

In the  
United States Court of Appeals  
For the Seventh Circuit

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Nos. 13-1674, -1676, -2052, -2262

ILLINOIS COMMERCE COMMISSION, *et al.*,

*Petitioners,*

*v.*

FEDERAL ENERGY REGULATORY COMMISSION,

*Respondent.*

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Petitions for Review of an Order of the  
Federal Energy Regulatory Commission.  
Nos. EL05-121-006, -008.

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ARGUED APRIL 22, 2014 — DECIDED JUNE 25, 2014

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Before CUDAHY, POSNER, and TINDER, *Circuit Judges.*

POSNER, *Circuit Judge.* It's been almost five years since we remanded this case to the Federal Energy Regulatory Commission. *Illinois Commerce Commission v. FERC*, 576 F.3d 470 (7th Cir. 2009). The petitioners who persuaded us to remand the Commission's order, which allocated costs for certain new high-voltage network transmission lines (consisting of the transmission lines themselves plus transformers, capacitors, and other ancillary equipment—for simplicity we'll

generally refer to the entire facility as a “transmission line”), are not satisfied with the order that the Commission issued on remand. For that order reinstated without change the order that we had vacated.

The petitioners are primarily the midwestern members of a Regional Transmission Organization (plus the Illinois Commerce Commission, which essentially is appearing on behalf of Commonwealth Edison, the largest electrical utility in Illinois) called PJM Interconnection. A Regional Transmission Organization is a voluntary association primarily of utilities that either own electrical transmission lines that comprise a regional electrical grid or generate electricity that is transmitted to the customers in the region. The association operates the grid on behalf of the members.

PJM has the largest peak load (the amount of electrical power expected to be provided for a sustained period of above-average demand) of any Regional Transmission Organization—also the largest population and the most transmission mileage. Its region stretches east and south from the Chicago area (northeastern Illinois) to western Michigan, eastern Indiana, Ohio, Kentucky, Tennessee, West Virginia, Pennsylvania, New Jersey, Delaware, Maryland, the District of Columbia, North Carolina, and Virginia. Most midwestern utilities, however, belong not to PJM but to an Independent System Operator (which is similar to a Regional Transmission Organization, however) called Midcontinent Independent System Operator, Inc. (MISO). As shown on the map (prepared by the ISO/RTO Council, [www.isorto.org/about/default](http://www.isorto.org/about/default), visited June 23, 2014, as were the other websites cited in this opinion), MISO operates in the Midwest, South, and some of the Great Plains states, in contrast to

PJM, which operates mainly in the mid-Atlantic region but also, though to a considerably lesser extent, in the Midwest. The Federal Energy Regulatory Commission’s order is addressed only to PJM, but MISO will play a bit role in our analysis.

### REGIONAL TRANSMISSION ORGANIZATIONS



What we’ll refer to as the western region of PJM consists of the parts of Michigan, Illinois, and Indiana shown on the map as being in PJM’s domain, along with all of Ohio. Electrical generating plants in the western region usually are close to the customers—Chicago, for example, a major electricity market, is ringed by power plants—and so in that region relatively low-voltage transmission lines (typically 345-

kilovolts) are adequate for serving most customers, although the region also has a number of high-voltage—765-kV—lines for transmitting electricity with greater efficiency, mainly from Indiana to customers in Chicago. The cities in the eastern region use even lower voltage (230-kV lines) than the cities in the western region, but most of the power plants are farther away from the customers than in PJM’s western region and therefore 500-kV lines are preferred even though more expensive; the reason is that higher voltage reduces the amount of electricity that is lost as a function of the distance over which it is transmitted.

The question presented by the petition for review is the extent to which the members of PJM in its western region (we’ll call these the “western utilities”) can be required to contribute to the costs of newly built or to-be-built 500-kV lines (we’ll call these the “new transmission lines”) even though the lines are primarily in the eastern part of PJM. Originally at issue were 18 such lines and related projects, expected to cost \$6.6 billion *in toto*. The number of new lines has dwindled to 12 (11 already built, the other under construction; but 3 more are under study). The current estimate of the total cost of the projects that have been or will be completed is \$2.7 billion.

PJM’s western utilities are unlikely to obtain a significant additional supply of electricity from the new transmission lines. The capacity of the western utilities to generate electricity is already ample—so ample that they transmit a great deal of their electricity to the eastern members of PJM to help them meet the heavy eastern demand for electricity. Because the demand for electricity is so much greater in PJM’s eastern subregion, it’s unlikely that much electricity will be

transmitted from the eastern to the western utilities via the new transmission lines.

