**BEFORE THE PUBLIC SERVICE COMMISSION**

**OF THE STATE OF MISSOURI**

In the Matter of a Working Case to Explore )

Emerging Issues in Utility Regulation ) **Case No. EW-2017-0245**

The Natural Resources Defense Council offers the following background materials for consideration:

1.     See information on upcoming LBL webinar and link to resource documents below.

2.     A summary of global and U.S. energy and electricity market trends from BNEF.

<https://data.bloomberglp.com/bnef/sites/14/2017/04/2017-04-25-Michael-Liebreich-BNEFSummit-Keynote.pdf>

3.     [More Than Smart: A Framework to Make the Distribution Grid More Open, Efficient and Resilient](http://morethansmart.org/wp-content/uploads/2015/06/More-Than-Smart-Report-by-GTLG-and-Caltech-08.11.14.pdf) by the Resnick Institute

4.     [Planning the Distributed Energy Future](https://pages.bv.com/rs/916-IZV-611/images/planning-the-distributed-energy-future.pdf) by Black & Veatch and SEPA.

5.     California Public Utilities Commission’s (CPUC) [Distribution Resource Plan](http://powersuite.aee.net/dockets/ca-r1408013) (DRP) proceeding and CPUC’s [Integrated Demand-Side Resource (IDER)](http://powersuite.aee.net/dockets/ca-r1410003)

6.     New York’s [Reforming the Energy Vision (REV) proceeding](http://powersuite.aee.net/dockets/ny-14-00581-14-m-0101).  Proceeding is currently exploring changes in [how utilities earn a return on expenditures](http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B48954621-2BE8-40A8-903E-41D2AD268798%7D), creating [a transition plan for moving from net metering to DER valuation](http://powersuite.aee.net/dockets/ny-15-02703-15-e-0751) (decision by the end of 2016), and establishing a process for determining a full value of DER.

7.     the [Minnesota Public Utilities Commission staff](http://powersuite.aee.net/dockets/mn-15-556) released a report with next steps in their grid modernization proceeding.

8.     file:///C:/Users/agupta/Downloads/Press%20Release%20-%20NextGrid%20Resolution%20Final.pdf

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| **WEBINAR ANNOUNCEMENT:** ***Regulatory Incentives and Disincentives*** ***for Utility Investments in Grid Modernization*** |

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| **Report No. 8 in the Future Electric Utility Regulation series** |

