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6 POWERING AMERICA: A REVIEW OF THE OPERATION
7 AND EFFECTIVENESS OF THE NATION'S WHOLESALE
8 ELECTRICITY MARKETS

9 WEDNESDAY, JULY 26, 2017

10 House of Representatives

11 Subcommittee on Energy

12 Committee on Energy and Commerce

13 Washington, D.C.

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17 The subcommittee met, pursuant to call, at 10:00 a.m., in
18 Room 2123 Rayburn House Office Building, Hon. Fred Upton [chairman
19 of the subcommittee] presiding.

20 Members present: Representatives Upton, Olson, Barton,
21 Shimkus, Murphy, Latta, Harper, McKinley, Kinzinger, Griffith,
22 Johnson, Long, Flores, Mullin, Hudson, Cramer, Walberg, Walden
23 (ex officio), Rush, McNerney, Peters, Green, Doyle, Castor,
24 Welch, Tonko, Loeb sack, Schrader, Kennedy, Butterfield, and
25 Pallone (ex officio).

26 Staff present: Elena Brennan, Legislative Clerk,
27 Energy/Environment; Jerry Couri, Chief Environmental Advisor;
28 Wyatt Ellertson, Research Associate, Energy/Environment; Tom
29 Hassenboehler, Chief Counsel, Energy/Environment; A.T. Johnston,
30 Senior Policy Advisor, Energy; Alex Miller, Video Production Aide
31 and Press Assistant; Brandon Mooney, Deputy Chief Energy Advisor;
32 Mark Ratner, Policy Coordinator; Annelise Rickert, Counsel,
33 Energy; Dan Schneider, Press Secretary; Sam Spector, Policy
34 Coordinator, Oversight and Investigations; Jason Stanek, Senior
35 Counsel, Energy; Madeline Vey, Policy Coordinator, Digital
36 Commerce and Consumer Protection; Evan Viau, Staff Assistant;
37 Andy Zach, Senior Professional Staff Member, Environment;
38 Priscilla Barbour, Minority Energy Fellow; David Cwiertny,
39 Minority Energy/Environment Fellow; Jean Fruci, Minority Energy
40 and Environment Policy Advisor; Rick Kessler, Minority Senior
41 Advisor and Staff Director, Energy and Environment; and Tuley
42 Wright, Minority Energy and Environment Policy Advisor.

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43 Mr. Upton. The Subcommittee on Energy will now come to order
44 and the chair would recognize himself for an opening statement.

45 So good morning. Last week, the subcommittee embarked on
46 its first hearing in our Powering America series where a panel
47 of witnesses share their diverse perspectives regarding the state
48 of the wholesale electricity markets. And during that hearing,
49 we heard directly from market participants who operate in all
50 seven of the nation's RTO and ISO markets. Today, I would like
51 to welcome representatives from the nation's grid operators and
52 invite them to share their thoughts regarding the current issues
53 and the challenges in their respective regional markets.

54 Americans have come to expect that electricity will always
55 be available when it is needed and it is the role of the grid
56 operators to make sure that this expectation is always met. RTOs
57 and ISOs play a vital role in the delivery of power from the
58 generator to the consumer, but it is a role that is largely outside
59 the public's view.

60 By operating and dispatching the transmission systems 24/7,
61 the grid operators must ensure that supply and demand is
62 continually kept in balance. In addition, they are responsible
63 for conducting long-term planning to reduce congestion on
64 existing transmission lines and to ensure that there is adequate
65 transmission capacity to reliably serve future electricity
66 demand.

67 So as we sit in the committee room today, the grid operator

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68 responsible for coordinating the movement of electricity in D.C.
69 is known as the PJM. In addition to serving the needs of 13 other
70 states including Michigan, and serving 65 million folks, PJM also
71 operates over 82,000 miles of transmission lines. And that
72 should provide a sense of the size and the importance of these
73 grid operators.

74 Along with the other six grid operators at the table today,
75 these RTOs and ISOs combined serve two-thirds of the nation's
76 population. However, as we heard from our witnesses last week,
77 there are concerns regarding the state of our nation's competitive
78 electricity markets. Some of the testimony focused on a specific
79 RTO function such as the complexities of the capacity market,
80 but we spent much of the time focused on broader issues involving
81 grid reliability, market competition, generator fuel diversity,
82 and whether certain baseload resources should receive financial
83 assistance to remain viable.

