

FY2013 Technology Innovation Portfolio

Research Topic Area	Sponsor	TIP No	FY13 Budget	Project Name	Abstract	BPA Project Mgr	Lead Org	Project Start Date	Project End Date	Total Budget incl. Cost Share
Cyber Security										
\$68,792	Larry Buttress									
		0255	\$68,792	EPRI Program 183A PID# 072129 and 183B PID# 072136: Cyber Security	The landscape of activities in the cyber security and privacy for the electric sector involves numerous industry, government, and regulatory groups. This project set can provide members with an up-to-date view of these activities and support the technical contribution to these groups to increase the usability of their work products. This project set will address several security challenges facing transmission and distribution (T&D) systems, such as reducing the security risk of legacy systems, developing protective measures, and managing cyber incidents to increase the resiliency of the grid.	Larry Buttress	EPRI	01/01/12	12/31/16	\$2,349,282
Demand Response										
\$527,267	Lee Hall									
		0260	\$120,000	A Modular and Dispatchable Battery Storage System	The proposed project is to deploy, test, and evaluate a scalable, modular, dispatchable battery storage system in real-world trials over a two-year period, first at the BPA testing facility in Vancouver, Washington, and then in BPA's service area of the Pacific Northwest at different utility customer locations. Energy Northwest already wants to host the storage system at its Nine Canyon Wind Project facility, and it has interest from some of its member utilities to host the system at their facilities, who want to get hands-on experience regarding the deployment, integration, operation, and maintenance of a battery storage system for demand response applications. PNNL wants to host the storage system at its facilities too.	Jason Gates	Powin Energy	10/01/12	09/30/14	\$624,400
		0266	\$35,000	EWEB / Metropolitan Wastewater Management Commission (MWMC)	The goal of the DR Demonstration Project is to demonstrate that the Metro Wastewater facility can act as a dispatchable large utility-scale DR resource (>1MW) to both increase load (DECs) when there is extra capacity on the grid, and decrease load (INCs) during peak periods, capacity constraints, grid emergencies or during periods when renewable resources experience intermittency. M&V of DR events will provide a performance based approach in developing reliable resources that can be used year-round for ancillary services.	Kari Nordquist	EWEB	10/01/12	09/30/14	\$1,561,180
		0270	\$250,000	Demand Response Demonstration Market	The City of Port Angeles will work with BPA to create and analyze an internal and external demonstration market for INCs and DECs at the commercial and industrial customer locations. The goal is to move the individual technical DR pilot projects further towards a realistic DR market by working out many of the practical issues. The City proposes to develop the demonstration market at two (2) customers' locations.	Tom Brim	City of Port Angeles	10/01/12	09/30/14	\$1,000,000

