



JULY 1, 2015–JUNE 30, 2016 | KLEINMANENERGY.UPENN.EDU

Kleinman Center for Energy Policy

2015–2016 Annual Report

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ALL THINGS NEW

In our second year, we experienced many firsts—from moving into a new office space to welcoming our first senior fellows.



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FROM THE DIRECTOR

Dear Friends,

As we moved into our beautifully renovated space at the beginning of this academic year, we were still very much in startup mode.

Now we look back at our second year and know that startup is finally behind us. We ratcheted up our production machine, created and improved the many processes involved in running a center, and delivered a significant number of high-quality courses, events, programs, and publications.

We are hitting our stride.

In 2015-2016, we enjoyed and maximized our new Energy Forum space by hosting fifteen Kleinman public events as well as our Energy Policy Roundtables. At these events we convened key industry leaders, researchers, and students to discuss today's meaningful energy policy topics—everything from natural gas extraction in Pennsylvania to blue skies in Beijing.

Our staff and Kleinman Center associated researchers published twenty policy digests and working papers. We also launched a new blog—a lively outlet for timely posts from staff, students, and new senior fellows like John Quigley and Bill Hederman.

At the end of year two, our center made our largest investment yet in policy research, with the launch of the first phase of our Pathways Project that seeks to explore and inform the choices facing cities and regions as they transition their energy systems. We expect future phases of this project to extend our reach as well as our stride.

We could not have achieved all of this without the support of our friends at the University of Pennsylvania—friends at the School of Design, the President's Office, and the many schools, centers, and institutes that have collaborated with us. Thank you for extending your reach and helping us hit our stride.

Best,



Mark Alan Hughes, PhD
Founding Faculty Director, Kleinman Center for Energy Policy
Professor of Practice, PennDesign
University of Pennsylvania

ABOUT US

MISSION

The Kleinman Center cultivates energy policy innovation and promotes its application—creating opportunities for students, researchers, and professionals to debate viewpoints, explore options, and develop agendas for decision and action.

VISION

Transition from an energy system with uncompensated external costs to one that optimizes energy productivity through smart demand, internalized impacts, and sustainable supply.

APPROACH

The Kleinman Center focuses on projects that:

Foster thoughtful and impactful energy research. We support Penn research through a variety of programs and bring distinguished energy leaders and scholars to Penn for visits and residencies.

Develop the next generation of energy leaders. We engage student learners by providing energy-related courses, a certificate program, lectures, internships, and grants for research, and professional development.

Create conditions for stakeholders to explore options and develop agendas. We convene thought leaders with diverse interests in settings that foster productive conversations and action.

SPOTLIGHT CARNOT PRIZE

In October 2015, the Kleinman Center for Energy Policy presented its first annual Carnot Prize for distinguished contributions to energy policy scholarship and practice to Pulitzer Prize-winning author and energy historian Dr. Daniel Yergin.

The Carnot Prize memorializes the French scientist Sadi Carnot who in 1824 published *Reflections on the Motive Power of Fire* at the age of 28. Carnot presented the first workable theory of the maximum efficiency of a heat energy, which converts thermal energy into mechanical energy available for work. While unappreciated during his lifetime, Carnot's insights became the basis for the second law of thermodynamics and the concept of entropy.

The Carnot Prize is intended to honor those who have revolutionized our understanding of energy policy. The Kleinman Center for Energy Policy continues to award a Carnot Prize annually each fall.



Dr. Daniel Yergin (center) accepts inaugural Carnot Prize, pictured with former Pennsylvania Governor Ed Rendell (left) and Kleinman Center Founding Faculty Director Mark Alan Hughes (right).

“Scott Kleinman’s generosity makes possible a new center that can really have impact. I’m very impressed by the thought, energy, dynamism, and perspective the Kleinman Center brings to bear.”

—DR. DANIEL YERGIN
2015 CARNOT PRIZE WINNER



SPOTLIGHT

WHERE WE WORK

THE LEGACY OF THE FISHER FINE ARTS LIBRARY

Our new Kleinman Center offices are located on the upper floors of Penn's iconic Fisher Fine Arts Library, designed with style by Frank Furness. The historic and significant library was completed in 1891 and the rest of the building has housed classrooms and studios, including that of architect Louis I. Kahn.



What is now the expansive and beautiful Kleinman Energy Forum was originally a large architectural studio and lecture hall. Carrying on the tradition of academic integrity and intellect, the Kleinman Center uses the forum to host events for the University of Pennsylvania community and beyond, bringing in an array of guest speakers, academics, and professionals.

Today, in addition to being our home, the Fisher Fine Arts Library contains collections related to architecture, landscape architecture, city and regional planning, historic preservation, history of art, and studio arts, as well as the Arthur Ross Gallery, an exhibition space for art and artifacts.

The Kleinman Center team is honored to work in a building so beautiful and so rich in history. Our new space offers a welcome home to students and scholars from Penn and beyond.



These photographs showcase the vision and hard work of Gensler, the architectural firm that transformed this magnificent building into our comfortable and functional new home.



PEOPLE

ADVISORY BOARD



PAUL BONNEY

Senior Vice President & General Counsel of Constellation at Exelon Corporation

Paul Bonney is Senior Vice President and General Counsel of Constellation at Exelon Corporation. Mr. Bonney is also Deputy General Counsel and the chief regulatory lawyer for Exelon. He has held leadership roles with Exelon Corporation and PECO since 1990 and previously served as PECO’s general counsel and vice president of regulatory affairs, where he was responsible for managing PECO’s legal and regulatory matters. He also helped lead the company through major strategic initiatives, including restructuring to implement competitive wholesale and retail electric markets, as well as mergers and acquisitions. Prior to joining PECO in 1990, Mr. Bonney was an associate at Morgan, Lewis & Bockius and a law clerk to the Honorable Edward N. Cahn, U.S. District Court for the Eastern District of Pennsylvania. He also worked for National Economics Research Associates, an economic consulting firm in Washington, D.C., and at the Board of Trade in Chicago. Mr. Bonney received a bachelor’s degree in economics from Duke University and a Juris Doctor degree from Georgetown University.



TERRY BOSTON

Former President & CEO, PJM (Exiting Board Member)

As President and Chief Executive Officer of PJM, Terry Boston oversaw the largest power grid in North America and the largest electricity market in the world. Mr. Boston is also President of the Association of Edison Illuminating Companies, Inc., and immediate past president of the GO15, the association of the world’s largest power grid operators. Mr. Boston was recently elected to the National Academy of Engineering, one of the highest professional honors in the field. He is a member of the Board of Directors of the Electric Power Research Institute. Mr. Boston is past chair of the North American Transmission Forum, dedicated to excellence in performance and sharing industry best practices. He was also one of eight industry experts selected to direct the North American Reliability Corporation investigation of the August 2003 Northeast/ Midwest blackout. Prior to joining PJM, Mr. Boston was the executive vice president of the Tennessee Valley Authority, the nation’s largest public power provider. In his 35 years at TVA, Mr. Boston directed divisions in transmission and power operations, pricing, contracts, and electric system reliability.



MARK BROWNSTEIN

Vice President of the Climate and Energy Program, Environmental Defense Fund

Mark Brownstein is Vice President of the Climate and Energy Program at Environmental Defense Fund. Mr. Brownstein leads EDF’s work on the oil and gas industry, with particular focus on methane emissions and the risks to public health and the environment associated with unconventional oil and gas development, and he specializes in a variety of electric and gas utility policy and regulatory issues. Mr. Brownstein is a member of the Electric Power Research Institute’s Public Advisory Board and the Keystone Center Energy Board. He is also an adjunct professor of law at New York University Law School, where he co-teaches a seminar on public policy and energy project finance, and has taught energy policy at Columbia University’s School of International and Public Affairs (SIPA). Prior to joining EDF, Mr. Brownstein held a variety of business strategy and environmental management positions within Public Service Enterprise Group (PSEG), one of the largest electric and gas utility holding companies in the United States. Mr. Brownstein’s career includes time as an attorney in private environmental practice, an air quality regulator with the New Jersey Department of Environmental Protection, and an aide to a member of the U.S. House of Representatives. Mr. Brownstein holds a B.A. from Vassar College and a J.D. from the University of Michigan Law School.



SCOTT KLEINMAN

Lead Partner for Private Equity, Apollo

Founder, Kleinman Center for Energy Policy at the University of Pennsylvania

Scott Kleinman joined the Private Equity Group of Apollo in 1996. For the past decade, he has focused on Apollo’s cyclical industrial businesses, including companies in the chemicals, forest products, and industrial sectors. In 2010, Mr. Kleinman was named Lead Partner for Private Equity. Prior to 1996, he was employed by Smith Barney Inc. in its Investment Banking Division. Mr. Kleinman serves on the boards of directors of VECTRA Co., Momentive Performance Materials, Hexion Inc., Constellis Group, and CH2M Hill Companies. In 2014, Mr. Kleinman founded the Kleinman Center for Energy Policy at the University of Pennsylvania. He is a member of the Board of Overseers at the University of Pennsylvania School of Design. Mr. Kleinman received a B.A. and B.S. from the University of Pennsylvania and the Wharton School of Business, respectively, graduating magna cum laude, Phi Beta Kappa.



FERNANDO MUSA

CEO, Braskem America (Exiting Board Member)

Fernando Musa is CEO of Braskem America, based in Philadelphia, PA. In addition to his position as CEO of Braskem America, Mr. Musa oversees Braskem’s European operations. In his most recent role, Mr. Musa served as Vice President of Planning, IT and Purchasing for Braskem S.A. In addition, he was responsible for quantiQ, Braskem’s distribution business. Previously, he was responsible for the integration of Quattor, a Brazilian chemical and petrochemical company, after its acquisition by Braskem in 2010. Mr. Musa worked for 22 years at companies as diverse as Monitor Group (as Managing Partner), MGDK (as Founding Partner), Editora Abril, McKinsey, and Dow Chemical. Mr. Musa is a graduate of Instituto Tecnológico de Aeronáutica (ITA) in São José dos Campos, Brazil with a degree in mechanical engineering and received his M.B.A. from INSEAD in France.