Still, the western utilities may benefit from the new high-voltage transmission lines in PJM's eastern region, and to the extent they do they can be required to contribute to the cost of building the new lines. The Commission's order that we set aside five years ago made no effort to quantify those benefits, however; instead it allocated the costs of the new transmission lines among all the members of PJM in proportion to each utility's electricity sales, a pricing method analogous to a uniform sales tax. The Commission acknowledged that this was a crude method of cost allocation—which is to put it mildly, because without quantifying the benefits of the eastern projects to the western utilities it is impossible to determine what those utilities should be charged: charging costs greater than the benefits would overcharge the utilities, and charging costs less than the benefits would undercharge them. The Commission defended its approach by appealing to the difficulty of measuring the benefits that the western utilities would derive from the new lines. We considered that a feeble defense. We said that "FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members." 576 F.3d at 476. We acknowledged that "if [the Commission] cannot quantify the benefits to the midwestern utilities from new 500 kV lines in the East, ... but it has an articulable and plausible reason to believe that the benefits are at least roughly commensurate with those utilities' share of total electricity sales in PJM's region, then fine; the Commission can approve PJM's proposed pricing scheme on that

basis.” *Id.* at 477. But the Commission hadn’t met that standard either. So we remanded.

Almost three years elapsed before the Commission issued its order on remand. *PJM Interconnection, L.L.C.*, 138 FERC 61230 (March 30, 2012). A year later the Commission supplemented the order on rehearing, *PJM Interconnection, L.L.C.*, 142 FERC 61216 (March 22, 2013), and now, a year farther on, the western utilities are back before us, challenging the order on remand—which like the order we set aside prescribes “a region-wide postage-stamp allocation of the costs of new transmission facilities that operate at and above 500 kV.” *PJM Interconnection, L.L.C., supra*, 138 FERC 61230, ¶ 49. This is FERC-speak for allocating the costs of the high-voltage lines across *all* the PJM utilities, east or west, in proportion to each utility’s respective sales. Just as the price of sending a letter anywhere within the United States is the same, so the cost that an electrical utility must contribute to a 500-kV transmission line will, if FERC has its way, be independent of the utility’s location relative to the location of the transmission line.

The postal analogy is forced. Distance doesn’t figure in the price of a letter, because most of the costs of postal service are incurred in the postal facilities in which mail is sorted and in local pick-up and delivery service, rather than in the transportation of the letter between distant locations. Here we’re talking about the allocation of the huge costs of building high-voltage transmission lines that do not provide uniform benefits to all the utilities in the region in which the lines are built.

Much of the Commission’s order on remand is devoted to hand-wringing over how difficult it is to estimate the

benefits to PJM’s western utilities of the new 500-kV lines in the east (thus reprising its original order). Yet at the same time the opinion contains detailed dollar estimates of many of the benefits—but without explaining the basis of the estimates. Studies are cited from time to time, but the evidence and analysis on which they’re based are not described. Eventually the Commission threw up its hands and said in its order on rehearing that “500 kV and above transmission facilities provide a broad range of benefits, including reduced congestion, reduced outages, reduced operating reserve requirements, and reduced losses. These benefits radiate from the upgraded facility, and thus are spread throughout the PJM region.” *PJM Interconnection, L.L.C., supra*, 142 FERC 61216, ¶ 67 (footnote omitted). But how far they “radiate,” and how equally, and with what loss of effect as the distance grows are critical questions not answered in the Commission’s order. The benefits may “spread throughout” the entire domain of PJM without spreading equally, or even approximately equally, among the utilities that comprise PJM.

Of the four types of benefit listed by the Commission in the passage we just quoted, at least two—reduced electrical outages and reduced electricity losses—will definitely not be equally distributed between the utilities in the eastern region and the utilities in the western region. Outages in the eastern region will be reduced because the high-voltage transmission facilities will enable electricity to be transmitted with greater reliability within the region. But outages in the western region will be reduced only trivially. The flow of electricity in PJM’s domain is west to east except there is some flow the other way from eastern Indiana to the Chicago area. And the typical blackout or brownout occurs because of an outage in an individual transmission line or transformers, often

because of an overload or weather damage, and the outages will persist until those lines can be repaired, rather than being offset by a new supply of electricity, whether from west or east.

As for reducing losses of electricity attributable to the distance over which it is transmitted, the new high-voltage transmission lines will do that in the eastern region because high voltage is more efficient than low for transmitting electricity over long distances. The western utilities will benefit too, because they won't have to generate as much electricity to satisfy the eastern demand. And because PJM requires the western utilities to maintain reserve capacity (just as hospitals are required to install generators to provide a back-up supply of electricity should there be an outage) to make up for interruptions in the supply of electricity to the eastern utilities, a reduction in those interruptions as a result of the new high-voltage transmission facilities will enable the western utilities to reduce their reserve capacity.

Another benefit to the western utilities will be a reduction in congestion in their transmission lines if interruptions in transmission to the eastern utilities are reduced because transmission lines in the east will be transmitting electricity at a higher voltage. Transmission congestion occurs when customers' demand for electricity exceeds transmission capacity, resulting in what is called "curtailment": the grid operator does not allow additional supply to enter the grid because it would overload the lines. Curtailment is costly to the utilities because it means they're producing electricity that cannot be sold to their customers because it cannot be transmitted to them.