84 As our witnesses are aware, there are many involving
85 challenges currently facing the electricity industry. In a very
86 short period, we have witnessed significant changes in the market
87 supply and demand fundamentals and specifically weak growth in
88 electricity consumption combined with the availability of large
89 supplies of inexpensive natural gas. In turn, wholesale
90 electricity prices are now at near-record lows around the country
91 and these low prices have resulted in some generators being unable
92 to recover their costs. Notably, several states are advancing

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93 proposals to support at-risk nuclear plants that are unable to
94 survive on revenues from the energy and capacity markets alone.

95 The witnesses before the subcommittee today all operate
96 competitive markets, the dispatch generation across the country
97 based on lowest cost. They also now find themselves in the middle
98 of this policy debate involving changing technology,
99 environmental goals, and the effects of out-of-market actions.

100 Many are questioning whether the RTO and ISO markets can remain
101 competitive and perform all of their existing essential functions
102 while still tackling the new challenges in the faces of these
103 emerging trends.

104 So as our Powering America series continues, I look forward
105 to learning more about what is occurring in each of your regions,
106 hearing your thoughts regarding what, if any, reforms could assist
107 your efforts to achieve greater efficiencies, reliability, and
108 competition in your organized market.

109 And I yield the balance of my time to the gentleman from
110 Oklahoma, Mr. Mullin.

111 Mr. Mullin. Thank you, Chairman Upton, for yielding. I
112 just want to take a quick moment to recognize those that are here.

113 One of the witnesses today is Mr. Nick Brown who represents the
114 Southwest Power Pool. Southwest Power Pool is a regional
115 transmission organization whose members like Oklahoma Gas and
116 Electric and GRDA operate in my state and help provide power to
117 millions of Oklahomans.

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118 I want to thank all the witnesses for being here and look
119 forward to hearing your testimony as this committee evaluates
120 the state of our wholesale electricity markets and I yield back.

121 Mr. Upton. The time is expired, you yield back. I
122 recognize the ranking member of the subcommittee, Mr. Rush.

123 Mr. Rush. I want to thank you, Mr. Chairman, for holding
124 this important hearing today examining the operation and
125 effectiveness of the nation's wholesale electricity markets.
126 I must also commend you, Mr. Chairman, for following up last week's
127 very informative hearing where we heard from industry insiders,
128 with today's discussion consisting of regional grid operators
129 as these are the people responsible for administering the nation's
130 wholesale electricity market and managing the day-to-day
131 operations of the respective transmission systems.

132 Mr. Chairman, it has been some time since this subcommittee
133 has held comprehensive hearings on the Federal Power Act, and
134 I think these informative discussions greatly benefit all of our
135 members and will also help us make better, more informed decisions
136 when determining whether we need to update the Federal Power Act
137 or leave it as it is.

138 Mr. Chairman, one of the points that every one of our industry
139 panelists from last week's hearing agreed upon was the fact that
140 the nation's electricity grid has changed in recent years and
141 will continue to undergo dramatic transformations in the near
142 future. Whether spurred by state and federal policy, marketing

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143 forces, or consumer demands and behavior, we have seen significant
144 new trends taking place in the electricity market.

145 Mr. Chairman, consumers are driving many of these changes
146 as they demand new tools to more responsibly use energy both as
147 a way to save money and as a way to save their environment. Some
148 of these trends include greater demand for cleaner, renewable
149 sources of energy to compete with traditional fossil fuels, an
150 increase in distributed generation and demand response resources,
151 more energy efficiency initiatives and all the while demanding
152 lower energy costs. With all of these consumer-driven changes
153 there is also the debate as whether issues such as fuel diversity
154 and distributive energy make the grid more or less reliable, and
155 I look forward to hearing from our witnesses on this important
156 topic.

157 There is also the important issue of grid modernization and
158 grid security. As new and different sources of energy are
159 absorbed into the grid, it is important that we have the
160 infrastructure in place to get this new, cleaner energy from the
161 places where it is produced to the places where it is needed.

162 Congress should not only focus on streamlining regulations in
163 an environmentally safe and responsible way, but also, Mr.
164 Chairman, we should be -- but also on making sure that we provide
165 adequate investment into modernizing and securing the grid.

166 Mr. Chairman, the American people want to feel confident
167 that our energy infrastructure provides secure, reliable,

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168 sustainable energy while also understanding that the grid is safe
169 from attacks, whether those attacks mean cyber or physical,
170 natural or man-made.

171 So Mr. Chairman, I look forward to engaging today's
172 distinguished panelists on what they identify as the greatest
173 opportunities as well as the most difficult challenges that we
174 see in ensuring that we have a greener, cleaner, more integrated
175 21st century grid. And with that Mr. Chairman, I thank you and
176 I yield back the balance of my time.

