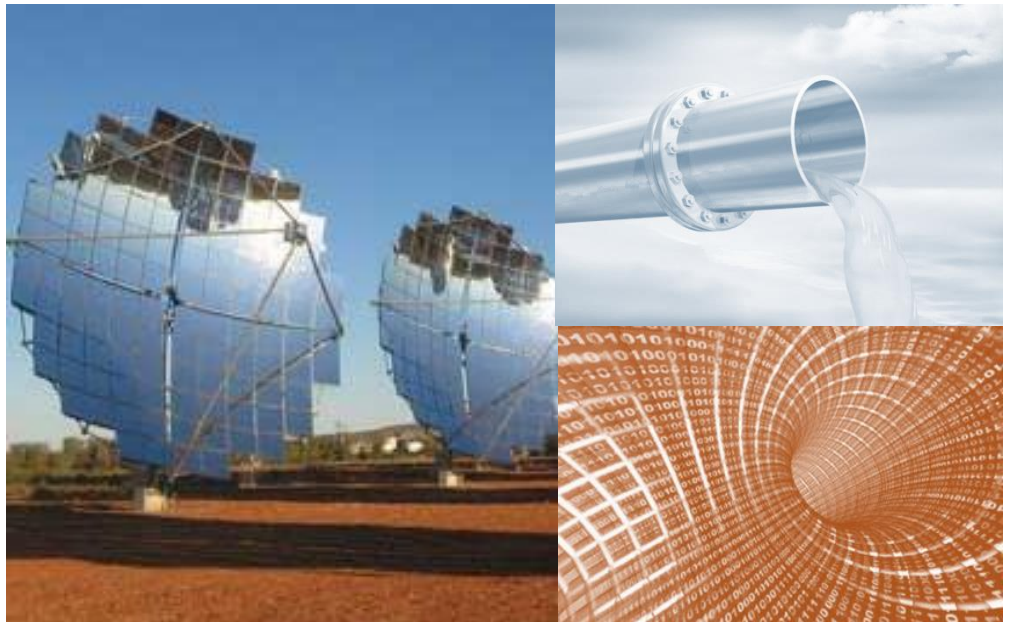


2018 Annual Report to the PURC Executive Committee



2018

Update on PURC Research and Outreach

This update on PURC research and outreach is intended to serve as an overview for PURC Executive Committee Members. Below are highlights of an active year. At the end of this summary is a list of recent research papers that are also available through the research papers search engine on the PURC website at www.purc.ufl.edu.

2018 Annual Report to the PURC Executive Committee

UPDATE ON PURC RESEARCH AND OUTREACH

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2018 Annual Report to the PURC Executive Committee

UPDATE ON PURC RESEARCH AND OUTREACH

STATISTICS AND HIGHLIGHTS

Statistics

- 33 blog posts
- 17 working papers and journal articles
- 7 video blogs
- 3 opinion editorials
- 2 Comments filed with federal regulatory agencies
- 1 US Senate testimony
- 1 book

46th Annual PURC Conference (2019)

The 46th Annual PURC Conference, *“Digitalization, Disruption, Dogma: The Amazon-Uber-fication of Utilities?”* will examine disruptive technology, changing business models, adaptive leadership challenges, and how policy is or isn’t keeping up.

45th Annual PURC Conference (2018)

More than 80 key leaders in industry and government attended the 45th Annual PURC Conference, *“Securing the Future of Florida’s Utility Infrastructure,”* held February 21 – 22, 2018. It examined the American Society of Civil Engineers infrastructure report card, emerging inter-dependencies for telecoms, power, and water, and cyber security challenges faced by industry and government.

Report: Valuing Municipal Utilities – The Case of the Potential Sale of JEA in Jacksonville

PURC examined valuation and other issues related to the potential sale of JEA. The study gave decision makers alternative views of valuation, value estimates under the different scenarios, and descriptions of issues that would arise with a sale.

Courses on Executive Leadership, Electricity Pricing, and Regulatory Principles

PURC provided courses in multiple countries. Topics included developing key strategies for regulatory leaders, regulatory challenges faced by multi-sector regulators, and how a regulatory board can best prepare itself for effectiveness.

Online Course: Regulatory Impact Analysis

PURC continues to offer its Comprehensive Regulatory Impact Analysis Online Course. In spring 2018, 12 professionals participated in the course in an effort to learn how to avoid the pitfalls that stifle utility regulatory decisions and gain support for difficult issues.

Research Initiatives on Distributed Energy Resources, Incentive Regulation, and Competition

PURC faculty and affiliates are engaged in research on behavioral changes of solar customers, demand charges, price cap regulation in energy, technology innovation, demand response, deregulation, anticompetitive conduct, and mergers.

PURC/World Bank International Training Program on Utility Regulation and Strategy

One hundred forty-two people attended this two-week program in 2018. Since its inception in 1997, this program has educated more than 3500 professionals representing 156 nations.

PURC Advanced International Practices Program

Twenty-one infrastructure professionals from around the world participated in this year's courses on energy pricing, benchmarking, and public-private partnerships.

PRIMARY RESEARCH PROJECTS

ENERGY

Valuing Municipal Utilities – The Case of the Potential Sale of JEA in Jacksonville

PURC examined valuation and other issues related to the potential sale of JEA. According to the assessment, the utility's current value is \$7.5 billion, which is not inconsistent with earlier valuations promulgated by JEA. The report addresses considerations when evaluating a possible sale of the JEA, including history, effects on the city's welfare, possible advantages and disadvantages of being a municipal utility, regulatory treatment of investor-owned utilities vs. municipal utilities, and factors, such as timing, that could significantly impact the potential seller and buyer.

Designing Compensation for Distributed Solar Generation: Is Net Metering Ever Optimal?