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| Lawrence Berkeley National Laboratory (Berkeley Lab) presents a free webinar on May 31, 2017, to discuss a new report, Regulatory Incentives and Disincentives for Utility Investments in Grid Modernization. **Who:**Steve Kihm, Seventhwave           Janice Beecher, Institute of Public Utilities, Michigan            State University           Ronald Lehr **Time:**  May 31, 2017, 10:30 a.m. to 11:45 a.m. Pacific (1:30 p.m. to 2:45 p.m. Eastern) **Register:** [https://cc.readytalk.com/r/925f8uqmy1c3&eom](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vTBhMck09UssNwIgaW7v6rQtaVuoG0y6CABGyZ_xN-WX2ZPs652aK8OxxIwLFR8A0vN1G3WpTQ2zkCKZePQGYuXIiCKKdtNms2BghXsz8lIl1QB4UwoxkTbomp2xrIsGrOeZiabUOicVFODmNgrOPmMeaFPd_9_IimoDVded3xXYdjRhda5sTjM9daCSdxnhchS37-LXr0sTWavRlgfT1On6oNXwm7LXCJGOahB1f5REm7Liz_CXLs-k4-QqtShn22PNXAyvW_pXkHVroRM7hcAuPufG3hmcCD_o2m0Wk2dl64N2og9ZuWg0ajbAcvCzj-yqWrQ3cgpUKf03gKzlf-s=&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==) The report will be available about a week before the webinar at [FEUR.lbl.gov](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vZPs7DIEd9ZQFngQlGxkToUgYgrEJ3aU-_sM37DPyk8rf1a79onoLYE8uNg5Mz5_RY3dn4hNZpCuLaEpi6b4zSsjwgtqqsWnI4Im5r5oOQeOsvE9Y32eImGz5DoPvbLYvQBdIl47py8gKhoiV8GCTTg3oU6gzzdvNUlAzF3IL3rKnH9yvKbRvD45zgw-eyJUnGGSXfddgUsT60ExeTFVwWxOUoO6Mh6035JIwymowcdoy8WJov4F0E6fjA3b4v4_6B9Or7AYRT7d_n90fp_fQFKwYvIf6-UXxUf_xrH5WHIWktOQycGmGGo0Cgy92xcN5JKEwc4aYJJlyo_0acXVg5Hc4k9VEjuci0Wiy3C1PyZGX5MP83ss8bxFuEDqigbtU_wV_1c7hIfI98XWNLLs5ePW9alcxBJ8_ltgipngavqdQ0EgW-GBDGg=&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==). Electric power is America's most capital-intensive industry, with more than $100 billion invested each year in energy infrastructure. Investment needs are likely to grow as electric utilities make power systems more reliable and resilient, deploy advanced digital technologies, and facilitate new services to meet some consumers' expectations for greater choice and control. But do current regulatory approaches provide the appropriate incentives for grid modernization investments? This report presents three perspectives:  * Financial analyst Steve Kihm begins by explaining that any major investor-owned electric utility that wants to raise capital today can do so at a reasonable cost. The question is whether utility managers want to raise capital for grid modernization. Specifically, they look for investments that create the most value for their existing shareholders. In cases where grid modernization investments are not the best choice in terms of shareholder value, Kihm describes shareholder incentive mechanisms that regulators could consider to encourage such investments when they are in the public interest.
* From an institutional perspective, Dr. Janice Beecher finds that the traditional rate-base/rate of return regulatory model provides powerful incentives for utilities to pursue investments, cost control, efficiency and even innovation, and it is well suited to the policy objectives of grid modernization. Prudence of grid modernization investments (fair returns) depends on careful evaluation of the specific asset, and any special incentives (bonus returns) should be used only if they promote economic efficiency consistent with the core goals of economic regulation. According to Beecher, realizing the promises of grid modernization depends on effective implementation of the traditional regulatory model and ratemaking tools to serve the public interest.
* Conversely, former commissioner and clean energy consultant Ron Lehr says that rapid electric industry changes require a better alignment of utility investment incentives with changes challenging the electricity sector, emerging grid modernization options and benefits, and public policies. For example, investor-owned utilities typically have an incentive to make capital investments, but rarely to employ expense-based solutions, since utilities do not earn profits on expenses. Further, Lehr cites a variety of factors that stand in the way of creating well targeted and well aligned utility incentives, including litigated regulatory processes. These may be a poor choice for finding the right balance among competing interests, establishing rules of prospective application, justifying demonstrations of new technologies and approaches to meeting emerging consumer demands, and keeping pace with rapid change.