SONNY POPOWSKY

Vice Chair, Department of Energy’s Electricity Advisory Committee

Sonny Popowsky served as the Consumer Advocate of Pennsylvania from 1990 to 2012. He started his career at the Office of Consumer Advocate (OCA) as an Assistant Consumer Advocate in 1979. He served as the President of the National Association of State Utility Consumer Advocates (NASUCA) from 1996 to 1998 and was previously Chairman of the NASUCA Electric Committee. Mr. Popowsky served on the Board of Trustees of the North American Electric Reliability Council (NERC) from 1997 to 2001 and the NERC Stakeholders Committee from 2001 to 2006. In 2010, Mr. Popowsky was appointed to the Department of Energy’s Electricity Advisory Committee and was named Vice Chair of that Committee in 2012. Mr. Popowsky also currently serves on the Advisory Council of the Electric Power Research Institute (EPRI), the Board of Directors of the Energy Coordinating Agency of Philadelphia, the Executive Council of the Pennsylvania AARP, and as a pro bono member of the Certification Decision Committee of the Center for Sustainable Shale Development. Mr. Popowsky graduated cum laude from Yale University and received his J.D. cum laude from the University of Pennsylvania.



MARVIN SCHLANGER

Chairman of the Board, CEVA Group, plc

Marvin Schlanger is the former Chairman of the Supervisory Board of Lyondell Basell Industries N.V., a \$50 billion global chemical producer, and is Chairman of the Board of CEVA Group, plc, a \$7 billion international logistics supplier. Mr. Schlanger began his career with Mobil and joined ARCO Chemical Company in 1975. He became Chief Financial Officer and a member of the board of directors in 1989, Chief Operating Officer in 1994, and was appointed President and CEO in 1998. Mr. Schlanger also serves on the boards of Taminco Global Chemical Holdings, LLP; UGI Corporation; UGI Utilities; Amerigas Partners LP; and Momentive Specialty Chemicals Holdings, LLC. Mr. Schlanger received his chemical engineering degree from Rutgers University and holds a Master of Science in Chemical Engineering from the University of Massachusetts.





FREDERICK STEINER

PennDesign Dean and Paley Professor, University of Pennsylvania (Incoming Board Member)

Fritz Steiner (MRP'77, MA'86, PhD'86) served as Dean of the School of Architecture and Henry M. Rockwell Chair in Architecture at The University of Texas at Austin for 15 years before coming to the University of Pennsylvania. He previously taught at Penn and the following institutions: Arizona State University, Washington State University, the University of Colorado at Denver. He was a visiting professor of landscape architecture at Tsinghua University in Beijing, China. Dean Steiner was a Fulbright-Hays scholar at Wageningen University in the Netherlands and a Rome Prize Fellow in Historic Preservation at the American Academy in Rome. During 2013–2014, he was the William A. Bernoudy Architect in Residence at the American Academy in Rome. He is a Fellow of both the American Society of Landscape Architects and the Council of Educators in Landscape Architecture, and a scholar at the Penn Institute for Urban Research.



MARILYN TAYLOR

Professor of Architecture and Urban Design, University of Pennsylvania (Exiting Board Member)

Marilyn Jordan Taylor is the former Paley Professor and Dean of the School of Design at the University of Pennsylvania. Dr. Taylor was Partner in Charge of the Urban Design and Planning Practice at Skidmore Owings & Merrill, LLP and the first woman to serve as chairman there. In addition to over 35 years at Skidmore Owings & Merrill, she was both the first architect and the first woman to serve as chairman of the Urban Land Institute, a nonprofit research and educational institution, where she championed a renewed focus on cities, sustainable communities, and infrastructure investment. Dr. Taylor has served as a member of The Partnership for New York City; president of the American Institute of Architects (NYC Chapter); visiting professor at the Harvard Graduate School of Design; and as one of the founding members of the New York New Visions Design and Planning Coalition—the design, planning, and real estate communities' unprecedented response to the events of 9/11. She also serves on the Advisory Board of the Penn Institute for Urban Research. She is a graduate of Radcliffe College, attended the MIT Graduate School of Architecture and received her M.Arch. from the University of California, Berkeley.

A word of **appreciation** for our departing Dean Taylor. Thanks for envisioning the new center, helping it launch, and supporting our many events and activities.

SENIOR FELLOWS



KENNETH KULAK

Partner, Morgan Lewis

Ken Kulak is a partner at the law firm of Morgan Lewis, where he advises clients on energy regulation and complex energy transactions. Mr. Kulak has worked on a wide variety of renewable energy projects and helps clients navigate the legal issues associated with the development, purchase, sale, and financing of renewable energy in evolving regulatory frameworks. His clients include utilities, developers, investors, and corporate energy users whom he counsels on retail and wholesale electricity market issues, distributed generation, renewable portfolio standards, and energy efficiency. Prior to joining Morgan Lewis, he worked as a trial attorney in the Civil Division of the U.S. Department of Justice in Washington, D.C., where he represented the United States in contract and employment law cases. He is a graduate of the University of Pennsylvania Law School, where he is a lecturer in law and teaches a seminar on energy law and climate change.



ANNA MIKULSKA

Nonresident Scholar, Baker Institute for Public Policy, Rice University

Anna Mikulska is a nonresident scholar in energy studies Rice University's Baker Institute. Dr. Mikulska joined the Institute's Center for Energy Studies following her two-year postdoctoral appointment at Rice's Local Elections in America Project. Her research interests center around European energy markets and energy policy. She has presented papers at numerous national and international conferences and co-authored articles in the *European Journal of Political Research* and the *Journal of Elections*, Public Opinion and Parties, as well as a chapter in the *Introduction to American Government* textbook. She speaks Polish, English, German, Farsi, and Russian. She received a law degree from Adam Mickiewicz University, a master's degree in international relations from the University of Windsor in Canada, and a PhD in political science from the University of Houston.

INCOMING SENIOR FELLOWS



WILLIAM HEDERMAN

Senior Fellow, Kleinman Center for Energy Policy

William Hederman recently served as Senior Advisor to U.S. Secretary of Energy Ernest Moniz, providing leadership on DOE missions to Ukraine, the Baltics, and Germany. He has also been on the research team for RAND Corporation and worked at FERC, where he formed the Office of Market Oversight and Investigations. He holds engineering degrees from the Massachusetts Institute of Technology and the University of Notre Dame, and a professional degree (M.P.P.) from the University of California at Berkeley.



HOWARD NEUKRUG

Principal, CASE Environmental, LLC

Howard Neukrug is currently the Principal of CASE Environmental LLC, a Senior Fellow at the U.S. Water Alliance (USWA), and an Advisor to the U.S. Environmental Protection Agency and the U.S. Forest Service. Mr. Neukrug is also an adjunct professor at the University of Pennsylvania, where he teaches classes on Water, Science and Politics, Sustainable Cities and Future Trends in the Water Industry. He is a professional engineer, board certified environmental engineer, and holds a degree in Civil and Urban Engineering from the University of Pennsylvania.



JOHN QUIGLEY

Senior Fellow, Kleinman Center for Energy Policy

John Quigley is a consultant and Senior Fellow at the Kleinman Center for Energy Policy at the University of Pennsylvania. Mr. Quigley served as Secretary of the Pennsylvania Department of Environmental Protection from January 2015–May 2016, and as Secretary of the Pennsylvania Department of Conservation and Natural Resources from April 2009–January 2011. He was an instructor in economics at a Penn State University and earned an M.P.A. from Lehigh University and a B.A. in economics from Bloomsburg University.



STEVE VISCELLI

Lecturer, Department of Sociology

Steve Viscelli is an economic and political sociologist. Dr. Viscelli is currently a lecturer in the department of sociology at the University of Pennsylvania. Steve's research focuses on work, labor market economics, and economic regulation. He has a recent book with the University of California Press entitled *The Big Rig: Trucking and the Decline of the American Dream*. He has a PhD in sociology from Indiana University, an M.A. in anthropology from Syracuse University, and a B.A. in philosophy from Colgate University.

VISITING SCHOLARS

In 2015-2016, we welcomed our first visiting scholars for collaborative weeklong residencies to continue established research projects with Penn faculty or to develop new opportunities for future collaborations.



CHRISTIAN GOLLIER

Director, Toulouse School of Economics

Christian Gollier is Director of the Toulouse School of Economics and the Wesley Clair Mitchell Visiting Research Professor at Columbia University. Prof. Gollier’s research focuses on decision theory under uncertainty, environmental economics, finance, investment, consumption theory, insurance economics, and cost-benefit analysis—with a special interest in long-term (sustainable) effects. He is the author of seven books on risk including *The Economics of Risk and Time* (MIT Press), winner of the 2001 Paul A. Samuelson Award, and *Pricing the Planet’s Future* (Princeton UP). He was one of the lead authors of the 2007 and 2013 reports of the Intergovernmental Panel on Climate Change (IPCC). Most recently, jointly with Jean Tirole (2014 Nobel Prize in Economic Sciences), he has made contributions to climate change negotiations through the Harvard Project on Climate Agreements. He has published over 100 articles in top-tier economic journals. He is also associate editor, editor or co-editor of scientific journals such as the *Geneva Papers on Risk and Insurance Theory*, the *Journal of Risk and Uncertainty*, the *Journal of Risk and Insurance*, and *Management Science*. Among many prizes and honors, he was awarded a fellowship in the Econometric Society, membership in the Institut Universitaire de France, the Ernst Meyer prize, the Erik Kempe award, and the Prix Edouard Bonnefous.



MARK JACOBSEN

Associate Professor of Economics, University of California, San Diego

Mark Jacobsen is Associate Professor of Economics at the University of California, San Diego and a research associate at the National Bureau of Economic Research. Dr. Jacobsen’s research focuses on environmental regulation and taxes and addresses two main themes: environmental regulation of transportation and the automobile industry, and optimal environmental policy in the context of the broader economy. He received his PhD from Stanford University. He has published in top-tier economic journals like the American Economic Review and the Journal of Economic Literature. He is a member of the Editorial Council of the Journal of the Association of Environmental and Resource Economists. He was the recipient of the Graduate Teaching Award at University of California, San Diego in 2013, the Hellman Fellowship at University of California, San Diego in 2011 and the B.F. Haley and E.S. Shaw Dissertation Fellowship at the Stanford Institute for economic Policy Research at Stanford University in 2006.