Electricity customers who install solar panels often are paid the prevailing retail price for the electricity they generate. This paper demonstrates that this rate of compensation typically is not optimal. A payment for distributed generation that is below the retail price of electricity often will induce the efficient level of distributed generation when the fixed costs of centralized electricity production and the network management costs of accommodating intermittent solar are large, and when centralized generation and distributed generation produce similar (pollution) externalities. The payment for distributed generation can optimally exceed the retail price under alternative conditions. The optimal compensation policy varies considerably as industry conditions change.

Solar Impacts: Does Distributed Production Affect Consumption Choices?

As the role of distributed generation grows in the electricity industry, this growth is accompanied by questions regarding its impact on the rest of the system, chiefly the impact on finances, environmental footprint and reliability. Unfortunately, analyses of these impacts assume, a priori, that generation from distributed resources displaces generation from "somewhere else", usually centralized resources and a 1:1 basis. We examine the behavior of customers who install solar arrays on their homes and find that these customers increase consumption by 8-14%. That is, every 100 kWh generated by residential distributed solar displaces only 86-92 kWh from other sources. This result has profound impacts on the financial compensation of these resources, their role in reducing emissions, and their impact on system reliability.

Self-Sabotage in the Procurement of Distributed Energy Resources

This paper examined conditions under which a regulated monopoly supplier can benefit from intentionally raising its own costs. Such self-sabotage is beneficial when it induces the regulator to implement a more accommodating procurement policy. The paper also demonstrates how the implementation of standard policies (e.g., cost reimbursement or a simple cost-sharing plan) can reduce procurement costs by deterring self-sabotage.

The Effect of Renewable Portfolio Standards on State-Level Employment: An Ex Post Analysis

Renewable Portfolio Standards (RPS) programs which propose target levels of energy production or consumption that must come from renewable sources, have become a popular policy in state capitals across the United States. As of 2010, 29 states and the District of Columbia had adopted programs which fall under the RPS umbrella. RPS are often times seen as a tool to foster economic development through job growth. This paper analyzes the effects of RPSs on state level employment in the whole economy. The paper finds RPS adoption does not lead to a statistically significant effect on overall employment.

The Economic and Political Realities of Regulation: Lessons for the Future

As competition emerges for electricity utilities, it is important to keep in mind lessons from the past. One lesson is that actual data, rather than conjecture, is needed for anchoring decisions in reality. Another lesson is that economic incentives are powerful. For example, electric utilities in the UK revealed that they were able to make significant improvements in efficiency once they were allowed to profit from the improvements. Finally successful transitions require that regulators carefully pace the changes so that the system does not derail. Because so many stakeholders have to give up something during times of change, the work of regulation is often about disappointing people at a rate that they can endure.

Five Things Regulators Should Know About Blockchain (and Three Myths to Forget)

With all the excitement about blockchain, it is important that utility regulators separate truth from myth. What should they know? The basic benefits of blockchain technology, its potential regulatory applications, the roles of smart contracts, and the implications for artificial intelligence. What are the myths? That blockchain removes the need for trust, that it uses too much electricity, and that smart contracts are actually smart and contracts.

Employing Simple Cost-Sharing Policies to Motivate the Efficient Implementation of Distributed Energy Resources

This paper considers the optimal design of simple cost-sharing policies to motivate electricity distribution utilities to manage the costs of distributed energy resource projects. The optimal share of realized cost savings that is awarded to the utility takes a particularly simple form in certain settings. More generally, the savings can vary with the prevailing environment in subtle and sometimes counterintuitive ways. For instance, the savings may increase as cost savings become less onerous for the utility to secure and as the utility becomes more averse to risk. Gains from affording the utility a choice among cost-sharing policies typically are minimal.

Energy Blogs

Dr. Kury blogs on energy issues for The Conversation. He addresses issues of storm hardening, taxes, and grid security. In 2018, his posts were read 101, 897 times. His blogs are available at <https://theconversation.com/profiles/theodore-j-kury-406888/articles>.

TELECOM

Regulating Regulators in Transitionally Competitive Markets

Over the past 30 years of transformations in telecommunications, the US has gained considerable insights about how to design regulatory policy in the presence of developing competition. The insight to date has focused on how to harness competitive forces to motivate incumbent suppliers to serve the best interests of consumers. This paper stresses the importance of considering the incentives of regulators and explores the associated changes in standard recommendations for regulatory policy design in the presence of developing competition.

Economic Scholars' Summary of Economic Literature Regarding Title II Regulation of the Internet

Much has been claimed about the economics of the FCC's 2014 decision to classify internet service as a Title II common carrier service, but little of what is said seems to relate to actual economic research. A group of scholars, led by PURC, summarized the economic research and provided this summary to the FCC in its Restoring Internet Freedom proceeding. In general the research shows that some of the activities prohibited by the FCC's decisions can actually be beneficial to customers, but not always.

Three Things Economists Wish the FCC Knew about Broadband Markets

Three well-known lessons from economics are largely missing from recent FCC decisions. One is that technology competition drives the deployment of high-speed broadband more than any other incentive. The second lesson is that a high market share is generally not a market failure, but an indicator that the company is satisfying customers more than are its competitors. Lastly subsidies created to improve universal service rarely do so.

Beyond Net Neutrality: Policies for Leadership in the Information, Computing, and Network Industries

This paper analyzes the FCC's struggles in developing coherent policies for net neutrality and concludes that the current regulations are counterproductive. It explains a multistakeholder approach that can be used to resolve intra-industry conflicts, which largely drive net neutrality issues, without imposing explicit regulatory constraints on a rapidly evolving technology ecosystem.

Identifying Market Power in Times of Constant Change

This paper explains that traditional approaches to defining markets to investigate market power fail in times of constant change because demand and supply are in constant flux. The analyses rely upon historical data, the value of which degrades over time, possibly resulting in harmful regulatory decisions. This points to a need for a different approach to determining when regulation is an appropriate response to market power. The paper presents an approach that relies upon essential factors leading to monopoly (EFMs), such as control of essential facilities, which persist across generations of products. Market power analyses should be a search for EFMs and policy responses should focus on diffusing the market power without destroying value.

