INFORMATION AND COMPETITION IN ELECTRIC POWER MARKETS: IS TRANSPARENCY THE HOLY GRAIL?

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Synopsis: Electricity market restructuring has prompted extensive debate in the United States and abroad about the extent to which wholesale market information should be made available to regulators, market participants, and the public. Unfortunately, the effects of transparency on market performance are complex. Transparency can be beneficial but it also can come with substantial costs, some of which may not be obvious. As a result, it can be difficult for a policymaker to determine whether a particular information policy that enhances or diminishes transparency is desirable in the sense that its benefits outweigh its costs. In this article, I discuss how information needs have changed with restructuring, the potential costs and benefits of information exchanges and transparency more generally, and a simple cost-benefit framework for determining whether a particular information policy should be implemented in an electric power or related market. The framework is designed to streamline the assessment of costs and benefits, potentially reducing the burden on a policymaker of determining whether an information policy should be implemented.

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I. INTRODUCTION

Is greater transparency always the best policy for electric power markets? Is it always a good idea for regulators or market monitors to reveal to market participants and the public more information about power markets so that they can plan electricity generation and consumption? Is it beneficial for market participants, whether generators, load serving entities, or traders, to exchange more information to facilitate mutually beneficial exchanges? Is it beneficial for market monitors to publish more information to enable consumers to better understand whether they are paying electricity prices that are the result of market manipulation or an undue exercise of market power? Or are the benefits of such communication exhausted at some point, perhaps even negative? These are just a few of the many questions about the collection and dissemination of information that have been cast in a new light since electric power market restructuring began in the United States more than two decades ago.

Restructuring prompted policymakers and regulators to reconsider the usefulness of old information policies that were appropriate for a cost-based rate regime, and to attempt to fashion new policies more appropriate for a market-

based regime. Pre-restructuring, the flow of information from utilities to regulators and the public concerning utilities' costs plainly was necessary to ensure that rates were just and reasonable. Such information disclosure arguably became unnecessary–perhaps even counterproductive–under a market-based regime. The need to evaluate and monitor newly-created electric power and related markets, however, created new information requirements for regulators and system operators. This change spurred the development of new information policies, many of which have been aimed at increasing transparency in wholesale power and related markets, such as capacity and transmission rights.

The push by regulators and policymakers for greater transparency is driven not just by the creation of new markets, but also by a crisis of confidence in deregulated power markets, which appear to be susceptible to extreme exercises of market power and market manipulation.[1] In particular, the California energy crisis prompted many reforms–including reforms aimed at increased transparency–designed to enhance market oversight to promptly identify and remedy market manipulation and the undue exercise of market power by generators and other market participants.[2] The Energy Policy Act of 2005 (EPAct),[3] for example, outlaws market manipulation and grants the Federal Energy Regulatory Commission (FERC) authority to enhance market transparency to better monitor power markets for such abuses.[4]

Issues surrounding power market transparency, and information policy more generally, continue to be debated by regulators, policymakers, and market participants.[5] The debates concern many difficult and complicated questions about the collection and dissemination of information, including the extent to

1. *See, e.g.*, Sandeep Vaheesan, *Market Power in Power Markets: The Filed-Rate Doctrine and Competition in Electricity*, 46 U. MICH. J.L. REFORM 921, 928 (2013) ("The properties of electricity markets make them vulnerable to the exercise of market power . . . , which has brought the value of the entire restructuring project into doubt. In fact, during the height of the California electricity crisis in 2000 and 2001, the wholesale markets almost certainly produced higher rates for consumers than the traditional cost-of-service regime would have.") (citations omitted).

2. *See generally id.*

3. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005) [hereinafter EPAct].

4. For an overview of changes in the FERC's market monitoring and oversight efforts since the start of restructuring, see Order No. 760, *Enhancement of Electricity Market Surveillance and Analysis through Ongoing Electronic Delivery of Data from Regional Transmission Organizations and Independent System Operators*, F.E.R.C. STATS. & REGS. ¶ 31,330, 77 Fed. Reg. 26,674 (2012) (codified at 18 C.F.R. pts. 35, 77). *See also* Tracy C. Davis, *FERC Enhances its Market Surveillance Tools*, 26 ELEC. J. 45 (2012), *available at* http://www.lexology.com/library/detail.aspx?g=3116253b-af29-411d-aea8-5bf51001e096.

5. These issues also have been debated extensively outside of the United States. In Europe, they have been considered in connection with the liberalization of electricity markets, most recently in connection with the European Commission's October 2011 issuance of regulations concerning wholesale electricity market integrity and transparency in the European Union (REMIT). *Commission Proposal for a Regulation of the European Parliament and of the Council on Energy Market Integrity and Transparency*, COM (2010) 726 final (Dec. 8, 2010). These regulations impose uniform electricity market transparency requirements within the EU, where transparency refers to the public availability of electricity market information. *See generally* Regine Feltkamp & Cecile Musialski, *Integrity and Transparency in the EU Wholesale Electricity Market: New Rules for a Better Functioning Market?*, 5 OGEL (2013), *available at* https://www.academia.edu/3883727/INTEGRITY_AND_TRANSPARENCY_IN_THE_EU_WHOLESALE_ELECTRICITY_MARKET_-_New_rules_for_a_better_functioning_market_Regine_Feltkamp_and_Cecile_Musialski_.

which access to market-related information encourages or discourages market efficiency, facilitates better market monitoring, and, more generally, alters market behavior or outcomes in ways that may be viewed as harmful or beneficial to society. These questions are not easy to answer. Access to market information can have complex effects on market participants and market performance that rarely are well understood, and those effects typically will depend on the particular policy and markets at issue.[6] As a result, it is practically impossible to answer a question such as "is transparency the best information policy for electric power markets?" with anything other than "it depends." Alas, market transparency is not the Holy Grail.

An electric power market information policy can take many forms and have many effects. Broadly defined, an information policy is any policy that enhances or diminishes the exchange of information by and among market participants (including plant and transmission operators, marketers, traders, and consumers), regulators, or the public at large. For example, a wholesale market regulator might mandate the collection of detailed price and cost information from generators for dissemination to the public. Alternatively, a regulator might ban the exchange of outage information among generators. Any such policy typically has many effects. A policy that calls for publication of generators' price and cost information might permit the public to better monitor markets, but it might also facilitate collusion. A policy barring the exchange of outage information among generators might reduce the likelihood of collusion but it might also inhibit the flow of information that facilitates more effective planning decisions by generators.

As these examples suggest, the effect of information on markets can be complicated. Unfortunately, our understanding of these effects is limited. Given this complexity, and the limits of our knowledge, a policymaker is well-advised to carefully consider the effects of an information policy before implementing it.[7] It is not always the case that more information is better: there may be times when

6. The effects of information availability on electricity markets and their performance have been discussed in several works. *See, e.g.*, Donald F. Santa, *Who Needs What and Why? Reporting and Disclosure Obligations in Emerging Competitive Electricity Markets*, 21 ENERGY L.J. 1 (2000); NILS-HENRIK M. VON DER FEHR, REPORT FOR STATKRAFT, INFORMATION PROVISION IN ELECTRICITY MARKETS: AN ECONOMIC ANALYSIS (Oct. 27, 2010) [hereinafter VON DER FEHR (2010)] (discussing information costs and benefits in context of European electricity market regulation); Memorandum No. 13/2013 from Nils Henrik M. von der Fehr, Univ. of Oslo, Dep't. of Econ., *Transparency in Electricity Markets*, [hereinafter VON DER FEHR (2013)] (update of VON DER FEHR (2010)); LIZ HOOPER ET AL., TRANSPARENCY AND CONFIDENTIALITY IN COMPETITIVE ELECTRICITY MARKETS (JUNE 2009), *available at* http://pdf.usaid.gov/pdf_docs/PNADQ695.pdf. Many of the issues that arise in connection with electricity market information policy also arise in connection with securities markets. *See, e.g.*, Sergio Gilotta, *Disclosure in Securities Markets and the Firm's Need for Confidentiality: Theoretical Framework and Regulatory Analysis*, 13 EUR. BUS. ORG REV. 45 (2012), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1709334. More general discussions of information's costs and benefits, including the effect of information on competition, can be found in RUSSELL B. STEVENSON, CORPORATIONS & INFORMATION: SECRECY, ACCESS, & DISCLOSURE (1980). More general discussion of transparency – that is, the dissemination of information to the public – can be found in several other works, including ARCHON FUNG ET AL., FULL DISCLOSURE: THE PERILS AND PROMISE OF TRANSPARENCY (2007) and Amitai Etzioni, *Is Transparency the Best Disinfectant?*, J. POL. PHIL. 1 (2010) (expressing skepticism about the efficacy of transparency as public policy).

7. *Cf.* HOOPER ET AL., *supra* note 6, at 8 ("data disclosure policy evaluation needs to proceed on a data category case-by-case basis").

the costs of enhanced transparency facilitated by an information policy exceed the benefits of the policy. However, determining when an information policy's costs exceed its benefits can be difficult. Identifying all possible benefits and costs, attempting to estimate their magnitude and likelihood, and then weighing costs against benefits to determine if the policy is sensible, can be a time- and resource-intensive exercise.

Despite these difficulties, there are ways to overcome some of the hurdles to understanding and assessing an information policy. In this article, I outline a simple cost-benefit framework designed to reduce the burden on a regulator, system operator, or other policymaker, of deciding whether to implement a new information policy in wholesale power or related markets. The framework calls for identifying and assessing the effect of the policy on information flows, then assessing the incremental costs and incremental benefits of any change in flows. The framework dictates that a policy should be implemented only if its incremental benefits exceed its incremental costs, which is common sense. An added benefit of the framework is that it allows the inquiry to be truncated under certain conditions, limiting the extent of the examination, thereby avoiding a potentially lengthy, more burdensome analysis of all of the policy's costs and benefits.

In Section II of this article, I provide a brief overview of the ways in which restructuring has affected information needs, and I describe some of the more salient issues that have arisen in post-restructuring regulatory proceedings before the FERC related to the exchange of information. Although the focus of this section is on information-exchange issues arising in FERC proceedings, many of the same issues arise in state regulatory proceedings. Thus, a reader concerned with state regulation may benefit from the discussion in Section II. However, a reader generally familiar with information policy proceedings at the FERC may skip ahead to Section III, in which I describe a simple taxonomy of the ways in which information can be exchanged among regulators, market participants, and the public at large. The taxonomy helps one focus on how the form of an exchange is related to the type and extent of benefits or costs associated with a particular information policy.

In Sections IV and V, I discuss the most prominent potential benefits and costs of information flows in wholesale electric power markets. As has been discussed in various FERC proceedings, these benefits include enhanced market efficiency and improved market monitoring; the costs include an increased likelihood of market manipulation or the exercise of market power. In Section VI, I describe the analytical framework for deciding whether to implement a new information policy. Section VII offers some final thoughts on the lessons learned in the debates about information policies and how best to assess such policies. Although the focus of this article is on wholesale power markets, which have been the focus of important regulatory proceedings at the FERC, the analysis of information's costs and benefits in Sections IV and V, and the analytical framework set out in Section VI, offer insights into the effect of information on related markets, such as capacity, financial transmission rights, and ancillary services markets.

II. INFORMATION NEEDS IN RESTRUCTURED MARKETS

Wholesale power market restructuring changed the information needs of market participants, market operators, the FERC, and the public. Under traditional ratemaking, the FERC allowed a utility to recover its cost of service plus "a reasonable return on invested capital."[8] To determine whether a public utility's rate was reasonable under the Federal Power Act (FPA),[9] the FERC required extensive information about the utility's operations, assets, liabilities, costs, and revenues; and the FERC's public, on-the-record ratemaking procedures required that much of this information be made public.[10] Under restructuring, the FERC's emphasis shifted away from cost-based rates, toward market-based rates. Although restructuring reduced the FERC's need to collect and disseminate information required to assess cost-based rates, it created new information needs for the FERC to assess market-based rates and oversee newly competitive power markets.[11]

A. New Markets and New Information Needs

Restructuring created new types of markets and concerns about their operation. As restructuring progressed, the FERC granted market-based rates to independent power marketers, then to power marketers affiliated with independent power producers, and eventually to merchant generators, whether affiliated with a vertically-integrated utility or not.[12] The FERC also encouraged the development of regional transmission organizations (RTOs) and independent system operators (ISOs) to operate transmission systems, which in turn lead to the development of day-ahead, real-time, and related markets for power and ancillary services, overseen by ISOs and market monitors.[13] Restructuring also led various organizations to create new markets to facilitate physical and financial power transactions. These include the development of various "over-the-counter" markets, and market participants continued to trade power bilaterally. Perhaps the most notable example of a platform created to facilitate electric power and related transactions is the IntercontinentalExchange (ICE), which serves as an exchange and clearinghouse for power market and related contracts.[14] Market participants often participate in related markets, entering into derivative or other contracts, such as those traded on ICE designed to hedge operational and market risk in power markets.[15] With these markets came new concerns about market power, market manipulation, and other possible abuses. To address those concerns, the FERC created a process for granting market-based rates in restructured markets

8. JAMES H. MCGREW, FEDERAL ENERGY REGULATORY COMMISSION 179-180 (2d ed. 2009).

9. Federal Power Act, 16 U.S.C. §§ 791a-828c (2012) [hereinafter FPA].

10. Santa, *supra* note 6, at 1.

11. *Id.*

12. MCGREW, *supra* note 8, at 194-196 (describing the key cases leading to the FERC's current market-based rate policy).