So some of the benefits of the new high-voltage transmission facilities will indeed “radiate” to the western utilities, as the Commission said, but “some” is not a number and does not enable even a ballpark estimate of the benefits of the new transmission lines to the western utilities. Consider two utilities, one in northern Illinois and one in southern New Jersey, whose peak-load capacity is the same. How likely is it that they benefit even roughly equally from a new 500-kV transmission facility in New Jersey? The New Jersey utility would obtain or deliver electricity using that facility; the Illinois utility could reduce its reserve capacity slightly because it would be less likely to have to help the New Jersey utility overcome an outage, as an outage would be less likely. Those are not equivalent benefits, though treated by the Commission as equivalent. The only explanation for why it did that is that having failed to conduct a cost-benefit analysis, it had no basis for treating the benefits as other than equivalent.

The western utilities go to the opposite extreme, arguing that their obligation to contribute to the cost of the new facilities should be limited to the percentage of their (that is, the western utilities’) electricity that flows through what is called a “constrained” transmission facility (one likely to experience an outage). This is called the “distribution factor” or “beneficiary pays” approach, in contrast to the Commission’s postage-stamp approach. The western utilities acknowledge that by enlarging transmission capacity the new facilities in the east will confer a benefit on them by reducing the constraint factor and consequent outage danger in the western subregion. They assign a very low dollar figure to this benefit, however, and the Commission has shown that

the figure is an underestimate. But it failed to come up with its own estimate.

One of the attorneys for the utilities remarked at oral argument that “utility executives and regulators have long struggled with how to quantify reliability benefits.” If one may judge from its opinions in the present case, FERC has given up the struggle. But it has done so prematurely, without demonstrating that even a rough estimate of the benefits to be conferred by the new eastern transmission facilities is impossible. Cost-benefit analysis is the standard method of valuing large public or commercial projects, and is hardly alien to the electric power industry. PJM for example in 2011 conducted a cost-benefit analysis of a \$100 million project to enlarge a 500-kV transmission line. It estimated costs and benefits over the first 15 years of the project’s life, discounted them to present value at an annual rate of 7.7 percent, determined the ratio of the present value of the benefits to the present value of the costs at 14.76, and approved the project. PJM, “MEP-B-11 Cost/Benefit Analysis” 3 (Nov. 3, 2011), [www.pjm.com/~media/committees-groups/committees/teac/20111103/20111103-2011-market-efficiency-analysis-results-update.ashx](http://www.pjm.com/~media/committees-groups/committees/teac/20111103/20111103-2011-market-efficiency-analysis-results-update.ashx). (On the methodology of cost-benefit analysis generally, see, e.g., *Cost-Benefit Analysis* (Richard Layard & Stephen Glaister eds. 1994), and for a short introduction, see Thayer Watkins, “An Introduction to Cost Benefit Analysis,” [www.sjsu.edu/faculty/watkins/cba.htm](http://www.sjsu.edu/faculty/watkins/cba.htm).) Of course it’s often difficult to obtain reliable predictions of costs and benefits, as long recognized in the extensive academic literature on cost-benefit analysis of big public infrastructure projects with long expected lives. See, e.g., Bent Flyvbjerg, “Policy and Planning for Large-Infrastructure Projects: Problems, Causes, Cures,” 34 *Environment & Plan-*

*ning B: Planning and Design* 578 (2007); Bert van Wee, “Large Infrastructure Projects: A Review of the Quality of Demand Forecasts and Cost Estimations,” in *id.* at 611; Roger Vickerman, “Cost-Benefit Analysis and Large-Scale Infrastructure Projects: State of the Art and Challenges,” in *id.* at 598. But the literature does not infer impossibility from difficulty, as FERC apparently does. Indeed, cost-benefit analysis has been used in more difficult cases than this one, for example where some of the costs or benefits are nonmonetary, see, e.g., John Rolfe, “Cost-Benefit Analysis—Some Practical Examples,” [www.cqu.edu.au/\\_\\_data/assets/powerpoint\\_doc/0014/23009/Rolfe-AGSIP-CBA-April-2007.ppt](http://www.cqu.edu.au/__data/assets/powerpoint_doc/0014/23009/Rolfe-AGSIP-CBA-April-2007.ppt), or where the costs are impossible to pinpoint but catastrophic risks exist. See index references to “cost-benefit analysis” in Richard A. Posner, *Catastrophe: Risk and Response* 316 (2004).