Revealing Transactions Data to Third Parties: Implications of Privacy Regimes for Welfare in Online Markets

This paper examines the effects of privacy policies regarding transactions (e.g., price/quantity) data on online shopping platforms. Disclosure of transactions data induces consumer behavior that affects merchant pricing decisions and the welfare of platform participants. A profit-maximizing platform prefers the disclosure policy that maximizes social benefit. Although this policy benefits sophisticated consumers, it harms those who do not understand the implications of their behavior. Consequently, the welfare effects of alternative privacy policies, data breaches, willful violations of stated privacy policies, and opt-in/opt-out requirements differ sharply, depending on the level of consumer sophistication and on other factors such as the prevailing status quo.

Net Neutrality Policies and Regulation in the United States

This paper examines the history of net neutrality in the United States, beginning with Federal Communications Commission decisions the 1960s and 1970s that laid the groundwork for neutrality policies. The paper also summarizes the economics literature on net neutrality to assess the implications of alternative regulatory approaches.

Technology Blogs

Dr. Jamison blogs on technology issues for the American Enterprise Institute. He addresses issues of net neutrality, universal service, privacy, innovation, competition, and regulatory institutions. His blogs are available on the PURC website at <http://warrington.ufl.edu/centers/purc/research/directorsTake.asp> or at the American Enterprise Institute website at <http://www.aei.org/scholar/mark-jamison-2/>.

WATER

Data Transparency as a Key Tool for Regulating Government-Owned Water Utilities

Data collection and information incentives are key for regulating the water sector where government ownership and operation is often the case. The problems are compounded for fragile, conflict-affected, and low income states. Issues, potential actions, and supporting examples that arise when monitoring and evaluating infrastructure utility performance are offered by this paper.

Technical Inefficiency Effects in a Stochastic Production Function for Managerial Incentives in Public Water Utilities

Performance of state-owned water utilities in developing countries is often weak. This study estimates the impact of managerial incentives upon efficiency using a stochastic frontier production function with revenue water as the output. The empirical analysis utilizes an unbalanced paneled data consisting of revenue water, connections, operating expenditure, water delivered and staff, from Uganda's nineteen NWSC sub-utilities for a nine-year

period, 2002-2010. The inefficiency effects are modelled as a function of utility-specific variables: service coverage, level of financial incentives, target difficulty, and year of observation. While financial incentives and increased service coverage improve efficiency, targets (such as the reduction of non-revenue water) that are perceived as excessive by employees may reduce it. The findings suggest some policy implications: utility managers in the public water sector need to incorporate monetary incentives and increase service coverage to reduce non-revenue water. However, targets need to be set with great care and with transparency.

MULTISECTOR

Blockchain

Dr. Jamison has written several blogs on applying blockchain for regulatory issues. He has also launched a Florida Blockchain group that provides educational services, helps people form businesses using the technology, and advises businesses and governments on the application of blockchain.

Stakeholders and Power Relations in Regulation

Stakeholders play at least two roles in utility regulation: Some receive benefits, such as customers protected from monopoly power. Stakeholders also influence regulation by, for instance, commenting in proceedings. Most studies on stakeholder relations focus on engagement, such as through advisory groups and public hearings. Largely missing are analyses of power relationships. Some stakeholders, such as lawmakers, have formal authority over regulatory bodies. Others have little formal authority. Stakeholders also vary in how and the degrees to which regulators affect them. This paper examines these relationships and illustrates them with a survey of regulatory agencies in the Caribbean.

OUTREACH

Puerto Rico Blue Ribbon Task Force

PURC has provided assistance to the Blue Ribbon Task Force regarding regulatory reform of energy in Puerto Rico. PURC faculty attended meetings in Puerto Rico and provided advice on reports and meeting agendas.

Plans for the 46th Annual PURC Conference - Digitalization, Disruption, Dogma: The Amazon-Uber-fication of Utilities?

Every few years we hear another prediction about the eminent death of utility businesses. Someday this prediction will be right – nothing lasts forever – but is this that day? Will the new disrupters send power utilities, water utilities, or traditional broadband providers packing?

Some utilities are getting in front of today's changes. Some regulators and policy makers want to choose the path forward. But what is that right way? Will it be Amazonification, where squeezing margins and creating high customer expectations dominate the future? Or will it be Uberfication, where anyone can be a utility, or not, whenever the urge strikes them? How can companies, regulators and policy makers stay adaptable and thrive with whatever directions the disruptions take us?

Conference details are available online at <http://www.purc.ufl.edu>.

How Can Regulators and Policy Makers Best Enable Blockchain to Benefit Customers?

By letting go of industry decision making. That was the message that PURC director Mark Jamison delivered to the Power Blockchain conference. Dr. Jamison explained that decisions about blockchain's role in the power sector should be made by those who bear the risks of bad decisions and rewards of good ones. This means letting go of many of the traditional regulatory mechanisms that have evaluated and directed utility business decisions. He explained that too often regulators make decisions that favor one type of industry player over others during times of transition, and that customers suffer as a result. The meeting was held in Orlando, Florida, in November 2018.

Practicing Leadership in Utility Data Analytics

Data analytics is sometimes hard to implement in traditional industries. PURC director of leadership studies Araceli Castaneda led two workshops for the Utility Analytics Institute in 2018 on how to make the work more effective. One session examined how to identify and change behaviors that inhibit effective use of data analytics. The second explained how to develop strategies for cultural change by engaging allies, softening opposition, nurturing disruptors, and changing personal behaviors.

How Can Regulators and Policy Makers Navigate When So Many Disruptive Technologies Are Making the Future Uncertain?