13. *Id.* at 154-161 (describing development of ISOs, RTOs, and market monitoring units).

14. *See, e.g., Products*, INTERCONTINTENTALEXCHANGE, https://www.theice.com/products (last visited Aug. 31, 2014) (listing electricity-related products that can be bought and sold via IntercontinentalExchange).

15. *See, e.g.*, S.J. Deng & S.S. Oren, *Electricity Derivatives and Risk Management*, 31 ENERGY 940 (2006).

that requires an applicant to submit information to the FERC that allows it to assess the applicant's ability to exercise market power.[16]

The creation of new markets called for the collection and dissemination of new kinds of information by ISOs and market monitors. For example, to determine market supply, market demand, and market clearing prices for a centrally operated power market, an ISO requires detailed information from market participants on offers to sell, bids to buy, and transmission availability in each market.[17] ISOs also collect and disseminate market prices, as well as information related to underlying supply and demand, to help buyers and sellers make economically rational decisions. To assess market power or determine whether market rules should be changed to improve market performance, a market monitor may require generator-specific information related to costs associated with offers to sell to compute mark ups over cost, a commonly-used indicator of market power. Market monitors also may publish detailed reports about market operations, including data and other information concerning the behavior of market participants, to help the public and regulators better understand how a market is working.[18]

Restructuring also changed the information needs of market participants.[19] Restructuring changed how market participants focus on the pursuit of profit, and introduced new metrics for determining profitability and new information requirements for conducting business. In addition to prices and related information published by ISOs about power markets, market participants seek all types of market-related information, such as the volume and prices of forward contracts for power, available transmission capacity, resource availability, weather forecasts, and fuel prices. Market participants need information about price and underlying supply and demand conditions in these new markets to make rational decisions about whether to buy or sell power or related products.

Many new firms have arisen to meet the new information needs of market participants and others. These firms supply subscribers with a wide variety of analytical and information services, including information related to generating unit costs and operating performance,[20] real-time plant generation,[21] actual and

16. MCGREW, *supra* note 8, at 152-61.

17. *Id.*

18. *See, e.g.*, *External Market Monitor*, ISO NEW ENGLAND, http://www.iso-ne.com/markets-operations/market-monitoring-mitigation/external-monitor (last visited Sept. 4, 2014).

19. The information needs of regulators, market participants, and others may differ, and different policies may be required to address the needs of each. *See, e.g.*, VON DER FEHR (2010), *supra* note 6, at 1.

20. *See, e.g.*, VENTYX, PRODUCT OVERVIEW: PROMOD IV (described as "the industry-leading Fundamental Electric Market Simulation solution, incorporating extensive details in generating unit operating characteristics, transmission grid topology and constraints, and market system operations."), http://www.ventyx.com/~/media/Files/Brochures/Promod_data_sheet.ashx?download=1 (last visited Aug. 31, 2014).

21. *See, e.g.*, *Power Real-Time (RT)*, GENSCAPE, (describing a service that provides real time output at generating facilities in the United States), http://www.genscape.com/solutions/power/north-america-real-time-monitoring/power-real-time-rt (last visited Aug. 31, 2014).

expected generating unit outages,[22] and real-time market prices.[23] Firms often merely aggregate existing information; many firms, however, develop proprietary information to sell to market participants.

B. FERC Information Policy Proceedings

In several proceedings since restructuring began, the FERC has considered the new information needs of restructured electric markets. Two of these proceedings illustrate the costs and benefits of a new information policy in the electric power industry; they also illustrate several issues that arise in the context of almost any information policy change. The first concerns the collection and dissemination of a utility's revenue and cost information to the public that was necessary under a cost-based, regulated rate regime, but whose usefulness under a market-based regime is less evident.[24] The second concerns the disclosure of transaction-specific information designed to help monitor newly-restructured markets for anticompetitive or other abusive conduct.[25]

1. Cost and Revenue Information: PECO Energy

For years, the FERC collected and disseminated detailed information about utilities' revenues and costs to the public.[26] The information contained in Form 1, the major annual report filed by electric utilities since 1937, was necessary to help the public and the FERC assess the reasonableness of cost-based rates.[27] By the time restructuring began in earnest in the 1990s, however, many market participants started to question the need for Form 1 in a market-based regime.[28] In 1999, PECO Energy and others opposed the FERC's practice of disclosing Form 1 data, requesting confidential treatment for certain information, including plant operating costs (e.g., fuel costs and unit efficiency data) and electricity sales information (e.g., prices and customer identities).[29] PECO argued, in part, that the FERC's policy of disclosing Form 1 information was inconsistent with competition in newly restructured markets.[30]

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22. *See, e.g., Power Industry: Power Generation, Transmission, & Distribution*, INDUSTRIAL INFO RESOURCES, (described as providing information on past, present, and future outages at generating plants in the United States and Canada), http://www.industrialinfo.com/marketcoverage.jsp?pagerequest=marketcoverage01 (last visited Aug. 31, 2014).

23. *See, e.g., Electricity Alert – Real-Time Market News, Price Discovery, & End-of-Day Prices for North America*, PLATTS, http://www.platts.com/Products/electricityalert/ElectricPower/Trader/RealTimeNews (last visited Aug. 31, 2014) (described as providing "real-time electricity spot market transactions reported as deals are done").

24. *PECO Energy Co., et al.*, 88 F.E.R.C. ¶ 61,330 (1999) (order denying requests for reh'g) [hereinafter *PECO Energy*]. *See also* Santa, *supra* note 6, at 3-4 (discussing *PECO Energy*).

25. Order No. 2001, *Revised Public Utility Filing Requirements*, F.E.R.C. STATS. & REGS. ¶ 31,127, 67 Fed. Reg. 31,044 (codified at 18 C.F.R. pts. 2 and 35) (2002) [hereinafter Order 2001].

26. *Form 1–Electric Utility Annual Report*, FERC, http://www.ferc.gov/docs-filing/forms/form-1/data.asp (last visited Sept. 6, 2014).

27. *PECO Energy*, *supra* note 24, at 62,019.

28. *Id.*

29. Request of PECO Energy Company for Privileged Treatment of Certain FERC Form 1 Data, No. AC98-100, 1-2 (filed June 29, 1998) [hereinafter Request of PECO].

30. *Id.* Other petitioners made similar arguments. *See, e.g.*, Petition for Rehearing of Virginia Elec. & Power Co., et al., No. AC99-138, 8 (filed July 23, 1999) ("In short, the last four years have witnessed an

PECO identified three harms of disclosure.[31] First, Form 1 data would allow a competitor to calculate PECO's generating capacity and operating costs, which might result in higher electricity prices.[32] For example, if PECO's costs were such that it could not profitably sell electricity for less than $50 per MWH, a competitor with costs of $40 per MWH could sell at $49 per MWH and still make a sale. Absent knowledge of PECO's costs, the competitor would be willing to sell at a price only slightly above $40. As a result, the additional information in the hands of a competitor might yield higher electricity prices. Second, the dissemination of a utility's cost and sales information would facilitate the exercise of coordinated market power by generators, thereby raising wholesale prices.[33] Coordination among competitors requires an ability to reach an agreement on price or some other dimension of competition, monitor that agreement, and punish deviations from the agreement. Greater transparency facilitates all three requirements, increasing the likelihood of coordination.[34] Third, PECO argued that disclosure of confidential data would harm its ability to negotiate with fuel suppliers.[35] Because suppliers would know the prices PECO paid for fuel in the past, suppliers would be able to drive a harder bargain with PECO.[36]

The FERC denied PECO's request for confidentiality.[37] It determined that Form 1 data helped it and customers determine whether rates are just and reasonable, and ensured that customers are protected from undue discrimination, as called for under the FPA.[38] The FERC emphasized that it

> [h]as long depended on customers looking out for their own best interests in the first instance–bringing complaints under Section 206 of the Federal Power Act . . . , often based on data in the Form 1, to the Commission when they believe that their rates are excessive or that they are suffering undue discrimination.[39]

It concluded these benefits outweighed any potential harms of disclosing Form 1 information.[40]

2. Sales and Offer Information: Order 2001

As restructuring advanced, the FERC became concerned that its information reporting requirements had not kept pace with its changed information needs.[41] In particular, the FERC was concerned that "the quality of information provided in [the past] has proven to be inconsistent and not always sufficiently informative for

unprecedented advance in the competitive nature of the market for electricity that the Commission, in relying on the Consolidated Edison order, has entirely ignored.").

31. Request of PECO, *supra* note 29, at 1-2.

32. *Id.*

33. *Id.*

34. *See infra* Section V.A.

35. Request for Rehearing of PECO Energy Co., No. AC98-100, 2 (filed Aug. 28, 1998).

36. *Id.*

37. *PECO Energy*, *supra* note 24, at 62,017.

38. *Id.* at 62,019.

39. *Id.*

40. *Id.* at 62,018 ("[W]e are not persuaded that competition in the industry has evolved to the degree that the potential of competitive disadvantage now outweighs the longstanding benefits of public access to such critical cost and operational information.").

41. Order 2001, *supra* note 25, at P 29 (2002).

the Commission and the public."[42] In its Revised Public Utility Filing Requirements (Order 2001), the FERC eliminated some of its existing reporting requirements but imposed a new reporting requirement called the Electric Quarterly Report (EQR).[43] The Order required that each utility file a report containing the contractual terms and conditions of its agreements for all jurisdictional services, including transaction-specific information regarding power sales.[44] Order 2001 also required disclosure of the reported information to the public.[45]

During the proceeding that led to Order 2001, opponents of disclosure made three arguments in favor of confidentiality, the first two of which were similar to those made in the PECO Energy proceeding.[46] First, they argued that disclosure of price information would facilitate the exercise of coordinated market power by suppliers, resulting in higher prices.[47] Second, they argued that disclosure of transaction-specific data would reveal negotiating positions, undermining the disclosing utility's bargaining power and ability to compete.[48] Finally, opponents argued that disclosure would discourage the development of new products, marketing efforts, trading strategies, and risk management tools.[49]

The FERC refused to make EQR information confidential.[50] It rejected arguments that disclosure would put reporting utilities at a bargaining disadvantage or inhibit innovation,[51] stating that such concerns were "not supported by evidence of actual harm . . . ."[52] The FERC also dismissed the

42. *Id.* The FERC stated that "[t]hese factors led the Commission to initiate this proceeding to revise the Commission's filing requirements to improve the quality and accessibility of information available to the public and to the Commission, while at the same time reducing the burden on filing public utilities." *Id.*

43. *Id.* at PP 2-7.

44. Order No. 2001, *supra* note 25.

45. *Id.* at P 18 (stating that Electric Quarterly Reports would be posted on the FERC's internet website).

46. Request of PECO, *supra* note 29, at 1-2.

47. Order 2001, *supra* note 25, at P 84.

48. Alcoa Power Generating, Inc., a subsidiary of Alcoa, Inc., one of the world's largest producers of primary aluminum and fabricated aluminum, noted that disclosure might also have an effect on the competitive situation of downstream firms that are heavy users of electricity. Electricity costs making up as much as one-third of primary aluminum's variable production costs. Information about the cost of electricity to an aluminum producer would give substantial insight into the costs of that producer. Comments of Alcoa Power Generating, Inc., No. RM01-8 (filed Oct. 4, 2001). *See also* Comments of Pinnacle West Companies, No. RM01-8 (filed Oct. 4, 2001) (arguing that disclosure of prices could lead to a competitive disadvantage for a customer).

49. Comments of Southern Cos., No. RM01-8, 24-25 (filed Oct. 5, 2001); Comments of Pinnacle West Companies, No. RM01-8 (filed Oct. 4, 2001) ("disclosure could seriously threaten the development of competitive energy markets and pose great risks to energy marketers whose business relies on fashioning creative packages of services at competitive prices").

50. Order 2001, *supra* note 25, at P 34 ("[W]e find that confidentiality is not warranted. The Commission's primary focus is on implementing section 205(c), promoting competition and protecting customers, and not on protecting competitors. Because almost all the data that will be reported in Electric Quarterly Reports are already publicly available and will be 30-120 days old when reported, negative competitive impact from disclosure is minimized.") (citation omitted).

51. *Id.* at P 94 ("We also disagree with predictions that disclosure would be harmful to the market generally.").