The authors will continue the debate on a free, 75-minute webinar on May 31, 2017, 10:30 a.m. to 11:45 a.m. Pacific/1:30 p.m. to 2:45 p.m. Eastern. The webinar will be recorded and archived at [FEUR.lbl.gov](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vZPs7DIEd9ZQNT_rtLB7fu4p5UmyGrDaEIAkcxhWWwd1NVnYHtJtDxwJUQYIpI2W-5G3Ipl-z0b3KqqPSrE3dEVro7yU_c7JbsLbhs9N_trYsETAL6txOIaxQcio44IjpEaNlI0n88yMlPznHcmxrXVitsWoTLwmW9Txu9WDCBTb6bXLWo1KCL-CUe9IJmlQBcMXSkqzfisodZ_oAd38x2TvrfFXKNHxgo5AsPTQ-ABUx3sEZTng3dGSkJVPbqEcnWF0PK_zH94Imp2I2YvNjQvXeStw8xTm9_xq7uxvpc-OmCwRcpKbXM6ujmRdDOvMA9kKQB8W335bMzMOzvTGif1RQbQPXRt5ULtEkkTKxwZYWHJbsyL3q1rDhrM6dH0Cxe8-ixQ_JDVZB-YgoMN9BlTPzJp3GOvObg==&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==) along with all reports and supporting materials. The report is the eighth in the [Future Electric Utility Regulation](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vZPs7DIEd9ZQNT_rtLB7fu4p5UmyGrDaEIAkcxhWWwd1NVnYHtJtDxwJUQYIpI2W-5G3Ipl-z0b3KqqPSrE3dEVro7yU_c7JbsLbhs9N_trYsETAL6txOIaxQcio44IjpEaNlI0n88yMlPznHcmxrXVitsWoTLwmW9Txu9WDCBTb6bXLWo1KCL-CUe9IJmlQBcMXSkqzfisodZ_oAd38x2TvrfFXKNHxgo5AsPTQ-ABUx3sEZTng3dGSkJVPbqEcnWF0PK_zH94Imp2I2YvNjQvXeStw8xTm9_xq7uxvpc-OmCwRcpKbXM6ujmRdDOvMA9kKQB8W335bMzMOzvTGif1RQbQPXRt5ULtEkkTKxwZYWHJbsyL3q1rDhrM6dH0Cxe8-ixQ_JDVZB-YgoMN9BlTPzJp3GOvObg==&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==) series from Berkeley Lab. Additional reports are forthcoming. Subscribe to our mailing list at [FEUR.lbl.gov](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vZPs7DIEd9ZQNT_rtLB7fu4p5UmyGrDaEIAkcxhWWwd1NVnYHtJtDxwJUQYIpI2W-5G3Ipl-z0b3KqqPSrE3dEVro7yU_c7JbsLbhs9N_trYsETAL6txOIaxQcio44IjpEaNlI0n88yMlPznHcmxrXVitsWoTLwmW9Txu9WDCBTb6bXLWo1KCL-CUe9IJmlQBcMXSkqzfisodZ_oAd38x2TvrfFXKNHxgo5AsPTQ-ABUx3sEZTng3dGSkJVPbqEcnWF0PK_zH94Imp2I2YvNjQvXeStw8xTm9_xq7uxvpc-OmCwRcpKbXM6ujmRdDOvMA9kKQB8W335bMzMOzvTGif1RQbQPXRt5ULtEkkTKxwZYWHJbsyL3q1rDhrM6dH0Cxe8-ixQ_JDVZB-YgoMN9BlTPzJp3GOvObg==&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==) and follow us on Twitter at [@BerkeleyLabEMP](http://r20.rs6.net/tn.jsp?f=001BUz_bDC32mhGm8CHfWx6myZkKaLRYtNBXmcZrV_uupi9l9H51gk_vWycPAtQtihXGdg4NBwgzwoUU3O8LKIl2As9J92S3qMfReZR3c0optpRkO3XAHSF002oNfpAlZFlVZiK5kWWDGSrsf1pCgQ9NdnKPyfbnebiIF0ImCus2yI6MmkmcOOdmnsoTMWNnWji&c=eETwASFH1ieE2C7bVXP9RNDQuN4clS6Q8JTxSZHdaYjcF5cCiWVF0g==&ch=gP0nOVcljebgnEYQGoH8y9Quptix7lEi2ETzI12gKRY3Q0VOY8P03A==). |
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| *The U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability - Electricity Policy Technical Assistance Program, and the Office of Energy Efficiency and Renewable Energy - Solar Energy Technologies Office, funded the report through DOE's Grid Modernization Initiative. Lisa Schwartz, in Berkeley Lab's Electricity Markets and Policy Group, is the project manager and technical editor.* |