By letting go of the deregulatory process and hanging onto first principles. That was the message that PURC director Mark Jamison delivered to the Energy Bar Association at its annual meeting. Dr. Jamison borrowed from the work of Professor Alfred Kahn, who emphasized during the telecommunications' industry's transition to competition that market regulation and market competition do not work well together. Either customers will be in charge of future industry directions, or regulators will, not both. Dr. Jamison suggested focusing on the core purposes of regulation - protecting the customers who have no options and protecting the industry from political interference - and letting go of everything else so that the industry can evolve according to its underlying economics. He explained that too often regulators make decisions that favor one type of industry player over others during times of transition, and that customers suffer as a result. The meeting was held in Washington, D.C., in October 2018.

What Truly Holds Individuals and Organizations Back from Implementing Necessary Change?

This is the topic of study and work that Ms. Araceli Castaneda, PURC director of leadership studies conducted October 18th, 2018 with the Advanced Leadership for Academics and Professionals as part of their Leadership Development Program at the University of Florida. During the Immunity to Change session, Ms. Castaneda guided the group through an exercise to help them surface the values that keep the status quo in place, acknowledge the individual contributions to the very problem they are trying to solve, and understand what it takes to achieve meaning and lasting change.

What Do Regulators Need to Know About Blockchain?

That was one of the questions PURC director Mark Jamison addressed at the 2018 annual conference of the Organisation of Caribbean Utility Regulators (OOCUR). Dr. Jamison told the story of how blockchain developed and how it works. He also talked about applications - such as managing licensing and permitting processes - how smart contracts work, how it opens opportunities for artificial intelligence, and how it can reshape the utility business and regulation. He explained that blockchain can be a game changer, but its impacts are uncertain: On the one hand, it creates opportunities for new startups in the energy sector. But on the other hand, it creates opportunities for incumbents to grow their relationships with customers. A key for regulators is to be open to either development. The conference was held in October 2018 in Belize City.

How Can Regulators Create Regulatory Impact Assessments That Have Impact?

That was one of the questions PURC director Mark Jamison addressed at the 2018 OOCUR annual conference. Dr. Jamison explained that one key is to conduct an objective analysis, giving all sides of an issue fair, fact-based analyses. This makes it important to deemphasize thinking in terms of pros and cons, and thinking instead in terms of alternative actions and the consequences of the actions, leaving stakeholders to use their own preferences to evaluate the consequences. This approach places a heavy emphasis on carefully defining the problem in objective terms. It also means that analyses need to be complete and clear, and that stakeholder voices need to be heard. Dr. Jamison used as a case study work by PURC's director of energy studies, Ted Kury, who had conducted a controversial study for the Governor of Florida several years ago. The study's findings were not what the Governor wanted to hear, but the study was accepted and respected because the work had

been transparent and emphasized evidence into which all stakeholders had given input. The conference was held in October 2018 in Belize City.

What Does a Regulator Need to Know to Practice Leadership in the Complicated Environment of Utility Regulation?

To be successful, a regulator needs to lead into the political environment (lead up), among stakeholders (lead laterally) and in the regulator's own organization (lead within). These are the topics introduced by Araceli Castaneda, PURC director of leadership studies at the 16th Annual Conference of the Organisation of Caribbean Utility Regulators held in Belize City, Belize October 10th - 12th, 2018. Ms. Castaneda's presentation was followed by a panel discussion with Mr. Ansord Hewitt, director general of the Office of Utilities Regulation of Jamaica, and Dr. Marsha Atherly-Ikechi, director of utility regulation at the Fair Trading Commission of Barbados who shared their experiences and knowledge in this complex subject.

What is the Future of Work?

That was the subject of PURC director Mark Jamison's presentation at Stand Up Republic. Dr. Jamison explained that work is always changing, and that it should. If people had expressed today's worries about innovation 125 years ago, the farm tractor might have been delayed and 43% of Americans would be farmers, as was the case in 1890. And the country would not have benefitted from all of the innovations in medicine, care for the environment, housing and the like that were made possible because people left farms and created new kinds of work. He also explained that people should not be worried about artificial intelligence replacing human decision makers. Artificial intelligence functions in sequential steps – if this, then that. Only a small portion of human mental work is sequential. Our minds' actual work is much more complex and poorly understood. Dr. Jamison spoke on October 1, 2018, in Washington, D.C.

What Do Policy Makers Need to Know About the Information Technology Industries (i.e., Tech)?

That is what PURC director Mark Jamison talked about with senior staff of the US House of Representatives. He first explained that market power in tech is illusory because the large companies have found their successes by satisfying users and customers. And even though companies appear to have unique markets -- Facebook has impressive market share in social media and Google has impressive market share in search, for example – in reality they all compete quite aggressively for the most important resource: People's time and attention. His second topic was election meddling. He explained that social media companies are indeed politically biased, but that is human nature. The question is whether they are meddling in violation of current laws. He said there is some evidence of this, but it would take a specific investigation to determine whether there is anything to worry about. Finally he discussed online privacy. He explained his concern with the European approach to privacy, which gives individuals authority over what others are allowed to remember. He indicated that the most effective government action would be to enforce existing laws related to consumer fraud so that internet users can make decisions about what is right for them. Dr. Jamison spoke with the staff on September 20, 2018, in Washington, D.C.

Revitalizing American Industries

Innovation and competition are the keys to growing the American economy, according to PURC director Mark Jamison. Speaking at RealClearPolitics event “Revitalizing American industries,” Dr. Jamison explained the country is poised for a breakout innovation, like the iPhone. He explained that about every 10 years there is such a breakthrough. These have included cellular phones, the personal computer, and the world wide web. These innovations always combine existing technologies in uniquely and unexpectedly valuable ways. He predicted that the next innovation will make use of blockchain, artificial intelligence, and 5G wireless. Dr. Jamison spoke on September 12, 2018, in Washington, D.C.