177 Mr. Upton. Thank you. The gentleman yields back. The
178 chair would recognize the chair of the full committee, the
179 gentleman from Oregon, for an opening statement, Mr. Walden.

180 The Chairman. Well, good morning, Mr. Chairman and members
181 of the committee and our distinguished panelists. As you will
182 recall, last week we held our first hearing on the Powering America
183 series where we received testimony from a wide range of
184 electricity sector stakeholders. That hearing provided this
185 committee with the perspective, concerns, and ideas from the
186 individuals who participate in the electricity markets.

187 So today, we pick up where we left off and continue our review
188 of America's electricity system by hearing from individuals who
189 operate, actually operate, the electricity markets known as
190 regional grid operators, so thank you all for being here.
191 Regional grid operators, or RTOs and ISOs, are one of the options
192 Americans have to access reliable and affordable electricity.

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193 They accomplish this by performing a variety of functions ranging
194 from long-term transition planning services to overseeing
195 competitive energy markets where wholesale electricity is bought
196 and sold.

197 Now in my home state of Oregon and neighboring state of
198 Washington, similar grid operator functions are performed for
199 various consumer-owned utilities by the Bonneville Power
200 Administration or the BPA. BPA is a nonprofit, federal power
201 and marketing administration based in the Pacific Northwest and
202 is part of the Department of Energy. Past attempts have failed
203 to form an RTO for the states of Oregon and Washington which
204 encompass my Eastern Oregon district. That opposition, I should
205 tell you, remains strong today.

206 But given the size and scope of America's electricity system
207 it is safe to say that the job of regional grid operators has
208 never been easy, and looking at recent developments within the
209 nation's power sector it is apparent that the job is becoming
210 even more challenging. Thousands of different stakeholders
211 participate in the U.S. electricity system and many of these
212 stakeholders have differing and competing desires for how
213 wholesale electricity markets should be administered.

214 The RTOs and ISOs regulated by FERC have the difficult task
215 of deciding how to best manage and oversee energy markets in order
216 to provide power in the most affordable and reliable way for the
217 consumers they serve. RTOs and ISOs do not own any physical grid

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218 assets and they do not exist to create a profit. They act as
219 an independent, nonprofit entity and their goal is to effectively
220 orchestrate the generation and delivery of affordable electricity
221 across the bulk power grid by instantaneously matching power
222 supply with power demand for customers.

223 Today, we have a panel of RTO executives who bring a wealth
224 of experience operating organized electricity markets, and I look
225 forward to their ideas on how we can we best serve the needs of
226 the consumers we all need to take care of. Additionally, I look
227 forward to discussing other important issues with our witnesses
228 such as how RTOs and ISOs can accommodate state policies in the
229 areas they serve while preserving the competitive nature of
230 markets and how RTOs and ISOs can incorporate new forms of
231 generation onto the grid without compromising system reliability.

232 Even though many Americans may not understand the
233 complexities of wholesale electricity markets, one thing most
234 Americans do understand is the electricity bill that arrives in
235 their mailboxes each month. This is especially true for American
236 businesses who rely on affordable power to succeed and grow our
237 economy and jobs.

238 The goal of this committee and I think of the operators is
239 to make sure that consumers are always coming out as winners.

240 If we keep the consumer at the front and that is our goal when
241 making important policy decisions, I am confident that the U.S.
242 electricity system will continue to thrive and flourish and meet

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243 the needs of all Americans. With that in mind I am eager to
244 discuss how we can ensure affordable energy for consumers across
245 the country while also maintaining system reliability now and
246 in the future.

247 So Mr. Chairman thanks for the hearing. To our witnesses,
248 thank you all for participating. I got your testimony here.
249 We have a couple of subcommittees meeting at the same time as
250 you might imagine, so I will be in and out. With that if there
251 are other members on the committee that would like the balance
252 of my time I am happy to yield to them and, if not, I will yield
253 back to the chairman and thanks again.

254 Mr. Upton. The gentleman yields back. The chair will
255 recognize the ranking member of the full committee, Mr. Pallone,
256 for an opening statement.

257 Mr. Pallone. Thank you, Chairman Upton. This is the second
258 hearing on this subject in the subcommittee this month and just
259 like last week's hearing, Ranking Member Rush and I worked in
260 partnership with Chairman Upton and Walden to set up today's
261 hearing in order to provide us important and unbiased background
262 for future decisions.

263 I am pleased we have an opportunity to hear from those who
264 are entrusted to run the grid, the regional transmission
265 organizations, or RTOs. While versions of these independent
266 system operators have existed for decades, it was the Energy
267 Policy Act of 2005 that enshrined these organizations as central

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268 to the wholesale markets and these markets have yielded us many
269 benefits including some of the lowest prices we have ever seen
270 for electricity.

