

Summary of Proposals

Technology Type	No. of 2011 Proposals	No. of 2012 Proposals	Total
Cooling	33	25	58
Air-cooled condensers	1	2	3
Aquatic life protection	1	0	1
Cooling tower	1	0	1
Energy storage	2	1	3
Evaluation study	1	0	1
Flue gas moisture	0	2	2
Green chiller	3	4	7
Heat transfer enhancement	0	1	1
Hybrid	2	2	4
Other condensers	1	0	1
Radiator fields	1	2	3
Thermal integration	5	2	7
Thermal transport	1	0	1
Vapor loss reduction	1	4	5
Waste heat utilization	2	1	3
Water-cooled condenser	6	2	8
Water use integration	2	0	2
Wet cooling tower	3	0	3
Coating	0	2	2
Water treatment	38	18	56
Carbon dioxide (CO ₂ capture)	4	0	4
Scrubber water	5	0	5
Water treatment	6	3	9
Water treatment—biological	1	4	5
Water treatment—forward osmosis	2	3	5
Water treatment—membrane	5	2	7
Water treatment—membrane distillation	3	2	5
Water treatment—microbial fuel cell	1	1	2
Water treatment—reverse osmosis	8	2	10
Water treatment—thermal desalination	3	1	4
Total proposals	71	43	114

Cooling Proposals Received in 2012

Technology Type	Proposal Name	Organization	Principal Investigator
Air-cooled condensers	Enhanced Dry Cooling Tower for Power Plant Water Consumption Reduction	Texas A&M University	Alvarado, Jorge L.
Air-cooled condensers	Innovative Power Plant Waste Heat Utilization Technology for Eliminating Water Use by Using Updraft Tower	Purdue University, School of Mechanical Engineering	Groll, Eckhard A.; Garimella, Suresh V.
Energy storage	Zero Water Consumption Thermoelectric Power Plant	Massive Cooling Technologies, LLC	Nguyen, Jack
Flue gas moisture recovery	Capture of Water Vapor From Boiler Flue Gas Using Air-Cooled Heat Exchangers	Lehigh University Energy Research Center	Levy, Edward K.
Flue gas moisture recovery	Cooling Tower Water Recovery from Flue Gas Using Air-Cooled Condensing Wet Electrostatic Precipitator	University of Cincinnati	Khang, Soon-Jai
Green chiller	Active Enhancement of Compact Microchannel Absorber Using Ionic Liquid as an Absorbant	Washington State University Vancouver	Kim, Yoonjo; Xu, Jie
Green chiller	A Novel Thermal-Driven Refrigeration System to Utilize Power Plant Waste Heat	May-Ruben Technologies	May, Wayne
Green chiller	Sub-Ambient Cooling Through New Absorption Refrigeration Approach Driven by Low-Grade Waste Heat	Georgia Institute of Technology	Kohl, Paul A.
Green chiller	Waste Heat Driven Chemical Heat Pump/Transformer Technology to Reduce Water Consumption and Augment Power Plant Cooling	Idaho National Laboratory	Donna Post Guillen
Heat transfer enhancement	Planar Static Mixers for Heat Transfer Enhancement	University of Toledo	Lipscomb, Glenn
Hybrid	Hybrid (Dry/Wet) Dephlegmator for Incorporation into Air-Cooled Steam Condenser Systems	Department of Mechanical and Mechatronic Engineering, (ITM), University of Stellenbosch	Detlev, Kroger G.
Hybrid	Water Conservation Using Polymer Air-Cooled Steam Condensers in Power Station Cooling	Victoria University	Jun-De Li
Radiator field	High Albedo Materials for Power Plant Water Cooling Applications	Ice 911	Field, Leslie A.
Radiator field	Project Bright Water	Microbubbles, LLC	Seitz, Russell