52. *Id.*

argument that disclosure would harm competition by facilitating collusion,[53] stating that if collusion occurred, the FERC and other federal agencies would "take strong actions."[54]

The FERC also identified several benefits of disclosure. First, disclosure would promote price transparency,[55] competition, and market efficiency.[56] Second, it would promote confidence in the market.[57] Third, it would allow the FERC and consumers to detect discriminatory or anticompetitive behavior,[58] promoting "confidence in the fair operation of the market."[59]

3. Other Proceedings

There have been several other proceedings before the FERC in which the issues raised in the PECO Energy and Order 2001 proceedings also were raised.[60] Most notably, the EPAct gave the FERC the authority to enhance transparency in electric power markets,[61] which resulted in two proceedings concerning aspects of the FERC's information policy.[62] Also, the FERC recently issued Order 760,[63] which called for each RTO and ISO to deliver to the FERC data related to the markets they operate, including detailed information about physical and virtual offers, bids, and market awards in energy and ancillary services markets, as well as marginal cost estimates, shift factors, and transmission and transmission rights data.[64] Many of the issues raised in the PECO Energy and Order 2001 proceedings also were raised in the Order 760 proceeding, including the extent to which the collected data would assist the FERC in its market oversight and monitoring efforts, and the extent to which the data would remain confidential.[65]

Individual ISOs also have instituted proceedings concerning their own information policies. For example, two proceedings that considered the speed with which certain power market information would be released to the public focused on issues related to market monitoring and market power. In Texas, the Public Utilities Commission decided to accelerate the release of individual bid

53. *Id.* ("[W]e reject the arguments that [illegal price fixing and collusion] will be the outcome of providing the public with better price information.").

54. *Id.*

55. *Id.* at P 44.

56. Order 2001, *supra* note 24, at P 44.

57. *Id.*

58. *Id.* at P 103.

59. *Id.*

60. Santa, *supra* note 6, at 5, 14, discusses several other proceedings and court cases involving the FERC information policy, including *Southern Cos. Servs., Inc.*, 75 F.E.R.C. ¶ 61,353 (1996) (reporting of market-based rate transactions); *AES Huntington Beach, L.L.C.*, 83 F.E.R.C. ¶ 61,100 (1998), *reh'g denied*, 87 F.E.R.C. ¶ 61,221 (1999) (confidential treatment of tolling agreement); and Alabama Power Co. v. Fed. Power Comm'n, 511 F.2d 383 (D.C. Cir. 1974) (disclosure of fuel purchasing information).

61. *See generally* EPAct, *supra* note 3.

62. *Transparency Provisions of the Energy Policy Act of 2005*, 119 F.E.R.C. ¶ 61,068 (2007); *Enhanced Natural Gas Market Transparency*, 114 F.E.R.C. ¶ 61,124 (2012).

63. Order No. 760, *Enhancement of Electricity Market Surveillance and Analysis through Ongoing Electronic Delivery of Data from Regional Transmission Organizations and Independent System Operators*, F.E.R.C. STATS. & REGS. ¶ 61,053, 77 Fed. Reg. 225 (2012) (codified at 18 C.F.R. pt. 35).

64. *Id.* at 1.

65. *Id.* at 23.

data for auction markets from 180 days to 30 days.[66] The change in information policy was coupled with an increase in offer caps, with the market administrator, ERCOT, reasoning that quicker release would facilitate more effective market monitoring, thereby offsetting any additional market power that might be exercised due to a higher offer cap.[67] In New England, ISO New England's (ISO-NE) proposal to reduce the lag time for posting auction market supply and offer data from six months to three months was accepted by the FERC, which found credible ISO-NE's testimony that a reduced lag "adds notable market transparency without a commensurate increase in the risk of collusive market power."[68]

III. TYPES OF INFORMATION EXCHANGES

The costs and benefits discussed in the PECO Energy and Order 2001 proceedings are discussed routinely in debates about information policy. In this section, I discuss the relationship between the form of an information exchange and its costs and benefits. In general, exchanges can be *private* or *public*.[69] A public exchange involves information flows among market participants, regulators, market monitors, and the public at large. The collection and public disclosure of Form 1 and EQR data discussed above are examples of public exchanges. A private exchange involves the flow of information between or among market participants (including competitors), regulators, or market monitors, but not the public at large.[70] Exchanges can also be *direct* or *indirect*. A direct exchange is between two entities (whether market participants, regulators, or market monitors); an indirect exchange–sometimes referred to as a "hub-and-spoke," or "A-B-C" exchange–is between two entities through a third party.

A. Private Exchanges

Private exchanges involve the direct or indirect flow of information between or among market participants, regulators, and market monitors, but not the public at large. Private exchanges can be *direct* or *indirect*; they also can be *unilateral* or *multilateral*, where unilateral exchanges involve one-way communications

66. PUB. UTIL. COMM'N TEX., *Order Adopting Amendment to § 25.502*, at 29 (2007).

67. *Id.* at 7.

68. *ISO New England Inc. & New England Power Pool*, 121 F.E.R.C. ¶ 61,035 at PP 1, 14 (Oct. 18, 2007) (order accepting information policy revision).

69. Similar distinctions between private and public exchanges have been made by others. *See generally* Organisation for Economic Co-operation and Development, *Unilateral Disclosure of Information with Anticompetitive Effects* [hereinafter OECD (2012)], *available at* http://www.oecd.org/daf/competition/Unilateraldisclosureofinformation2012.pdf (last visited Sept. 5, 2014).

70. The exchange of information by competitors ("horizontal" exchanges) traditionally has been viewed as having the greatest potential for anticompetitive effects. The exchange of information by firms at different levels of the production chain ("vertical" exchanges) also can affect competition. *See generally* Julia Shamir & Noam Shamir, *Reviewing Antitrust Policies: The Use of Vertical Information Sharing in Achieving Collusion*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2318989 (last visited Sept. 5, 2014). Whether the information exchanges are public or private, horizontal or vertical, the ways in which information is communicated can vary widely. Communication can be "non-specific," in which someone makes a general announcement; or "inexplicit," in which the recipient needs to make large inferences in order to understand the speaker's meaning; or "non-linguistic," taking place by "nods or eye contact." William H. Page, *Communication and Concerted Action*, 38 LOYOLA L. REV. 405, 427-428 (2007).

from one entity to others, and multilateral exchanges involve reciprocal communications among entities.[71]

1. Direct Private Exchanges

A direct private exchange can occur in many ways and have many effects on market participants' behavior. Consider the following examples:

Informal bilateral exchange. Two competing generators, G1 and G2, might agree to exchange information about offer prices and quantities they expect to submit in an ISO-run day-ahead electricity market. After implementing this agreement, G1 and/or G2 may increase their offers to exercise market power, thereby increasing electricity prices earned by their own generating units.

Informal unilateral exchange. During a discussion regarding general market conditions, G1 might mention to G2 that it is considering a maintenance outage at a generating unit during a specific time in the near future. With this information in hand, G2 may find it profitable to plan to increase its output during the outage, reducing market price below what it might have been absent the information. Alternatively, with this information in hand, G2 may find it profitable to plan to reduce its output during G1's outage, raising market price above what it might have been absent the information.

Formal joint bidding agreement. As a result of a joint bidding agreement, whereby G1 submits bids for generating units owned by competing G2, information about G2's units may flow to G1.[72] Such information may be necessary for G1 to optimize offers for G2's units. However, with this information in hand, G1 may find it profitable to increase or decrease output at its own units, lowering or raising market price relative to what it might have been absent the information.

Formal joint production agreement. As the result of an agreement between G1 and G2 to jointly build and operate a generating plant, information about G1's other plants may flow to G2 (and vice versa) during discussions regarding the jointly-owned plant. The exchange of information about the jointly-operated plant may be necessary to operate the plant. However, conversations regarding the jointly-owned plant may facilitate discussions of the operation of the generators' other plants, which may lead to coordination between G1 and G2 in the operation of their plants, and an increase in electricity prices.[73]

71. OECD (2012), *supra* note 69, at 186.

72. *See generally* John Kwoka, *The Effect of Cross-Control on Bidding Behavior and Prices in Electricity Auction Markets*, (2010), *available at* http://www.publicpower.org/files/PDFs/kwokacrosscontrol.pdf (discussing these types of information flows and their potential effect on prices).

73. For example, the Keystone and Conemaugh generating plants in western Pennsylvania are jointly operated by several generators. Prior to restructuring, these plants were dispatched based on the basis of costs. Post-restructuring, they have been dispatched based on offers submitted by plant owners. Concerns with information sharing and potential collusion led the plant owners to adopt firewalls and other practices designed to limit information flows among competitors. *See generally* Letter from Joel I. Klein, Asst. Atty. Gen., U.S. Dept. of Justice, Antitrust Div., to Gary L. Kaplan, Reed Smith Shaw & McClay, LLP (Jan. 30, 1998) (business review letter), *available at* http://www.justice.gov/atr/public/busreview/1337.pdf; Press Release, U.S. Dept. of Justice, Justice Department Allows Electric Power Joint Venture to Change Method of Bidding in Newly-Deregulated Market Environment (Jan. 30, 1998), *available at* http://www.justice.gov/atr/public/press_releases/1998/212596.pdf.

2. Indirect Private Exchanges

An indirect exchange is sometimes referred to as a "hub-and-spoke" exchange.[74] An indirect private exchange involves a third party (the hub) collecting information from and disseminating it to market participants, regulators, or market monitors (the spokes), but not the public at large. Consider the following examples and their possible effects on market behavior:

Communications via a downstream purchaser. While collecting offers to sell power from generators, an LSE may learn of G1's operating plans and, in negotiations with G2, reveal information about the plans of G1 to G2. For example, the LSE may learn that G1 is planning to retire a generating unit and intentionally or unintentionally reveal it to G2. In this case, the LSE acts as a "hub," collecting information from G1 and revealing it to G2. With the information about G1 in hand, G2 may find it profitable to retire one or more of its own generating units to raise electricity prices, or G2 may find it profitable to expand capacity to lower electricity prices.

Communications via a trade group. A generator trade group may collect information from, and disseminate it to, its members (but not the public at large) in the interest of promoting "best practices," or "benchmarking," so that generators can improve their performance. Such benchmarking may require some degree of information flow among competing generators for it to be useful and effective. Thus, the trade group may act as a hub, permitting G1 to learn about the operations of G2's units (and vice versa) via the trade group. Although benchmarking may promote more efficient operations, and hence, lower electricity prices, the information flows required for benchmarking may facilitate coordination in power markets, raising electricity prices.

Communications via a market operator. ISOs may collect and disseminate information to market participants, but not the public at large, in the interest of facilitating more efficient operation of the market.[75] For example, an ISO may determine that although it is necessary to share transmission outage information with generators, it is not necessary to share that information with the public. However, such information may facilitate coordination between competing generators, G1 and G2, who may see an opportunity to jointly reduce output arising from the transmission outage, thereby raising electricity prices.

B. Public Exchanges

In contrast to private exchanges, public exchanges involve the dissemination of market information to the public at large. As with private exchanges, public exchanges can be either *direct* or *indirect*.

74. An indirect exchange is sometimes referred to as a "hub-and-spoke" or "A-B-C" exchange. Okeoghene Odudu, *Indirect Information Exchange: The Constituent Elements of Hub and Spoke Collusion*, 7 EUR. COMP. J. 205, 207 (2011).

75. In the United Kingdom and New Zealand, for example, some market data has been made available only to market participants but not the public at large. Frank A. Wolak, *Lessons from International Experience with Electricity Market Monitoring* at 15-16, (2005) [hereinafter Wolak (2005)], *available at* http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3692.

1. Direct Public Exchanges

A direct public exchange typically involves a market participant providing information directly to the public. Consider the following hypothetical examples in the power industry and their possible consequences:

Solicitation of offers to buy or sell. To make power sales, G1 might publicly announce the types of products it would be willing to sell and the price at which it would be willing to sell. Or an LSE might announce that it is willing to buy certain types of wholesale power products in certain quantities to supply its load. Such public solicitations can permit buyers and sellers to find one another more quickly and at lower cost relative to private solicitations. However, such public solicitations may permit competing sellers (or buyers) to coordinate on price. For example, G1's announced price may serve as a focal point for an agreement between competing generators G1 and G2 on the price to charge for a particular product.[76]

Conveying information to investors. During an investors call, G1 might state that it expects its generating capacity to decline. Or G1 might announce plans to retire a plant. Or G1 might reveal such plans in an interview, which is then reported to the public. Such public announcements make it possible for investors to formulate opinions about the generator's financial prospects and make rational decisions about whether to invest in the generator. However, the announcements may facilitate coordination between G1 and other generators.[77] For example, G1's announced capacity reduction may induce G2 to also reduce its capacity, further raising prices to consumers; alternatively, it may induce G2 to expand capacity to lower prices.

2. Indirect Public Exchanges

An indirect public exchange involves a third party collecting market information and disseminating it to the public at large. There are many examples of indirect public information exchanges involving the dissemination of information by regulatory bodies or private third parties.

Communications via a regulator. The FERC has long collected and disseminated information to the public on individual generating units' costs and capacities, based on data reported in Form 1. In such a case, the FERC serves as a "hub," collecting information from generators and disseminating it to the public. Although such information can help the public to determine whether rates are just and reasonable, as called for under the FPA, detailed firm-specific information can facilitate an exercise of market power by generators. With an understanding of its competitors' costs, generators may be better positioned to coordinate so as to raise electricity prices.