271 However, that doesn't mean that we should just turn a blind
272 eye to the question of whether these organizations are properly
273 positioned to address the many changes that are underway in the
274 electricity sector. RTOs make decisions every day that greatly
275 affect the market, its participants, and consumers. In some ways
276 they are more powerful on a day-to-day basis than the Federal
277 Energy Regulatory Commission, which is why we need to ensure that
278 RTOs are providing unbiased management of their systems and not
279 veering into the kind of policymaking that is the responsibility
280 of Congress and the States.

281 Today, RTOs have their work cut out for them. New
282 technologies, evolving policies, fuel market changes, and aging
283 infrastructure all influence the operation, reliability, and
284 resiliency of the grid, so too do changes in patterns and
285 distribution of electricity demand. All of these factors have
286 called into question the most basic tenets of ratemaking and
287 challenged the longstanding financial model for utilities. They
288 are also having an impact on wholesale markets with implications
289 for the competitive position of more traditional grid assets,
290 and I am sure we are going to hear more about these issues from
291 our witnesses today.

292 The growth of distributed generation and these new

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293 technologies are also creating opportunities for consumers and
294 their advocates to have a more active role in the electricity
295 sector. Consumers are driving policies at the state level
296 through the Public Utility Commissions and seeking input on
297 decisions that impact generation, distribution, and transmission
298 of electricity. Although consumers have not played a role in
299 RTO decisionmaking, it may be time to put in place formal
300 mechanisms to facilitate direct communication between consumer
301 advocates and the RTOs. And each of the organizations we
302 will hear from today operates differently. While they are all
303 administering wholesale markets, their governance structures,
304 market rules, state and regional policies, and relationships to
305 market participants and consumers are different. This hearing
306 gives us the opportunity to compare and contrast the different
307 approaches and to evaluate whether some approaches offer
308 advantages in managing the grid.

309 And keeping the electric grid operating is essential to our
310 economy and our safety, so the RTOs' focus on grid reliability
311 and resiliency is understandable, but these concepts are evolving
312 along with the new technologies and tools that have emerged over
313 the past decade. Reliability and resiliency are no longer
314 defined solely by transmission and baseload generation assets.

315 In some cases, I have seen transmission projects needlessly
316 rubberstamped in the name of reliability.

317 There is certainly other ways to address reliability than

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318 just gold plating the transmission system. Newer and bigger
319 transmission lines are no longer always the best or most cost
320 effective answer to the question of how we improve reliability.
321 It is time for the RTOs to begin to adapt to this new reality.
322 Distributed energy resources, renewable and otherwise, along
323 with efficiency and demand response are equally important. And
324 of course we certainly do need more interstate and interregional
325 transmission, particularly from the Great Plains to the rest of
326 the Eastern Interconnection. The lack of progress in this area
327 leads me to ask whether the approval process between regions is
328 working as effectively and efficiently as it should and whether
329 regions have become too balkanized and unable to work together
330 for the greater good.

331 So Mr. Chairman, I am pleased that we have been able to work
332 together on this hearing series evaluating our nation's
333 electricity market. Last week, we learned about the perspectives
334 of market participants and today have an experienced panel
335 representing our nation's RTOs. But what we have been missing
336 so far is an analysis of consumer perspectives. And there are
337 number of important issues impacting consumers that we must
338 consider including governance structure, cost recovery models,
339 and appropriate transparency, and I hope that we will commit to
340 holding such a hearing from the consumer perspectives in the near
341 future. That said, I look forward to hearing from the panel
342 and I yield back, Mr. Chairman.

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343 Mr. Upton. Thank you. With that, all member statements
344 have been completed. We are joined by great witnesses today and
345 we will start with 5 minutes for each one with Gordon van Welie,
346 president and CEO of ISO New England. Welcome. You need to
347 hit the mike button there.

348 STATEMENTS OF GORDON VAN WELIE, PRESIDENT AND CEO, ISO NEW
349 ENGLAND; NICK BROWN, PRESIDENT AND CEO, SOUTHWEST POWER POOL;
350 BRADLEY C. JONES, PRESIDENT AND CEO, NEW YORK ISO; RICHARD DOYING,
351 EXECUTIVE VICE PRESIDENT, MIDCONTINENT ISO; CHERYL MELE, SENIOR
352 VICE PRESIDENT AND CEO, ERCOT; KEITH CASEY, VICE PRESIDENT, MARKET
353 & INFRASTRUCTURE DEVELOPMENT, CALIFORNIA ISO; AND, CRAIG GLAZER,
354 VICE PRESIDENT, FEDERAL GOVERNMENT POLICY, PJM INTERCONNECTION,
355 LLC

356

357 STATEMENT OF GORDON VAN WELIE

358 Mr. Van Welie. Good morning, Chairman Upton, Ranking Member
359 Rush, and members of the subcommittee. Thank you for the
360 opportunity to appear before you this morning. As you said, my
361 name is Gordon van Welie. I am the CEO of ISO New England. And
362 the ISO was established back in 1997 and led to the creation of
363 wholesale electricity markets and the subsequent investment in
364 the region of some \$30 billion in electricity supply and
365 transmission infrastructure.