Cooling Proposals Received in 2012

Technology Type	Proposal Name	Organization	Principal Investigator
Thermal integration	Optimizing Boiling Condenser and Its Cycle for Maximum Efficiency in Steam Power Plants;	University of Pretoria	Sharifpur, Mohsen; Meyer, Josua
Thermal integration	A Novel Low-Medium Temperature Solar Energy Technology Application	University of Parma	Lorenzini, Giulio
Vapor loss reduction	Improvement to ClearSky Technology to Reduce Fresh Water Evaporative Cooling Loss at Thermoelectric Power Plants	SPX Cooling Technologies	Mortensen, Ken
Vapor loss reduction	Development of Novel Vapor Capture and Recovery Technology to Eliminate Cooling Tower Water Loss	University of Maryland	Yang, Bao
Vapor loss reduction	Water Recovery Condenser Evaporator for Cooling Tower	Gas Technology Institute	Chudnovsky, Yaroslav
Vapor loss reduction	Improving Water Use in Wet and Hybrid Cooling Towers Using Membranes	Kema, Inc.	Daal, Ludwin
Waste heat utilization	Cooling Process for Reducing Water Consumption at Thermal Power Plants	University of Illinois	Knutson, Chad
Water-cooled condenser	Condenser Tubes with Micro-Structured Features and Superhydrophobic Coatings to Promote Dropwise Condensation and Reduce Cooling Water Requirement	Idaho National Laboratory	Sohal, Manohar S.
Water-cooled condenser	Superior Dropwise Condensation	University of Nevada, Las Vegas	Kim, Kwang J.

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Technology Type	Proposal Name	Organization	Principal Investigator
Air-cooled condensers	Development of Air-Cooled Heat Exchangers for Condensing Water Vapor from Boiler Flue Gas	Lehigh University, Energy Research Center	Levy, Edward K.
Aquatic life protection	AquaSweep Flume/Waterway Testing Project	C-Water Technologies, Inc.	Murphy, Dr. Brian R.
Cooling tower	Computational Modeling and Design of Cooling Towers for Water Management	Virginia Tech	Pitchumani, Ranga Dr.

Cooling Proposals Received in 2011

Technology Type	Proposal Name	Organization	Principal Investigator
Energy storage	Energy Storage and Waste Heat Utilization	Oregon State University	Peterson, Richard B.
Energy storage	Multiple Combined Cycles for Zero-cooling Water Usage	Advanced Systems & Technology Division Science Applications International Corporation (SAIC)	Huan PhD, James C.
Evaluation study	Evaluation Studies Component of the Electric Power Research Institute's Request for Information	Peter Benenson Consulting	Benenson, Peter
Green chiller	Dry Cooling Condenser System	Allcomp Inc.	Tu, Dr. Jianping (Gene)
Green chiller	Thermal Organic Power System (TOPS)	Dynathermal Laboratories	Habte, Malaku Ph.D.
Green chiller	Development of Innovative Technologies for Cooling, Waste Heat Utilization, Water Treatment, and Water Resource Expansion to Reduce Power Sector Water Use	Johnson Controls	Furlong, James W.
Hybrid	Ultra Low Cost and Energy Use, Indirect, Hybrid Cooling Technology Demonstration Project	Combined Power Cooperative	King, John
Hybrid	Evaporation-Enhanced, Dynamically Adaptive Air (Gas) Cooling System	Georgia Institute of Technology	Fedorov PhD, Andrei G.
Other condensers	Nontoxic and Abundant Complex Metal Oxide-Based Solid-State Cooling and Energy Harvesting in Power Plants	Purdue University	Wu, Yue
Radiator field	Reducing Water and Fossil Fuel Usage with a Radiator Field	Arizona Board of Regents for Arizona State University (ASU)	Phelan, Patrick
Thermal integration	Design, Fabricate and Test a Combined Steam Turbine and Steam Compressor and Compact Condenser for Power Plant	Savengy	Wu, Wei
Thermal Integration	High-Performance, Air-Cooled, Integrated Steam/ORC Power Plant	Turbine Air Systems	Pierson, Tom
Thermal integration	Reduction of Water Consumed in Coal-Fired Steam Cycle Power Plants with Carbon Capture	Lehigh University	Levy, Edward K.
Thermal integration	PMX Incorporated—Response to RFI	PMX Incorporated	Malik, Paul
Thermal integration	Combined Water Use Reduction and Increased Power Production Configuration For Power Plant Cooling Lakes	Tetra Tech, Inc.	Garrett, Al