We do not suggest that postage-stamp pricing is appropriate only for the postal service. Our concern is with the absence from the Commission’s orders of even an attempt at empirical justification. The Commission *assumes*—it does not demonstrate—that the benefits of the eastern 500-kV lines are proportionate to the total electric-power output of each utility, no matter how remote the utility is from the eastern projects that the utility is to be made to contribute to the costs of. It is a method guaranteed to overcharge the western utilities, as they will benefit much less than the eastern utilities from eastern projects that are designed to improve the electricity supply in the east, though the western utilities will derive an incidental consequence that the Commission hasn’t tried to quantify. Contrast our wind-power decision, *Illinois Commerce Commission v. FERC*, 721 F.3d 764 (7th Cir. 2013), which upheld postage-stamp pricing of the transmission lines required to bring western wind-generated electri-

cal power to the MISO utilities. There was evidence that the lines would not yield highly disparate benefits to the utilities asked to contribute to their costs. See *id.* at 774–75. Indeed, the Commission had determined that the benefits from the new lines would be spread almost evenly across all the utilities. *Midwest Independent Transmission System Operator, Inc.*, 133 FERC 61221, ¶¶ 54–56 (Dec. 16, 2010). It made no such determination in the present case; as a practical matter, all it did was express a hope that things might turn out that way.

As an example of the unreality of that hope, consider the 500-kV project (eventually abandoned) called Branchburg-Roseland-Hudson, which was to be built in New Jersey at an expected cost of \$946 million. PJM refers to “20 thermal and reactive reliability criteria violations in Northern New Jersey,” and these are the only reasons given for the project. Under the Commission’s cost allocation, only about 12 percent of the cost of the project would have been paid by the two principal New Jersey utilities, while Commonwealth Edison would have had to pay almost 16 percent even though there was no suggestion that it had contributed more than trivially (1.26 percent was its estimate, though probably an underestimate because based on its “beneficiary pays” analysis) to those thermal and reactive reliability criteria violations.

The Commission relied heavily for its postage-stamp approach on an “ISO/RTO Metrics Report” published in 2011 by the Regional Transmission Organizations and their cousins the Independent System Operators. Only two pages of the report, however, refer to possible cost savings from PJM’s plans, which include the new 500-kV projects, to improve its grid. The discussion of those savings is cursory and

conclusional, as where the report says that “by planning for future reliability needs on a region-wide rather than a utility-by-utility or state-by-state basis, PJM’s Regional Transmission Expansion Planning (RTEP) process helps focus on transmission upgrades that meet reliability criteria and increase economic efficiency. Annual savings: \$390 million.” Not only are the calculations that yield the \$390 million figure not disclosed, but there is no indication of how the benefits of the increased efficiency are likely to be distributed across PJM’s region. Some of the savings that the report attributes to the new projects, such as greater generation capacity, appear to be irrelevant to utilities in the western sub-region, such as Commonwealth Edison, because those utilities don’t need additional generation capacity; the need is in the east.

In denying the petition of Dayton Power & Light (one of the western utilities challenging the Commission’s postage-stamp approach) for rehearing of the Commission’s order on remand, the Commission had repeated the statement in our opinion that “if [the Commission] cannot quantify the benefits to the []western utilities from new 500 kV lines in the east” it can nevertheless reinstate the order that we had vacated if it “has an articulable and plausible reason to believe that the benefits are at least roughly commensurate with” the western utilities’ share of electricity sales in the entire PJM region. *PJM Interconnection, L.L.C., supra*, 142 FERC 61216, ¶ 38. But even the modest goal of rough commensurability requires *some* effort by the Commission, as we insisted, to quantify the benefits. It hasn’t responded to that directive. Instead it says such things as that the western utilities “will make use of and benefit from” the new eastern 500-kV transmission lines. *Id.* ¶ 37. The Commission doesn’t ex-

plain how much use or how much benefit. Instead it points out unhelpfully that “flows on the transmission facilities that operate at or above 500 kV also can change over time.” *Id.* ¶ 47. Yes, but how likely is such change, when is it likely to occur, and how great is it likely to be? These questions the Commission ignores.

The Commission refers repeatedly to the fact that 500-kV transmission lines have an estimated useful life of 40 years, and it emphasizes that much can change over 40 years. That is indeed true—indeed a truism—but again unhelpful, as it offers no insight into the likely character or direction of change over that period. A lot of wind blows over the Atlantic Ocean, and maybe some day, as the Commission notes, that wind will generate electricity for Chicago, or for that matter Seattle. There are plans to build a large wind farm in the Atlantic Ocean off Cape Cod. See “Cape Wind Completing Geophysical Surveys; Aided by Four Massachusetts Companies,” May 12, 2014, [www.capewind.org/node/1751](http://www.capewind.org/node/1751). But there is nothing in the Commission’s opinions on remand concerning when the wind farm (which is controversial, and has been repeatedly delayed since it was first proposed in 2001, Katharine Q. Seelye, “Funds and New Timetable for Offshore Wind Farm in Massachusetts,” *New York Times*, Feb. 27, 2014, p. A16) will be built or whether any of its power is likely to be transmitted to PJM’s western utilities. We don’t see how the prospect of such a wind farm justifies making Commonwealth Edison pay more for a transmission facility designed to reduce outages in New Jersey than the two primary utilities serving New Jersey are required to pay.