366 This has caused a dramatic change in how electricity is
367 produced and consumed and I believe this transformation is
368 accelerating. Wholesale markets have produced demonstrable
369 benefits for New England electricity consumers. For instance,
370 in 2016, New England's wholesale electricity markets cleared \$5.4
371 billion in revenues. This was the lowest since 2003 and down
372 from high water mark of nearly \$14 billion in 2008. During this

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373 period, emissions have decreased substantially, and since I last
374 appeared before this subcommittee the forward capacity market
375 has driven investment in approximately 5,600 megawatts of
376 additional generation in demand resources including energy
377 efficiency. I last appeared before the subcommittee in March
378 of 2013 to discuss the transformation of our power system
379 resources. At the time, I noted a pair of key issues. First,
380 the critical need for accurate price formation and performance
381 incentives in our wholesale markets to ensure reliable
382 electricity supply, and second, I stressed the importance of
383 adequate fuel infrastructure and supply arrangements. We now
384 have had an additional 4 years of experience to underscore the
385 importance of both issues.

386 I would like to update the subcommittee on these issues and
387 also speak to cybersecurity challenge. First, I would like to
388 comment on the issue of state-sponsored resources and their impact
389 on wholesale markets. The region is preparing to accommodate
390 an influx of state-sponsored, carbon-free resources. ISO New
391 England has proposed changes to our Forward Capacity Market to
392 ensure appropriate price formation and to accommodate the states'
393 policies. These changes will allow existing resources that are
394 seeking to retire to swap their capacity obligations with
395 state-sponsored resources. We believe that this is innovative
396 way to continue to utilize the wholesale market to ensure
397 reliability while gradually transitioning the region towards an

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398 energy supply with lowered carbon emissions.

399 We are currently discussing this proposal with our
400 stakeholders and intend to file the market rules with the FERC
401 in January of 2018. This proposal will likely accelerate the
402 retirement of uneconomic non-gas generators which are the
403 resources we currently rely upon when the region's gas pipelines
404 are constrained and unable to supply gas generators.

405 This leads me to the issue of fuel security which continues
406 to be a top priority for ISO New England. The region is
407 experiencing a major shift in the generation mix and we anticipate
408 this ongoing transition could lead to the retirement of
409 approximately a third of the generation fleet within the next
410 decade. The shift away from generators with onsite fuel to gas
411 generators relying on just-in-time fuel delivery has exposed the
412 limitations of New England's fuel infrastructure.

413 As I have previously testified, the constraints on the
414 natural gas transportation during very cold winters can lead to
415 reliability risks and price volatility in the wholesale market.

416 The transformation of the resource mix will continue to drive
417 additional retirements among gas generators and likely exacerbate
418 the effects of these pipeline constraints. In order to mitigate
419 the risk, New England market participants or the states will have
420 to invest in sufficient infrastructure and fuel arrangements and
421 the ISO may have to make additional improvements to the wholesale
422 market rules to incent these investments. The ISO is studying

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423 this fuel security risk and will report preliminary results in
424 October of this year.

425 Finally, the ISO is working to improve the safeguards for
426 our control center and business system infrastructure. We
427 recognize the volume and sophistication of the threats against
428 the electric grid are rising. I can assure the subcommittee that
429 we also recognize the importance of critical cybersecurity assets
430 that we operate and are constantly working to identify and address
431 these dynamic and evolving challenges.

432 Since I last appeared before the subcommittee, ISO New
433 England has made many operational and market-based changes to
434 meet the needs of our region. Market forces and public policy
435 decisions are impacting both operations and markets and the region
436 continues to require innovative solutions to ensure reliable,
437 environmentally responsible, and competitive electricity supply.

438 I believe that the collaborative governance and risk management
439 structures in place in New England will keep us on course to
440 navigate and meet these challenges. Thank you and I look forward
441 to your questions.