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		0285	\$122,267	Energy Storage Multifaceted Tool for Demand Management	Primus Power EnergyPods™ are being developed with these uses as their basis. They will work to improve the economics, emissions, efficiency and quality of the entire electrical power delivery system. The EnergyPod is a 250kW – 750 kWh zinc-based flow battery. The objectives will be to Analyze value of distributed storage in Puget Sound Energy's (PSE) distribution system to PSE and BPA, Select a location for a pilot to capture as many different value streams as possible, Develop a control strategy that maximizes the total value of the storage both from a distribution system and transmission perspective, Demonstrate a 500kW, 1 MWh system, analyze the operation, test control algorithms and validate performance and effectiveness.	Jason Gates	Primus	10/01/12	08/28/15	\$2,865,936
Energy Efficiency										
\$2,518,207										
Ryan Fedie										
		0140	\$1,345,500	EE Emerging Tech Assessment	Multi-year program for the identification, assessment, development, and transfer of emerging energy efficiency technologies and solutions. This program consists of a portfolio of emerging technology assessment projects. The objectives are, 1. Identify and screen emerging energy efficiency innovations for assessment and development as EE measures, 2. Select and manage portfolio of emerging technology assessment projects that bridge targeted emerging technologies into BPA energy efficiency programs ("fill the pipeline"), 3. Increase the speed of development, the quality, and the impact of new energy efficiency measures, and 4. decrease the cost to identify, develop, and implement new measures.	Debra Bristow	BPA	10/01/07	09/30/15	\$7,594,774
		0247	\$100,000	Image Processing Occupancy Sensor	This project develops a cost-effective occupancy sensor based on novel image processing techniques to identify occupancy regardless of motion. It can also classify occupancy by capturing additional information about a scene. The data includes the number of occupants and type of activity. It will be accessed by building automation systems, allowing improved performance of temperature, ventilation and lighting control systems along with security system integration. A prototype image processing occupancy sensor (IPOS) will be used to demonstrate new control algorithms that leverage IPOS information and to illustrate new value propositions for vendors and end users.	Mira Vowles	NREL	10/01/11	09/20/13	\$466,176
		0252	\$144,672	Integrated Daylighting and Energy Analysis Toolkit	This project builds on NREL's existing OpenStudio Platform project, adding objects and methods to the OpenStudio building model to facilitate rigorous (Radiance-based) integrated daylighting and electric lighting control simulations within the broader whole building energy simulation context. The goal is to create a tool that is easy to use for: simple daylighting explorations that show energy benefits; compliance evaluation against codes, standards and building rating systems; and as a research-level tool for the advanced user to perform multivariate optimization analysis and sector-wide daylighting/energy evaluations.	Levin Nock/Craig Ciranny	NREL	10/01/11	09/30/13	\$543,372
		0257	\$320,472	Energy and Cost Optimized Technology Options to Meet Energy Needs of Northwest Food Processors	The Pacific Northwest National Laboratory (PNNL) and the Northwest Food Processors Association (NWFPA) propose to carefully evaluate opportunities for energy, emission, and cost savings and non-wires solutions including alleviation of transmission bottlenecks and fast-ramping supply capabilities with greater use and better design of combined heat and electric power (CHP) distributed generators (DGs); combined cooling, heating, and electric power (CCHP) DG; and energy storage installed on-site at energy-intensive food processing facilities.	Erin Hope	PNNL	10/01/12	09/30/14	\$876,000
		0261	\$283,620	Determining and Improving the Energy Intensity of Microwave Sterilization & Pasteurization Technologies	An advanced thermal post-packaging food preservation technology for controlling pathogens called "Microwave Assisted Thermal Sterilization" (MATSTM) has been developed by a team led by WSU. (http://www.microwaveheating.wsu.edu/). MATSTM technology has the potential for replacing conventional thermal retort ("canning") food preservation methodologies due to its greatly reduced processing time. Typical MATSTM processes cut conventional canning processing time by 80%, with increased energy efficiency and superior finished product characteristics like improved nutrient retention and substantially increased food quality.	Erin Hope	WSU	10/01/12	09/30/15	\$1,311,147