Furthermore, the Commission, underlining what appears to be an aversion to cost-benefit analysis, ignores the need to discount future to present value in order to value a future benefit. Suppose it were certain (obviously it is not certain) that in 2060 Commonwealth Edison will derive a \$100 million benefit from an eastern transmission facility completed in 2020 (and thus reaching the end of its useful life in 2060) for which it was charged \$100 million that year. At a discount rate of 5 percent the present value of that future benefit would be only \$14.2 million.

The Commission states that since Exelon now owns not only Commonwealth Edison but also an eastern PJM utility (Baltimore Gas & Electric), Exelon’s “views of the benefits that these subsidiaries receive from the new high voltage connection lines will change over time as corporate structures change, blurring distinctions between Eastern and Western PJM.” *Id.* ¶ 48. But “corporate structure” has nothing to do with the benefits that the two subsidiaries will or won’t receive from the Commission’s cost-allocation system. Exelon will be delighted by the benefits that its eastern subsidiary receives but distressed at the costs that its western subsidiary will incur without corresponding benefits.

The Commission notes Dayton Power & Light’s argument “that all of the 500 kV and above lines at issue are hundreds of miles away from [Dayton Power & Light’s] system, and that it would be a near impossibility for lines located so far away to provide any meaningful role in reducing the number of momentary [outages] or outages of less than an hour experienced on the Dayton system.” *Id.* ¶ 58. (For remember that when electricity is transmitted over long distances, some of it is lost.) Dayton Power & Light adds that

“neither it, ComEd, nor AEP’s [American Electric Power’s] Ohio subsidiaries own any 500 kV facilities, yet these companies do not experience abnormally high outage rates on their transmission systems.” *Id.* To this the Commission’s only reply is that “Dayton admits that the Western PJM zones received some benefit from their integration into PJM.” *Id.* ¶ 79. But will any of the benefit from the *new* transmission facilities be in the western subregion? And if so, how much? We’d settle for a rough estimate. The Commission made no estimate.

In similar vein the Commission, while acknowledging that “western regions of PJM generally have sufficient generation,” quotes ComEd as saying that it “sought membership in PJM first of all because of the reliability benefits that membership would bring ... and the most likely source from which ComEd could import energy to prevent loss of load during system emergencies is PJM.” *Id.* ¶ 76. True. But from where in PJM?

By now it should be apparent that the basic fallacy of the Commission’s analysis is to assume that the 500-kV lines that have been or will be built in PJM’s eastern region are basically for the benefit of the entire regional grid. Not true; their purpose is to address specific reliability violations in the eastern part of PJM. No electric-power company would spend billions of dollars just to improve reliability in the absence of reliability violations that required fixing. There are bound to be benefits to the entire grid and therefore to the utilities connected to it, but they are incidental, just as repairing a major pothole in a city would incidentally benefit traffic in the city’s suburbs, because some suburbanites commute to the city. So they should pay a share of the cost

of repair, but a share proportionate to their use of the street with the pothole rather than proportionate to their population. The incidental-benefits tail mustn't be allowed to wag the primary-benefits dog.

The order on rehearing was approved by a 3 to 2 vote of the FERC commissioners. Commissioner Clark's dissent is particularly pointed. He denies that "there is sufficient evidence or reasoning in the record to find that benefits for utilities in the Midwest are even roughly commensurate to the costs incurred under the postage stamp methodology. Inasmuch as this is the case, I believe the Commission's decision has largely ignored the [Seventh Circuit's] clear directive." He notes that the new "transmission facilities were approved to resolve specific anticipated reliability violations in the East, not to increase the general system-wide benefits discussed in the Order on Remand or the Order on Rehearing." He points out that the Commission confuses benefits from belonging to PJM, which accrue to all the members (a member who doesn't benefit quits—this happens from time to time), with benefits from specific projects, noting succinctly that "avoiding overloads in northern New Jersey reduces outages first and foremost for those living in New Jersey."

We conclude, with regret given the age of this case, that the Commission failed to comply with our order remanding the case to it. It must try again. If it continues to argue that a cost-benefit analysis of the new transmission facilities is infeasible, it must explain why that is so and what the alternatives are. It has presented no evidence that postage-stamp pricing is an acceptable, or the only possible, alternative.

We acknowledge that the benefits of the new facilities to the western utilities may prove unquantifiable because they depend on the likelihood and magnitude of outages and other contingencies, and that likelihood and that magnitude may for all we know baffle the best analysts. If the Commission after *careful* consideration concludes that the benefits can't be quantified even roughly, it can do something like use the western utilities' estimate of the benefits as a starting point, adjust the estimate to account for the uncertainty in benefit allocation, and pronounce the resulting estimate of benefits adequate for regulatory purposes. If best is unattainable second best will have to do, lest this case drag on forever.