GRU Governance: Get the Facts

How should a municipal utility be regulated? PURC's Ted Kury served on this panel discussion, along with David Arreola of the Gainesville City Commission, Ed Bielarski of GRU, and Barry Jacobsen of the Utility Advisory Board on the upcoming local referendum, hosted by the League of Women Voters of Alachua County/Gainesville. GRU is a publicly owned local utility, providing electricity, natural gas, water, wastewater, and telecommunications services. Currently, it is governed by the Gainesville City Commission, guided by the Utility Advisory Board (UAB), and managed by GRU's General Manager. If the referendum measure passes, GRU will be governed and managed by an autonomous board called the Authority, whose five members would be appointed by the Gainesville City Commission. What would this Authority do? How would it accomplish its goals? These questions from the public and others were addressed by the panelists at this interactive forum.

Immunity to Change

The status quo is potent: As leaders we often see people fail to make changes that they know would improve their success. And we see ourselves fail in the same way. How can we make changes that we know we want, but never seem to make? This workshop engaged 30 participants from the University of Florida Leadership Network in an exercise to reveal the hidden stories we tell ourselves - and that people in their organization tell themselves - to create a natural but powerful immunity to change. Participants used this mechanism to understand what holds them back and identify strategies for unlocking their potential to finally move forward. By experiencing this in themselves, they learned to see the mechanism at work in their organization and how to bring it forward as well.

Reforming Troubled Utilities – an USAID Workshop

How are utilities regulated around the world? What are the principles for commercialization of electric utilities? How can we incentivize utilities to improve performance? PURC Director of Energy Studies Ted Kury discussed these questions and more with 35 field staff at USAID during the agency's workshop on Reforming Troubled Utilities in Washington, DC. Kury presented two sessions at the workshop. The first, Utilities' Organizational Structure and Commercialization Principles focused on the idea of the revenue requirement, its components, and the role of each component in delivering a sustainable electricity system. The second, Regulatory Incentives for Improving Performance, focused on the types of program utilized by regulators around the world to incentive performance, along with the advantages and disadvantages of each.

Range of the Future (ROTF) Task Force

Members of the ROTF Task Force met with the PURC faculty on May 18, 2018. The ROTF Task Force was chartered by the Air Force Space Command to develop an action plan to transform today's national space launch ranges at Cape Canaveral and Vandenberg Air Force Base. The Task Force is investigating ways to promote commercial investment in the federal ranges and encourage business to business relations and reduce the dominant role of the federal government. The Task Force is in the early stage of fact finding and engaging with our stakeholders on options for public-private partnerships, port authority management structures, private investment, and/or government-approved commercial range service providers.

Why Do Some Companies Adapt to Shock, Such as Technology Changes, While Others Do Not?

It is costly for firms to change systems and ways that people think, and sometimes these costs are too high. That is the conclusion that PURC director, Mark Jamison, presented at the International Industrial Organization Conference in April 2018. Dr. Jamison explained that people's decision making is constrained by limitations of time, attention, mental energy, and mental capacity. To function with these constraints, people develop biases, heuristics, mental frameworks, and norms. Changing these ways of thinking consumes people's energy, time and attention, which makes it costly for a firm to make changes while also competing in a changing market. Dr. Jamison's coauthors for the paper are Dr. Janice Hauge of the University of North Texas and Laura Jamison of Outmatch. The conference was held in Indianapolis, Indiana.

What Are the Challenges in Regulating Environmental Outcomes with a Tax?

This was the subject of PURC Director of Energy Studies Ted Kury's talk at the 2018 Public Interest Environmental Conference at UF's Levin College of Law. He discussed the role of regulation by price (taxation) and volume (cap and trade) in the market for carbon and explained the complications inherent in the choice of regulation method. Carbon taxation, while ensuring that everyone knows the price, may not achieve the desired volumetric reductions in emission. And cap and trade, while allowing for a defined volumetric reduction, may experience volatile pricing of allowances.

Annual PURC Award for Best Paper in Regulatory Economics

This year's award went to Matthew Grennan, University of Pennsylvania, Wharton School and Robert Town, University of Texas for their paper "Regulating Innovation with Uncertain Quality: Information, Risk, and Access in Medical Devices."

Results of the 45th Annual PURC Conference, Securing the Future of Florida's Utility Infrastructure

More than 80 key leaders in industry and government attended the 45th Annual PURC Conference, held February 21 – 22, 2018. This year's conference examined the American Society of Civil Engineers (ASCE) infrastructure report card, emerging inter-dependencies for telecoms, power, and water, and cyber security challenges faced by industry and government.

Body of Knowledge on Infrastructure Regulation (BoKIR) Web site

PURC continues to update this valuable online resource to include more recent information in its sections. Currently, the web site provides tutorials, literature surveys, self-paced tests, and more than 500 downloadable references on utility regulation, as well as a regulatory glossary translated into several different languages. As of 2018, the glossary of terms is available in 11 languages including Bulgarian and Arabic.

TRAINING AND DEVELOPMENT

43rd and 44th PURC/World Bank International Training Programs on Utility Regulation and Strategy

One hundred and forty-two infrastructure managers learned from each other and from leading experts during the January and June deliveries of this biannual, two-week program in Gainesville. The program is designed to enhance the economic, technical, and policy skills required to design and manage sustainable regulatory systems for infrastructure sectors. The participants studied ongoing infrastructure reform programs, networked with international speakers, and offered their own insights into regulatory policies.

2018 PURC Advanced International Practices Program

PURC delivered three courses under its Advanced International Practices Program: Energy Pricing, Benchmarking Infrastructure Operations, and Public-Private Partnerships (P3) Certification. In attendance were 21 participants from 10 nations. Participants of the energy course performed price reviews and analyzed financial statements for rate setting. Benchmarking participants assessed how information on trends in key performance indicators helps decision-makers. PPP participants completed the Foundation level of the Certified PPP Professional program, promoted by the World Bank and other multilateral development banks. Dr. Jamison, Dr. Berg, Dr. Kury, and Ms. Castaneda designed and delivered the courses during the 10-day program.