Communications via an ISO. ISOs and market monitors routinely publish electricity market prices and generating unit outage information. In this case, the ISO serves as a "hub," collecting and disseminating information to the public. A certain degree of market information is required for the efficient operation of a

76. OECD (2012), *supra* note 69, at 42.

77. *Cf. id.* at 14 (noting that information provided in earnings calls "might expose the company to antirust liability in the light of the risk of collusion that they may create").

market. Indeed, market prices are necessary for buyers and sellers to make rational consumption, production, and investment decisions. However, detailed firm-specific information can facilitate an exercise of market power. G1, for example, may be able to more confidently reduce its output to raise price if it knows that competing generator G2 will not step in to replace lost generation due to an outage at one of G2's plants.

Communications via a private third party. Private, for-profit firms may gather and disseminate to subscribers information about the operating status of generating units owned by competing generators. In this case, the private firm acts as a "hub," disseminating information to the public. With information in hand about an outage at a unit owned by G2, for example, competing generator G1 may alter its behavior to expand production at its units to replace lost capacity and keep market prices lower than they otherwise would be. Alternatively, G1 may restrict production at its units to raise prices relative to what they otherwise would have been.

Not all information flows fit neatly into these categories. For example, exchanges such as ICE bring together information on individual offers to buy and sell, and use that information to determine the market price for particular types of electricity contracts.[78] The communication of individual offers from potential buyers and sellers to the exchange might be viewed as a private direct exchange between ICE and the potential buyers and sellers (because the actual offers are not made public). However, ICE aggregates the offers to determine supply, demand, and a market-clearing price, which it disseminates to the public.[79] A typical indirect public exchange might entail public dissemination of the offers and bids, as an ISO or the FERC might do; ICE, however, releases the clearing price to the public, which merely reflects offers and bids, not the underlying offers and bids themselves. As a result, it is not clear that ICE should be considered a hub in a typical hub-and-spoke exchange.

Despite some ambiguity about how to characterize information exchanges, the examples discussed above illustrate three simple points. First, the communication of market information occurs and can have effects on consumers and competition in a wide variety of settings. Calls for "increased transparency" in electric power markets are common, and they usually involve the implementation of a policy under which a regulator or market operator collects and disseminates information to the public. However, there are many other situations in which market information is communicated, including dissemination to the public of information by others, such as commercial information aggregators or trade groups, as well as more informal exchanges among market participants. Such communications also serve to increase "transparency" in the sense that information about electricity and related markets, such as capacity and transmission rights markets, flows to market participants, regulators, or the public. In short, information exchanges are commonplace, and their effects on consumers and competition are widespread.

78. ICE's role in derivative and over-the-counter markets for electricity can be found in IntercontinentalExchange Group, Inc., Annual Report (Form 10-K) (Feb. 14, 2014).

79. *Id.* (describing price data disseminated to the public and to subscribers to ICE's data services).

Second, public exchanges generally are more likely to be beneficial than private exchanges because they typically offer a broader range of benefits. For example, public exchanges regarding the terms of electric power transactions allow buyers and sellers to more quickly agree to terms, while at the same time facilitate monitoring by regulatory authorities, ISOs and market monitors to detect and prevent collusion. Public exchanges regarding outages or transmission system operations may permit buyers and sellers to better adjust their behavior, promoting more efficient purchase and production decisions. Private exchanges may offer some of the same benefits, but may not provide the protections that result from the dissemination of information to regulators, ISOs, market monitors, and consumers. Indeed, absent some sort of efficiency-enhancing cooperation, such as a joint venture among generators to operate a generating plant, private exchanges of information among competitors usually are treated skeptically by competition policy analysts.[80]

Third, the form of the private exchange, whether direct or indirect, typically has little bearing on the type of effects that arise from an exchange. Private information exchanges among competitors, for example, may facilitate coordination whether they are direct exchanges or whether they are indirect, going through a third party, such as a trade group or a commercial information aggregator. Whether exchanged directly or indirectly, private exchanges generally carry the risk of collusion and may not offer the broader benefits of providing information to those who would monitor and prevent the coordinate exercise of market power.

IV. THE BENEFITS OF INFORMATION

As the examples drawn from the FERC proceedings illustrate, access to market information yields many possible benefits and costs. I discuss the benefits at greater length in this section. In the following section, I discuss the costs.

A. Efficiency in Production & Consumption

Communication of information concerning market prices–and the factors that affect market prices–can make market participants' production, consumption, and investment decisions more efficient. Indeed, a key concern of the FERC and others since restructuring began has been to ensure that a sufficient amount of price information flows to market participants such that they can make economically rational decisions.

1. Price Information

A key benefit of price information is that it reduces producers' and consumers' search costs, which enhances economic efficiency. Absent knowledge of market price, a producer will not know how much to produce. It could search for market price through trial-and-error. However, if it guessed that the market price was higher than it was, it would produce too much; if it guessed that market price was lower than it was, it would produce too little. If the producer knew what market price was, it could arrive at its profit maximizing level of output

80. *Id.* at 40.

without incurring the over-production and under-production costs of trial-and-error.[81] Similarly, market price information can reduce consumers' search costs.[82] Absent knowledge of market price, a consumer could search for market price by contacting many sellers to compile a list of offers, eventually discovering the market price.[83] But if it knew market price up front, the consumer could avoid such search costs.[84]

In the case of electricity markets, enhanced market price information also can allow generators and consumers to make more efficient short-run decisions.[85] For example, a generator that owns a generating unit with extensive startup and ramping costs needs to know current expected prices over a period of several days to determine whether he will be able to cover those costs and operate profitably.[86] The same is true for electricity consumers: market price information can help them avoid costly over- and under-consumption.[87] Large industrial consumers, for example, need to know current and expected prices to make rational decisions about when and how much power to buy.[88] Information about future prices may allow them to shift their purchases to take advantage of low prices that will prevail at certain times of the day or year.[89]

Enhanced future price information enables generators and consumers to make economically rational long-run decisions.[90] Rational decisions by generators about maintenance, repair, and capacity additions depend on expected future electricity prices.[91] More accurate future price information also tends to make investment decisions more accurate, reducing costly over- or under-investment and production in the long run.[92] Similarly, decisions by consumers about maintaining, repairing, and upgrading electricity-consuming capital will depend on expected future prices, with more accurate information about future price promoting investment by reducing uncertainty, and also reducing costly over- or under-consumption in the long run.[93]

81. Richard A. Posner, *Information and Antitrust: Reflections on the Gypsum and Engineers Decisions*, 67 GEO. L.J. 1187, 1194 (1979).

82. *Id.* at 1194-95.

83. *Id.*

84. *Cf.* Andrew R. Dick, *Knowing Your Rivals Price: Some Guideposts for Evaluating Communications Between Competitors* 4 (U.S. Dept. of Justice, Working Paper No. EAG02-10, 2002). *See also* Theodore J. Kury, *The Impact of Transparency of Wholesale Markets on Market Participation: The Case of the U.S. Electricity Industry* 3-4 (2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2259225.

85. VON DER FEHR (2013), *supra* note 6, at 6.

86. *Id.*

87. *Id.*

88. VON DER FEHR (2010), *supra* note 6, at 4-5; VON DER FEHR (2013), *supra* note 6, at 6.

89. Dick, *supra* note 84, at 5.

90. VON DER FEHR (2013), *supra* note 6, at 7.

91. *Id.* (rational decisions about planned outages require future price information).

92. VON DER FEHR (2010), *supra* note 6, at 6.

93. *Cf.* VON DER FEHR (2013), *supra* note 6, at 7 ("[D]ecisions about investment (and divestment), whether on the demand or the supply side of the market, are based on how prices develop over time.").

2. Other Information

In addition to current and expected price information, several other types of information can enhance efficiency in production, consumption, and investment.

Price formation. When available future price information is not sufficient to allow efficient short run or long run decisions, additional information concerning price formation–i.e., information regarding the factors affecting price–may permit market participants to better form their own price expectations.[94] Electric power price forecasting, for example, typically involves forecasting other market variables, such as demand growth, planned outages, and net investment in capacity.[95] Historical and expected future values of these variables can help generators and consumers forecast future prices more accurately and make more efficient long run decisions.[96] Because it permits better forecasting, information related to price formation can reduce uncertainty, thereby promoting efficient investment.[97]

Estimates of common values. Information sharing among market participants can improve forecasts of "common values," which include industry aggregates such as industry supply or demand.[98] Pooled estimates of common values are likely to be better predictors than any one firm's estimate.[99] For example, exchanging information about estimated long-run demand, and pooling those estimates, may permit market participants to more accurately forecast future electric power demand.[100]

Historical firm performance. Historical firm information can promote efficient production. For example, historical information about the production processes, practices, and costs of individual generators can help other generators identify best practices, permitting them to benchmark their own performance.[101] Underperforming generators can use such information to identify and adopt more efficient production techniques, thereby reducing their costs and, ultimately, prices to consumers.[102]

B. Market Monitoring

Increased collection and dissemination of information can enhance competition and benefit consumers by facilitating more effective market

94. *Cf.* HOOPER ET AL., *supra* note 6, at 6 ("[A]gents need information about, and an understanding of, the determinants of price formation now and in the future.").

95. VON DER FEHR (2010), *supra* note 6, at 7-8; VON DER FEHR (2013), *supra* note 6, at 9-10.

96. VON DER FEHR (2013), *supra* note 6, at 9-10.

97. HOOPER ET AL., *supra* note 6, at 6.

98. David J. Teece, *Information Sharing, Innovation, and Antitrust*, 62 ANTITRUST L.J. 478-79 (1994).

99. *Id.* at 479.

100. *Id.*

101. *Cf.* Richard K. Lester & Mark J. McCabe, *The Effect of Industrial Structure on Learning by Doing in Nuclear Power Plant Operation*, 24 RAND J. ECON. 418, 436-37 (1993) (suggesting that information sharing by U.S. nuclear power plant operators might facilitate learning). Increased information flows also may promote innovation. *See, e.g.*, Teece, *supra* note 98, at 469-73. Or, they may facilitate standards setting, which may expand output by realizing network externalities. *Id.* at 473-77.

102. Dennis W. Carlton et al., *Communication Among Competitors: Game Theory and Antitrust*, 5 GEO. MASON L. REV. 423, 434 (1997).

monitoring by regulators and the public.[103] Formal market monitoring units, which have become a standard feature of restructured markets, have two key responsibilities: identifying and proposing remedies for market manipulation or undue exercises of market power, and identifying and remedying poor market rules.[104] Both of these require market information. For example, to determine whether a generator is exercising market power, a market monitor typically needs information about the generator costs, market prices, and other information about market conditions.[105] Similarly, to determine whether markets are being manipulated, a monitor may need data and other information concerning market transactions, including the profitability of, and reasons for, transactions suspected of improperly affecting market prices.[106] More information in the hands of market monitors may permit them to do their job more effectively, enhancing market performance and public confidence in the market.

Of course, a market monitor need not publish the market information it relies on to do its job.[107] It could meet its responsibilities while keeping the necessary information to itself, out of the hands of market participants and the public.[108] However, publishing market information, including information relied on by a market monitor to do its job, can permit the public to monitor markets, supplementing the monitor's oversight.[109] Another benefit of publishing market information is that if market participants know that information concerning their behavior will be public, they may be less inclined to manipulate markets or exercise undue market power.[110] For example, if information about an individual generators' offers into an ISO-run auction market will be made public, the generator may be reluctant to submit offers for a generating unit that substantially

103. HOOPER ET AL., *supra* note 6, at 6; Wolak (2005), *supra* note 75, at 15. This argument was made by the FERC in Order 2001, *supra* note 25, at 31,048 (implementing the EQR).

104. Some have argued the absence of a strong market monitor has been linked to significant exercises of market power. *See, e.g.*, Wolak (2005), *supra* note 75, at 4 ("Virtually all electricity markets around the world have experienced a sustained period with the exercise of significant unilateral market power. The markets that have fared the worst are those that did not have a prospective market monitoring process in place.").

105. *See generally* Paul Twomey, et al., *A Review of the Monitoring of Market Power: The Possible Roles of Transmission System Operators in Monitoring for Market Power Issues in Congested Transmission Systems*, 11 J. ENERGY LIT. 3 (2005).

106. *See, e.g.*, Shaun D. Ledgerwood & Paul R. Carpenter, *A Framework for the Analysis of Market Manipulation*, 8 REV. L. ECON. 253, 284-90 (2012) (describing screens that might be used to detect market power or market manipulation).

107. Par Holmberg & David Newbery, *The Supply Function Equilibrium and its Policy Implications for Wholesale Electricity Auctions*, 18 UTIL. POLICY 209, 219 (2010).

108. *Id.* at 218-19.

109. HOOPER ET AL., *supra* note 6, at 6 ("Substantial information availability to both market monitors and third parties assists in the detection of potential or actual exercise of market power and other anti-competitive behavior.").