442 [The prepared statement of Mr. Van Welie follows:]

443

444 *****INSERT 1*****

445 Mr. Upton. Thank you.

446 Next, we are joined by Nick Brown, president and CEO of

447 Southwest Power Pool. Welcome.

448 STATEMENT OF NICK BROWN

449

450 Mr. Brown. Thank you and good morning, Chairman Upton and
451 Ranking Member Rush and all the members of the subcommittee.

452 My name is Nick Brown. I am president and CEO of Southwest Power
453 Pool, an organization for which I have worked 32 years. The title
454 of today's topic, Review of the Operation and Effectiveness of
455 the Nation's Wholesale Electricity Markets, I appreciate your
456 interest in that topic and I am here to tell you the wholesale
457 markets are functioning very well and very effectively.

458 In Southwest Power Pool we are focused on end use customers
459 and we focus a great deal of our attention in ensuring that our
460 benefit to cost ratio is large and increasing. Today it is
461 greater than 11:1 versus the cost of operation of our organization
462 across all reports of 14 states in the central part of the U.S.

463 We have over 83,000 megawatts of generation and our footprint
464 serving just shy of 55,000 megawatts of load, so obviously our
465 reserve margins are multiple of our minimum criteria and we are
466 very blessed that that portfolio is very diverse.

467 We have significant coal, gas, nuclear, a huge amount of
468 wind and continuing to grow, and hydro. In fact, this morning
469 I pulled up our website in real time, a typical summer day, and
470 our footprint 46 percent was coal, 28 percent wind, 19 percent
471 natural gas, 6 percent nuclear, 4 percent hydro, a very diverse
472 portfolio.

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473 Very important to understand that the wind in our footprint
474 has grown significantly over the past decade to nearly 17,000
475 megawatts. Nearly 17,000 megawatts. Also important is that
476 half of that came on line in the last 2 years. It operates
477 extraordinarily reliably and does so for a multiple of reasons.

478 I will tell you as an engineer with training in operations
479 and planning, if you had asked me 10 years ago if we would have
480 been able to reliably accommodate even half of that I would have
481 said no. Period. End of discussion. So how are we able to do
482 that today? There are specific reasons that we are able to
483 accommodate that magnitude of wind in a very reliable fashion.

484 First and foremost, over the last 10 years, we have invested
485 in nearly \$10 billion in transmission across our 14-state
486 footprint and that has been paid for under policies developed
487 by our regional state committee who is comprised of a commissioner
488 from each of our states who, collaboratively, through our
489 committee and their committee processes, determined a cost
490 allocation process to pay for that transmission. But for that
491 transmission we would not be able to accommodate in a reliable
492 fashion that magnitude of wind. Second, a day-ahead energy
493 and day-ahead unit commitment market, we are able to commit
494 generating units across that 14 states in a very, very reliable
495 fashion. And then third, we consolidated all of the balancing
496 authorities, more than 20, in our 14-state footprint, but for
497 any one of those being pulled out of the equation we would not

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498 be able to accomplish. Reliability is job one. We can
499 accommodate managing the system in a reliable fashion and we can
500 mandatorily from a reliability unit commitment perspective
501 maintain whatever generation is needed to protect reliability.

502 Second, I want to go on to cybersecurity. It is an interest.
503 It is a very, very high risk for our organization, but we are
504 subject to the standards of the North American Electric
505 Reliability Corporation. They require us to mandatorily comply
506 with those. We are heavily audited against those. They are
507 backstopped by the Federal Energy Regulatory Commission as are
508 our market rules and we are subject to penalties of up to a million
509 dollars a day per violation.

510 I believe we are in good hands, but the reliability standards
511 are a threshold. We focus on security far above minimum
512 reliability standards. I appreciate your time today.

513 [The prepared statement of Mr. Brown follows:]

514

515 *****INSERT 2*****

516 Mr. Upton. Thank you.

517 Next we are joined by Bradley Jones, president and CEO of

518 New York ISO. Thank you.

519 STATEMENT OF BRADLEY JONES

520

521 Mr. Jones. Thank you. Chairman Upton, Ranking Member
522 Rush, members of the subcommittee, thank you for having me here.

523 I am the chairman and CEO of the New York ISO. Prior to my
524 position as CEO of the New York ISO, I was the chief operating
525 officer of the Electrical Reliability Council of Texas.

526 New York has gone through significant changes much of the
527 country has. Social, economic, policy changes are driving
528 significant changes among each of these ISOs, and each of these
529 ISOs here before you have responded to those changes and have
530 built systems to ensure that they have the capability to maintain
531 reliable, safe operations of their systems as well as do so at
532 the lowest possible economic cost for their consumers.