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| **About the Authors** **Steve Kihm** is principal and chief economist at Seventhwave, a think tank in Madison, Wis., and senior fellow at Michigan State University's (MSU's) Institute of Public Utilities. He has worked in the field of utility regulation for 36 years, including 21 years at the Wisconsin Public Service Commission. He has appeared as an expert witness in utility proceedings across the country, published reports and journal articles, and is co-author with Janice Beecher of the book, Risk Principles for Public Utility Regulators (MSU Press). Kihm holds a bachelor's degree in economics and master's degrees in financial economics and quantitative methods from the University of Wisconsin. He is a Chartered Financial Analyst. **Dr. Janice Beecher** has served as Director of the Institute of Public Utilities at MSU since 2002, bringing more than 30 years of applied research experience to the position. Her areas of interest include regulatory institutions, governance, and pricing and she specializes in the water sector. She is a frequent author, lecturer, and participant in professional forums and Editor of the journal Utilities Policy. She recently coauthored the book, Risk Principles for Public Utility Regulators. She is presently serving on the U.S. Environmental Protection Agency's Environmental Finance Advisory Board and recently completed service on Michigan's 21st Century Infrastructure Commission. She previously held positions at Ohio State and Indiana Universities and the Illinois Commerce Commission. Beecher has a Ph.D. in Political Science from Northwestern University and faculty appointments in MSU's College of Social Science, where she has taught graduate courses in public policy and regulation.  **Ronald L. Lehr** practices law and consults with clients about energy regulation and business matters.  Current assignments include foundation-funded consulting work on a variety of topics related to increasing the amount of clean energy in electric systems, including work for Western Grid Group on system, operations, integration and transmission planning for the Western Interconnection; for America's Power Plan on new utility business models and regulatory reforms that support them; and for a consortium of foundations interested in application of new financial approaches to address stranded utility assets resulting from retiring fossil generation plants. He served for seven years (1984 to 1991) as Chairman and Commissioner of the Colorado Public Utilities Commission. He completed terms as an appointed member of panels charged to make recommendations to the Colorado General Assembly on electric industry restructuring, renewable energy resources and transmission needs, and as President and Commissioner of the Denver Board of Water Commissioners, the water utility for Denver and surrounding suburban areas. |

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| *Previous reports in the Future Electric Utility Regulation series:* |

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| **Report No. 1: Electric Industry Structure and Regulatory Responses in a High Distributed Energy Resources Future (November 2015)**By Steve Corneli (previously with NRG) and Steve Kihm of Seventhwave This report envisions potential structural and business model changes in a future where distributed energy resources are competitive with grid power in price and performance. It describes two competing views. In one, utilities play a major role in sourcing, financing and optimizing distributed energy resources. In the other, competitive firms increasingly perform these functions. In such a future, the utility focuses on providing and maintaining infrastructure to deliver basic energy and capacity services, while facilitating distributed energy resources to create value for the utility and grid, lower the utility's costs, and encourage customers to remain connected to the distribution system rather than defect from it. |