MATTHEW KAHN

Professor of Economics and Spatial Sciences, University of Southern California

Matthew Kahn is a Professor of Economics and Spatial Sciences at the University of Southern California, a research associate at the National Bureau of Economic Research and a research fellow at IZA. Dr. Kahn also serves as a non-resident scholar at the NYU Stern School of Business, at the Urbanization Project and as a non-resident scholar at the University of Pennsylvania Institute for Urban Research. He has taught at Columbia, the Fletcher School at Tufts University, and UCLA. He has served as a visiting professor at Harvard and Stanford, and as the Low Tuck Kwong Distinguished Visiting Professor at the National University of Singapore. He holds a PhD in economics from the University of Chicago. He is the author of *Green Cities: Urban Growth and the Environment*, the co-author (with Dora L. Costa) of *Heroes and Cowards: The Social Face of War* and the co-author (with Siqi Zheng) of *Blue Skies Over Beijing: Economic Growth and the Environment in China*. His research focuses on environmental, energy, and urban economics.

INCOMING VISITING SCHOLARS

Through a competitive faculty nomination process, the Kleinman Center selected and will host the following visiting scholars on Penn’s campus in 2016-2017.



JOSEPH ALDY

Professor of Public Policy, John F. Kennedy School of Government at Harvard University

Joseph Aldy is an Associate Professor of Public Policy at the John F. Kennedy School of Government at Harvard University, a visiting fellow at Resources for the Future, a faculty research fellow at the National Bureau of Economic Research, and a senior advisor at the Center for Strategic and International Studies. Dr. Aldy is also the Faculty Chair for the Regulatory Policy Program at the Mossavar-Rahmani Center for Business and Government. He holds a PhD in economics from Harvard University, a master’s in environmental management from the Nicholas School of the Environment, and a bachelor’s from Duke University.



ROBERTO SCHAEFFER

Professor of Energy Economics, Federal University of Rio de Janeiro

Roberto Schaeffer is Professor of Energy Economics in the Energy Planning Program (PPE) of the Federal University of Rio de Janeiro (UFRJ), Brazil. Dr. Schaeffer is a member of the Working Group III of the Intergovernmental Panel on Climate Change (IPCC), leader of the Brazilian country team. During the last 15 years, his research has focused on developing the Brazilian integrated assessment energy model. He received a PhD in Energy Management and Policy from the University of Pennsylvania.



KATHERINE SMITH

Counsellor Nuclear, Australian Embassy

Katherine Smith is Counsellor Nuclear at the Australian Embassy and Permanent Mission to the United Nations in Vienna, Austria. Prior to this, Dr. Smith was Senior Advisor in International Relations at the Australian Nuclear Science and Technology Organisation (ANSTO). She has been an active member of a range of committees and panels, including the International Scientific Advisory Panel of the Monash (University) Centre for Electron Microscopy. She earned a both a PhD and a bachelor’s in physics from Monash University in Australia.



ROGER STERN

Assistant Professor of Energy Economics, Policy and Commerce, University of Tulsa, Collins College of Business

Roger Stern is an Assistant Professor of Energy Economics, Policy, and Commerce at the University of Tulsa, Collins College of Business. Dr. Stern’s recent research mainly concerns the intersection of U.S. energy policy, foreign policy, national security, and economic history. Following a career in land conservation and environmental policy, he earned a PhD in geography and environmental engineering from Johns Hopkins University. He also holds a master’s from the University of Vermont and a bachelor’s from Antioch College.



JÉRÔME TAILLARD

Assistant Professor of Finance, Babson College

Jérôme Taillard is an Assistant Professor of Finance at Babson College in Massachusetts. Dr. Taillard’s main research interests are in corporate finance, with a current focus in areas of risk management, innovation, litigation, corporate governance, and the oil and gas industry. Prior to completing his PhD, he served as a consultant on risk management. He earned his PhD in finance from The Ohio State University in 2010. He also received a graduate degree in economics from the Study Center in Gerzensee (Switzerland) and an undergraduate degree in mathematics applied to finance (magna cum laude) from the University of Neuchâtel in Switzerland.





PUBLICATIONS

Much to Say

Center staff, research assistants, faculty, senior fellows, and visiting scholars published a wealth of content on timely energy policy topics.

OUR WRITTEN WORK INCLUDES THREE
CORE PRODUCTS: RESEARCH PAPERS,
POLICY DIGESTS, AND BLOG POSTS.

PAPERS

Digging Deep. For those readers wanting a deeper dive, we produce long-format papers—such as reports and scholarly articles. Our papers take an in-depth look at leading energy policy issues and are written for professional audiences. This year, we produced the following papers:



JUNE 29, 2016

Philadelphia Gas Works' LNG Expansion Efforts: A Guide to Understanding and Evaluating Project Benefits and Risks

By Christina Simeone

Philadelphia Gas Works (PGW) is seeking to expand its liquefied natural gas (LNG) assets. If there is sufficient private sector interest, city officials will be exploring an agreement in the fall. This report identifies some of the benefits and risks associated with PGW's LNG proposal, and suggests issues for officials to consider.



JUNE 6, 2016

Rate Decoupling and Economic and Design Considerations

By Christina Simeone

Price signal dampening and reduced rate-making transparency are some potential drawbacks to consumers from decoupling policy. While utilities generally benefit from decoupling, regulatory assessment of return on equity may lack a structured approach. This paper provides decoupling policy design considerations aimed at addressing these and other facets of decoupling policy.



FEBRUARY 1, 2016

Exploring the Utility of the Future in Pennsylvania

By Christina Simeone

This report summarizes the Kleinman Center's series of meeting that engaged Pennsylvania stakeholders representing electric utilities, regulators, consumer advocates, environmental organizations, and technology vendors to discuss the future of the state's electric utility business model. Facilitated stakeholder dialogue explored current challenges with the existing business model, future opportunities for business model improvement, and pathways for future engagement, with all perspectives summarized consistent with the Chatham House Rule.



NOVEMBER 4, 2015

Listening, Learning, Leading: A Framework for Regulatory Excellence

By Dr. Cary Coglianese

Cary Coglianese, from Penn Law, issued his final report of the Penn Program on Regulation's Best-in-Class Regulator Initiative, an effort commissioned a year ago by the Alberta Energy Regulator (AER) to define regulatory excellence and offer recommendations to regulators around the world about how they can improve and measure their regulatory performance. The Kleinman Center collaborated with Professor Coglianese on this initiative.

 **GET EXECUTIVE SUMMARIES ONLINE, OR DOWNLOAD THE FULL PAPERS AT:**
KLEINMANENERGY.UPENN.EDU/PAPERS

POLICY DIGESTS

High Impact. We know that energy industry professionals and policy makers are busy. That's why Kleinman policy digests distill key research into bite-sized reads and also tell the story visually with graphs, charts, and photos. Over the past academic year, we produced the following policy digests:



JUNE 21, 2016

Will China Reduce Coal Consumption and Greenhouse Gas Emissions?

By Dr. Matthew Khan

JUNE 20, 2016

Part 1: Understanding the Challenges of Integrating Seasonal Resources into PJM's Wholesale Capacity Market

By Christina Simeone



JUNE 13, 2016

Economics of Policy of Large-Scale Battery Storage

By Dr. Mark Jacobsen



JUNE 3, 2016

Developing the High-Res Grid

By Christina Simeone

APRIL 29, 2016

Fighting Climate Change and the Social Cost of Carbon

By Dr. Christian Gollier



APRIL 28, 2016

Computing the Right Price Signal for the Social Cost of Carbon

By Dr. Christian Gollier and Angela Pachon

MARCH 30, 2016

NRC Staff Raises Alarm on Widespread Nuclear Plant Design Flaw

By Christina Simeone



FEBRUARY 26, 2016

Of Corn and Climate Change: Ethanol in America

By Dillon Weber and Angela Pachon

FEBRUARY 11, 2016

Electric Utility Trends in Pennsylvania (2005-2014)

By Christina Simeone



JANUARY 9, 2016

Energy Production and the Potential for Electric Motorcycles in Solo and Central Java, Indonesia

By Dr. Erick Guerra and Lucia Artavia

DECEMBER 4, 2015

The Coal Dilemma

By Angela Pachon and Dillon Weber

NOVEMBER 4, 2015

Should Maximum Contingency Fuel be Regulated for U.S. Civil Aviation?

By Dr. Megan Ryerson with Mark Hansen, Lu Hao, and Michael Seelhorst

NOVEMBER 4, 2015

From Coal to Clean: How China is Revolutionizing the Transition to Renewable Power

By Dillon Weber



SEPTEMBER 30, 2015

How Attractive Are Fuel-Economy Standards?

By Dr. Sebastien Houde and Dr. Arthur van Benthem

SEPTEMBER 16, 2015

Why the U.S. Might Lift a Decades Long Ban on Crude Oil Exports

By Dillon Weber



SEPTEMBER 2, 2015

A Tale of Two Taxes: Impact Fee and the Severance Tax in Pennsylvania

By Angela Pachon and Dillon Weber

 **VIEW POLICY DIGESTS AT**
KLEINMANENERGY.UPENN.EDU/POLICY-DIGESTS



BLOG POSTS

Blogging It. In February 2016, we rolled out a new blog—to reach a broader audience, share diverse voices, and provide an outlet for timely commentary.

The Kleinman Center blog features two to three posts a week, with a growing body of commentary from staff, faculty, students, and senior fellows. On this page, you'll find some featured highlights. On the next page, you'll find a full list of this year's posts:



JUNE 29, 2016
[PHILADELPHIA EAGLES GO GREEN WITH RENEWABLE ENERGY](#)

A Renewable America offered Kleinman Center staff the opportunity to tour the green programs at Lincoln Financial Field last week. The stadium, located in south Philadelphia, is one of the greenest in the world and home to the Philadelphia Eagles.



APRIL 25, 2016
[OPPORTUNITY REMAINS AS CEO MAVERICKS FALL SHORT](#)

What do SunEdison's CEO Ahmad Chatila, NRG's David Crane and Shell's Marv Odum have in common? Your first responses might be bankruptcy, being ousted, or failure. You wouldn't be wrong. You also wouldn't be totally right.

Photo courtesy of Steve Johnson



APRIL 19, 2016
[GAS TRUST FUND TO HELP COMMUNITIES FACES UPHILL BATTLE](#)

It's hard to make a deal when two sides have little trust in each other. The Brookings Institution's new report offers Pennsylvania policymakers a compelling tool for making a deal on a new natural gas severance tax.

Photo courtesy of Stuart Connor



APRIL 8, 2016
[PUT YOUR MONEY WHERE THE RISK IS](#)

My main takeaway from the rollout of the Greater Philadelphia Energy Action Team's new "A Pipeline for Growth" report is this: the use of the word "molecules" in any energy policy discussion should be avoided.