110. *Id.* at 10; Ledgerwood & Carpenter, *supra* note 106, at 286-87 ("Knowledge of such oversight efforts will deter manipulative behavior at the times most critical to price formation, benefitting compliant market participants in the long run through the increased market efficiency derived from better certainty, improved transparency, greater liquidity, and reduced bid-ask spreads.").

exceed the units' costs for fear of drawing the attention of regulators, buyers, or the public.[111]

C. Other Benefits

There are at least three other potential benefits of increased information flows:

1. Enhanced Buyer Power

Greater information about sellers may give buyers the ability to shop more effectively, potentially offsetting seller market power. With more information about the universe of sellers and their sales terms, a buyer can avoid being locked into a smaller set of suppliers who might not offer the best terms or lowest prices available; and more information may permit a buyer to stimulate competition among sellers.[112] In wholesale electric power markets, for example, a centralized site that lists bilateral offers to sell or buy particular products may give buyers a better sense of the universe of sellers, permitting buyers to play sellers off against one another to secure lower prices.

2. Enhanced Consumer Understanding

A somewhat more subjective benefit is that greater transparency can promote better consumer understanding of power markets.[113] Absent information that allows consumers to understand market prices and reasons for changes in market prices, consumers may suspect manipulation or an exercise of market power by suppliers.[114] This, in turn, may lead to calls for unnecessary investigations.[115] If consumers better understand how market prices are determined, they may have greater confidence in markets and be less inclined to call for investigations of behavior that simply may be the result of normal market activity.[116]

3. Reduced Information Asymmetries

Information asymmetries can create a competitive disadvantage for less informed market participants, thereby discouraging participation in a market, reducing entry, and reducing new investment.[117] For example, merely as a result

111. HOOPER ET AL., *supra* note 6, at 6. In this sense, the publication of unit-specific offer information by a regulator (an indirect public information exchange) would serve as a "soft" price cap on offers into the market, which may serve to limit an exercise of market power.

112. *Information Exchanges Between Competitors Under Competition Law*, OECD, at 27-28, *available at* http://www.oecd.org/competition/cartels/48379006.pdf (last visited Sept. 19, 2014) [hereinafter OECD (2010)].

113. HOOPER ET AL., *supra* note 6, at 6.

114. *Id.*

115. *Id.* An equally plausible argument–for which there also is no substantial evidence–is that greater transparency may allow for unfair criticism of generators (or other market participants) on the basis of information related to generator behavior.

116. *But see* VON DER FEHR (2013), *supra* note 6, at 16 (expressing skepticism that detailed information regarding abuses such as insider trading and market manipulation needs to be made public). Some have argued that greater transparency may be a way of keeping regulators and market monitors, who may be subject to industry capture, honest, and permit them to demonstrate their independence. *See, e.g.*, HOOPER ET AL., *supra* note 6, at 11.

117. HOOPER ET AL., *supra* note 6, at 6.

of their size, large generators may have more information about future generating capacity than small generators because large generators control a greater share of capacity.[118] Allowing all participants access to the same information may increase trust in markets and market participation; this, in turn, may improve market liquidity and predictability.[119]

V. THE COSTS OF INFORMATION

More information is not always better. Transparency has costs that a policymaker should balance against its benefits before implementing a policy facilitating transparency. Among these costs are increased market power and decreased intellectual property creation, both of which can harm consumers by raising prices or inhibiting the introduction of new or improved products or production processes.

A. Market Power

One concern with increased access to market information is it can facilitate seller market power. Market power generally is considered to be the ability to price profitably above the competitive level.[120] The exercise of market power can harm market participants and the public more generally by transferring wealth from consumers to producers and by reducing output.[121] In the case of electricity markets, an exercise of seller market power, e.g., market power exercised by a generator selling electricity, would lead to higher prices for electricity, a wealth transfer from electricity consumers to generators, and a decrease in the amount of electricity consumed.

Generators can exercise market power in two ways: (1) by withholding output to increase price, and (2) by altering output to create transmission congestion to increase price.[122] In theory, either method can be implemented unilaterally by a single generator, or by two or more generators in coordination with one another. Although the focus of this section is on the exercise of market power by generators in the production and sale of electricity, sellers in related markets, such as capacity or financial transmission rights, also may be able to exercise market power.

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118. *See, e.g.*, VON DER FEHR (2013), *supra* note 6, at 10 ("[A] large generator knows more about future capacity availability than a small generator, simply because the former controls a larger part of total capacity than the latter.").

119. HOOPER ET AL., *supra* note 6, at 6. *But see* VON DER FEHR (2013), *supra* note 6, at 10-11 (expressing skepticism that providing equal access to all information can reduce inherent information asymmetries arising from size differences, and noting that market efficiency does not necessarily depend on "equal access to information by all market participants").

120. DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 642 (4th ed. 2005) ("A firm (or group of firms acting together) has market power if it is profitably able to charge a price above that which would prevail under competition, which is usually taken to be marginal cost."); STEVEN STOFT, POWER SYSTEM ECONOMICS 318-319 (2002).

121. STOFT, *supra* note 120, at 333-34.

122. *Cf.* Diana L. Moss, *Electricity and Market Power: Current Issues for Restructuring Markets (A Survey)*, 1 ENVT'L & ENERGY LAW & POL'Y J. 11, 15 (2006) (identifying means by which market power can be exercised). There are many other ways a generator could exercise market power. *See, e.g.*, STOFT, *supra* note 120, at 327 (describing method of exercising market power that involves forcing another generator to withhold).

1. Unilateral Market Power

There are two basic ways that a generator could exercise unilateral market power:[123]

Withholding. The potential harm arising from withholding output is easiest to understand in the context of a uniform price auction like the typical day-ahead or real-time market run by an ISO.[124] In such a market, every generating unit that clears in the market earns the (single) market clearing price. If a generator owns enough generating units that it can influence the market clearing price, the generator may find it profitable to withhold output from one or more units, restricting supply and raising price.[125] Withholding can be (1) physical, which involves taking a generating unit offline (e.g., by declaring an outage); or (2) economic, which involves offering to sell output from a generating unit at such a high price that it never gets taken in the market.[126] Either way, the result is a higher price for, and reduced consumption by, consumers.[127]

Creating congestion. A generator may strategically create transmission constraints to limit competition to raise electricity prices.[128] In a uniform price auction, a generator (or group of generators) with one or more generating units that are strategically located near key constraints on the transmission grid may find it profitable to alter output from a unit to fully utilize the capacity of the transmission grid, thereby limiting the amount of low-cost generation that can compete to supply a newly constrained area.[129] With limited supply, a generator may face less competition for electricity sales, enabling it to raise prices.

Greater information about a market may increase the likelihood of a unilateral exercise of market power, whether by withholding, creating congestion, or some other method.[130] For example, there may be times of the day or year when market conditions would make withholding more profitable than at other times of the year. During peak times of the year and day, supply may be sufficiently inelastic that even a slight decrease in output or a slight increase in congestion would result in a very large increase in price, enhancing the likelihood that a generator would attempt to exercise market power.[131] Alternatively, the

123. Paul Twomey, et al., *A Review of the Monitoring of Market Power: The Possible Roles of Transmission System Operators in Monitoring for Market Power Issues in Congested Transmission Systems*, 11 J. ENERGY LIT. 1, 10 (2005) (dividing withholding into "physical" or "quantity" withholding and "financial" or "economic" withholding; noting also the possible use of "[t]ransmission related strategies, which involves creating or aggravating transmission congestion in order to raise prices in a particular zone or node.").

124. *See, e.g.*, STOFT, *supra* note 120, at 319-22 (explaining withholding theory).

125. Moss, *supra* note 122, at 16-17.

126. *Id.* at 15.

127. *Id.*

128. Severin Borenstein et al., *The Competitive Effects of Transmission Capacity in a Deregulated Electric Industry*, 31 RAND J. ECON. 294 (2000) (constructing theoretical models that assess the incentive of generators to strategically congest transmission). They argue that a profit maximizing firm "may find it profitable to induce congestion into its area, thereby becoming a monopolist on any residual demand left unserved by imports from other regions." *Id.* at 295. In simulations of the California market, they show that "it is profitable for generators to reduce output and induce congestion." *Id.* at 317.

129. *Id.* at 295.

130. Moss, *supra* note 122, at 15.

131. *Id.* at 16.

profitability of a unilateral exercise of market power might depend on the operating status of a competitor's generating unit. Uncertainty about when those conditions exist may inhibit attempts to exercise market power. Increased information about when those conditions occur can reduce uncertainty about the profitability of withholding, increasing the likelihood that market power will be exercised.[132]

2. Coordinated Market Power

Generators may be more likely to coordinate the more information they have about one another or market conditions. Coordination refers to collusion between competitors on some dimension of competition, such as price, output, or territory served.[133] Generators could, for example, coordinate on withholding output to increase wholesale power prices. Collusion can be tacit or express.

Explicit Collusion. Explicit collusion refers to competitors directly communicating with one another, such as through phone calls or e-mails, to arrive at an agreement. The most obvious forms of explicit collusion involve two horizontal competitors meeting to agree to fix prices or output. Less obvious forms of explicit collusion involve horizontal competitors communicating indirectly with one another via public statements to reach an agreement on prices or output.

Tacit Collusion. Tacit collusion refers to the use of indirect communication, such as pricing and output decisions, to arrive at an agreement.[134] The quintessential form of tacit collusion involves oligopoly pricing. In a market with relatively few competitors, it may be possible for firms to jointly reduce output and raise prices above competitive levels merely by observing and reacting to the market behavior of one another.[135]

Collusion, whether "tacit or express, entails two fundamental problems."[136] First, competing sellers could agree to any one of a number of anticompetitive strategies to increase their profits. For example, suppliers could jointly agree to reduce output levels to improve their profits. This is how an oil cartel functions (when it works). The problem of identifying and agreeing on one of many possible strategies is referred to as *the coordination problem*.[137] Second, competing sellers face the *enforcement problem*; that is, for the agreement to persist, suppliers must be able to identify and punish firms that deviate from the agreed-upon strategy.[138] Each supplier has something to gain from collusion, but each supplier also may gain even more if it deviates from the jointly chosen strategy.[139] Because suppliers

132. *Cf.* VON DER FEHR (2010), *supra* note 6, at 13 ("more precise information about market conditions–including load configuration, availability of competing generators and transmission capacity–may facilitate the exercise of market power and thereby potentially undermine market performance.").

133. MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE (2004).

134. *Id.* at 141. Explicit collusion can take the form of naked price fixing agreements or other agreements that may indirectly affect price or some other dimension of competition.

135. *Id.* at 140-141.

136. HANDBOOK OF ANTITRUST ECONOMICS 307 (Paolo Buccirossi, MIT Press, 2008) [hereinafter Buccirossi].

137. *Id.*

138. *Id.*

139. *Id.*

cannot rely on the legal system to enforce an anticompetitive agreement, they must find some other mechanism to enforce their agreement.[140]

An increase in the exchange of market information among competitors can facilitate agreement, monitoring, and punishment; that is, it can help solve both the coordination and enforcement problems, increasing the likelihood of coordination.[141] Greater communication among firms will, of course, make it easier for firms to reach an agreement. Even when an explicit agreement is not possible (due to, for example, fear of detection by law enforcement authorities), shared information can help firms reach a tacit agreement.[142] For example, an exchange of information on markups of offers over costs might permit generators to tacitly agree to simple rule of thumb pricing involving markups over cost of some fixed amount. Or, an exchange of information about prices to be charged or output to be produced in the future may enable firms to reach an agreement as to joint output or a common price.[143]

Imperfect observability of coordinating firms' past actions can inhibit coordination.[144] Punishment can be triggered only if deviations from an agreement can be detected, i.e., only if past actions can be observed.[145] Information on past actions can facilitate collusion by reducing detection lags and uncertainty.[146] A detection lag means that cheating on an implicit agreement can be kept secret by the defector for some time, while a small probability of detection implies that a defector is likely to escape punishment.[147] In the case of electric power markets, for example, release of past offers for day-ahead or real-time markets may facilitate an agreement on offers that increases prices to consumers. Generators would be able to better identify and punish defectors from an agreement, which increases the likelihood that an agreement will be formed.[148]

B. Market Manipulation

Market manipulation can cause substantial harm to consumers and markets more generally.[149] Although there is some uncertainty about its precise

140. *Id.*

141. *Id.* at 308.

142. *Id.* at 307.

143. *Id. See also* MOTTA, *supra* note 133, at 153-56.

144. Kai-Uwe Kuhn, *Fighting Collusion by Regulating Communication Between Firms*, 16 ECON. POL'Y 169, 173 (2001).

145. MOTTA, *supra* note 133, at 139.

146. *Id.* at 151.

147. Per Baltzer Overgaard & H. Peter Mollgaard, *Transparency & Competition Policy*, THE PROS AND CONS OF INFORMATION SHARING 1, 5 (2006); *see generally* Kuhn, *supra* note 144.