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		0287	\$323,943	Reducing Technology Evaluation Costs Through a Technology Performance Exchange	This proposal addresses Faster and Lower Cost End-Use Field Studies to Support Verification of New Energy Efficiency Measures, including the direct support of BPA's stated goal to "target an order of magnitude reduction in both cost and time for complete field studies, including research design, contracting, metering, data acquisition, analysis, and decision making." The DEFs will also be designed to aid in the evaluation and accelerate the adoption of a broad range of technologies including those that are included in the BPA Food Processing Technology Roadmap, such as absorption chillers and alternative refrigerants, sterilization, and pasteurization technologies.	Tyler Dillavou	NREL	10/01/12	08/30/13	\$647,886
Energy Efficiency EPRI \$513,376 Ryan Fedie										
		0238	\$125,000	EPRI Supplemental: Coordinated Early Deployments of Efficient	This project will apply the framework created in the prior research to develop early deployment plans for three additional technologies and to guide early deployments with multiple utilities for five technologies, two of which were planned in prior research.	Jennifer Williamson	EPRI	01/01/13	12/31/16	\$1,000,000
		0272	\$171,137	EPRI Program 170: End-Use Energy Efficiency and Demand Response	The electricity industry faces growing demand for power and the imperative to maintain reliable, affordable service while reducing carbon emissions. Utilities and policy makers in the United States and abroad are increasingly turning to energy efficiency as a resource to help address these challenges. Many U.S. states have enacted legislation that mandates specific energy-efficiency savings goals, and some explicitly require utilities to place energy efficiency atop their resource planning initiatives. Key to the realization of these goals is the development and adoption of emerging energy-efficient technologies and best practices.	Jennifer Williamson	EPRI	01/01/13	12/31/16	\$4,055,972
		0294	\$127,239	EPRI Program 182: Understanding Electric Utility Customers	Understanding what customers want and how they perceive and realize value from electric services is becoming more important—in some cases, imminently so. There is a growing movement for electric utilities to better understand, as well as engage with, customers so that they may more fully realize the benefits of utility program activity and technology investments. Some fundamental research is first required to get to the root of various aspects of utility customer behavior, such as the effects of rate structure and information provision (or feedback) on customer response, response variation by customer segment, and other pertinent research questions.	Jennifer Williamson	EPRI	01/01/13	12/31/16	\$1,053,086
		0295	\$20,000	EPRI Supplemental: End Use Loads Phase I PID# 072202	The Phase I project will investigate alternative cost-effective methods for collecting end-use data. These include conditional demand analysis, non-intrusive load monitoring and smart distribution panels among others.	Jennifer Williamson	EPRI	10/01/12	12/31/12	\$160,000
		0296	\$20,000	EPRI Supplemental: End Use Loads Phase 2 PID# 072092	This project would use the results of Phase I to collect and analyze residential end-use load data. The Phase I project will investigate alternative cost-effective methods for collecting end-use data. These include conditional demand analysis, non-intrusive load monitoring and smart distribution panels among others. Phase II would be the collection and analysis phase and would collect residential end-use load data on a broad geographic and climate zone basis.	Jennifer Williamson	EPRI	01/01/13	12/31/13	\$0
		0297	\$50,000	EPRI Supplemental: Energy Efficiency Demo 2.0 PID# 072091	This projec builds on the success of the first demonstration project and provides an opportunity to demonstrate the next round of hyper-efficient end-use technologies. As such, consideration will be given to technologies that have been developed on a worldwide basis. The project could lay the groundwork for understanding the technical and other obstacles for adopting many of the new hyper-efficient technologies, which could lead to a substantial reduction in electricity consumption for several major end uses of electricity. Technologies demonstrated under this program have the potential for early deployment in the next stage of the pipeline, EPRI's Coordinated Early Deployments of Efficient End-Use Technologies program.	Jennifer Williamson	EPRI	01/01/13	12/31/16	\$1,000,000