Photo courtesy of O. Kormushin



MARCH 8, 2016
[NY COURT TAPS BREAKS ON NY REV](#)

On March 4, the New York State Supreme Court issued a temporary restraining order against NY Public Service Commission (PSC) rules imposing restrictions on retail electricity providers. NY PSC struggles to find balance between consumer protection and competitive markets.

Photo courtesy of Qfamily



FEBRUARY 8, 2016
[COMMODITY ODDITIES AND THE NEW EXPORT ECONOMY](#)

With oil and natural gas prices at historic lows, Americans are paying rock-bottom prices for energy. However, an associated economic stimulus is missing as consumers sock away savings, producers struggle with debt, and the nation prepares for exports.

GUEST BLOGGING

REGBLOG

APRIL 28, 2016
[NRC STAFF PUSH AGENCY TO ADDRESS ESCALATING SAFETY CONCERNS](#)

In April, we were also invited to guest blog for Penn Law's well-established *RegBlog*, a regulatory news blog.

THIS YEAR'S BLOG POSTS

JUNE 30, 2016
[TOUGH TIMES FOR PHILADELPHIA'S LOCAL REFINERY](#)

JUNE 29, 2016
[PHILADELPHIA EAGLES GO GREEN WITH RENEWABLE ENERGY](#)

JUNE 24, 2016
[WATCHING THE GRID'S HEARTBEAT](#)

JUNE 17, 2016
[ARE OIL TRAINS COMING BACK TO PHILLY'S RAILS?](#)

JUNE 10, 2016
[CYBER ATTACKS ON ENERGY INFRASTRUCTURE](#)

JUNE 6, 2016
[DISMEMBERING THE CPUC, WHAT THE HECK IS HAPPENING IN CALIFORNIA?](#)

MAY 25, 2016
[TOP LINES FROM PJM'S CAPACITY AUCTION](#)

MAY 16, 2016
[TVA FILES FIRST-EVER APPLICATION FOR SMALL SCALE NUCLEAR REACTOR](#)

MAY 10, 2016
[CALIFORNIA AND PA PIPELINE FORECAST SUMMER ENERGY DIALOGUE](#)

APRIL 28, 2016
[HIGHLIGHTS FROM FERC'S 2015 STATE OF THE MARKETS REPORT](#)

APRIL 25, 2016
[OPPORTUNITY REMAINS AS CEO MAVERICKS FALL SHORT](#)

APRIL 21, 2016
[PENNSYLVANIA HIGHLIGHTS THE LOCAL DEBATE ON NUCLEAR WASTE STORAGE](#)

APRIL 19, 2016
[GAS TRUST FUND TO HELP COMMUNITIES FACES UPHILL BATTLE](#)

APRIL 12, 2016
[GRID ASSURANCE LLC TO OFFER RESILIENCY SUBSCRIPTIONS TO MAJOR UTILITIES](#)

APRIL 8, 2016
[PUT YOUR MONEY WHERE THE RISK IS](#)

APRIL 7, 2016
[EMERGENCY PLANS NEEDED FOR THE POWER GRID IN THE AGE OF GAS](#)

APRIL 5, 2016
[BLUE SKIES OVER BEIJING](#)

APRIL 4, 2016
[PUCO RULES AGAINST COMPETITIVE MARKETS](#)

APRIL 1, 2016
[DOE'S LIFELINE TO TRANSMISSION SITING FOR RENEWABLES](#)

MARCH 24, 2016
[IMF LINKS LOW INTEREST RATES TO MISSING STIMULUS FROM OIL PRICE DECLINES](#)

MARCH 17, 2016
[CALIFORNIA'S COLD SHOULDER TO THE BLOOM BOX](#)

MARCH 10, 2016
[BANKRUPTCY COURT PUSHES DOMINO ON OIL AND GAS INDUSTRY](#)

MARCH 8, 2016
[NY COURT TAPS BREAKS ON NY REV](#)

FEBRUARY 29, 2016
[FINANCING GAS PIPELINES THROUGH ELECTRIC RATES?](#)

FEBRUARY 26, 2016
[NY REV: PROMOTING INNOVATION AND COMPETITION THROUGH PRICE CAPS?](#)

FEBRUARY 17, 2016
[OIL AND THE NEXT GLOBAL ECONOMIC CRISIS](#)

FEBRUARY 8, 2016
[COMMODITY ODDITIES AND THE NEW EXPORT ECONOMY](#)

 FOLLOW OUR BLOG ONLINE AT
KLEINMANENERGY.UPENN.EDU/BLOG

“ . . .galvanize all the University’s strengths and resources to advance the transformation of U.S. energy policy for a productive, secure and sustainable energy future.”

—AMY GUTMANN
PRESIDENT OF THE UNIVERSITY OF PENNSYLVANIA



FACULTY WORK

Research Endeavors

Our faculty grants program supports a broad spectrum of energy policy research across the university.



WE SUPPORT FACULTY SCHOLARSHIP ON A WIDE ARRAY OF ENERGY TOPICS THAT LEVERAGE EXISTING PENN RESEARCH STRENGTHS TO IMPROVE POLICY OUTCOMES.

RESEARCH GRANTS

Meaningful Projects. Our goal is to create the collegial and productive conditions under which energy-related research at Penn can flourish and better inform policy decisions. Our competitive grants program draws proposals from Penn scholars across schools and disciplines. This year, we funded seven faculty research projects.

ENVIRONMENTALLY RESPONSIVE AND ENERGY EFFICIENT BUILDING SKINS

Principal: *Dr. Shu Yang, School of Engineering and Applied Sciences*

Residential and commercial buildings account for nearly 40% of total energy consumption in the U.S., which includes 72% of the nation's electricity use and 39% of carbon dioxide emissions each year due to heating, cooling, and lighting. There has been tremendous interest in economizing energy uses in buildings through roofing, skylights, and architectural windows. For example, smart windows that respond to sunlight have been developed. Current regulations and strategies, however, focus on the static properties of building materials or their interaction with responsive lighting and mechanical systems.

In this project, Yang worked on the development of a responsive and light-reflective building skin. Light reflected or transmitted through the skin can be modulated and (re)configured in response to local changes in solar radiance, lighting, and heat. Yang embeds the modularizes optical components and actuators on a kirigami template that can open, close, and change shape via strategically placed cuts and creases. Compared to conventional origami, which often involves highly intricate folds, wedges and pleats that effectively "remove" materials, cutting in kirigami minimizes waste, weight, and energy consumption. This kirigami skin is a platform technology, suited to new and existing constructions, including windows, building wraps, façades or exterior walls. If successful, this technology will improve a building's sustainability, and thus strengthen U.S. energy security.

THE FUTURE OF AVIATION POLICY

Principal: *Dr. Megan Ryerson, School of Design and School of Engineering and Applied Sciences*

Major federal and international policy changes such as Open Skies—which allow a number of large cities to directly subsidize airlines—in addition to airlines reshaping through mergers and the introduction of "capacity discipline"

practices, are radically transforming the global aviation sector. These changes leave gaping holes in our understanding of the future of global and U.S. domestic air transportation, especially in regard to the structure of such systems and their energy demands and emissions. In this project, Ryerson reviews major aviation policy shifts and their impacts, and estimates future energy demands and environmental effects.

GAMING THE SUSTAINABLE CITY

Principals: *Dr. William Braham, School of Design and Dr. Barry Silverman, School of Engineering and Applied Sciences*

Urban designers have long recognized the value of using simulators and games to evaluate sustainability initiatives. Energy—in its many forms—drives urban growth and development. It provides an engine for economic activities and underlies many of the choices that urban designers, city managers and citizens make every day: where to live, where to work, how far to drive and how much to buy? With the exception of actions such as driving, the connection between energy and everyday life is neither direct nor especially visible.

In this project, William Braham and Barry Silverman worked on developing a prototype for a community game generator that lets users rapidly model their community in terms of energy balances, affordability of options and residents' values. Their goal was to model basic interactions between energy supplies (renewable and non-renewable) and typical activities in a city, using an agent-based model simulation (ABMS) to capture the social and economic choices made by different players.

GLOBAL INFRASTRUCTURE PROJECT RESEARCH NETWORK

Principal: *Dr. Witold Henisz, Deloitte & Touche Professor, Wharton*

Analyzing the determinants of the financial and operational performance of energy infrastructure could help achieve increased energy production with less investment, and tap significant new capital in pension and sovereign wealth funds by improving investor and stakeholder confidence in performance. The Global Infrastructure Project Research Network (GIPRN) is developing a unique data resource that allows for the quantitative analysis of the factors, conditions, governance structures, and stakeholder engagement strategies influencing the financial and operational performance of major energy and transportation infrastructure projects across the world. This database will advance research on how we plan, regulate,

finance, govern, manage, develop, and maintain the infrastructure that supports our societies. This project involved coding 65 energy projects in the U.S., South America, Asia, and Africa.

LIGHTING DARK CORNERS: IMPROVING LIGHT EFFICIENCY WITH KIRIGAMI

Principal: *Dr. Randall Kamien, School of Arts and Sciences*

Though there have been incredible advances in the efficiency of lighting, we still waste much of our natural light. To retrofit existing space it is necessary to develop simple, scalable and inexpensive technologies; only then can we keep the corners brightly lit for free. In 1973, the mathematician Victor Klee posed the following question: "in a polygonal art gallery with N corners, how many of the corners need to have guards so that every part of the gallery is being watched?" Easy for a triangle (one), a rectangle (one), or any convex polygon (one) but not so obvious for a concave polygon. In other words, how many globe lamps do you need mounted at corners to light the whole room? This project explored this problem by determining how we can uniformly illuminate a room and redistribute the solar flux through dynamically adaptable surface panels based upon kirigami applications.

OPTIMAL PATHWAYS FOR REGIONAL ENERGY TRANSITION

Principal: *Dr. William Braham, School of Design*

Since the IPCC AR4 in 2007, many governments have adopted a policy goal of an 80% reduction in greenhouse gas emissions by the year 2050. But what guidance does this global goal provide to a region trying to optimize its energy future through smart investments and planning? An all-of-the-above approach makes sense at the national scale, but cities and regions face binding constraints on money, expertise, and attention span. Local choices really matter.

Read more about the Optimal Pathways project and its team of scholars on page 40.