To summarize, the lines at issue in this case are part of a regional grid that includes the western utilities. But the lines at issue are all located in PJM's eastern region, primarily benefit that region, and should not be allowed to shift a grossly disproportionate share of their costs to western utilities on which the eastern projects will confer only future, speculative, and limited benefits.

The petitions for review are granted and the matter once again remanded to the Commission for new proceedings.

CUDAHY, *Circuit Judge*, dissenting. The issues presented here are practically identical with those that we dealt with in *Illinois Commerce Comm'n v. FERC*, 576 F.3d 470 (7th Cir. 2009) (“*Illinois Commission I*”). I filed a dissent in that case and I emphatically reiterate its contents here.

The majority has expressed a need for more precise numbers about benefits, burdens and a variety of other aspects. Now it has enhanced that need by suggesting the use of cost-benefit analysis (a method, some think, of dressing up dubious numbers to reach more impressive solutions). I will say preliminarily that I think the majority is under the impression that somehow there is a mathematical solution to this problem, and I think that this is a complete illusion. Despite the frequency with which cost-benefit analysis is used, it does not resolve the difficulty of accurately or meaningfully measuring the costs and benefits involved with these grid strengthening projects. Cost allocation, particularly at these extraordinarily high voltages, is far from a precise science, and there are no mathematical solutions to determining benefits region by region or subregion by subregion. See *PJM Interconnection, L.L.C.*, 142 FERC ¶ 61,216 (2013) (“Remand Rehearing Order”)(noting the difficulty of precisely quantifying future benefits); see also *Illinois Commerce Comm'n v. FERC*, 721 F.3d 764, 774 (7th Cir. 2013) (“*Illinois Commission II*”)(same). Both parties acknowledged this much at argument. Cost allocation is a judgmental matter and should be treated as such. E.g., *Alabama Elec. Co-op., Inc. v. FERC*, 684 F.2d 20, 27 (D.C. Cir. 1982) (explaining the cost causation principle in a different context). Cost allocation produces approximate results and requires selection of the most appropriate methodology among many, none of which are necessarily “right.” This is one reason courts should generally

be deferential to FERC's technical analysis; and, I think somewhat heretically, because the majority's notions of cost-causation and related technical concepts were not developed in a context of extra-high voltage projects forming a backbone framework, judicial precedents involving radically distinguishable arrangements, especially those involving lower voltages, are dubious guides to developing an appropriate methodology here.

In addition, the majority indulges in descriptions of many elements of the PJM grid and their functions without reference to any engineering evidence in support. For example, the majority claims that "the cities in the eastern region (of PJM) use even lower voltage (230 kv lines) than the cities in the western region, but most of the power plants are farther away from the customers than in PJM's western region and therefore 500 kv lines are preferred even though more expensive; the reason is that higher voltage reduces [line loss]." Such a statement is at best a vast oversimplification, and the comment that "it's unlikely that much electricity will be transmitted from the eastern to the western utilities via the new transmission lines" is based on ignoring the potential for future developments of generation and transmission.

In fact, the entire thrust of the majority is toward precise cost causation, even in the present case, where that is indeterminate or at least obscure. The effect of the majority opinion is to emphasize functional relationships of the fragments of PJM rather than its value as a unique whole. I do not agree with the majority (or the Commission) that postage stamp cost distribution is "crude." The reason ascribed by the majority for this deficiency assumes that some other methodology, like DFAX, can trace the benefits of additions

with precision—an ability convincingly rejected by the Commission. In fact, the postage stamp methodology is the only one that can be mathematically verified. Thus, if one knows the total cost of the improvements and the total amount of the electrical output, one divided by the other provides an unarguable dividend representing the uniform burden of the various segments. Other methodologies provide approximations, but no more. The majority cites *Illinois Commerce Comm’n v FERC*, 721 F.3d 764,774 (7<sup>th</sup> Cir. 2013), the “wind power decision,” as evidence of tolerance for postage stamp allocation but fails to indicate why that decision is not more broadly precedential for this one. In an elaborate effort to distinguish the very similar wind power decision, the majority underestimates the role of a ultra high-voltage backbone in equalizing benefits for all grid members. Why should not uniformity of benefit as provided by the postage stamp approach be the starting point in both cases?

In its critical analysis of an abandoned project in New Jersey the majority cites the alleged single reason for building the project (rather than benefits derived from it). The majority then, by recourse to a Distribution Factor Analysis (DFAX) approach, claims that the New Jersey utilities have been virtually unscathed while Commonwealth Edison has been grossly overcharged. Since this example does not even purport to measure respective benefits (but focuses on motives for construction), I am afraid that it compares apples to (abandoned) oranges. The majority apparently seeks to compare an *a priori* reason for building the line with benefits (*a posteriori*) derived from it.