148. A regulator may be able to release some firm-specific market information to the public while reducing the likelihood that it will facilitate coordination to mask, aggregate, and/or lag the release of firm information. Masking the identity of the firms whose information is being released, or aggregating the information of several firms before release, makes it more difficult for coordinating firms to identify who may be deviating from an agreement. Lagging the release of data also may make it more difficult for coordinating firms to promptly identify firms that deviate from an agreement, making it less likely that an agreement will be formed. *See, e.g.*, COMMENTS OF THE DEP'T OF JUSTICE, ANTITRUST DIVISION, NO. AD06-11-000, TRANSPARENCY PROVISIONS OF THE ENERGY POLICY ACT (2007), *available at* http://www.justice.gov/atr/public/comments/223049.pdf.

149. The activities of power marketers and generators during the California crisis, and the resulting electricity price increases and other disruptions, plainly appear to have caused substantial harm to consumers and

definition,[150] it is possible to identify at least two forms of market manipulation.[151] The first form of market manipulation involves fraud. A classic example is a market participant misreporting a transaction price that, in turn, distorts the price of a derivative contract (i.e., a contract whose price depends on the misreported price) or related contracts to the benefit of the market participant.[152] During the California crisis, for example, market participants falsely reported transactions to companies that compiled natural gas price indices in an effort to affect the indices which, in turn, directly affected the price of gas contracts and indirectly affected power prices to the benefit of the misreporting market participants.[153] Such manipulation often involves reporting misleading information to individuals or the public at large with the result that wealth is transferred from the misinformed to the fraudulent reporter.

The second form of market manipulation involves the creation or use of market power.[154] A classic example is a market "corner" or a "squeeze" whereby a market participant accumulates contracts for the delivery of a commodity that, in the aggregate, exceed the ability of other market participants to deliver at the competitive price.[155] This allows the participant to demand a higher price for the commodity at the time it is to be delivered.[156] The manipulator in this case has, in essence, accumulated market power in the market for delivery of the commodity, allowing him to demand a supracompetitive price for delivery.[157] Market-power based market manipulation does not differ in its effects from any other type of market power exercise, including the examples of withholding and strategic

others. That event contributed to Congress' enactment of the Energy Policy Act of 2005, which outlawed electricity market manipulation and gave the FERC tools to better police and remedy energy markets for manipulation. EPAct, *supra* note 3, § 1283. As codified, the FERC's anti-manipulation rules make it unlawful to use any "device, scheme, or artifice, to defraud" or "make any untrue statement of a material fact," or "engage in any act, practice, or course of business that operates . . . as a fraud or deceit upon any entity," in connection with the purchase or sale of electric power or transmission services. 18 C.F.R. § 1(c) (2010). For a brief review of the evolution of anti-manipulation laws and regulations regarding electricity markets in the United States, *see generally* Shaun Ledgerwood & Dan Harris, *A Comparison of Anti-Manipulation Rules in U.S. and EU Electricity and Natural Gas Markets: A Proposal for a Common Standard*, 33 ENERGY L.J. 1, 3-10 (2012). In the last few years, the FERC has investigated and imposed penalties on several market participants for market manipulation. *See generally* OFFICE OF ENFORCEMENT, FED'L ENERGY REG. COMM'N, 2013 REPORT ON ENFORCEMENT (Nov. 21, 2013).

150. Craig Pirrong, *Energy Market Manipulation: Definition, Diagnosis, and Deterrence*, 31 ENERGY L.J. 1, 3 (2010) ("Despite all of the attention paid to the subject of manipulation, precise definitions have proved elusive. . . . Courts also have found it a challenge to define what manipulation is . . . . Nor has Congress been able to define it with any precision."); Talis J. Putnins, *Market Manipulation: A Survey*, 26 J. ECON. SURVEYS 952, 954 (2012) ("The law and economics literature contains considerable debate about how to define manipulation.").

151. Pirrong, *supra* note 150, at 3 (arguing that there are two primary types of market manipulation, one involving fraud, the other, market power). *See also* Ledgerwood & Carpenter, *supra* note 106 (arguing that there is a third category, "uneconomic trading," that involves elements of fraud and market power).

152. Pirrong, *supra* note 150, at 5.

153. *See generally* FED. ENERGY REG. COMM'N, NO. PA02-2-000, FINAL REPORT ON PRICE MANIPULATION IN WESTERN MARKETS: FACT-FINDING INVESTIGATION OF POTENTIAL MANIPULATION OF ELECTRIC AND NATURAL GAS PRICES (2003).

154. Pirrong, *supra* note 150, at 3-5.

155. *Id.* at 3-4.

156. *Id.* at 4.

157. *Id.*

congestion of the transmission grid discussed above. As with any exercise of market power, it distorts price and harms society because it distorts commodity flows and results in a transfer of wealth to the manipulator from other market participants.[158] However, market corners and market squeezes are rarely discussed alongside withholding or strategic congestion with respect to electric power markets; more typically, they are discussed under the rubric of market manipulation.

The relationship between information dissemination and market manipulation has not been as well studied as the effect of information dissemination on the exercise of market power.[159] It is obvious, however, that some minimal degree of information is required to manipulate a market.[160] For example, to execute a corner, a trader needs to have some understanding of the aggregate ability of the market to deliver a commodity to be sure that he or she can accumulate a large enough contract position to affect the commodity's delivery price. It also is obvious that information flows may facilitate joint manipulation by two or more traders. For example, if two or more traders have information about the aggregate ability of the market to deliver, as well as their own positions, they will be in a better position to execute a corner jointly. Similarly, to execute a manipulation involving dissemination of false information, a trader needs to have some general understanding of the existing state of information concerning a market and the type of information that is likely to be believed by market participants. By disseminating false, but believable, information, the manipulator is able to affect market behavior to its benefit.[161]

C. Intellectual Property

Increased information flows concerning trade secrets or other intellectual property can diminish the incentive to create intellectual property, harming consumers.[162] A trade secret is proprietary information that has commercial value and that the owner wishes to conceal from competitors.[163] If competitors gain access to the trade secret, as might occur through public disclosure, the value of the trade secret to the owner will decrease: other firms will compete away the

158. *Id.* There arguably is some overlap between the notion of market power discussed in the prior section and the notion of a market power manipulation as discussed in this section. However, much of the literature treats classic market manipulation, such as market squeezes and market corners, separately from the unilateral or coordinated exercise of market power, such as might be exercised by generators. I take no position on whether such a distinction is appropriate. I discuss market manipulation separately from market power simply because much of the existing literature treats these notions as distinct from one another.

159. Putnins, *supra* note 150, at 963 (discussing market manipulation largely in the context of securities markets, concluding that "[w]e know little about: (1) the prevalence of manipulation, (2) its effects and (3) how it responds to regulation"). It seems fair to conclude that we know even less about manipulation in power markets than we do in securities markets.

160. Pirrong, *supra* note 150, at 5.

161. *Id.*

162. HOOPER ET AL., *supra* note 6, at 7 ("[I]n order to protect incentives to invest in innovations (technical, operational, administrative etc.) that cannot be protected by other means (e.g. patents) firms should not be forced to disclose information that undermines their ability to profit from such investment."). *Cf.* Gilotta, *supra* note 6, at 64-69 (arguing that public disclosure can encourage or discourage innovation).

163. DEBORAH E. BOUCHOUX, INTELLECTUAL PROPERTY: THE LAW OF TRADEMARKS, COPYRIGHTS, PATENTS, AND TRADE SECRETS 340 (2000).

profits the original trade secret holder could have earned had the trade secret remained undisclosed.[164] This, in turn, may diminish the incentive to innovate: a firm is less likely to invest in developing a new product or method of doing business if competing firms that have not incurred development costs can duplicate the product or business method because competition will prevent the innovator from recouping its investment.[165] If prospective innovators anticipate this, they may not innovate.[166] In sum, disclosure may have the *ex ante* effect of decreasing innovative activity: anticipating government disclosure, a firm may be reluctant to invest in developing trade secrets for fear of being unable to recoup sunk development costs.[167]

This argument was raised in the PECO Energy proceeding by generators who argued that the release of proprietary information, such as that related to carefully crafted contracts, would reduce the incentive to invest in the creation of intellectual property.[168] The development of a new contract, for example, which may be used in multiple settings, requires that the developer incur costs that it hopes to recoup by implementing such contracts in the future. If others can draft and implement such a contract, without incurring any development costs, then the *ex ante* incentive to develop the contract will be diminished, diminishing the likelihood the contract would have been developed in the first place.[169]

D. Other Costs

There are, of course, other costs to increased information flows that will depend on the type of information, who reveals it, and who receives it.[170]

1. Reduced Buyer Power

Although greater information about sellers gives buyers the ability to shop more effectively, greater information about buyers may also give sellers the ability to charge higher prices.[171] For example, if a regulator forces a retail utility or other load serving entity (LSE) to reveal to the public detailed information about its

164. *Id.* Unlike copyrights or patents, whose use are protected under the law, once a trade secret is made public the owner has no legal remedy for use by others. Government disclosure effectively nullifies the value of a trade secret and leaves the holder of the trade secret without a remedy against those who would use it.

165. WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 13 (2003).

166. *Id.*

167. *Id.*

168. *PECO Energy*, *supra* note 24, at 62,018.

169. *Cf.* HOOPER ET AL., *supra* note 6, at 7 ("to protect incentives to invest in innovations (technical, operational, administrative, etc.) that cannot be protected by other means (e.g., patents) firms should not be forced to disclose information that undermines their ability to profit from such investment"); VON DER FEHR (2013), *supra* note 6, at 21 (noting that a generator's incentive to develop improved price forecasting techniques may be diminished if it has to make information public that effectively reveals its forecast). Hooper's argument that such information should never be disclosed seems to be too absolute: it is easy to imagine situations in which disclosing some proprietary information (e.g., trading strategies to exploit market design flaws) may produce relatively large benefits by, e.g., facilitating market monitoring.

170. Although I do not discuss them in this article, other potential costs of increased information flows include "information overload," and "information distortion." VON DER FEHR (2013), *supra* note 6, at 20-22.

171. Timothy N. Cason & Charles R. Plott, *Forced Information Disclosure and the Fallacy of Transparency in Markets*, 43 ECON. INQUIRY 699, 713-14 (2005).

demand for electricity, generators may be in a better position to strike a more favorable agreement with the LSE, thereby raising electricity prices to the LSE and its customers. Although such information may arguably facilitate better planning and investment decisions by generators, which is a benefit as it could decrease electricity prices, the loss of bargaining power on the part of buyers, which might increase prices, would be considered a cost.[172]

2. Administrative Costs

Another important cost is that of administering and complying with an information policy.[173] To the extent the policy requires that private parties, such as generators, supply information to a regulator, these costs could include the costs to a regulator, for example, of designing electronic data systems to accept and maintain required data submissions from generators or others. They also would include the costs to generators of designing their own systems for collecting data, then assembling it in the appropriate form for submission to the regulator.[174]

VI. A COST-BENEFIT FRAMEWORK TO ASSESS AN INFORMATION POLICY

It is impossible to make any sweeping judgments about whether more information or greater transparency about wholesale electric power markets is desirable. Changes in access to market information yield costs and benefits, the extent and likelihood of which will depend on many factors. It is only in the context of a specific policy that an assessment of the net benefit (whether positive or negative) of a change in policy is even remotely possible. And even then, a full assessment typically requires a fact-intensive examination of the policy's potential effects. As a result, a policymaking entity, such as the FERC, an ISO, or a state public utility commission, deciding whether to implement a new information policy faces a potentially burdensome exercise. This section outlines an analytical framework that may reduce that burden.

There are many examples of information policies that might be assessed using this framework. For example, a typical information policy might involve mandating that certain information be collected by a regulator from market participants, such as generators, and then made public (an indirect public exchange), as in the PECO Energy and Order 2001 proceedings. Another example is a policy that mandates appropriate firewalls between generators that are partners in a joint bidding agreement (thereby inhibiting a direct private exchange). A final example is an ISO collecting and publishing generators' outage schedules (an indirect public exchange).

In principle, a policymaker could engage in a comprehensive analysis of all possible harms and benefits from a policy by collecting evidence concerning the policy's effects on market power, market monitoring, the incentives to create intellectual property, etc. Such an analysis can be very time consuming and resource intensive. A thorough analysis of a policy to collect and disseminate day-

172. *See, e.g.*, *id.* at 714 (reporting results of an experiment suggesting that if utilities are forced to reveal information about their demand to suppliers, the price utilities pay for electricity under privately negotiated contracts would tend to increase).

173. VON DER FEHR (2013), *supra* note 6, at 18-19; HOOPER ET AL., *supra* note 6, at 7-8.

174. VON DER FEHR (2013), *supra* note 6, at 18.

ahead market offers, for example, might entail considering whether dissemination enhances market efficiency in some substantial way. That is, does dissemination enable market participants to make better decisions about investment, production, or consumption? It might also entail considering whether the public would be able to use the offer information to determine whether rates are just and reasonable, whether undue market power is being exercised, or whether electricity markets are being manipulated. And that is just on the benefit side of the cost-benefit ledger. A consideration of the costs could require answering equally difficult questions.