Practicing Leadership in a Political Environment: A One-Day Intensive Training Workshop for Emerging Leaders in Utility Policy

In January and June, Dr. Jamison and Ms. Castaneda delivered leadership workshops for regulatory professionals, who examined the activities, behaviors, mindsets, and skills of a successful leader during this training workshop designed by PURC for emerging leaders in utility policy.

Comprehensive Regulation Impact Analysis

PURC's online course provides tools and approaches for regulatory impact analysis (RIA), a systematic appraisal of the potential impacts of a regulatory decision to assess whether the decision is likely to achieve the desired objectives and at what cost. Through case studies, exercises, and lectures, course participants learn how to identify key questions, identify stakeholders and engage them in the analysis, use appropriate analytical techniques, and communicate their findings. In the spring of 2018, this online course was led by PURC director of energy studies, Ted Kury, and PURC director of water studies, Sanford Berg.

Fundamentals of Telecommunications Regulation

PURC provided with National Broadcasting and Telecommunications Commission of Thailand with a 4-day course on the basics of telecommunications regulation. The course examined technologies and technology trends, goals and purposes of regulation, net neutrality, over the top services, evolving business models, interconnection arrangements, the internet of things, and radio spectrum management.

Training on Utility Regulation for EWURA Staff

What are the regulatory challenges faced by multi-sector regulators? How do pricing challenges differ when regulators oversee different sectors? These were just a few of the questions addressed when PURC delivered a two week training program for the staff of EWURA in Dar es Salaam, Tanzania. Throughout the first week of the course, PURC Director of Energy Studies Ted Kury and PURC Director Mark Jamison worked with the staff of EWURA on utility and industry structure, regulatory models, and incentives and strategies for improving utility performance. During the second week, Kury and PURC Senior Fellow Raj Barua detailed each step of the utility pricing process for both the energy and water sectors and participants implemented this process with PURC's hands-on computer models.

Public-Private Partnerships (P3) Certification Training Program

As the first academic institution in the US to become an Accredited Training Organization (ATO) of the APMG's PPP Certification Program, PURC offered its inaugural P3 Foundation level training program in April 2018. The Foundation level is the first level of the Certified PPP Professional (CP3P) program, promoted by the World Bank and other multilateral development banks, and managed by APMG International. The Foundation level aims to standardize knowledge of the PPP process and terminology. We are happy to note that all 6 of our participants obtained passing scores for APMG's Foundation Level credential!

Regulatory Training Course for OfReg

What are the key strategies for regulatory leaders? This was the question addressed in a PURC course for the Cayman Islands Office of Regulation, OfReg. On the first day of the two-day course, the regulatory board studied the fundamentals of regulatory systems, governance models and relationships in regulatory systems, the importance of agency rules and systems, and how to assess health of the regulatory system. The board was joined by senior staff for the second day and studied utility finance, regulatory impact analysis, ratemaking, renewable energy, and adapting to changing technologies and economic situations. The second day included a case analysis of how the agency could assess the potential impact expanding renewable energy. The course was taught by PURC director, Mark Jamison, and PURC senior fellow, Raj Barua. It was held on Grand Cayman in April 2018.

Follow-up Part II Regulatory Training Course for the Members of the Office and Senior Managers at the OUR

How can a regulatory board prepare itself for effectiveness? This was the question addressed in a PURC leadership course provided for the Jamaican Office of Utilities Regulation. The board members studied analyzing their political context, defining their roles relative to their relationships with the agency staff and with outside stakeholders, leadership frameworks and styles, and thinking strategically about regulatory challenges. PURC's director of leadership studies, Araceli Castaneda, led the program. PURC director Mark Jamison assisted. The two-day course was held in March 2018 in Kingston, Jamaica.

Your First 90 Days in Regulation

PURC offers an online course for new commissioners on their leadership and strategic challenges in regulation. The course examines the roles of regulators, political context, identifying situations and imperatives, public narrative, and understanding utility finance.

FACULTY RESEARCH FOCUS



Mark A. Jamison, Director

Dr. Jamison conducts studies on leadership in regulation, regulation and strategy in telecommunications, and regulatory institutions. In recent years, his research has been presented at meetings of the American Economic Association, Industrial Organization Society, Western Economic Association, Australian Competition and Consumer Commission, Telecommunications Policy Research Conference, the Caribbean Electric Utility Services Corporation, the Organisation of Caribbean Utility Regulators, and the National Association of Regulatory Utility Commissioners. He was the principal investigator on a National Science Foundation grant to examine barriers to adoption of solar technologies in developing countries. His current research examines market competition, adaptive regulation, and institutional change. He has conducted training programs for regulatory organizations in Africa, Asia, Australia, the Caribbean, Central America, Europe, North America, and South America.



Ted Kury, Director of Energy Studies

Dr. Ted Kury's research has focused on three current issues confronting energy markets: the efficacy of relocating power lines, the complexity in determining optimal levels of carbon dioxide abatement, and the effects of restructured electricity markets. The relocation of power lines is a complicated question because relocation is very expensive and does not necessarily reduce the damage associated with storm events. In areas more susceptible to storm surge and flooding, the relocation may even increase damages, leading to a waste of valuable consumer and utility resources. Understanding how the efficacy of undergrounding changes with location is critical to ensuring that customers are receiving safe, reliable electricity service at just and reasonable rates. In addition to his academic work, Dr. Kury has published a number of essays in the popular press on the topic. His work on carbon abatement includes insight into the marginal cost curves for abatement. Theoretically, we can equate the marginal cost with the marginal benefits of abatement to determine optimal levels of emissions. Economic theory provides clear guidelines on what constitutes optimal levels of production for any good – the point at which the marginal cost is equal to the marginal benefit. However, in practice, these curves are not always well-behaved, and this can lead to different characterizations of the optimum. So while an understanding of these costs and benefits is necessary to determine optimal levels, it is not sufficient, and public policy should take this into account. In addition, the sensitivity of these marginal abatement curves to the price of natural gas means that consumers suffer twice as natural gas prices increase. This question is critical as states decide how to comply with the EPA's Clean Power Plant Rule. Restructured electricity markets have led to more opportunities, but it is not clear how these opportunities are distributed. Dr. Kury's research has shown that the benefits of increased trade in transparent wholesale markets are not uniformly distributed, with larger and privately-owned utilities more apt to participate. He is also studying whether growth in distributed generation resources have an effect on consumption for consumers, impacting system planning and reliability. Finally, in 2018 he led the PURC team that performed a study for the Jessie Ball duPont Fund on the Value of Municipal Utilities, utilizing JEA in Jacksonville as a case study.