533 I would like to highlight three of the critical functions
534 of the NYISO. First, the NYISO operates the bulk electric system
535 and does so under reliability rules that are set by the nation,
536 by the state, and by our regions. Second, we operate competitive
537 electricity markets throughout our regions to attain that lowest
538 possible cost for consumers. And third, the NYISO conducts
539 planning studies to ensure that we can guarantee reliability out
540 into the future not just for today.

541 Since 1999, the competitive markets in New York have
542 delivered consistently for consumers. Over \$7.8 billion over
543 the last several years have been returned back to consumers

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544 through the efficient operation of our systems. Now beyond
545 efficiency, since 1999, the creation of the NYISO, we have also
546 seen a significant reduction in air emissions. Carbon is down
547 by 43 percent from our generation fleet. Nitrogen oxides are
548 down by 87 percent and sulfur dioxide down by 98 percent in that
549 same period, significant track record. Yet, New York State
550 continues to be a national leader on the environment and clean
551 energy.

552 And at the NYISO we see a recognition as we move forward
553 to ensure this clean energy future that we have something we must
554 address. In our state we are beginning to recognize that we have
555 a state which is characterized by a tale of two grids, a grid
556 in Upstate which is primarily clean energy, nuclear energy, hydro,
557 wind, solar, all components that have low emissions and yet in
558 the south where much of our load is, over two-thirds of our load,
559 Downstate we have a grid which is characterized by over 75 percent
560 fossil fuel generation. In order to achieve our low
561 emissions and clean energy objectives we must be able to transport
562 that power. To move renewable power throughout our grid we have
563 to focus on the transmission system in New York. Now I need to
564 applaud FERC. FERC passed, several years ago, an Order 1000 which
565 has given the great opportunity to move forward on transmission
566 projects within our region.

567 We have two major transmission projects that are currently
568 underway and under consideration. One that moves power a

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569 thousand megawatts from left to right across the state and will
570 enable us to get more of our power out of the hydro resources
571 we have in the west as well as the wind resources we have in the
572 west. We also have another transmission project that is moving
573 from Central New York down into our load centers of the Lower
574 Hudson Valley, New York City, and Long Island.

575 Third, under consideration we are looking forward to working
576 with the Public Service Commission in New York to drive one
577 additional policy improvement. That is transmission from our
578 north country into the central part of the state so that we can
579 capture again renewable resources in that region. Achieving our
580 renewable future, which is set by our governor as a goal of
581 achieving 50 percent renewables by 2030, depends upon building
582 transmission in the state. We are making great progress thanks
583 to the work of the FERC so far and we will be making more progress
584 as we go forward.

585 In addition, we are working very closely with the state of
586 New York as an effective partner on analyzing the possibility
587 of integrating carbon directly into our markets. What I mean
588 by that is pricing carbon into the market dispatch, something
589 that at this time that I don't believe any other state is doing,
590 but certainly something that I believe most economists would
591 suggest is the best way to accommodate low carbon resources in
592 our markets.

593 We are very much at the beginning of this process. We have

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594 been working very closely with our state in a collaborative way.
595 Our market participants requested that we hire a consultant.
596 We hired the very renowned Brattle Group in to study this issue.
597 We hope in the next several days to release a major report on
598 the possibility of integrating carbon into our markets.

599 We think it is an extraordinary way that could, is very
600 promising for our future not only at keeping costs down for our
601 consumers, but also in doing so in a way that reduces carbon even
602 further than the current programs in place. So New York ISO,
603 much like these ISOs before you, have accommodated change, they
604 have led change. We will continue to do that in the future.

605 Thank you.

606 [The prepared statement of Mr. Jones follows:]

607

608 *****INSERT 3*****

609 Mr. Upton. Thank you.

610 Next, Richard Doying, executive VP for Midcontinent ISO.

611 Welcome.

612 STATEMENT OF RICHARD DOYING

613

614 Mr. Doying. Good morning, Chairman Upton, Vice President
615 Olson, I guess, in absentia, and Ranking Member Rush, and the
616 rest of the subcommittee members. I appreciate the opportunity
617 to talk to you today about the important topic of energy markets
618 and their effectiveness and efficiency.

619 I started at MISO in 2002 as we were developing the energy
620 markets, and we have seen significant change in the markets and
621 the resources since that time and I look forward to discussing
622 those changes with you and how the markets have adapted to deal
623 with those changes. I know the committee is interested in hearing
624 about retirement of generation coal and nuclear units as well
625 as increases in gas, increases in renewable energy, and I intend
626 to focus my remarks here today on just those issues.