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Technology Type	Proposal Name	Organization	Principal Investigator
Thermal transport	Thermal Transport in the Critical Region	University of Rochester	Chimowitz, Dr. Eldren H.
Vapor loss reduction	Multifunctional Nanofluid Development for Cooling Tower Evaporation Loss Reduction	Argonne National Laboratory	Singh, Dr. Dileep
Waste heat utilization	Innovative Power Plant Waste Heat Utilization Technologies for Reduced Fresh Water Use	Purdue University	Groll, Eckhard A.
Waste heat utilization	A Pilot Plant Based on Solar Thermal Energy Conversion System	FutureNet Group, Inc.	Mehta, Perry
Water-cooled condenser	Tubes with Nano- and Micro-Structured Features to Promote Dropwise Condensation	Idaho National Laboratory	Sohal, Manohar S.
Water-cooled condenser	Application of the Dual-Coil, Closed-Circuit Cooler Technology to Field-Erected Cooling Towers in the Power Industry	Evapco, Inc.	Libert, Jean-Pierre R.
Water-cooled condenser	Extending Operating Limits and Critical Heat Flux in Steam Generators using Enhanced Boiling Surfaces	Rochester Institute of Technology	Kandlikar, Satish
Water-cooled condenser	Development of a Semi-Closed Loop Cooling System Integrated with an Embedded Underground Heat Exchanger System for Reducing the Amount of Cooling Water Consumption of Rankine Cycle Power Plants with Wet Cooling Towers	Marquette University	Park, Hyunjae
Water-cooled condenser	Evaporative Heat Transfer Enhancement of Wet Cooling Systems by Nanoporous Coatings	University of Texas at Arlington	You, Seung M.
Water-cooled condenser	Long-Term Dropwise Condensation	University of Nevada, Reno	Kim, Dr. Kwang J.
Water use integration	Time-Dependent Evaluation and Optimization for Wet/Dry Hybrid and Alternative Cooling Technologies	GE Global Research	Tang, Ching-Jen
Water use integration	Integrated Water Management Tool for Power Plants with CO ₂ Capture in the Face of Seasonal Variations	Vishwamitra Research Institute	Diwekar, Dr. Urmila
Wet cooling tower	Advanced Dew Point Cooling Tower	Gas Technology Institute	Chudnovsky, Dr. Yaroslav
Wet cooling tower	Approach on Improving Efficiency of a Natural-Draft Wet Cooling Tower Under Crosswinds Condition	China Institute of Water Resources and Hydropower Research	Shunan, Zhao
Wet cooling tower	Use of Air2Air/ClearSky Technology to Recover Fresh Water from Saline/Salt Water Sourced Evaporative Power Plant Cooling Tower	SPX Cooling Technologies, Inc.	Mortensen, Ken

Water Treatment Proposals Received in 2012

Technology Type	Proposal Name	Organization	Principal Investigator
Water treatment	Waste Heat Utilization for Cooling Tower Blowdown Treatment and Reuse Coupled with Turbine Inlet Cooling	Energy and Environmental Research Center, University of North Dakota	Stepan, Daniel J.
Water treatment	Reducing Makeup Water Usage Through Reactive Filtration and Reuse of the Blowdown Water	Purdue University Calumet Water Institute, Center for Innovation Through Visualization and Simulation	Nnanna, George
Water treatment	Use in Power Plant Cooling Systems of Produced Water From CO ₂ Sequestration	Idaho National Laboratory	Robert S. Cherry
Water treatment—biological	Insect-Assisted Water Treatment using Plants	Texas A&M University	Vinson, Brad
Water treatment—biological	Solar-Activated Nanoparticles for Water Treatment	Texas Engineering Experiment Station/Texas A&M University	Liang, Hong; Cirillo, Jeffrey D.
Water treatment—biological	Reclaimed Water for Energy Production Using an Innovative Sulfate-Based Wastewater Treatment Technology	West Virginia University Research Corporation, on behalf of West Virginia University	Lin, Lian-Shin
Water treatment—biological	Algae-Based Blowdown Water Treatment for Water Reuse	University of Missouri, Columbia	Hu, Zhiqiang (Zack); Reed, Robert
Water treatment—forward osmosis	An Innovative Waste Heat–Driven Water Reclamation System Utilizing Impaired Water Sources for Power Sector Applications	University of Nevada, Reno	Booth, Jennifer
Water treatment—forward osmosis	Water Resource Expansion Using Polymer-Assisted Osmotic Dewatering	Illinois Sustainable Technology Center; University of Illinois, Urbana-Champaign;	Rajagopalan, N.
Water treatment—forward osmosis	An Experimental and Computational Study of the Switchable Polarity Solvent FO Osmosis Process	Idaho National Laboratory	Aaron D. Wilson
Water treatment—membrane	The Revolutionary Anti-Fouling Membrane System	BKT Co., Ltd.	Joon, Min H.
Water treatment—membrane	Graphene Oxide Membrane System for Water Recovery from Power Plant Flue Gas	University of Illinois at Urbana-Champaign	Dastgheib, Seyed A.
Water treatment—membrane distillation	Carbon Nanotube Enhanced Membrane Distillation for Effective Utilization of Waste and Brackish Water	New Jersey Institute of Technology	Somenath, Mitra
Water treatment—membrane distillation	Integration of Carbon Nanotubes Technology and Membrane Distillation Technology to create Low Cost Water Treatment of Unconventional Waters	A3E Technologies; Sandia National Laboratory	Glasscott, Jay; Dwyer, Brian