SOLAR ENERGY POWERED WATER PURIFICATION SYSTEM IN RWANDA

Principal: *Dr. Jorge J. Santiago-Aviles, School of Engineering and Applied Sciences*

In Gashora, a small Rwandan town one hour from Kigali, water and energy are daily challenges—where wood and charcoal are the primary sources of energy and where raw water from parasite-infested lakes is used for drinking. Waterborne diseases such as schistosomiasis (Bilharzia) affect over 80% of the region's inhabitants. The School of Engineering and Applied

Sciences(SEAS) designed and organized an effort to implement three photovoltaic energized water purification systems at the Gashora Girls Academy of Science and Technology (GGAST).

Student teams traveled in early summer 2016 to begin implementation. Unfortunately, the piston pump and related hardware did not arrive in Rwanda before Penn students departed. Santiago-Aviles and his students instead went to work helping install photo-voltaic (PV, solar cells) lamps for the schoolyard to improve safety and living conditions. In spite of the delayed equipment, GGAST's lead engineer will now receive and implement this water purification system under the remote guidance of Santiago-Aviles.



INNOVATION SPOTLIGHT

ARPA-E

KLEINMAN CENTER + PENN CENTER FOR INNOVATION

Last year, the Kleinman Center and the Penn Center for Innovation teamed up as Technology Development Partners in the ARPA-E Energy Innovation Summit in Washington, D.C. The ARPA-E Energy Innovation Summit is an annual conference and technology showcase that brings together experts from different technical disciplines and professional communities to think about America's energy challenges in new and innovative ways. Showcase participants included ARPA-E-funded project teams as well as a highly selective group of researchers and technologists from other companies and organizations.



Left: Kleinman-funded students and staff join a large audience for a discussion with Al Gore.

Above: ARPA-E Director Ellen Williams (center) stops by our booth at the Technology Showcase. Pamela Beatrice of the Penn Center for Innovation (left) and Angela Pachon of the Kleinman Center (right) presented eight leading Penn technologies during this showcase event.

The summit was a great opportunity to increase the visibility of Penn research and network with other Ivy League Universities, national labs, private companies, and prestigious research centers. Penn showcased eight new energy technologies developed by Penn faculty and fellows, including:

- **Direct Carbon Fuel Cell Stack Designs**
Ray Gorte, Chemical and Biomolecular Engineering, School of Engineering and Applied Sciences
- **Engineered Enzymes for Sesquiterpene Biofuel Generation**
David Christianson, Chemistry and Biology, School of Arts and Sciences
- **Nanoparticle Catalysts for High Performance Methane Combustion**
Ray Gorte, Chemical and Biomolecular Engineering, School of Engineering and Applied Sciences
- **Robust Smart Windows: Reversible Switching from Transparent to Color**
Shu Yang, Materials Science and Engineering, School of Engineering and Applied Sciences
- **Simple Chemical Method for Separation of Rare Earth Metals**
Eric Schelter, Chemistry, School of Arts and Sciences
- **Simultaneous Imaging and Friction Measurement with In Situ Tribometer**
Rob Carpick, Mechanical Engineering and Applied Mechanics, School of Engineering and Applied Sciences
- **Smart Demand Response for Building Efficiency**
Rahul Mangharam, Electrical and Systems Engineering, School of Engineering and Applied Sciences; Madhur Behl, Electrical and Systems Engineering, School of Engineering and Applied Sciences
- **Visible Light Absorbing Ferroelectric Materials for Photovoltaics**
Andrew Rappe, Chemistry, School of Arts and Sciences and Materials Science and Engineering, School of Engineering and Applied Sciences



THE NETFLIX OF DEMAND MANAGEMENT:
RAHUL MANGHARAM + MADHUR BEHL

Developers Rahul Mangharam and Madhur Behl took center stage at the ARPA-E summit this year with their innovative product "DR-Advisor," a data-driven demand response system designed to cut energy costs and improve building efficiency.

Described as the Netflix of demand management, DR-Advisor uses historic meter and weather data as well as set-point and schedule data to make predictions about power consumption and recommend a better plan.

"The folks at the Kleinman Center for Energy Policy have been instrumental in making our research relevant," said Mangharam. "They have provided an engagement platform to reach PJM, curtailment service providers, utilities, and large facility managers. By better understanding the real challenges in the operations and planning we have been able to align our research to have a meaningful impact in the region."

After ARPA-E, the Kleinman Center staff encouraged Mangharam and Behl to apply for the Allegheny Region Cleantech University Prize, offered by Carnegie Mellon and sponsored in part by the U.S. Department of Energy. Mangharam and Behl's DR-Advisor startup received first place and \$50,000 in prize money.

Above Left: Dr. Rahul Mangharam, Professor, Department of Electrical and Systems Engineering

Above Right: Madhur Behl, Postdoctoral research fellow, Department of Electrical and Systems Engineering

"The folks at the Kleinman Center for Energy Policy have been instrumental in making our research relevant."

—RAHUL MANGHARAM
PROFESSOR, DEPARTMENT OF ELECTRICAL AND SYSTEMS ENGINEERING

Three of these Penn technologies were selected for Summit Corporate Acceleration Program: Nanoparticle Catalysts for High Performance Methane Combustion, Robust Smart Windows, and Smart Demand Response for Building Efficiency.

The Kleinman Center also sponsored two students from Penn to travel, attend, and participate in the ARPA-E summit. The summit hosted a recruitment event for students interested in a career in the energy sector. The graduate-level students selected to participate in the student program participated in student-focused panel sessions and networked with corporate recruiters. From showcase to students, Penn and the Kleinman Center team showed our breadth of knowledge and leadership in energy issues.



STUDENTS

—

Engage to Learn

Students connect with our center in many hands-on ways—through events, internships, jobs, research, travel grants, and more.



IN OUR SECOND YEAR,
AWARENESS OF THE CENTER
GREW AND STUDENTS ACROSS
CAMPUS PROPOSED A WIDE
ARRAY OF ENERGY-FOCUSED
LEARNING OPPORTUNITIES.

STUDENT GRANT FUNDING

The Kleinman Center supported 28 student grants during the 2015–2016 academic year. We funded travel, research, internships, fellowships, competitions, field trips, and a variety of energy-related learning opportunities.

FELLOWSHIPS

The new Kleinman Student Fellowship Program launched this year, providing fellowships specifically designed and designated for Penn students. Our first student fellows gained valuable energy policy experience in the following offices:

City of Philadelphia, Office of Sustainability
Adithya Suresh, Mechanical Engineering and Applied Mechanics, School of Engineering and Applied Sciences

DOE / Presidential EV Everywhere Grand Challenge (jointly funded by Penn Wharton Public Policy Initiative)
Ricardo Peña, Master of Public Administration, Fels Institute of Government, School of Arts and Sciences

Inter-American Dialogue Program (jointly funded by Penn Wharton Public Policy Initiative)
Gleeson Ryan, The Huntsman Program—Economics, International Studies, The Wharton School and School of Arts and Sciences

Philadelphia City Council
Michael Truax, Master of Environmental Studies, School of Arts and Sciences

U.S. Department of Agriculture, Rural Utilities Service
Oumourumana Jalloh, Environmental Studies, School of Arts and Sciences

U.S. Green Building Council
Beth Murray, Masters of Environmental Studies, School of Arts and Sciences

U.S. Secretary of State on the Greening Initiative (jointly funded by Penn Wharton Public Policy Initiative)
Sarah Hinstorff, International Relations, School of Arts and Sciences

STUDENT MENTORING

Once again, the Kleinman Center partnered with Penn Undergraduate Research Mentoring Program to connect students to energy summer research opportunities. With Kleinman support, students worked with a professor on an energy topic of interest, such as:

Investigating Mechanisms of Lubricant Additives Using the Atomic Force Microscope
Noah Glachman, Materials Science and Engineering and Physics, School of Engineering and Applied Sciences (with Professor Robert Carpick, School of Engineering and Applied Sciences)

Precautionary Federalism and the Sharing Economy
Tiffany Yung, Economics, The Wharton School (with Professor Sarah Light, The Wharton School)

Statistical Modeling of the Fundamental Diagram
Karen Chi, Undeclared, School of Arts and Sciences (with Professor Yong Chen, Medicine)

Technological Choice in Response to Environmental Regulation: Electricity Markets and the Clean Power Plan
Neerja Chandrasekar, Economics, The Wharton School (with Professor Mike Abito, The Wharton School)

PENN SUMMER ABROAD: BERLIN & ROTTERDAM

For a second summer, the Kleinman Center supported students on a trip led by faculty member Simon Richter to Germany and the Netherlands, where they studied policymaking, sustainability, and environmentalism. Students studied the energiewende (German energy transition) and had the opportunity to meet with representatives from the German Energy Agency, Potsdam Institute for Climate Impact Research, and Agora Energiewende.

Kleinman Supported Students

- Adamseged Abebe
Undeclared, School of Arts and Sciences
- Dhristi Dagliya
Political Science, School of Arts and Sciences
- Erica Higa
Mechanical Engineering and Applied Mechanics, School of Engineering and Applied Sciences
- Wayne Schmitt
Biology, School of Arts and Sciences

STUDENT SPOTLIGHT

SUMMER GRANT STORIES



OUMOURUMANA JALLOH *Environmental Studies and Political Science, School of Arts and Sciences*

Jalloh worked as a fellow in the Rural Utilities Services department of the U.S. Department of Agriculture in Washington, D.C.

“An article I wrote to promote Rural Utilities Services’ electric programs will be published in the *Rural Cooperatives Magazine* of the USDA. This is my very first publication. No better way to end my fellowship. Thanks to the Kleinman Center for this amazing opportunity! I cannot wait to share once it is published online.”



BETH MURRAY *Master of Environmental Studies, School of Arts and Sciences*

Murray completed a fellowship at the United States Green Building Council in Washington, D.C.

“My work at the USGBC involved talking to people in the sustainability offices of leading cities across the U.S. It was fascinating to compare how different cities collect their benchmarking data, analyze the data, report the data, and use the data to make policy decisions. As an older student looking at a career transition, I feel very lucky to have worked on a project that so closely connects to the urban sustainability topics I’m interested in.”



JOSHUA POWELL *Master of Environmental Studies, School of Arts and Sciences*

Powell attended the Verge Hawaii Pacific Clean Energy Summit in Honolulu, Hawaii.