Araceli Castaneda, Director of Leadership Studies

Ms. Araceli Castaneda's leadership work in 2018 has mostly focused on the topic of change and the difficulties of its implementation. The same values that have made individuals and organizations effective over time may be holding them back from moving into a successful future. Surfacing those values and exploring the loss to be experienced will be key to accept and implement change. In 2018, she presented at the Organisation of Caribbean Utility Regulators, the Utility Analytics Institute, the Advanced Leadership for Academics and Professionals Program at the University of Florida, and the Jamaican Office of Utilities Regulation.



Sanford V. Berg, Senior Fellow

Dr. Sanford (Sandy) Berg, PURC Senior Fellow, continues to examine internal and external governance mechanisms in the context of infrastructure reform. As part of a World Bank project, he developed a two-day training course (with PowerPoints) on regulation when there are significant institutional and informational constraints. In Manila this December, he served as a Facilitator and Session Leader at the Advancing City Wide Inclusive Sanitation Workshop sponsored by the Bill and Melinda Gates Foundation. PURC is exploring a possible project with the Gates Foundation. In addition, Berg continues to assist in the delivery of PURC eLearning and training programs for international participants.



David Sappington, Lanzillotti-McKethan Eminent Scholar

Professor Sappington's ongoing research focuses on the design of regulatory policies to: (i) limit peak electricity consumption by providing incentives for demand response; and (ii) promote efficient distributed generation of electricity via net metering and related policies.

APPENDIX

Public Utility Research Center

Recent Publications and Working Papers

Alvarado de Córdoba, Sylvia, and Juan A.B. Belt. 2018. "Central American Power Markets: Lessons Learned and Policy Recommendations with Particular Emphasis on Competitive Procurement" University of Florida, Warrington College of Business, PURC Working Paper.

Baye, Michael R., and David E. M. Sappington. 2018. "Revealing Transactions Data to Third Parties: Implications of Privacy Regimes for Welfare in Online Markets." University of Florida, Department of Economics, PURC Working Paper.

Belt, Juan, and Nicolas Allien, Jay Mackinnon, and Bahman Kashi. 2017. "Cost Benefit Analysis of Power Sector Reform in Haiti" University of Florida, Warrington College of Business, PURC Working Paper.

Berg, Sanford V. 2016. "Seven Elements Affecting Governance and Performance in the Water Sector" *Utilities Policy*, 43(A): 4-13.

Berg, Sanford V. 2017. "Three Lessons for Improving Infrastructure Performance" University of Florida, Warrington College of Business, PURC Working Paper.

Berg, Sanford V., and Michelle Phillips. 2016. "Data Availability as a Key Tool for Regulating Government-Owned Water Utilities" *Utilities Policy*, forthcoming.

Berg, Sanford V., and Michelle Phillips. 2018. "Networks in Infrastructure with Applications to Latin America and the Caribbean" *Competition and Regulation in Network Industries Journal*, forthcoming.

Berg, Sanford V., and Robert N. Gakubia. 2016. "Performance Based Contracts (PBC) and Regulatory issues" University of Florida, Warrington College of Business, PURC Working Paper.

Bet, Germán, Roger D. Blair, and David E. M. Sappington. 2018. "The Impact of Vertical Integration on Losses from Collusion." University of Florida, Department of Economics, PURC Working Paper.

Boampong, Richard. 2016. "Residential Energy Consumers Response to Energy Efficiency Rebates, Incentives, and Prices" University of Florida, Warrington College of Business, PURC Working Paper.

Boampong, Richard, and Michelle Phillips. 2016. "Renewable energy incentives in Kenya: Feed-in-tariffs and Rural Expansion" University of Florida, Warrington College of Business, PURC Working Paper.

Boampong, Richard, Colin A. Knapp, and Michelle Phillips. 2016. "The Effect of Renewable Portfolio Standards on State-Level Employment: An Ex Post Analysis" University of Florida, Warrington College of Business, PURC Working Paper.

Bose, Arup, Debashis Pal, and David E. M. Sappington. 2016. "Pricing to Preclude Sabotage in Regulated Industries" University of Florida, Department of Economics, PURC Working Paper.

Brown, David P., and David E. M. Sappington. 2016. "Designing Compensation for Distributed Solar Generation: Is Net Metering Ever Optimal?" University of Florida, Warrington College of Business, PURC Working Paper.

Brown, David P., and David E. M. Sappington. 2016. "On the optimal design of demand response policies" *Journal of Regulatory Economics*, 49(3):265-291.

Brown, David P., and David E. M. Sappington. 2016. "On the Role of Maximum Demand Charges in the Presence of Distributed Generation Resources" University of Florida, Department of Economics, PURC Working Paper.

Brown, David P., and David E. M. Sappington. 2018. "Employing Simple Cost-Sharing Policies to Motivate the Efficient Implementation of Distributed Energy Resources." University of Florida, Department of Economics, PURC Working Paper.

Brown, David P., and David E. M. Sappington. 2018. "Optimal Procurement of Distributed Energy Resources," *The Energy Journal*, Vol. 39(5), September 2018, pp. 131-155.

Brown, David P., and David E. M. Sappington. 2018. "Optimal Policies to Promote Efficient Distributed Generation of Electricity," *The Journal of Regulatory Economics*, forthcoming.