Water Treatment Proposals Received in 2012

Technology Type	Proposal Name	Organization	Principal Investigator
Water treatment—microbial fuel cell	Integrating Bio-Electrochemical and Membrane Technologies to Produce Cooling Water from Degraded Water Sources	Rensselaer Polytechnic Institute	Kilduff, James E.
Water treatment—reverse osmosis	Closed-Circuit Desalination Technology for Innovative Water Treatment and Water Consumption Reduction for Power Plants	Desalitech	Stover, Richard L.
Water treatment—reverse osmosis	Cooling Tower Blowdown Water Reuse Enabled by Novel Self-Adaptive NF/RO Treatment	University of California, Los Angeles	Cohen, Yoram
Water treatment—thermal desalination	An Innovative High-Performance Modular Desalination Process	Water Planet Engineering	Tanuwidjaja, Dian

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Technology Type	Proposal Name	Organization	Principal Investigator
CO ₂ capture	Reduced Water Use in Air Pollution Control /Others (Technologies for CO ₂ Capture)	Georgia Institute of Technology	Fedorov PhD, Andrei G.
CO ₂ capture	Water Recovery, Treatment, and Recycling in Coal Oxy-Combustion	University of Illinois at Urbana-Champaign	Dastgheib PhD, Seyed A.
CO ₂ capture	Utilization of Waste Heat from Compression to Reduce Water Use at a Power Plant Equipped to Capture CO ₂	University of North Dakota Energy & Environmental Research Center	Jensen, Melanie D.
CO ₂ capture	CO ₂ Extracted Water—A Water Resource Development Strategy for Addressing Water Use Expansion at the Water–CCS Nexus	University of North Dakota, Energy and Environmental Research Center	Gorecki, Charles D.
Scrubber water	The Use Of Ultrasonics To Reduce Water Usage In Wet Scrubber Air Pollution Control	Clemson University	Saylor, Dr. John R.
Scrubber water	Use of Produced Saline Water from Geologic CO ₂ Sequestration for Power Plant Cooling Systems	Carnegie Mellon University Department of Civil and Environmental Engineering	Dzombak, David A.
Scrubber water	Implementation of Water-Saving Additives in Wet Flue Gas Desulfurization	University of North Dakota Energy and Environmental Research Center	Zhao, Ye