Energy Efficiency
Water Heaters
 \$374,922

Ryan Fedie

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		0262	\$80,672	Demonstration of 2nd Generation Prototype Ducted GE "Brillion" Hybrid Water Heater in the PNNL Lab Homes	The major objective of the project are: 1) demonstrate and quantify the energy performance of the prototype GE Brillion GeoSpring Hybrid Water Heater with and without exhaust air ducting over heating and cooling conditions in the lab homes; and 2) evaluate/quantify the potential for the GE smart grid-enabled HPWH to provide demand response (to both increase/absorb [INC] and decrease/shed/shift [DEC] load) under various price signals sent to the unit. In addition, the proposed project will provide GE information to determine and design the optimal ducting configurations for their unit should they decide to offer this feature as an option for this new-to-the-market unit.	Kacie Bedney	PNNL	10/01/12	01/30/14	\$198,787
		0263	\$154,250	EPRI Development of Next-Generation Heat Pump Water Heater Technology	In recent years, heat pump water heaters have re-emerged as a potentially high-impact energy efficient technology. Hybrid heat pump water heaters have been shown by EPRI to provide high-efficiency electric water heating. EPRI's Energy Efficiency Demonstration has shown energy savings of 20-40% over conventional water heaters in preliminary analysis. The project will address the feasibility of variable speed compressors to eliminate electric resistance backup; alternative refrigerants and system configurations; demand response and ancillary service opportunities and strategies, and whole-building impacts of heat pump water heater systems.	Kacie Bedney	EPRI	10/01/12	09/30/14	\$600,000
		0292	\$140,000	Advanced Heat Pump Water Heater Research	Washington State University Energy Program (WSUEP), in partnership with Avista, the Energy Trust of Oregon, the Northwest Energy Efficiency Alliance (NEEA), Puget Sound Energy, Ravalli Electric Co-op and Tacoma Public Utilities will research and demonstrate the performance of high performance, next generation heat pump water heaters in the laboratory and the three main heating climate zones of the Pacific Northwest. The technology WSUEP and its partners propose to introduce is split system heat pump water heaters with variable speed compressors.	Kacie Bedney	WSU	10/01/12	09/30/15	\$880,000
Geomagnetic Disturbance \$214,750	Margaret Albright	0264	\$126,000	Modeling Geomagnetically Induced Current for Evaluation and Mitigation	PowerWorld has developed an innovative tool for analyzing the potential impact of geomagnetic disturbances (GMD), using our familiar power flow and transient stability platforms. PowerWorld Simulator GIC may be the most accessible tool in the world for power system planning and operations engineers to readily assess GMD risk posed to their systems. Power systems are vulnerable to time and spatial variations in dc ground voltages caused by GMD. Geomagnetically induced currents (GICs) flow through circuits formed by the earth, a grounded transformer, a high-voltage transmission line, and another grounded transformer at the far end of the transmission line.	Terry Doern	Power World	10/01/12	09/30/13	\$253,000
	Richard Becker	0025 c	\$18,750	EPRI Supplemental: Geomagnetic Disturbance PID# 071802	The initial objective will be to determine the state of knowledge of GMD. This will include a review of the available literature and interviews of industry experts to collect and validate industry data on the probability of extreme events and the extent to which storms can reasonably be anticipated. System models will be developed of representative regions of the North American grid in cooperation with North American Electric Reliability Corporation (NERC) staff. The models are designed to determine how the system and equipment respond to various storm scenarios or to evaluate candidate mitigation technologies. All results will be analyzed by a technical team comprised of NERC, utility, and EPRI staff.	Richard Becker	EPRI	01/01/12	12/31/13	\$2,700,000
		0290	\$70,000	Modeling High Impact Low Frequency Geomagnetic Disturbances Using Magnetic Field Data From Solar-Orbiting	Although various government agencies (e.g. NOAA) provide short-term (hours to days) forecasts of space weather that can be used for more immediate management of power transmission, there is a need for longer-term space climate forecasts that can inform management and planning processes over an extended time horizon. The aim of this project is to develop a method to forecast and predict extreme solar events at long time horizons. This in turn will allow for the prediction of potentially harmful geomagnetic disturbances.	Scott Lissit	Queens Univ	10/01/12	09/30/13	\$168,830

