid in natural spawning. The coho salmon would be released into the tributaries and mainstem reaches of the Yakima and Naches rivers. Scoping is expected to begin in the second half of October and would include a public meeting in Ellensburg where project information, maps and project team members will be available. For more information, contact Dave Goodman at 503-230-4764.

Columbia Estuary Ecosystem Restoration Program [Ore. and Wash.]

BPA, along with the Portland District, U.S. Army Corps of Engineers, initiated scoping for a programmatic assessment evaluating the Columbia Estuary Ecosystem Restoration Program. The program was jointly instituted by BPA and the Corps to undertake the activities necessary to evaluate, protect, monitor and restore fish and wildlife habitat in the lower Columbia River and estuary. The scoping period will be open for 30 days and is expected to close in the second half of October. For more information, go to www.bpa.gov/goto/EstuaryRestorationProgram.

CLOSE OF COMMENT

Oct. 9, Alcoa Remand Public Process

CALENDAR OF EVENTS

BPA Visitor Center Grand Opening Celebration

- Oct. 7, 12 to 3 p.m., BPA headquarters, 905 NE 11th Ave, Portland, OR

For current meeting information, go to www.bpa.gov/PublicInvolvement/Cal.

FOR MORE INFORMATION

Information on other projects under environmental review is available at www.bpa.gov/goto/NEPA.

For information about the National Environmental Policy Act in general, go to www.bpa.gov/goto/environmentalplanning.

The Journal is a monthly publication of the Bonneville Power Administration. If you have questions or comments, or you want to be added to the mailing list for any project, call toll free 800-622-4519.

To order copies of documents, call: 800-622-4520 or 503-230-7334. Written comments may be sent to: BPA, P.O. Box 14428, Portland, OR 97293-4428. Email address: comment@bpa.gov. BPA home page: www.bpa.gov. For details on BPA environmental reviews listed above, including site maps and documents issued to date, see www.efw.bpa.gov/environmental_services/nepadocs.aspx. Process Abbreviations: EA-Environmental Assessment, EIS-Environmental Impact Statement, ESA-Endangered Species Act, FONSI-Finding of No Significant Impact, NOI-Notice of Intent, ROD-Record of Decision.