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Technology Type	Proposal Name	Organization	Principal Investigator
Scrubber water	Water Recovery from Flue Gas Using Air-Cooled Condensing Wet Electrostatic Precipitator	University of Cincinnati	Khang, Dr. Soon-Jai
Scrubber water	Anaerobic Treatment of Scrubber Wastewater for Reuse as Makeup Cooling Water	University of North Dakota	Ye, Dingyi
Water treatment—forward osmosis	Water Resource Expansion Using Polymer-Assisted Osmotic Dewatering	University of Illinois, Urbana-Champaign, Sustainable Technology Center	Rajagopalan, N.
Water treatment—forward osmosis	Desalination Using Forward Osmosis and Power Plant Waste Heat	Idaho National Laboratory	Oh, Chang H.
Water treatment—membrane	Use of NF/NF to Develop an Alternate Power Plant Cooling Water Resources by Means of a Sized Up Pilot Operation in the Parched Four Corners Area	Sandia National Laboratories	Sattler, Allan R.
Water treatment—membrane	Nanofiltration Treatment of Side-Stream Cooling Tower Water for Reduction of Water Usage	Sandia National Laboratories	Altman, Susan J.
Water treatment—membrane	Sustainable Energy using Pressure Retarded Osmosis for Mixing of Seawater with Treated Wastewater Effluent	University of Toledo	Escobar, Isabel
Water treatment—membrane distillation	Novel Vacuum Membrane Distillation Modules for Water Desalting	Advanced Material Recovery, LLC	Prasad Phd, Ravi
Water treatment—membrane distillation	Membrane Distillation and Applications for Ultrapure Water Production in Thermal Power Plants	Department of Energy Technology, Royal Institute of Technology (KTH), Stockholm, Sweden	Martin, Andrew
Water treatment—membrane distillation	Novel Waste Heat Utilization of Power Plants using Membrane Distillation	Sandia National Laboratories	Sun, Amy
Water treatment—microbial fuel cell	Waste Heat Utilization for Cooling Tower Blowdown Treatment and Reuse Coupled with Turbine Inlet Cooling	University of North Dakota,	Stepan, Daniel J.
Water treatment—reverse osmosis	Research and Development of Osmotic Energy Recovery to Reduce the Energy Demand of Seawater Desalination	Water Planet Engineering LLC	Hoek, Dr. Eric M.V.
Water treatment—reverse osmosis	Optimization of Cooling Tower Wastewater Recycling with Smart Integrated Membrane Systems	University of California, Los Angeles	Cohen, Yoram

Water Treatment Proposals Received in 2011

Technology Type	Proposal Name	Organization	Principal Investigator
Water treatment—reverse osmosis	Reverse Osmosis Blowdown Water Treatment to Reduce Cooling Tower Water Consumption at Power Plant Facility Sites	GEA Group	Gamelsky, Steven M.
Water treatment—reverse osmosis	Reverse Osmosis Makeup Water Treatment to Reduce Cooling Tower Water Consumption at Power Plant Facility Sites	GEA Group	Gamelsky, Steven M.
Water treatment—reverse osmosis	Enhanced Membrane Treatment and Recycling of Blowdown Water through Waste Heat Utilization	University of Illinois at Urbana-Champaign	Knutson, Chad
Water treatment—reverse osmosis	Total Water Recovery through Seeded Silica	Sandia National Laboratories	Brady, Dr. Patrick V.
Water treatment—reverse osmosis	Proposal to Evaluate the Feasibility of Stormwater for Power Plant Cooling	Tetra Tech Inc.	Roy, Sujoy B.
Water treatment—reverse osmosis	Use of Ash Pond Effluent at Power Plants as Internal Makeup Water Source for Cooling Systems	University of Pittsburgh	Vidic, Dr. Radisav
Water treatment—thermal desalination	Advanced Power Desalination Process: Integrated Desalination and Energy Approach	Leading Edge Technologies, Ltd.	Awerbuch, Leon
Water treatment—thermal desalination	Zero-Reject Water Solar Desalination System	FutureNet Group, Inc.	Mehta, Perry
Water treatment—thermal desalination	Cooling Tower Blowdown Recovery Integrated Desalination and Environmental Approach	Leading Edge Technologies, Ltd.	Awerbuch, Leon

Coating Proposals Received in 2012

Technology Type	Proposal Name	Organization	Principal Investigator
Coating	A Two-Layered Self-Healing Coating to Enable the Use of Alternate Waters in Power Plants	NEI Corporation	Skandan, Ganesh
Coating	Increased Fresh Water Production in Multiple-Effect Distillation Systems Through a Superhydrophilic Microporous Coating	University of Texas at Arlington	You, Seung M.