The analytical framework proposed in this section is designed to help a policymaker avoid a full-scale weighing of all such costs and benefits unless absolutely necessary. The framework consists of a series of steps designed to help quickly screen out policies that are not likely to harm consumers, reducing the costs of assessing the policy. It focuses on the "marginal" or "incremental" effects of a proposed policy.[175] That is, what are the additional costs or benefits of the policy relative to the status quo? If the incremental benefits of a policy exceed its incremental costs, the policy should be adopted; alternatively, if incremental costs exceed incremental benefits, the policy should not be adopted. The framework focuses on those incremental costs or benefits that can be analyzed at a relatively low cost and/or are likely have a relatively large effect on competition or consumers.[176]

The framework consists of four steps:

Step 1. Identify the effect of the policy on the flow of information. If the policy does not affect information flows substantially, the analysis can end.

Step 2. Assess the costs arising from the policy. If incremental costs are not substantial, then the analysis can end and the policy can be implemented.

Step 3. Assess the benefits arising from the policy. If incremental benefits are not substantial, then the policy should not be implemented, and the analysis can end.

Step 4. If the incremental benefits and harms are substantial, then weigh them against one another. If the incremental benefits outweigh the incremental costs, then the policy should be implemented; if the benefits do not outweigh the harms, then the policy should not be implemented.

175. The incremental approach to assessing competitive effects is advocated by Carlton, et al., *supra* note 102, at 439 ("To determine whether a particular set of communication activities is or is not anticompetitive one must understand the practice, the market and the context in which the communication is occurring and then examine the likely incremental effect of any challenged communication.").

176. The framework proposed in this section is based on C. Frederick Beckner III & Steven C. Salop, *Decision Theory and Antitrust Rules*, 67 ANTITRUST L.J. 41 (1999), who advocate the use of decision theory, which "sets out a *process* for making factual determinations and decisions when information is costly and therefore imperfect." *Id.* Beckner & Salop recognize that gathering and processing relevant information can improve the quality of decision making, but information gathering and processing is costly. *Id.* at 46. Thus, additional information may reduce the likelihood of making a costly erroneous decision, but gathering and processing that additional information is costly. *Id.* According to Beckner & Salop, "[a] rational decision maker will try to minimize the sum of the two types of costs. This is the . . . key insight of the decision theoretic approach." *Id.* The authors argue that it can be more rational for a decision maker "to focus the inquiry first on a single issue (or a subset of all the issues) rather than learn more about all the issues simultaneously." *Id.* at 48. In this case, they argue, it tends to be more economical to learn about less costly issues and/or issues that are more likely to determine the decision. *Id.*

In principle, the first step should be relatively easy to implement and, if the effect of the policy on information flows is slight, avoid the burdensome task of identifying incremental costs and weighing them against incremental benefits. In practice, the four steps need not be executed in lockstep: as a policy is considered, evidence will accrue related to each of the steps, and information related to one step may inform judgments made in another step.[177] For example, a past history of coordination of output among suppliers may make the policymaker particularly wary of a policy permitting suppliers to exchange output information. The fact that market participants have coordinated in the past suggests that market conditions may make them predisposed to do so in the future. In that case, even if the policy involves a small increase in the exchange of information among suppliers about output, it may make sense to continue to consider the incremental costs and benefits of the policy.

In addition, the order of the inquiry, if strictly followed, may affect the ultimate determination.[178] And the inquiry might be structured slightly differently, in particular situations, to allow for consideration of the benefits first. For example, if considering an information policy in a new market where there is substantial uncertainty about the likelihood of market manipulation or an exercise of market power, one might adopt a strong presumption against transparency unless there are substantial benefits to avoid the potentially substantial consequences of an exercise of market power. Even if not executed in any particular order, however, the four-step framework–explained in greater detail below–serves to focus attention on key issues in a way that may reduce decision costs.

The framework I am proposing is a form of cost-benefit analysis (CBA), a term that has many meanings. In the strict sense, CBA involves three fundamental principles: (i) explicit valuation of a policy's costs and benefits, (ii) an evaluation of the policy's costs and benefits using consequential evaluation, and (iii) additive accounting to arrive at the net benefit of the policy.[179] In principle, this type of analysis is an objective method by which to identify policies that enhance societal welfare. If costs exceed benefits, welfare is diminished and the proposed policy should not be implemented. If benefits exceed costs, then one can be assured the policy will make society better off. The reality, however, is that it is almost impossible to implement a "pure" version of CBA.

When strictly followed, CBA can be criticized on many grounds.[180] First, it is extremely difficult to assess quantitatively the benefits and costs of a policy.[181] In the case of electricity market information policy, for example, it is virtually impossible to quantitatively assess the efficiency benefits that arise from making market prices more transparent to market participants. We generally understand

177. *Id.* at 47 (noting that "[g]athering information sequentially is not always efficient. Even where the relevant facts are distinct, there may be economies of scope to gathering facts on multiple issues simultaneously").

178. *Id.* at 47-48.

179. Amartya Sen, *The Discipline of Cost-Benefit Analysis*, 29 J. LEGAL. STUD. 931, 935-39 (2000).

180. Many works address the shortcomings of cost-benefit analysis, including Daniel H. Cole, *Law, Politics, and Cost-Benefit Analysis*, 64 ALA. L. REV. 55, 59-69 (2012).

181. *Id.* at 59.

that greater price transparency can enhance welfare, but we cannot quantify those benefits with any great precision. As a result, subjective judgments about costs and benefits almost always will play some role in assessing an information policy.[182] Second, CBA may ignore distributional considerations. Even if one could quantitatively assess all costs and benefits, they will be incurred by different individuals. For a given policy, some individuals or groups may disproportionately bear the costs, and others may disproportionately reap the benefits. For example, mandated disclosure to the public of power contracts may facilitate market monitoring to the benefit of the power-consuming public, but it may diminish the value of the intellectual property created by those who developed the contracts. Accounting for such distributional concerns and their effect on societal welfare is difficult, to say the least.

Despite its widely-recognized shortcomings, CBA can be a useful tool for assessing policy choices.[183] The framework I propose is not a "strict" form of CBA in the sense that all possible costs and benefits need to be quantified. Instead, it is a more general process for identifying and considering the relative costs and benefits of alternative policies to determine, to the extent feasible, whether or not costs exceed benefits. Merely identifying and articulating the reasoning behind a policy decision, as called for by CBA, is useful. It brings into the open the factors considered and the rationale employed by a policymaker so that, if nothing else, all interested parties have greater transparency into the decision process. However, as I explain below, the CBA framework I describe in this section has the added benefit of potentially reducing the costs associated with the decision process itself.

A. Incremental Information Flows

The first step in the process is to assess the incremental effect of the policy on access to information. It should be a relatively easy exercise for a policymaker to canvass the market to identify the type and amount of information currently available and then determine the likely effect of the policy on communications among regulators, market participants, and others. For example, if the proposed policy does not result in any change in the availability of information, but only encourages or results in the aggregation or re-packaging of existing information, then the policy likely has little effect on information flows. If the effect on access to information is small, any harms or benefits are unlikely to be substantial. On the other hand, if the policy has a substantial effect on access to information, the analysis should proceed to the next step.

182. *Cf. id.* ("The process appears straightforward enough, but appearances are deceiving. At virtually every step, subjective judgment calls are required.") (citations omitted). Cole also notes that the subjectivity inherent in CBA may lead it to be manipulated to achieve a desired result. Despite its shortcomings, Cole argues that CBA is a useful tool, stating that "[p]roblems of subjectivity and manipulability affect all decision tools, but in the absence of a formalized process such as CBA, assumptions and valuations are likely to remain unspecified and opaque, preventing policy analysts, the media, and interest groups from reviewing, challenging, replicating, or even simply understanding why a particular decision was taken, rather than some other decision." *Id.* at 69-70.

183. *See generally* Sen, *supra* note 179, at 934 ("[T]he ordinary procedure of considering, in a general way, the benefits and costs associated with alternative possibilities and then assessing their respective advantages is usable in a wide variety of problems . . . .").

The incremental effect of a policy on information flows will depend on the policy at issue and the existing state of information in a market. In some cases, the policy may have a very limited effect on access to information. A substantial amount of market information already exists about many wholesale markets administered by ISOs, which often publish large amounts of market data.[184] Indeed, one of the primary reasons for establishing an ISO or RTO is to improve market transparency and to facilitate efficient investment and consumption by market participants. A policy that merely encourages repackaging or aggregation of such pre-existing information likely will have a relatively small effect on information flows and likely could be implemented (or rejected) without a detailed inquiry into its costs or benefits. In other cases, a policy may have a relatively large effect on the availability of market information. For example, generators typically do not voluntarily publish their electricity market offer prices and quantities. A policy mandating that generators publish their offers for all to see may have a large effect on the availability of market information, which would call for further analysis of the policy's incremental costs and benefits.[185]

B. Incremental Costs

If a policy has substantial effects on information flows, the second step is to assess the policy's incremental costs. Two primary costs that are likely to be important are an increased likelihood of an exercise of market power or market manipulation and a reduced incentive to create intellectual property.

1. Effect on Intellectual Property Incentives

A policy that does not call for publication of information, but merely calls for reporting information to a regulator or market monitor, should not have any substantial effect on intellectual property creation. A trade secret loses its value only when competitors can take advantage of the intellectual property without incurring sunk costs to create the trade secret. If competitors do not have access to the trade secret, there should be little concern with diminished incentives to create intellectual property.

Publication of trade secrets, on the other hand, may have an effect on intellectual property creation. And these concerns may be heightened in newly-restructured electricity markets. As new markets arise, new methods or means of transacting in those markets also arise. For example, as California restructured, generation owners and generation operators developed highly complicated contracts to toll generating plants.[186] Developing the terms for the contracts probably required a substantial amount of time and effort, especially given that

184. William H. Dunn, Jr., Sunset Point, LLC, *Data Required for Market Oversight: A Concept Paper for the Electric Market Reform Initiative of the American Public Power Association*, 9-13 (Dec. 8, 2007), *available at* http://www.publicpower.org/files/PDFs/dunn2007.pdf (summary of price data published by RTOs in the United States).

185. For example, during the Order 2001 proceeding, discussed *supra* Section II.B.2, generators expressed reluctance to publishing electricity market offer prices and quantities. Implementation of the EQR, which mandated release of such data, substantially changed the amount of information available to the public about a generator's market activities.

186. Deng & Oren, *supra* note 15, at 941.

these contracts may have been the first of their kind in restructured power markets.[187] To mandate disclosure of such contracts may reduce incentives to develop innovative products. Thus, a policymaker may need to more carefully assess the incremental effect of disclosure on innovation in newly restructured markets. In more mature, well-established markets, on the other hand, concerns with the creation of intellectual property may be diminished.[188]

2. Effect on Market Power

Assessing the effect of an information policy on market power likely would involve a fact-intensive inquiry into the particulars of the policy and markets at issue. A common first step toward assessing market power is to identify relevant product and geographic markets[189] in which a change in information flows may affect the likelihood of an exercise of market power. There are, of course, many markets related to wholesale markets in which market power might be exercised, including physical and financial power markets, physical and financial transmission rights markets, ancillary services markets, and capacity markets. For example, three potential product markets are (i) wholesale power bought and sold in day-ahead or real-time markets run and administered by ISOs/RTOs, (ii) standardized wholesale power products bought and sold in bilateral or over-the-counter markets, and (iii) structured wholesale power products bought and sold in bilateral markets. Moreover, there are many possible geographic markets for each of these product markets. Depending on the product market at issue, geographic markets can be as broad as (or broader than) an ISO control area, or as narrow as a small geographic area determined by transmission constraints, as may be the case for locationally-priced electricity markets.

3. Susceptibility to Market Power

Once a relevant market is identified, the policymaker needs to determine whether the market is susceptible to an exercise of market power. If the market is not susceptible to an exercise of market power, then incrementally greater access to information is less likely to yield harm. For example, if entry into the market is easy, then any attempt to exercise market power by one or more incumbents in the market is likely to be defeated by entry. If that is the case, and there are no other adverse effects of the policy, the analysis can end. On the other hand, if the market has the characteristics of a market that is likely to be susceptible to an exercise of market power, then further analysis is warranted.

There is extensive literature identifying factors that affect the likelihood of an exercise of market power, and it generally supports the notion that increased information sharing by and among competitors may facilitate the exercise of

187. *Id.* at 946.

188. *Cf.* HOOPER ET AL., *supra* note 6, at 7 (expressing skepticism that electricity market data affects incentives to create intellectual property).