Brown, David P., and David E. M. Sappington. 2018. "Self-Sabotage in the Procurement of Distributed Energy Resources," University of Florida, Department of Economics, PURC Working Paper.

Castaneda, Araceli, and Mark A. Jamison. 2017. "Stakeholders and Power Relations in Regulation" University of Florida, Warrington College of Business, PURC Working Paper.

Castaneda, Araceli, Mark A. Jamison, and Michelle Phillips. 2015. "The Essential DNA of Electricity Regulation" University of Florida, Warrington College of Business, PURC Working Paper.

Fikru, Mahelet, and Michelle Phillips. 2016. "Consolidation of Municipality-owned Water Suppliers in Japan" Water Science and Technology, 695-702.

Hauge, Janice A., and Mark A. Jamison. 2016. "Identifying Market Power in Times of Constant Change" University of Florida, Warrington College of Business, PURC Working Paper.

Hauge, Janice A., Mark A. Jamison, and Laura Jamison. 2018. "X-efficiency vs Adaptive Efficiency: An Analysis of Firm Survival" University of Florida, Warrington College of Business, PURC Working Paper.

Hauge, Janice A., Mark A. Jamison, James E. Prieger, Michelle P. Connolly, and Gerald Faulhaber. 2017. "Economic Scholars' Summary of Economic Literature Regarding Title II Regulation of the Internet" University of Florida, Warrington College of Business, PURC Working Paper.

Holt, Lynne. 2015. "Political Implications of the Clean Power Plan for the 2016 Presidential Election." University of Florida, Warrington College of Business, PURC Working Paper.

Holt, Lynne. 2016. "U.S. Electric Utility Creditworthiness--Why the Regulatory Framework Matters" University of Florida, Warrington College of Business, PURC Working Paper.

Holt, Lynne, and Mary Galligan. 2015. "Florida's Proposed Constitutional Amendment on Local Solar Electricity Supply" The Electricity Journal, 28(4):66-77.

Holt, Lynne, and Mary Galligan. 2017. "Utility-Led Community Solar – A “Win-Win” for Customers & Electric Utilities?" University of Florida, Warrington College of Business, PURC Working Paper.

Holt, Lynne, and Mary Galligan. 2017. "State Public Utility Commissions' Role in Cybersecurity and Physical Security Issues: Trade-Offs and Challenges" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2015. "The Economic and Political Realities of Regulation: Lessons for the Future." *Energy Regulation Quarterly*, 3:17-20.

Jamison, Mark A. 2016. "Co-evolution of Business, Government, Technology, and Economics: Lessons from U.S. Telecommunications" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2016. "Emerging Institutional Weaknesses in US Regulation?" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2016. "Three Things Economists Wish the FCC Knew about Broadband Markets" Georgetown University, Center for Business & Public Policy, PURC Working Paper.

Jamison, Mark A. 2018. "Politics and Business in Social Media Regulatory Responses to the Cambridge Analytica Revelations" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2018. "Responses for the Record from Dr. Mark Jamison, Responding to Questions from Sen. Charles E. Grassley (R-IA) US Senate Committee on the Judiciary "Cambridge Analytica and the Future of Data Privacy"" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2018. "Comments of Mark Jamison to the Federal Trade Commission on Competition and Consumer Protection in the 21st Century" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2018. "Net Neutrality Policies and Regulation in the United States" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A. 2018. "Comments Filed with the FTC: Competition and Consumer Protection Issues in Communication, Information and Media Technology Networks" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A., and Araceli Castaneda. 2017. "Stakeholders and Power Relations in Regulation" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A., and Janice A. Hauge. 2016. "Adding Dimension to Merger Analysis" Journal for Competition Law and Economics.

Jamison, Mark A., and Roslyn Layton. 2016. "Beyond Net Neutrality: Policies for Leadership in the Information, Computing, and Network Industries" University of Florida, Warrington College of Business, PURC Working Paper.

Jamison, Mark A., and Palveshey Tariq. 2018. "Five Things Regulators Should Know About Blockchain (and Three Myths to Forget)," Electricity Journal.

Kury, Theodore, Cindy Miller, David Richardson, and Mark A. Jamison. 2018. "Valuing Municipal Utilities – The Case of the Potential Sale of JEA in Jacksonville" University of Florida, Warrington College of Business, PURC Working Paper.

Mandy, David M., John W. Mayo, and David E. M. Sappington. 2016. "Targeting Efforts to Raise Rivals' Costs: Moving from 'Whether' to 'Whom'" International Journal of Industrial Organization, 46:1-15.

Mayo, John W., and David E. M. Sappington. 2016. "Regulation in a 'Deregulated' Industry: Railroads in the Post-Staggers Era" Review of Industrial Organization, 49(2):203-227.

Mayo, John W., and David E. M. Sappington. 2016. "When Do Auctions Ensure the Welfare-Maximizing Allocation of Scarce Inputs?" RAND Journal of Economics, 47(1):186-206.

McNealy, Jasmine. 2018. "Twitter Reactions to Hurricane Irma: Mining Social Media for Inferences" University of Florida, Warrington College of Business, PURC Working Paper.

Mugisha, Silver, and Sanford V. Berg. 2016. "Adaptive Leadership in Water Utility Operations: The Case of Uganda" Sustainable Water Resources Management.

Sappington, David E. M., and Dennis L. Weisman. 2016. "The disparate adoption of price cap regulation in the U.S. telecommunications and electricity sectors" Journal of Regulatory Economics, 49(2):250-264.

Sappington, David E. M., and Dennis L. Weisman. 2016. "The price cap regulation paradox in the electricity sector" *The Electricity Journal*, 29(3):1-5.

Sappington, David E. M., K. Viscusi and J. Harrington. 2018. *Economics of Regulation and Antitrust*, Fifth Edition, Cambridge, MA: The MIT Press, forthcoming.