“I enjoyed getting to explore some of the most advanced technology in renewable energy transportation, by using a micro-grid to charge a BMW i8. As someone who is interested in the policy angle of clean energy, this was a really good opportunity to learn more about the engineering and technology-based—often industry-led—aspects of clean energy. After all, policy goals have to be achieved through practical action, and in Hawaii it is very much industry that is leading the charge in that.”



HALIMA SAID *The Huntsman Program—Economics, International Studies, The Wharton School and School of Arts and Sciences*

Said traveled through Egypt, Kenya, and Rwanda, comparing the countries’ solar energy usage.

“As hydroelectric power and fossil fuels become less viable in Africa, governments have turned towards green energy to supplement their national energy consumption. This summer, I had the opportunity to travel to Egypt, Kenya, and Rwanda, to research the substantial increase in the use of solar energy.”



ADITHYA SESHADRI SURESH *Mechanical Engineering and Applied Mechanics, School of Engineering and Applied Sciences*

Suresh worked in Philadelphia as a fellow in the city’s energy office.

“All it took was two days for me to realize how ideal this experience would be. The internship gave me hands-on experience in the energy sector and brought to fruition my long-term goal to work on sustainable energy and energy efficiency.”



OTHER STUDENT GRANTS

ARPA-E Conference Attendance

Miriam Posner, Master of Public Administration, Fels Institute of Government, School of Arts and Sciences; Tiffany Wang, Master of Business Administration, The Wharton School

Coca-Cola and Energy in Kenya, Rwanda, and Egypt

Halima Said, The Huntsman Program—Economics, International Studies, The Wharton School and School of Arts and Sciences

Columbia / Booz Allen Case Competition

Miriam Posner (and team), Master of Public Administration, Fels Institute of Government, School of Arts and Sciences

The Environ Group LEED Certification

Led By: Connie Chen, Finance, The Wharton School; Aaron Guo, Strategic Management, Engineering, The Wharton School, School of Engineering and Applied Sciences

Evaluation of Waste to Energy in Nairobi

Diana Mong-Are, The Huntsman Program—Business, International Studies, The Wharton School and School of Arts and Sciences

GreenBiz Renewable Energy Conference Attendance

Joshua Powell, Master of Environmental Studies, School of Arts and Sciences

Penn Political Coalition Policy Week: Renewable Energy Kick-Off Event

Susan Radov, Undeclared, School of Arts and Sciences

Penn Sustainability Review Launch

Led By: Sasha Klebnikov, Mechanical Engineering and Applied Mechanics, School of Engineering and Applied Sciences

The Root Project: Artificial Intelligence for Smart Plugs

Michael Raevsky, Mathematics, School of Arts and Science; Jack Harkins, Computer Engineering, School of Engineering and Applied Sciences; Don Yu, Network and Social Systems, School of Engineering and Applied Sciences; Stratton Spirou, Computer Engineering, School of Engineering and Applied Sciences

Ross School of Business Renewable Energy Case Competition

Vishwanth Vankadari, Master of Science in Engineering, School of Engineering and Applied Mechanics; Scott Huffman, Master of Business Administration, The Wharton School; Alex Bolano, Master of Business Administration, The Wharton School

Wharton Energy Conference Attendance

Wu-Bin Chao, City and Regional Planning, School of Design

Wharton Undergraduate Energy Group Energy 101 Series

Led By: Sheetal Akole, Economics, The Wharton School

Wharton Undergraduate Energy Group: Trip to Co-Op Solar Field

Led By: Sheetal Akole, Economics, The Wharton School; Jack Tyree, Finance, The Wharton School

STUDENT SPOTLIGHT

KLEINMAN TEAM PLACES 2ND AT COLUMBIA

MAX DAVIDSON, GREGORY LUEHRS, MIRIAM POSNER, ROBERT RITCHIE + VISHWANTH KUMAR VANKADARI

After a grueling week tackling a complex energy hypothetical, a team of five Penn graduate students supported by the Kleinman Center presented their findings to a panel of industry judges and won second place at the 11th Annual Columbia University Energy Symposium Case Competition.

The national competition, sponsored by Booz Allen Hamilton, pulled in teams from graduate programs across the United States, which developed responses to contemporary challenges facing the energy industry.

“Our diverse team worked extremely well together. Learning how to communicate a simple yet complete response to a complex prompt tailored to our target audience was certainly worth all of the hard work and late nights. We owe thanks to the Kleinman Center for their continued support both academically and financially,” said Team Kleinman member Greg Luehrs.

Responses required an interdisciplinary approach, including expertise in business, finance, policy, and energy technologies. This year’s case study asked students to act as Chair of the Public Utility Commission in a state trying to balance renewable deployment and technology integration. Students addressed key policy issues including rates and subsidies for various stakeholders. Kleinman students secured second place and \$1,500 in prize money following their successful 15-minute presentation.

Team members included:

- Max Davidson
Master of Environmental Studies, School of Arts and Sciences
- Gregory Luehrs
Master of Business Administration, The Wharton School
- Miriam Posner
Master of Public Administration, Fels Institute of Government, School of Arts and Sciences
- Robert Ritchie
Master of Science in Engineering, Mechanical Engineering, and Applied Mechanics, School of Engineering and Applied Sciences
- Vishwanth Kumar Vankadari
Master of Science in Engineering, Mechanical Engineering, and Applied Mechanics, School of Engineering and Applied Sciences



Team Kleinman accepts their prize at Columbia University.





COURSEWORK

Lay the Foundation

Our targeted coursework provides energy policy essentials taught by leading experts.



THE KLEINMAN CENTER IS BUILDING PENN'S ENERGY CURRICULUM—WITH A NEW FOUNDATION COURSE AND A GRADUATE-LEVEL CERTIFICATE.

COURSES

Our new graduate-level courses drew students from PennDesign, SEAS, SAS, and Wharton. Students met weekly in the Kleinman Center's new classroom on the third floor of the Fisher Fine Arts Library Building.

INTRODUCTION TO ENERGY POLICY

In the fall, Dr. Mark Alan Hughes taught Introduction to Energy Policy. The first half of the course provided readings and lectures on systems theory, the energy system, the policy process, design thinking, policy design, decision analysis, and emerging issues. Students then explored a set of timely energy policy issues using readings and student presentations. Issues included: disruption of legacy business models in energy markets, carbon budgets and tax and trade policies, compliance options under EPA's Clean Power Plan, energy efficiency and rebound, grid reliability and investment, and emerging technologies—such as energy storage, stranded assets, and corporate sustainability.

TOPICS IN ENERGY POLICY

In the spring, the Kleinman Center sponsored two sections of Topics in Energy Policy: one on Technology and Policy Innovation for Energy Systems taught by Senior Fellow William Hederman and one on the Geopolitics of Energy, taught by Senior Fellow Anna Mikulska.

Mr. Hederman's class focused on several major energy systems relevant to North America, including high voltage power grids and transmission pipeline networks.

Dr. Mikulska's class focused on global trends in the production and use of energy, its impact on the environment, and the geopolitical issues around energy security and trade using the United States energy developments and energy-related policies as a backdrop.

LOOKING FORWARD:

THIS FALL, BILL HEDERMAN AND ANNA MIKULSKA WILL CO-TEACH THE POPULAR KLEINMAN COURSE: INTRODUCTION TO ENERGY POLICY.

CERTIFICATE IN ENERGY MANAGEMENT AND POLICY

Our new interdisciplinary certificate program prepares graduate students for careers in energy policy. For the first time in 2015-2016, students had the opportunity to apply for our Certificate in Energy Management and Policy.

The certificate is intended for professional graduate students interested in adding an understanding of energy policy to their list of educational qualifications. It leverages the interdisciplinary nature of energy policy education at Penn—drawing from a comprehensive set of courses across several schools and a foundational course in the fundamentals of energy policy, offered through the Kleinman Center.

We accepted six students into our certificate program last year, and four students graduated with this distinction:

Certificate Graduates

- Max Davidson
Master of Environmental Studies, School of Arts and Sciences ('16)
- Miriam Posner
Master of Public Administration, School of Arts and Sciences ('16)
- Robert Ritchie
Master of Science Engineering, School of Engineering and Applied Sciences ('15)
- Samuel Sklar
Master of City Planning, School of Design ('16)

Continuing Certificate Students

- Aubrey Jahelka
Master of City Planning, School of Design ('17)
- Tiffany Wang
Master of Business Administration, The Wharton School ('16)

STUDENT SPOTLIGHT

GRADUATING WITH ENERGY

MIRIAM POSNER

Miriam Posner, a recent graduate from our certificate program, worked with the Kleinman Center during her time at Penn.

Having previously worked for four years at the Department of Energy, she arrived in Philadelphia with a keen desire to broaden her skill set. She knew she wanted a more interdisciplinary education.

As part of her education, Posner applied for the Certificate in Energy Management and Policy. In May of 2016, she was one of the center's first certificate graduates.

"Because of the Kleinman Center, I am more versatile and capable," Posner states.

With certificate in hand, Posner said she now hopes to work in the private sector between energy companies and government. That hope recently came to fruition when she landed a job at A Better City in Boston, where she is now the Director of Energy and Environmental Policy.

In addition to her certificate coursework, Posner's other pursuits certainly helped land the job. She was involved in with the Fels Student Association, received both the Fels Leadership and Institutional Service Award, as well as a summer grant from Wharton Public Policy Initiative. She also worked as a Kleinman Center Graduate Assistant, which included assisting with the center's new Topics in Energy Policy course.

This past spring, she graduated from Penn with a degree in public administration and that strong interdisciplinary energy education she wanted—an education that she believes will greatly inform her energy career.



Miriam Posner, Master of Public Administration, School of Arts and Sciences ('16)



POLICY PROJECTS

Bridging the Gap

Our policy projects convene stakeholders with diverse views to explore issues, seek answers, and find common ground.



WE EXPLORE CRITICAL ISSUES, ADDRESS CHALLENGES THAT HAVE REGIONAL, NATIONAL, AND GLOBAL IMPLICATIONS.

PHILADELPHIA ENERGY HUB

For over a year the Philadelphia region struggled with prospects, uncertainties, and fears surrounding the Marcellus/Utica shale gas resource. Is natural gas a key to the Philadelphia region's prosperous future or a trap that would lock it into a fossil fuel future?