Greenhouse Gas

\$111,539

Elliot Mainzer

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		0293	\$111,539	EPRI P102: Global Climate Policy Costs and Benefits	This program provides members and public- and private-sector decision makers with analyses and information on the potential costs and benefits of domestic and international global climate policy proposals. The research focuses on estimating the economic costs of climate policy proposals against the backdrop of other energy, environmental, and economic policies; identifying policy principles for reducing these costs; and comparing these potential costs with the potential benefits of lower GHG concentrations, taking into account the role of uncertainty.	Matt Tidwell	EPRI	01/01/13	12/31/16	\$2,599,833
Hydro Operations										
\$675,283										
Mark Jones										
		0233	\$117,776	Field Evaluation of the Service Life of Foul-Release Coatings in Columbia River	This project is a continuation of a panel experiment initiated in Fiscal Year 2011 to assess the effective service life of foul-release coatings to mitigate the impacts of invasive zebra/quagga mussels to the FCRPS and other entities in the Columbia River Basin. Panels with foul-release coatings were deployed in the spring of 2012 and will be removed at periodic intervals to assess durability and ability to resist fouling by quagga mussels. This information is necessary to determine the cost-effectiveness of coatings for maintaining the functionality of multiple structures at hydropower facilities, including fish screens and fish ladders.	Julius Fields	PSMFC	10/01/12	09/30/13	\$313,118
		0276	\$257,507	Enhanced monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin, with special reference to	This project proposed to expand existing efforts by Washington State University and the United States Geological Survey to 1) Enhance an integrated AIS monitoring and information system; 2) Enhance and further coordinate existing early detection efforts; 3) Provide a Geographic Information System layer describing all of the river access points on the mainstem Columbia and Snake Rivers; 4) Conduct research that will help to assess the cause and effects of biological invasions in the CRB; and 5) Provide opportunities to train young professionals in assessing the effects of AIS on food webs.	Julius Fields	WSU	10/01/12	09/30/15	\$1,259,075
		0284	\$300,000	EPRI Flexible Operation of Hydropower Assets	We are proposing to join a multi-year, EPRI lead effort to understand the impacts associated with increased start/stops and cycling of hydro generating units. The project will improve understanding of flexible operation impacts on plant equipment, develop dispatch cost modeling framework, and create a technical basis for a proactive maintenance strategy. With our aging hydro power assets and the additional demand placed on them, understanding the short and long term impacts is critical to maintaining system reliability.	Julius Fields	EPRI	10/01/12	03/30/14	\$400,000
Hydro Reservoir Modeling										
\$708,122										
Steve Kerns										
		0258	\$156,967	Development of a state-of-the-art computational framework and platform for the optimal control of multi-reservoir systems under uncertainty	BPA is looking for an innovative framework that can produce fast, stable and high-resolution results and that fully utilizes the advanced capabilities of modern computer processors such as high performance clusters. Other needs of BPA include uncertainty and risk analysis, quantification of operational flexibility and effective and efficient ways to visualize and display large amounts of complex data to support real-time and planning decisions. The ultimate goal of the proposed research is to produce a robust and computationally efficient hybrid and parallelized framework for the real-time operation of multi-objective and multi-reservoir systems that accounts for uncertainty and flexibility.	Dennis Mai	OSU	09/01/12	08/31/14	\$590,324
		0259	\$283,014	Short-Term Hydropower Production and Marketing Optimization (HyProM)	The proposed project focuses on the integrated short-term management of hydropower production and marketing over a period of up to 20 days ahead. Because of the significant uncertainty present in particular in meteorological forecasts, deterministic methods provide only sub-optimal results. Therefore, we aim at the development of techniques and tools enabling an integrated management of scenarios for both stream flow and load by deterministic and stochastic optimization techniques, joint system management for hydro power production and marketing under various hard and soft constraints and a proper visualization of the resulting information to support decision-making.	Chris Allen	Deltares	10/01/12	09/30/14	\$1,156,791