In the next paragraph the majority repeats that our earlier opinion asked for an “articulable and plausible reason” to

believe that certain benefits exist, but rejects the Commission's efforts to provide one for alleged lack of obviously obscure detail. This goes far beyond the proper scope of judicial review. The majority derogates the prospect of harnessing ocean winds, minimizing the well-known efforts to establish a wind farm in the Cape Cod area on the grounds that that transmission project (like many, many others) is controversial. More importantly, the majority seems to devalue future impacts of projects lasting for a half century by improperly discounting future benefits.

I could go on reciting in the case of Dayton Power and Light the drumbeat for "precision," which is simply beyond human capability. I have the impression that the majority is charging the Commission with lack of commitment in pursuing a "two plus two equals four" solution, but the Commission is dealing with incommensurable forces and conditions as skillfully and honestly as it can. It has my sympathy as well as my respect.

The majority casually concedes the central point that Commonwealth Edison joined PJM for the dominant reason of improving its reliability, but in its unremitting pursuit of fragmentation it insists on identifying exactly the source of the reliability instead of recognizing PJM as an extraordinarily sophisticated centrally dispatched unit acting as a whole. Nowhere does Commonwealth Edison, in its pursuit of reliability, request a strengthening of *some part* of the grid, but apparently relies on the reliability that the entire grid provides. It should be no surprise that the Commission split on how to respond to the demands of the majority for more and more precision—specious or otherwise—and in the end the majority concedes that its demand for numbers may be

unobtainable and we may have to accept whatever the Commission can produce—whether second best, third best, or whatever. The majority even approves rejection of DFAX, but this was the very basis on which the protesters brought this lawsuit. The only inescapable requirement of the majority seems to be finality and an end to litigation; in that respect I certainly agree with the majority.

At one point the majority complains because the Commission fails to specify the degree of “radiation” from an upgraded facility and then recites with apparent authority a difference in benefits and lack of uniformity between the eastern and western utilities. Much of this is an effort to supply various details of electrical phenomena, much more the business of the Commission than of this court. The majority seems willing to pursue these details, as speculative and unsupported conclusions, and faults the Commission for not attaching precise magnitudes to its own bottom lines. This is not judicial review; it is manufacturing its own “evidence” as a substitute for the Commission’s but still seeking greater exactitude. In any event, since the majority seems to feel free to second guess the Commission, I will indulge in the same freedom (hopefully without too much violence to the *Chenery* principle) in proposing my own rationale for upholding the FERC proposal.

First of all, I think it makes a great deal of sense to start with the presumption that the costs of these extraordinarily high voltage lines ought to be allocated on a shared cost or postage stamp or “socialized” basis.<sup>1</sup> These extraordinarily

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<sup>1</sup> Indeed, the majority in *Illinois Commission I* acknowledged that a presumption of grid-wide benefits is appropriate for new projects because the grid is integrated and the benefits are inherently spread over the en-

high voltages are not commonly found in electrical transmission systems generally and, if they are found, they constitute what seems to be the backbone of an electrical grid. *See PJM Interconnection L.L.C.*, 138 FERC ¶ 61,230 (Mar. 30, 2012) (“Remand Order”). By that, I mean that they are capable of transmitting large quantities of bulk power long distances to make the entire grid more reliable and more efficient. *Id.* By their very nature their impacts are broader both geographically and temporally; that is, it’s much more difficult to pinpoint their exact benefits to some other part of the system or to confine them to what is going on today rather than tomorrow. *See* Remand Rehearing Order ¶ 67. In this proceeding, the Commission considered the application of cost allocation by Distribution Factor Analysis (DFAX) but rejected this approach for, I think, adequate reasons<sup>2</sup>—essentially that precise

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tire grid. 576 F.3d at 477 (“[FERC] can presume that new transmission lines benefit the entire network by reducing the likelihood or severity of outages.”); *see also Entergy Servs., Inc. v. FERC*, 319 F.3d 536, 543 (D.C. Cir. 2003)(noting that upgrades intended to preserve reliability are presumed to benefit the system as a whole). Given the backbone nature of these extra high-voltage projects, I think this presumption is even more compelling.