189. *See, e.g.*, Policy Statement, Inquiry Concerning the Commission's Merger Policy Under the Federal Power Act, 61 Fed. Reg. 68,595 (1996) (codified at 18 C.F.R. pt. 2) (noting that in the context of assessing market power arising from a merger that the FERC's "analysis of the effect on competition will more precisely identify geographic and product markets . . . .").

market power.[190] These concerns are particularly acute in the case of wholesale electricity markets, which have many of the characteristics that are associated with a susceptibility to an exercise of market power.[191] Two key characteristics are inelastic supply and inelastic demand. If demand elasticity is low, small reductions in output yield large increases in price, increasing the profitability and likelihood of a unilateral or coordinated exercise of market power.[192] If supply elasticity is low, reductions in output will not be met by large increases in output by other firms, increasing the profitability and likelihood of an exercise of market power.[193]

There are several other characteristics that may render a market susceptible to a coordinated exercise of market power, including the following:

Homogeneous products. If products are homogeneous, it will be easier for firms to reach an agreement on price, output, or some other dimension of competition.[194]

High concentration. The smaller the number of firms in a market, the easier it will be for the firms to coordinate.[195]

Difficult entry. The harder is entry, the more likely it is that collusion will persist. As entry occurs, the number of firms in the market increases, making it harder for firms to coordinate.[196]

Regular and frequent orders. Regular and frequent orders may allow firms to quickly detect and punish deviations from an agreement, increasing the likelihood of coordination.[197]

Multimarket contacts. Multimarket contacts can help make firms more alike and therefore increase the likelihood of collusion. Multimarket contact also may tend to increase the frequency of firms' contacts with one another,[198] which makes it easier for firms to monitor and punish deviations.

190. For a textbook treatment of the effect of information on market power (more particularly on market power exercised via collusion), see generally MOTTA, *supra* note 133, at 150-156 (2004); *see also* OECD (2012), *supra* note 69; OECD (2010), *supra* note 112.

191. HOOPER ET AL., *supra* note 6, at 7 ("The electricity market . . . fulfils [sic] all the preconditions identified by competition authorities . . . as giving rise to the potential for tacit coordination or abusive pricing arrangements." (citations omitted)); Frank A. Wolak, *Using Restructured Electricity Supply Industries to Understand Oligopoly Industry Outcomes*, 18 UTIL. POL'Y 227, 227 (2010) [hereinafter Wolak (2010)] (noting that power markets are characterized by high storage costs, finite transmission capacity, and inelastic demand, which render them susceptible to an exercise of market power); Frank A. Wolak, *Regulating Competition in Wholesale Electricity Supply*, *in* ECONOMIC REGULATION AND ITS REFORM: WHAT HAVE WE LEARNED? 195, 213 (Nancy L. Rose ed., 2014) ("It is difficult to conceive of an industry more susceptible to the exercise of unilateral market power than electricity. It possesses virtually all of the product characteristics that enhance the ability of suppliers to exercise unilateral market power.").

192. Wolak (2010), *supra* note 191, at 227.

193. *Id.*

194. MOTTA, *supra* note 133, at 146.

195. MOTTA, *supra* note 133, at 142-143. Also, the smaller the number of firms, the smaller the incentive to cheat on an agreement: a firm that is a large part of the market can reap only relatively small gains by cheating on an agreement as sales shift to it. Kuhn, *supra* note 144, at 172 (noting that punishment is larger the smaller the number of firms).

196. MOTTA, *supra* note 133, at 143.

197. *Id.* at 145.

198. *Id.*

These factors often are present in power markets.[199] For example, many electricity products are relatively homogeneous. Power sold in day-ahead or real-time markets for a particular hour is relatively homogeneous, with little difference between electricity supplied by one generator or another. Demand for electricity generally is highly inelastic, particularly in the short run.[200] Transmission constraints often limit the number of competitors available to supply electricity in the typical ISO market, which may result in highly concentrated markets. Entry can be difficult, with entry by large generating plants taking two or more years. Generators typically sell into ISO auction markets on a daily basis, making for regular and frequent interaction, potentially allowing for monitoring of an agreement and quick detection of deviations from an agreement. Finally, many generators participate in multiple markets: it is not unusual for the same generators to simultaneously participate in power, ancillary services, and capacity markets within the same ISO; moreover, it is not unusual for the same generators to participate in these markets in two or more ISOs. As a result, the potential market power costs associated with information flows in practically any electricity or related market should be carefully evaluated before an information policy is implemented.[201]

4. Forward Contract Positions

One final observation on assessing the incremental effect of information on market power: although there generally seems to be a fair amount of public information available in many RTO markets, one key piece of information that rarely is public concerns the forward contract position of generators. Scholarly work has identified and assessed the effect of forward positions on the incentive to exercise market power.[202] The intuition behind this work is simple: if a generator has sold a substantial portion of its expected output in the forward market at a fixed price, it has substantially less incentive to raise power prices. Indeed, if a generator has sold forward more power than it can economically generate in the long run (i.e., if the generator is "short" in the long run), it may be a net buyer in the market, possibly giving it an incentive to *decrease* power prices. And this is true not just in power markets, but also in related markets such as ancillary services and transmission rights markets. To put forward contract information in the hands of a competitor may facilitate collusion by giving that competitor insight into the incentives of its rivals, possibly making it easier for

199. *See, e.g.*, Severin Borenstein, et al., *Diagnosing Market Power in California's Restructured Wholesale Electricity Market* 6 (Nat'l Bureau of Econ. Research, Working Paper No. 7868, 2000), *available at* http://www.nber.org/papers/w7868.pdf; HOOPER ET AL., *supra* note 6, at 7.

200. *See, e.g.*, Wolak (2010), *supra* note 191, at 227 (power markets characterized by inelastic demand).

201. *But see* HOOPER ET AL., *supra* note 6, at 13 (suggesting that the risk of collusion should not justify "failure to release the types of information required by a competitive market").

202. *See, e.g.*, Holmberg & Newbery, *supra* note 107, at 215 (collecting cites to theoretical and empirical work concerning forward contracts). *See also* Ali Hortacsu & Steven L. Puller, *Understanding Strategic Bidding in Multi-Unit Auctions: A Case Study of the Texas Electricity Spot Market*, 39 RAND J. ECON. 86, 87 (2008) ("[F]irms cannot predict the equilibrium bids of their rivals with certainty because each firm possesses private information on their own forward contracts to supply power. These contract obligations determine the firms' net buy or net sell positions in the balancing market, and therefore affect bidding incentives. Because they are private information, these obligations generate uncertainty from the perspective of other bidders.").

them to agree (tacitly or expressly) to coordinate a reduction in output (or some other collusive strategy) designed to raise market prices. This suggests that any policy proposal related to the exchange of information concerning forward positions should be scrutinized closely.

5. Market Manipulation

As noted above, there generally are two types of market manipulation: fraud-based manipulation and market power-based manipulation. To some extent, all markets are susceptible to fraud-based manipulation, which typically depends on the spread of misleading information. Although the subject does not appear to have been studied to any extent at all, it is not obvious that increased "truthful" information flows would increase the likelihood of fraud-based manipulation. Indeed, the opposite would seem to be the case. Because fraud-based manipulation generally involves injecting false information into the market, an increase in truthful information would seem to be likely to help offset the effect of false information, diminishing the likelihood of fraud-based manipulation.

On the other hand, enhanced information flows may facilitate market power manipulation. Many of the factors that go into the consideration of "traditional" market power exercises (such as withholding or creating congestion) will also influence the likelihood of market power manipulation. Additional information concerning the conditions under which an exercise of market power might be profitable, such as information concerning the elasticity of market supply or market demand, may facilitate market power manipulation. To the extent that information flows enhance the ability of market participants to, all else equal, predict when a market power manipulation would be profitable, they should be considered a policy cost.

C. Incremental Benefits

If there are incremental harms, the next step is to evaluate the incremental benefits. These typically will be due to increased efficiency in production and consumption, increased effectiveness of market monitoring, or enhanced buyer power.

In certain circumstances, a policy that increases the amount of information available to market participants may have a large beneficial effect. To take a very simple example, a market in which there is little information about market clearing prices likely would benefit from a policy that increased price information available to market participants. Indeed, it has been argued that an important benefit of restructuring and the implementation of locationally-priced markets is that they encourage efficiency in production and consumption by sending more precise price signals to market participants.[203] Because market prices alone likely do not substantially increase the likelihood of coordination but likely do substantially increase efficiency in production, consumption, and investment, a policy

203. *See, e.g.*, Pennsylvania-New Jersey-Maryland Interconnection, et al., 81 F.E.R.C. ¶ 61,257 (1997), *order on reh'g*, 92 F.E.R.C. ¶ 61,282 (2000). In this order, which established PJM, the FERC stated that "the proposal will also send price signals that are likely to encourage efficient location of new generating resources, dispatch of new and existing generating resources, and expansion of the transmission system."

encouraging price transparency in these circumstances would be more likely to have marginal benefits that exceed marginal costs.

There also may be benefits in a market in which market power already is being exercised. In this case, a policy that encourages the dissemination of that information to consumers might enhance efficiency by facilitating "public" market monitoring, encouraging consumers to consider the ways in which market power is exercised and ways in which it might be remedied. The release of offer information, for example, may prompt academics and others to assess the causes of and cures for market power.[204] If market power already is being exercised and the risk that additional information will facilitate further market power is relatively small, the benefits of transparency may outweigh the costs in this circumstance.[205]

Finally, the market monitoring benefits of information flows to regulators and to the public may be larger in the case of new markets relative to more established markets. There is little doubt that electric power and related markets are complicated and difficult to understand. And this appears to be especially true in new markets where market participants may develop new products and means of transacting, which continue to evolve as understanding of the markets evolves. Moreover, the precise means by which a market participant might exercise market power or manipulate markets typically is not well understood *ex ante*; it often is the case that the precise mechanisms by which manipulation can take place do not emerge until participants and regulators have extended experience with the new market, its rules, and its relationship to other markets. As a result, the market monitoring benefits of a policy that enhances transparency may be relatively large in the case of newly-established markets.

D. Weighing Costs & Benefits

If there are substantial costs and benefits, the final step is to weigh them and implement the policy if its benefits outweigh its costs. It will, of course, be virtually impossible to develop any precise estimates of benefits and harms.[206] It may be possible to develop relatively crude estimates of the benefits and costs and weigh those costs and benefits. When a policy presents potential costs and benefits that may not be easily quantified, it may make sense to develop a simple presumption that unless the benefits substantially outweigh the harms (or vice-versa), information should not (or should) be released. Indeed, some have argued there should be a general presumption in favor of complete transparency, and those

204. *Cf.* HOOPER ET AL., *supra* note 6, at 11 (suggesting that collusion in England and Wales Electricity Pool was not worsened by publishing individual offer data as there were only two major price-setting generators, rendering tacit collusion relatively easy whether or not data was publicly available).

205. Some commentators argue that the monitoring benefits of transparency are so great that there should be a presumption in favor of releasing information to the public. *Id.* at 16 ("Data relevant to understanding and predicting market prices (wholesale, balancing and other key determinants of final prices) should be published unless there is a compelling case, either on cost, practicality, or commercial confidentiality grounds can be mounted against publication.") (citations omitted).

206. *Cf. id.* at 8 ("Even when it is acknowledged that the case for disclosure depends on the costs and benefits involved, establishing the magnitude of their values may be very difficult.").

opposed to transparency should have the burden of coming forward with evidence to overcome that presumption.[207]

Two examples of situations in which presumptions about harm might be useful concern direct exchanges of information among competitors and publication of detailed firm-specific information. First, competition policy analysts typically view private exchanges of information among competitors with skepticism. Such exchanges carry a much greater risk of coordinated market power than public exchanges, and because they do not offer the benefits associated with public exchanges, they seem more likely to have costs that outweigh any benefits.[208] If a proposed policy encourages or facilitates a private direct exchange, it may make sense to adopt a simple presumption that unless there are demonstrable and substantial benefits, the policy will not be implemented. Second, competition policy analysts also typically view exchanges (whether public or private) of detailed firm-specific information among competitors with skepticism. The more detailed the information, the greater the insight a competitor may have into the competitive strategies of its rivals, and the greater will be the risk of an exercise of market power (whether unilateral or coordinated).[209] If a proposed policy encourages or facilitates such an exchange, it may make sense to adopt a simple presumption that unless there are truly substantial benefits, the policy will not be implemented.

VII. CONCLUSION

Restructuring changed the type of information required by regulators, market participants, and the public for electric power markets to function effectively. This change has prompted a reconsideration of information policy, resulting in debates about the costs and benefits of transparency. One clear lesson that has emerged from these debates is that the effects of transparency on market participants and market performance can be complicated and difficult to evaluate, as they typically depend on the specific policy and the markets at issue. However, the use of a structured cost-benefit analysis, as I have outlined in this article, may reduce the cost of the decision-making process itself, while focusing attention on the more important effects of a proposed policy. Perhaps the most important lesson to emerge from debates about the role of information in electric power markets, however, is that transparency is not always the best policy. It is not always the case that more information in the hands of market participants, market operators, regulators, or the public, is beneficial. Transparency often comes at a cost. And rational, well-informed, publicly-defensible policymaking requires that the costs of transparency, as well as its benefits, be accounted for to the extent possible.

207. *Id.* at 9 ("[A] number of commentators have argued that the approach to transparency should start from the presumption of data release.").

208. OECD (2012), *supra* note 69, at 25 ("the economic literature associates with public disclosures a number of pro-competitive effects which are not associated with private communications.").

209. *See, e.g.*, OECD (2010), *supra* note 112, at 48-49.