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		0265	\$268,141	Computationally Efficient, Flexible, Short-Term Hydropwer Optimization and Uncertainty Analysis (SHOA) for the BPA	This proposal describes the development of a short-term reservoir modeling system SHOA (Short-term Hydropower Optimization and Analysis). SHOA can be used to investigate the operation of reservoir systems with different descriptions of streamflows, forecast errors, load, and other sources of uncertainty. SHOA will be used to explore a range of model structures and computational procedures for addressing BPA's short-term reservoir operation challenges, including dynamic optimization algorithms.	Steve Barton	Cornell Univ	10/01/12	09/30/15	\$1,640,604
Overhead Transmission \$463,202	Mike Staats	0023	\$433,202	EPRI Program 35: Overhead Transmission	This program is designed to address the research needs of transmission asset owners and operators. The program includes projects focused on specific components (e.g., insulators, compression connectors, conductors, composite poles, and crossarms) as well as projects focused on issues (e.g., lightning and grounding, live working, and transmission capacity). The program delivers a blend of short-term tools such as software, reference guides, and field guides, together with longer-term research such as component-aging tests and the development of sensors for monitoring the performance of line components.	Mike Staats	EPRI	01/01/09	12/31/16	\$8,340,414
		0023 b	\$5,000	EPRI Supplemental: Daytime Discharge Inspection Interest Group	This Interest Group was initiated in 2007 to help the industry maximize the use of Daylight UV camera technology for inspection and maintenance of the power network. An ongoing challenge is the improved understanding and diagnosis of the visual images taken from the camera by developing training material and undertaking fundamental research on UV & IR inspections.	Charles York	EPRI	01/01/12	12/31/16	\$90,000
		0023 c	\$25,000	EPRI Supplemental: Field Trial of Aluminum Conductor Composite Core (ACCC) Carbon-Fiber Core and Aluminum Conductor Steel Supported HS285	This project seeks to provide information on the operational performance of ACCC (CTC) and ACSS HS285 under extreme electrical and mechanical loading conditions through approximately three years of field experience. The two conductors will be strung for two spans consisting of approximately 780 feet. Each conductor will have two splices installed and two dead-end hardware assemblies. The anticipated benefits of this project include a better understanding of the two subject conductors, as well as more information to use in the evaluation of advantages and disadvantages of using these advanced conductors on BPA's system.	Tyler Ashburn	EPRI	10/01/12	12/31/14	\$900,000
Smart Grid \$1,084,098	Karen Meadows	0035	\$1,084,098	PNW Smart Grid Demo	The PNW Smart Grid project is a 5-year demonstration led by Battelle and partners including BPA, 11 utilities, 2 universities, and 5 vendors. The cost is \$178M, (\$89M private, \$89M ARRA-funded). BPA's contribution is \$10M., 5-year demonstration. The project will include 60,000 metered customers in 5 states. The project aims to substantially increase smart grid asset installation in the region by purchasing and installing smart grid technology. The project goals are to facilitate integration of wind and other renewable, quantify costs and benefits, develop two-way communication protocol, and advance interoperability standards.	Lee Hall	Battelle	11/25/09	01/31/15	\$178,397,879
Substation \$856,714	Richard Becker	0023 d	\$15,000	EPRI Supplemental: Seismic Studies of Substation Equipment – 2011	EPRI will select the item(s) of equipment that is (are) to be tested for each year. EPRI establishes equipment support structure specifications and vibration test requirements, electrical equipment specifications, and test specifications. EPRI will select a vibration testing facility (and electrical testing laboratory, if required) to perform tests and EPRI draws a contract for laboratory services. The manufacturer and the testing laboratory prepare qualification documentation for the equipment that is qualified following IEEE 693 requirements.	Leon Kempner	EPRI	01/01/12	12/31/16	\$120,000

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		0025	\$356,714	EPRI Program 37: Substations	This program helps substation owners enhance safety, reliability, equipment life, and performance, as well as maximize the return on asset investments despite limited resources. It offers a portfolio of tools and technologies such as decision support analytics and transformer monitoring. The program also includes resources such as failure databases and aging models to improve transformer and circuit breaker life management and training materials for systems operators. Program results help operations and maintenance engineers extend equipment life, optimize maintenance costs, reduce outages, and reduce switching errors.	Richard Becker	EPRI	01/01/09	12/31/16	\$6,862,311
		0025 b	\$50,000	EPRI Supplemental: Testing Guidelines and	The project will research and develop testing guidelines that can be used in field to assist in function and performance testing for multi-vendor equipment and systems based on the IEC 61850 standard.	Aaron Martin	EPRI	01/01/11	12/31/15	\$500,000
		0278	\$220,000	Transformer Bushing Performance	The purpose of this project is to investigate the failure modes of older transformer bushings and mitigation options for the BPA power grid. Worldwide earthquake performance of older transformer bushings has demonstrated the extreme vulnerability, with many failures and significant loss of transformer capacity. The performance of the BPA power grid is important to maintain a reliable supply of energy. Without a reliable power grid the research performed under the TI Road Map preferential topics would not be accessible. Therefore this research indirectly supports the FY13 TI Road Map preferential topics.	Leon Kempner	BPA	10/15/12	09/15/13	\$220,000
		0291	\$215,000	Substation Seismic Performance	The purpose of this project is to investigate the seismic performance of BPA existing substation designs. This project will analyze typical 115kV, 230kV, and 500kV substation bay configurations. The seismic vulnerability of existing installations will be determined and selected mitigation options will be evaluated. Mitigation options could include new design standards for equipment replacement and/or supplemental damping devices. One damping device that will be included was developed under a separate TI research project. This project is significant for establishing available mitigation options to reduce the seismic vulnerability of BPA's legacy transmission system.	Mike Riley	BPA	10/01/12	09/30/14	\$0
Sustainability EPRI \$10,000	Guy Kyle	0298	\$10,000	EPRI Supplemental: Sustainability Interest Group (SIG)	This work may support companies in implementing sustainability programs and initiatives at their organizations, learn best practices from other companies and industries, make strategic decisions about sustainability priorities, and better understand what "sustainability" means for the industry and for the public. The benefits of this collaborative effort may allow companies to better communicate and make decisions that align with public concerns and interests, which may in turn improve responsiveness to those concerns regarding sustainability in the electric power industry.	Rodrigo George	EPRI	01/01/13	12/31/13	\$10,000
Transmission Operations \$1,186,484	Margaret Albright	0046	\$450,000	Operations Real-Time Study Process Imprv	This project uses the innovative Operations Study Process Improvement environment to investigate options to reduce unnecessary risks and curtailments by accurately modeling near term system conditions for Operations study engineers following an unplanned outage or during extreme operating conditions. The study automation system will be designed to assist BPA Systems Operations engineers to calculate a reliable system Operating Limit (SOL) for real time operation of BPA's critical transmission paths such as the California Oregon Intertie (COI). The system will be built around PowerWorld's Simulator power flow that is used daily for off-line studies.	Kathy DeBoer	BPA	10/01/07	09/30/14	\$1,738,431
		0268	\$152,931	Verification and Validation of Transient Stability Models and Results	This project plans to develop an automated mechanism to verify transient stability simulation packages, used by BPA for their system analyses, against each other. This will be done by simulating WECC power system models in GE-PSLF, PowerWorld Simulator, PowerTech's TSAT and Siemens PTI PSS/E. The overall objective of this proposed work is to bridge the gaps identified in BPA's transmission roadmap and further BPA's cause in optimizing their transmission grid, by facilitating better planning studies and the consequent operational enhancements. This will be attained by increasing the confidence in the dynamic simulation studies of the BPA system, by an integrated software-verification and model-validation approach.	Terry Doern	UIUC	10/01/12	09/30/14	\$611,724