"The conversation had been a series of 'dueling monologues,'" said Dr. Mark Alan Hughes, founding faculty director of the Kleinman Center. "From press releases, to protests and rallies, to opposing quotes in newspapers...there was no place for stakeholders to talk to each other."

In collaboration with Drexel's Institute for Energy and the Environment, this year the Kleinman Center organized a series of private meetings for twenty high-level stakeholders to explore the future of energy in the city of Philadelphia. Participants were selected for their standing, open-mindedness, and willingness to invest substantial time—each agreed to attend four, four-hour sessions. The confidential meetings were designed to generate candor, allowing individuals with diverse opinions to share their views without public backlash. The goal was to develop a list of shared principles and a short vision statement.

"The Center is doing the hard work of convening and mediating conversations among diverse stakeholders around the contentious idea of a Philadelphia energy hub," said Michael DiBerardinis, managing director of the city of Philadelphia. "The mayor is eager for a successful outcome that will advance the public interest."

While the meetings failed to generate a consensus vision for Philadelphia's energy future, they did build understanding among key decision makers. In addition, conversations brought into focus the critical need for a much better understanding of the tradeoffs among competing visions of the region's future. The center is moving forward with a new project to address this critical issue. Continue reading to learn more about the Optimal Pathways project.

OPTIMAL PATHWAYS

Since the IPCC AR4 in 2007, many governments have adopted a policy goal of an 80% reduction in greenhouse gas emissions by the year 2050. But what guidance does this global goal provide to a region trying to optimize its energy future through smart investments and planning? An all-of-the-above approach makes sense at the national scale, but cities and regions face binding constraints on money, expertise, and attention span. Local choices really matter.

The Optimal Pathways for Regional Energy Transition project responds to this challenge. In 2016, the Kleinman Center issued a call for proposals to develop a regional framework for evaluating competing approaches to energy transition that maximize local net benefits rather than mimic global emissions reduction goals. A multi-disciplinary team of ten Penn researchers from Design, Wharton, and Engineering are now collaborating on this research question.

RESEARCH TEAM

William W. Brahman (Principal Investigator) FAIA is a Professor of Architecture at the University of Pennsylvania, where he previously served as chair, and is currently Director of the Master of Environmental Building Design and Director of the T.C. Chan Center for Building Simulation and Energy Studies.

Eugénie Birch The Lawrence C. Nussdorf Chair of Urban Research and Education. She teaches courses in planning history, global urbanization, and serves as chair of the graduate group in City and Regional Planning, co-director of the Penn Institute for Urban Research, co-editor of "The City in the 21st Century Series" (University of Pennsylvania Press) and co-editor of SSRN's *Urban Research eJournal*. She is also currently the chair of UN-HABITAT'S World Urban Campaign (WUC), and president of the General Assembly of Partners (the civil society platform to facilitate contributions to Habitat III).

Erick Guerra Assistant Professor and Assistant Chair in the Department of City and Regional Planning. His research interests focus on transportation and land use, including travel behavior, investments, informal transportation, and developing-world cities. His most recent work, "The Geography of Car Ownership in Mexico City: A Joint Model of Households' Residential Location and Car Ownership Decisions" was published in the *Journal of Transport Geography*.

Megan Ryerson Assistant Professor in the Department of City and Regional Planning. Her research focuses on the design and management of resilient and sustainable transportation systems, particularly the air transportation system. Her recent work focuses on airport infrastructure planning, network geography evolution, and the growth of China's aviation systems.

Barry Silverman Professor of Systems Engineering at the University of Pennsylvania. His research has received over \$40 million in grants, leading to the creation of state-of-the-art software tools and environments and the development of socio-cognitive agent models that help humans improve their learning, performance, and systems thinking in simulated worlds. He is the author of over 160 articles and is a fellow of IEEE and AAAS and recipient of several research and teaching excellence awards.

Susan M. Wachter Albert Sussman Professor of Real Estate and Professor of Finance, The Wharton School; Professor of City and Regional Planning, School of Design; and co-director, Penn Institute for Urban Research. She was recently co-editor of *Shared Prosperity in America's Communities* (2016), which examines place-based disparity of opportunity. She is currently researching the potential impact of key drivers of homeownership rates on homeownership outcomes by 2050.

SUPPORT TEAM

Alon Abramson
Project Manager for Energy Initiatives at Penn IUR

Nasrin Khansari
Post-Doctoral Researcher in the Department of Electrical and Systems Engineering

Amanda Lloyd
Project Manager at Penn IUR

Alex Waegel
Post Doctoral Researcher at the T.C. Chan Center



EVENTS

Meaningful Discourse

At the Kleinman Center, we value engagement. This year, through our public lectures, panel discussions, and faculty seminars we gathered professionals and practitioners in our new Energy Forum to discuss timely issues.



PUBLIC EVENTS

APRIL 5, 2016
**BATTERIES, FUEL CELLS, OR FUEL ECONOMY:
WHERE WILL GASOLINE-SAVING POLICY LEAD?**

SPEAKERS
Dr. William Chernicoff, Manager of Energy & Environmental Research, Toyota
Dr. Mark Jacobsen, Associate Professor of Economics, University of California, San Diego
Andrew Stober, Vice President of Planning and Economic Development, University City District
Dr. Arthur van Benthem, Assistant Professor of Business Economics and Public Policy, Wharton

APRIL 4, 2016
**THE ENERGY OF GERMANY: REFLECTIONS ON THE
NUCLEAR EXIT AND THE BOOM OF RENEWABLE ENERGY**
Co-sponsored by Penn Department of Germanic Languages and Literatures

SPEAKER
Dr. Frank Uekotter, University of Birmingham, UK

MARCH 17, 2016
**BLUE SKIES OVER BEIJING: ECONOMIC GROWTH
AND THE ENVIRONMENT IN CHINA**

SPEAKER
Dr. Matthew Kahn, Professor of Economics and Spatial Sciences, University of Southern California

MARCH 3, 2016
THE CHANGING LANDSCAPE FOR GLOBAL OIL COMPANIES
Co-sponsored by Wharton Business Economics and Public Policy Department and Penn Wharton Public Policy Initiative

SPEAKER
Marvin Odum, President of Shell Oil Company

FEBRUARY 19, 2016
**URBAN TRANSPORTATION AND ENERGY CONSUMPTION:
WHAT IS THE ROLE OF URBAN PLANNING**

Co-sponsored by Wharton Real Estate Department and Penn IUR
SPEAKERS
Dr. Bob Cervero, Professor and Chair of Urban and City Planning, University of California, Berkeley
Dr. Eugénie L. Birch (Moderator), Professor of Urban Research and Education, Penn Design, University of Pennsylvania
Dr. Matt Turner, Professor of Economics, Brown University
Dr. Gilles Duranton, Chair of Real Estate Department, Wharton, University of Pennsylvania
Dr. Erick Guerra, Assistant Professor of Urban Planning, Penn Design, University of Pennsylvania

FEBRUARY 18, 2016
**CLIMATE AND ENERGY POLICY AFTER PARIS:
A PUBLIC LECTURE**
Co-sponsored by Perry World House

SPEAKER
Dr. David Victor, Professor of International Relations, University of California, San Diego

FEBRUARY 1, 2016
**ECONOMIC, POLITICAL AND SOCIAL CONSIDERATIONS
FOR UNIVERSAL CARBON PRICING**

SPEAKERS
Dr. Christian Gollier, Professor of Economics, University of Toulouse
Dr. Howard C. Kunreuther, Professor of Decision Sciences, Business and Public Policy, Wharton

NOVEMBER 17, 2015
**GLOBAL CLIMATE CHANGE: COP21—
LESSONS FROM COPENHAGEN**
Co-sponsored by International Programs, Penn Program on Regulation

SPEAKERS
Senator Penny Wong, Leader of the Opposition, Australian Senate
Prof. Cary Coglianese, Edward B. Shils Professor of Law and Professor of Political Science, School of Law, University of Pennsylvania



PUBLIC EVENTS

NOVEMBER 17, 2015
URGENT ACTION: GLOBAL PERSPECTIVES ON THE
DUTCH CLIMATE CHANGE LITIGATION

SPEAKERS

Dr. Lucas Bergkamp, Partner, Hunton & Williams (Brussels)

Roger Cox, Partner, Paulussen Advocaten

Dr. Veerle Haevart, Associate Professor,
London School of Economics

MODERATOR

Prof. Cary Coglianese, Edward B. Shils Professor
of Law and Professor of Political Science, School of Law,
University of Pennsylvania

OCTOBER 12, 2015
OPENING OF THE KLEINMAN CENTER FOR ENERGY POLICY

SPEAKERS

Dr. Eduardo Glandt, Dean Emeritus and Professor of Chemical
and Biomolecular Engineering, School of Engineering and
Applied Sciences (SEAS), University of Pennsylvania

Governor Edward G. Rendell, Professor of Government
and Politics, School of Arts and Sciences, University
of Pennsylvania

Dr. Daniel Yergin, Vice Chairman, IHS

OCTOBER 7, 2015
THE LOCAL ECONOMIC EFFECTS OF FRACKING

SPEAKER

Dr. Christopher Knittel, Co-Director of the Center for Energy
and Environmental Policy Research (CEEPR), William Barton
Rogers Professor of Energy Economics, Sloan School of
Management, Massachusetts Institute of Technology

SEPTEMBER 15, 2015
POWER SYSTEM TRANSFORMATION IN AN ERA
OF INCREASING DISTRIBUTED GENERATION

Co-sponsored by Department of Mechanical Engineering
and Applied Mechanics

SPEAKER

Ronald Schoff, Senior Program Manager for Technology
Innovation at the Electric Power Research Institute (EPRI)

EVENT SPOTLIGHT

ENERGY ROUNDTABLES

Last fall, Raab Associates and the Kleinman Center for Energy Policy partnered to develop a new series of roundtables for energy leaders in the Mid-Atlantic region and PJM states.

The roundtables, which convene quarterly in our Energy Forum, explore contemporary electricity and natural gas policy issues at the wholesale and retail levels.

With thought leaders and stakeholders from academia, industry, regulatory agencies, NGOs, and tech and finance disciplines, the roundtables provide a forum for education and discourse on energy policy issues. Raab Associates, Ltd., which has successfully run the New England Electric Restructuring Roundtable for two decades, manages and moderates these events.

Raab Associates is currently engaged in discussions with organizations interested in potentially becoming founding sponsors of this new forum. More than a dozen current sponsors of the New England Electric Restructuring Roundtable—whose organizations are active within the PJM footprint—have already committed to sponsoring this new forum.