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| **Report No. 2: Distribution Systems in a High Distributed Energy Resources Future: Planning, Market Design, Operation and Oversight (October 2015)**By Paul De Martini of the California Institute of Technology and Lorenzo Kristov of California Independent System Operator The report offers a practical three-stage framework to guide the evolution of distribution systems with growth in distributed energy resources. The authors provide a structured sequence that regulators and policy makers can use to assess options and develop a preferred distribution system tailored to their jurisdiction, with clear lines of sight to overarching regulatory and public policy objectives. The authors then compare three distribution operational models for the future and discuss the pros and cons of an independent Distribution System Operator (DSO) versus the distribution utility serving as the DSO. The report concludes with considerations and recommendations for policy makers, regulators, utilities and other stakeholders. **Report No. 3: Performance-Based Regulation in a High DER Future (January 2016)**By Tim Woolf of Synapse Energy Economics and Mark Lowry of Pacific Economics Group Research The report explores key elements and variations of comprehensive performance-based regulation (PBR) and its advantages and disadvantages from the perspectives of utilities and customers. The report explains the components of PBR, including multi-year rate plans and performance incentive mechanisms, and how they can be applied to a potential future with a high reliance on energy efficiency, demand response, distributed generation and storage. **Report No. 4:  Distribution System Pricing With Distributed Energy Resources (May 2016)**By Ryan Hledik of The Brattle Group and Jim Lazar of the Regulatory Assistance Project Utilities will likely continue to provide backup power and other grid services to customers that adopt distributed energy resources (DERs). At the same time, utilities may buy from these customers services such as energy, capacity and balancing. In this kind of two-way future, how should these services be priced? This report explores four options for pricing distribution services in the future: (1) rates tailored for each type of service; (2) rates tailored to each type of customer; (3) a buy/sell arrangement where DER customers pay for their use of the distribution grid and get paid separately for services they provide; and (4) a competitive solicitation for buying grid services from DER customers. The authors evaluate these options from utility and consumer perspectives based on economic efficiency, equity and fairness, customer satisfaction, utility revenue impacts and customer price impacts. **Report No. 5:  Recovery of Utility Fixed Costs: Utility, Consumer, Environmental and Economist Perspectives (June 2016)**By Lisa Wood (Institute for Electric Innovation) and Ross Hemphill (RCHemphill Solutions), John Howat (National Consumer Law Center), Ralph Cavanagh (Natural Resources Defense Council) and Severin Borenstein (UC-Berkeley), with a literature review by Jeff Deason and Lisa Schwartz (Berkeley Lab) Today, most residential customers pay a small monthly fixed charge plus a payment for each kilowatt-hour of electricity they consume. The less power they use, the less they pay. Utilities are proposing a variety of changes to retail rate designs to address the potential gap between revenues and so-called "fixed" costs to serve customers - costs that do not vary over the course of a year regardless of electricity usage. Proposals include significantly increasing the fixed charge, adding a demand charge based on the customer's highest energy usage in the billing period, formula rates that automatically adjust rates when utility earnings fall above or below a set level, and time-varying rates. Four essays and a literature review discuss these and other options for recovery of fixed utility costs.  **Report No. 6:  The Future of Electricity Resource Planning (September 2016)**By Dr. Fredrich Kahrl, Luke Lavin, Dr. Nancy E. Ryan and Arne Olson of E3, and Dr. Andrew D. Mills of Lawrence Berkeley National Laboratory  Electric utilities have long used resource planning to identify investments to meet reliability and other requirements at a reasonable cost. As the electricity industry undergoes a period of transition, driven by new technologies and shifting customer preferences and public policies, utilities and regulators may need to revisit resource planning practices. While past planning primarily addressed load growth and resource adequacy needs, it will increasingly need to consider low-cost variable energy resources, risk management, regulations, and customer preferences and investments.This new report examines recent resource plans from 10 diverse utilities, mainly in non-restructured regions, assessing current practices and emerging issues in five areas: 1) central-scale generation, 2) distributed generation, 3) demand-side resources, 4) transmission and 5) uncertainty and risk management.  **Report No. 7:  The Future of Centrally-Organized Wholesale Electricity Markets (March 2017)**By Craig Glazer, PJM; Jay Morrison and Paul Breakman, National Rural Electric Cooperative Association; Allison Clements, Natural Resources Defense Council; and National Association of State Utility Consumer Advocates Despite enormous complexity, diversity and challenges, bulk power markets in the United States are functioning reasonably well. However, some aspects of their design - particularly, the long-term functioning of wholesale markets administered by regional transmission operators and independent system operators - remain a work in progress and in some cases are subject to an ongoing debate. This report discusses four questions: 1) are centrally-organized market designs adequate to accommodate state public policy goals, or are design changes needed; 2) what are the market impacts of environmental regulations that further constrain the deployment of fossil fuel resources; 3) what are the market impacts of integrating increasingly higher levels of renewable resources with zero marginal cost; and 4) are today's market designs adequate to acquire the flexible resources needed to better integrate increasing levels of variable energy resources at least cost? |