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		0275	\$112,493	New remedial action scheme (RAS) research work to avoid cascading	The objective of this project is to develop feasible new remedial action schemes (RAS) using synchrophasors and on-line contingency analysis will be studied. Concept of desired RAS is identified.	Gordon Matthews	Hitachi	10/01/12	09/30/13	\$224,986
		0279	\$144,360	Implementation of a Full-Topology, Robust, and Generalized State	The goal of this project is to create a state estimator which overcomes this limitation by meeting two major objectives as follows: □ 1. Must include integrated topology error detection □ 2. Must operate on a single power system model representing the full-topology	Gordon Matthews	Power World	10/01/12	09/30/13	\$288,730
		0281	\$326,700	Impacts Due to Dynamic Transfers	BPA's plays a vital role in wind power development in the Pacific Northwest. Dynamic Transfer is essential to reliably integrate wind, smart grid and other devices that increase variability. RD 237 developed Dynamic Transfer algorithm. This research will identify 1. The factors that influence the Dynamic Transfers, 2. Identify allowable voltage variation in the transmission system, 3. Approach to minimize labor intensive Dynamic Transfer studies and, 4. Understand Dynamic Transfer limits change with respect to system operating conditions.	Kathy DeBoer	BPA	10/01/12	09/30/15	\$799,200
Transmission Planning \$1,548,871	Dmitry Kosterev	0269	\$212,500	Voltage Management: VIP Approach	This project is based on initial research done under TIP 51. The Voltage Instability Predictor provides a fast indication of voltage stability risks to system operators using wide-area synchronized measurements. The project's objective is to advance the development and demonstrate a Voltage Instability Predictor in BPA synchro-phasor application lab.	Gordon Matthews	Quanta	10/01/12	09/30/14	\$756,000
		0282	\$50,000	Transmission Power Flow Controls for Bulk Grid Optimization	The project will test the hypotheses that a well planed transmission upgrade adding power flow control to the main grid can provide an increase to operating transfer capability (OTC) and total transfer capability (TTC), while maintaining or increasing reliability and operating flexibility, at a better benefit/cost ratio than a new line build addressing the same constraints. The final goal is to provide a list of projects that have tested results and are available for Transmission Planning to move into the Planning Process, as determined appropriate.	Eric Heredia	BPA	10/01/12	06/30/14	\$75,000
		0283	\$63,000	Impact of Power Electronic Loads on the Grid Stability	This project is based on initial research done under TIP 50 and 51. The fraction of power electronic loads is expected to increase over the next decade. The project will evaluate the impact of power electronic loads on power system stability, including dynamic voltage stability, damping of power oscillations, and frequency response. The project will look at a wide number of power electronic loads, such as VFDs, consumer electronics, and Electric Vehicle Charges. The project will simulate, test and evaluate various designs that make electronic loads friendly to the power grid. This project is coordinated with a larger nation-wide DOE CERTS project.	Steve Yang	BPA	10/01/12	09/30/16	\$196,000
		0289	\$500,000	Wide Area Damping Control Proof-of-Concept Demonstration	Recent efforts by the Bonneville Power Administration (BPA) have identified control schemes that can mitigate inter-area power oscillations through increased damping. This project includes the frequency sensor specifications, the communications link specifications, actuation device specifications, and the design of the high level supervisory control system that monitors system damping and identifies potential failures of the damping control system and takes autonomous corrective action. The goal of this research and development effort is to perform a proof-of-concept demonstration of a wide area damping controller system.	Lawrence Carter	Sandia	10/01/12	09/30/16	\$4,000,000
	Hardev Juj	0050	\$225,000	Inter-Area Oscillation Damping Controls	This project assesses oscillation damping risks in the Western Interconnection. The project develops a roadmap of solutions to address the oscillation damping risks. Currently, the project has three main focus areas: (i) activities to improve modeling and analysis of power oscillations, (ii) applications to give system dispatchers an awareness of oscillations and low damping conditions, (iii) controls to dampen inter-area power oscillations either on transmission. The project supports BPA capital investment in the synchro-phasor technology.	Dmitry Kosterev	BPA	10/01/07	09/30/14	\$883,786