The showcase event, held last October, centered on gas and electric integration and featured a welcome from former School of Design Dean Marilyn Jordan Taylor, as well as keynote addresses from Commissioner Cheryl LaFleur (FERC), CEO Andy Ott (PJM), and President Richard Levitan (Levitan & Associates). Since the showcase, the Kleinman Center and Raab Associates, Ltd. have hosted two additional successful roundtables:

JUNE 27, 2016

Can Competitive Markets Deliver in a Low Commodity Price World (and what's the appropriate role for state regulation)?

MARCH 30, 2016

Variable Energy Resources in the PJM Footprint And Demand Response in the Wake of the Supreme Court Decision

LOOKING FORWARD:

A THIRD ROUNDTABLE, "FUTURE OF NUCLEAR POWER IN THE PJM FOOTPRINT AND VALUE OF DISTRIBUTED ENERGY RESOURCES" IS PLANNED FOR SEPTEMBER, 2016.





PUBLICITY

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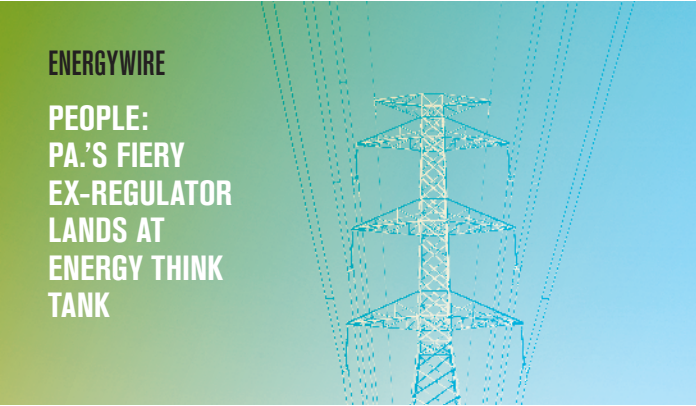
Word on the Street

Through our website, social media,
newsletters, and media outlets—
we're getting the word out.



IN THE NEWS

This year, we increased our media exposure on Penn campus and beyond—and were referenced in more than twenty articles. Here are a few highlights:



JUNE 22, 2016
By Mike Lee and Elizabeth Harball

A month after stepping down as Pennsylvania's top environmental regulator, John Quigley is heading to a new position where he hopes to again have an influence on state and national energy policy.



MARCH 17, 2016
By Mark Alan Hughes

Just because we can do something doesn't necessarily mean we should. Yet this homely admonition seems forgotten in the otherwise admirable efforts of cities and regions around the globe to create more sustainable energy policies. *Photo by B. Krist for GPTMC*



JUNE 2016
By Mark Alan Hughes

Penn professor and Kleinman Center Founding Faculty Director explains why, instead of focusing on "80 by 50" goals, cities should identify the energy, land use, and transportation options that maximize long-term employment, public health, and resilience net benefits for their local constituencies. *Photo by Clara Hughes*



JUNE 2016
By Niharika Gupta

The summer before her junior year at the University of Pennsylvania, Tabeen Hossain decided to take her academic journey in environmental science and policy abroad to Berlin and Rotterdam. In those two cities, she discovered the cultural aspects of sustainability, environmentalism, and policymaking.



SEPTEMBER 22, 2015
By Oil & Gas Investor Staff Writer

Daniel Yergin, vice chairman of IHS, is the recipient of the inaugural Carnot Prize by the University of Pennsylvania's Kleinman Center for Energy Policy. The Carnot Prize recognizes distinguished contributions to energy policy through scholarship and practice.



NOVEMBER 23, 2015
By Sydney Adams

In the Kleinman Energy Forum, Senator Penny Wong, Leader of the Opposition in the Australian Senate and former Australian Minister for Climate Change and Water, discussed her expectations for Paris COP 21.

We built awareness of the center and its activities with an ad campaign in the campus newspaper and our own monthly newsletters—which we continue to send to a growing list of subscribers.

AD CAMPAIGNS



Newspaper Ads. Throughout the academic year, we ran a series of advertisements in *The Daily Pennsylvanian* (the University of Pennsylvania newspaper). These ads appeared in print and online and targeted students and faculty. Our goals were threefold: **1)** to increase awareness of the center, **2)** to provide information on its programs, and **3)** to increase attendance at our events.

NEWSLETTERS



Center Updates. This year, we hit a consistent pace with a newsletter that now goes out monthly and continues to feature faculty research, student opportunities, event information, and links to center publications.

Policy Insights. In June, we launched a second newsletter aimed at professionals. This policy-focused newsletter is sent monthly and features blog posts, digests, and reports—and relevant news and events.

CONTACT US

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Cornelia Colijn
Deputy Director

Mark Alan Hughes, PhD
Founding Faculty Director

Angela Pachon
Research Director

Christina Simeone
Director of Policy and External Affairs

Mollie Simon
Administrative Assistant

RESEARCH ASSISTANTS:

Stevie Flanery
*Corporate Risk Management and Sustainability,
School of Law*

Adija Manley
City and Regional Planning, School of Design

Miriam Posner
*Masters of Public Administration, Fels Institute
of Government, School of Arts and Sciences*

Oscar Serpell
*Environmental Studies, School of Arts
and Sciences*

Alexandra Sanyal
*Growth and Structure of Cities,
Bryn Mawr College*

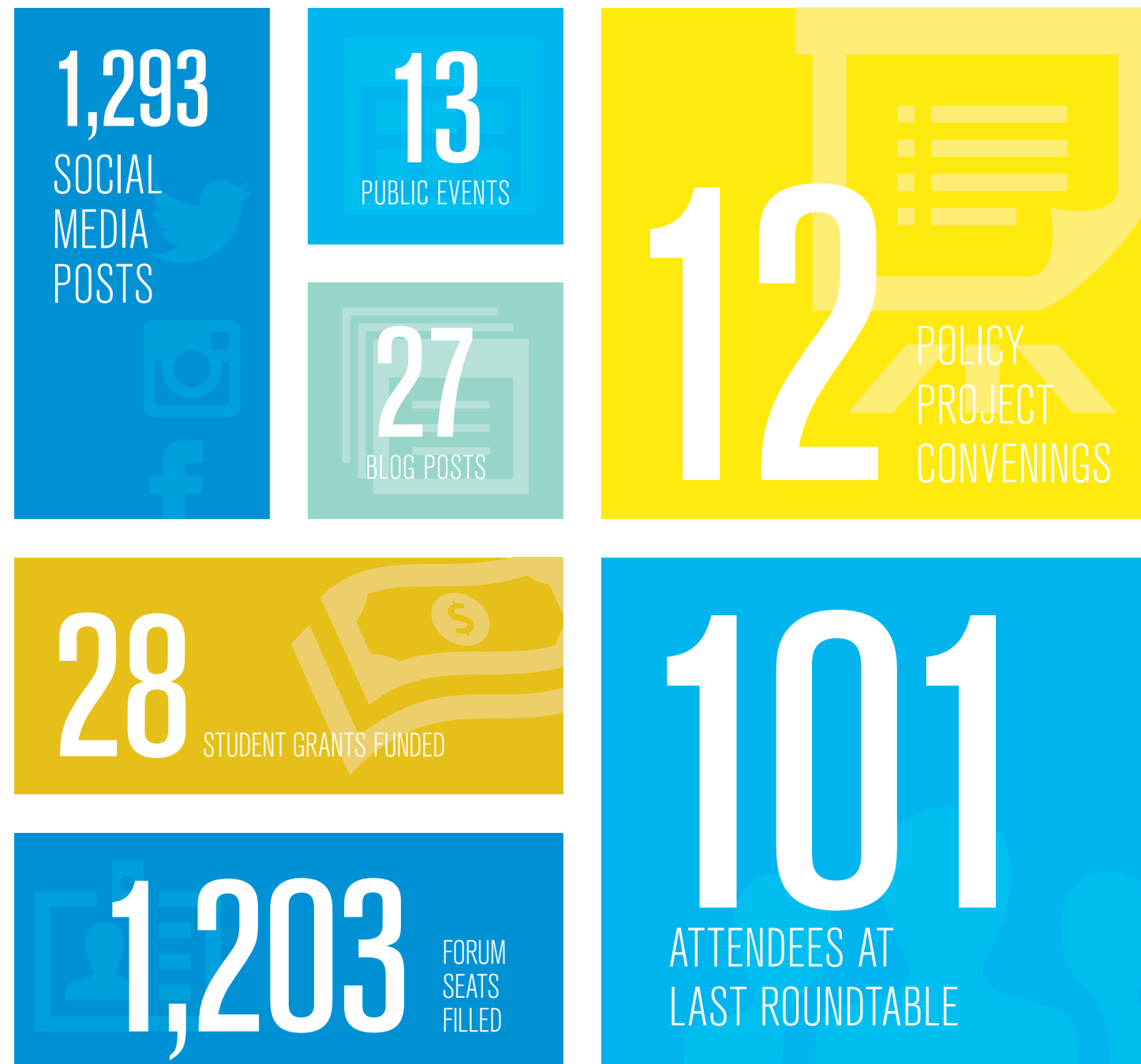
Dillon Weber
*Chemical and Biomolecular Engineering,
School of Engineering and Applied Sciences*

“As a nation, we need a clearly articulated energy policy that promotes economic growth, energy optimization, and technological development, all in a context of a sensible environmental backdrop.”

—SCOTT KLEINMAN
C’94, W’94



KLEINMAN CENTER BY THE NUMBERS





“Thanks to the generosity and vision of Scott Kleinman and his wife, Wendy, this beautifully refurbished space will be a catalyst for effective energy policy and creative solutions to some of our greatest energy challenges.”

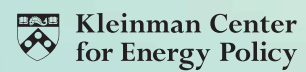
—AMY GUTMANN
PRESIDENT OF THE UNIVERSITY OF PENNSYLVANIA

2015–2016 FINANCIAL OVERVIEW



Building on last year's experience, the Kleinman Center improved fiscal operations with a refined budget structure and streamlined financial processes.

We continued to support diverse faculty research endeavors, expanded professional and academic opportunities for students, enhanced engagement with energy policy professionals, and broadened the reach and impact of our written work. Most significantly, we bestowed the first annual Carnot Prize, successfully launched a visiting scholar program, and awarded our largest faculty grant to date.



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