<sup>2</sup> Under the DFAX methodology, PJM selects the single most severe reliability violation for each project, models it on a 5-year period, and does not revisit the allocation even if changes occur to the system before or during construction. *See* Remand Order ¶ 41, 44. This method also bases allocations solely on who causes the need for the new project, and does not consider who will use the new line once it is built. *See id.* In other words, the DFAX method is based on limited and temporally inflexible information. Conversely, FERC found that the regional allocation method was adjusted every year to account for changes to the system, as well as use a 15-year projection which allows for greater planning for future developments affecting the grid. *See id.* ¶¶ 97, 117.

benefits and temporally limited impacts were impossible to determine with this approach. *See* Remand Order ¶ 37. On the other hand, the petitioners here base their entire case upon an application of this methodology. This is the essence of the case; I think the so-called DFAX methodology is appropriate for relatively lower voltage transmission, but it is unsuitable for the extraordinarily high voltage backbone for the reasons I have mentioned above. *Id.*

If we start with a presumption that the cost of extraordinarily high voltage transmission lines should be allocated on a shared cost or postage stamp basis, I see no reason to depart from that presumption here. The reasons on which the protesters rely are based on an application of the DFAX methodology, which the Commission has found to be inappropriate for reasons that no court should intervene to reject. *See id.* ¶¶ 36–47. In fact, I think that the rejection here illustrates the dangers of substituting the court’s findings in these technical matters for the Commission’s. In general, my view of starting with a presumption (rebuttable, of course) of shared costing for extraordinarily high voltage lines corresponds to the reality of the situation reflecting why the line is there and what its basic function is, namely to make the entire grid more functional.<sup>3</sup> *See id.* ¶ 21. The protests here

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<sup>3</sup> Reliability is not a middling concern—power outages and the more serious “cascading” outages are not uncommon. In 2003 a cascading outage in Ohio spread across several states, left over 50 million people and resulted in economic losses in the billions. *E.g.*, Mike Edmonds, *10 Years Later, Power Outages Still Cost U.S. Billions Each Year*, GridTalk (Aug. 14, 2013), available at <http://www.sandc.com/blogs/index.php/2013/08/10-years-later-power-outages-still-cost-u-s-billions-each-year>. Estimates put the annual cost of outages upwards of \$80 billion. *See* Kristina Hamachi LaCommare & Joseph H. Eto, *Understanding the Cost of Power*

are based on the approach of measuring the impact of the backbone network and attempting to target its broad effect to some subregion of the grid.

As a matter of equity, many tears have been shed here over the plight of Dayton Power & Light, and particularly, Commonwealth Edison (which, as the power supplier of the forum is singled out), but these utilities joined the system only a few years ago, even though they are many hundreds of miles away from the original PJM (which has been in business for many, many years and was unusually sophisticated as a centrally dispatched grid). Interestingly, neither Commonwealth Edison nor its parent Exelon is a party to this proceeding, which may reflect a less intense degree of objection to the outcome. Commonwealth Edison was well aware of the reliance on ultra high voltage transmission as a basic element in improving reliability in PJM, and Commonwealth Edison is significantly quoted by the majority as having been motivated to join PJM by its need for reliability benefits. Perhaps, Commonwealth Edison was surprised that the cost of any additions would follow a postage stamp basis rather than a DFAX basis, but I doubt that that possibility escaped them completely and I see nothing inequitable about requiring them to participate in the costs of these additions, which are basically for the benefit of the entire grid.

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*Interruptions to U.S. Electricity Consumers*, Lawrence Berkeley National Laboratory, (Sept. 2004), available at <http://certs.lbl.gov/pdf/55718.pdf>. Experts have estimated that the reliability savings from strengthening the transmission backbone, and thus the entire grid, could be as much as \$49 billion, annually. See Massoud Amin, *U.S. Electrical Grid Gets Less Reliable*, IEEE Spectrum (Dec. 30, 2010), available at <http://spectrum.ieee.org/energy/policy/us-electrical-grid-gets-less-reliable>.

This is the essence of my difference with the majority, which says the Commission’s “basic fallacy” is to assume that the 500 kv lines are for the benefit of the entire grid. I do not think this is a fallacy, and even Commonwealth Edison seems to recognize that reality. Commonwealth Edison came late to the party, and I think it is not unfair that they participate on a pro rata basis in these developments.

The majority also seems to be totally convinced of the position that, since the electrical flows at the moment are primarily from east to west, almost the entire burden should be placed on the eastern utilities; and in that regard my colleagues were very skeptical of the development of off-shore wind farms in the Atlantic Ocean or other such future developments in electrical generation and transmission, as a possible basis for reversing the flow of power in the future. I can only guess the specific prospects of offshore wind farms or other developments, or how these specific developments might affect the situation, but I certainly don’t think it is unlikely that there will be significant changes in electrical flows over these new facilities during the next 40 or 50 years when the facilities will be in operation. Confining the Commission to the DFAX methodology, which substantially restricts considerations of grid development over time, the protesters’ approach ignores the function and outlook of a high voltage backbone. *See* Remand Order ¶¶ 39, 41, 43, 111.

I suppose that the next version of things that we may get from back from FERC will be some sort of hybrid system, which would bow in the direction of what I think should be presumptive (namely, a postage stamp methodology for these extremely high voltage facilities), while maintaining some aspects of an approach that superficially conforms to

various radically distinguishable judicial precedents. In my opinion this will be unfortunate, since I firmly believe we should allow the FERC to be creative in addressing these unprecedented problems.

For these reasons I respectfully dissent.