Research Topic Area	Sponsor	TIP No	FY13 Budget	Project Name	Abstract	BPA Project Mgr	Lead Org	Project Start Date	Project End Date	Total Budget incl. Cost Share
		0051	\$250,000	Response-Based Voltage Stability Controls	This project assesses voltage stability risks and researches methods to improve the voltage stability and controls in the Pacific Northwest power system. The project started with a nation-wide panel of leading voltage stability experts scoping the existing and emerging voltage stability risks and framing specific research areas. Currently, the project has three main focus areas: (i) dynamic voltage stability risks due to changing characteristics of electrical loads, (ii) voltage stability controls to enable reliable integration of wind integration, and (iii) using synchronized wide-area measurements for controls and situational awareness, including the development of BPA synchro-phasor application labs. The project supports BPA capital investment in the synchro-phasor technology.	Dmitry Kosterev	BPA	10/01/07	09/30/15	\$2,370,350
		0256	\$58,371	EPRI Project 40.019: Strategic and Flexible Transmission Planning, PID# 070598	This project will work on transmission planning, which considers both economic and reliability aspects in one process and the evaluation of system flexibility to respond to increased ramps in demand caused by an increase in variable generation. This will include ensuring that transmission is considered in measuring flexibility adequacy and the ability of newer resources such as demand response and storage to offer flexibility. Flexibility metrics will be proposed so that they can be adopted by bodies such as NERC to ensure flexibility adequacy in systems aiming for high penetrations of VG. Case studies will be extended from 2011 work to show the need (or otherwise) of such a metric.	Stan Williams	EPRI	01/01/12	12/31/16	\$2,231,066
		0274	\$190,000	Development and Demonstration of Applications for BPA and FCRPS Compliance with Modeling Standards and Performance Monitoring	This project will develop and integrate a comprehensive set of model validation and performance monitoring applications for BPA and FCRPS participants. Project approach includes (a) developing a consistent set of dynamic performance requirements, (b) establishing a good baseline for power plant model / performance, (c) continual monitoring of power plant dynamic performance using synchronized wide-area measurements. The project is expected to reduce the compliance costs with the NERC MOD-06 and -027 Standards and WECC business practices.	Dmitry Kosterev	BPA	10/01/12	09/30/16	\$595,000