627 As a brief introduction to MISO we are, as noted earlier,
628 a 501(c)(4), a public interest organization, so we exist for the
629 benefit of the consumers in our region to reliably operate the
630 system as well as to ensure the lowest cost delivered prices to
631 those customers. We operate about 175,000 megawatts of
632 generation across 15 states, serving about 42 million people.

633 As part of that we annually generate about \$3 million in benefits
634 for all of our consumers.

635 The industry is being impacted by a combination of
636 regulatory, political, and economic factors and we have already

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637 experienced a dramatic shift, changes in the MISO region. While
638 coal-fired generation supplied about 75 percent of the energy
639 consumed in the MISO region in 2005, it now accounts for less
640 than 50 percent, about 46 percent. While gas resources generated
641 about 7 percent of the energy consumed in the MISO region in 2005,
642 that number is now at 27 percent. And while renewables generated
643 and accounted for almost zero percent of our energy in 2005, it
644 now accounts for about 7 percent and it continues to grow rapidly.

645 The changes in that generation profile are due both to
646 changes in the generation portfolio that reduction in coal is
647 due in part to retirement of about 13,000 megawatts of coal within
648 the region, but it is also driven by economic factors primarily
649 the reduction in natural gas prices. If you looked at the natural
650 gas prices in 2005 and considered how far they would reduce by
651 2015 and the fact that gas would be a more economic fuel source
652 than coal, no one would have believed that that could possibly
653 be the case. But it has led to considerable change in the
654 generation resource mixes as well as the operation of the grid.

655 So how do markets adapt to those changes? We innovate.
656 We create new market products and new market services in order
657 to accommodate those changes in the resource mix and we continue
658 to innovate in order to address particularly renewables and the
659 increase in gas generation. So I will note three different areas
660 where that occurs.

661 One is we partner with our states as they conduct their

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662 resource planning to evaluate the generation portfolio that they
663 plan to bring forward in the future and to provide our planning
664 and oversight to make sure that they understand in an aggregate
665 basis across the broader region the implications of changes they
666 may be making in their portfolio and how that will affect the
667 operation of the grid in the market. We also facilitate
668 infrastructure investment and reliable grid planning. That
669 process has resulted in over \$26 billion of new transmission
670 infrastructure. An original portfolio of about \$5.6 billion
671 approved in 2011 resulted in 28,000 direct construction jobs and
672 about 50,000 jobs total.

673 We also work continuously to improve our markets, to innovate
674 the market design and products and services. We have a market
675 roadmap process where we work with all of our stakeholders
676 including states, including the load-serving entities,
677 generators as well as all other interested stakeholders, and that
678 includes changes that are directly related to the changes that
679 I noted in the generation mix in the region.

680 And I will give you just a couple examples of those.
681 Previously we introduced a new product that would allow wind
682 generators to participate in the market on the same basis as
683 thermal generators offering into the market and allowing dispatch
684 within the region in order to assure the most operationally
685 reliable as well as market efficient outcomes. More recent
686 examples of additional changes to address both the changing fuel

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687 mix as well as increasing gas would be new market capabilities
688 for combined cycle units which are very flexible and can offer
689 in multiple configurations into the market and that will allow
690 us to optimize the uses of those resources.

691 Finally, we work closely with other sectors such as the
692 natural gas sector and we will continue to do so as we go forward
693 and gas becomes more important. I hope my written comments and
694 introductory comments have been helpful to the committee in terms
695 of introducing these topics and I look forward to the
696 conversation.

697 [The prepared statement of Mr. Doying follows:]

698

699 *****INSERT 4*****

700 Mr. Upton. Thank you.

701 Cheryl Mele, senior VP and chief operating officer of ERCOT,

702 welcome.

703 STATEMENT OF CHERYL MELE

704

705 Ms. Mele. Good morning, Chairman Upton, Ranking Member
706 Rush, and members of the subcommittee. Thank you for the
707 opportunity to address you today and offer ERCOT's perspective
708 on the wholesale competitive markets. My name is Cheryl Mele
709 and I am the senior vice president and chief operating officer
710 for the Electric Reliability Council of Texas.

711 ERCOT manages the flow of electric power to about 24 million
712 Texas customers. This represents about 90 percent of the load
713 in Texas. We are a membership-based 501(c)(4) nonprofit
714 corporation governed by a board of directors and subject to the
715 oversight of the Public Utility Commission of Texas as well as
716 the Texas legislature. ERCOT is the only non-FERC jurisdictional
717 power market in the continental United States. We are subject
718 to the reliability and security standards set by NERC, and
719 maintaining this regulatory structure is vital and will continue
720 to bring the benefits of a reliable grid and vibrant market with
721 the lowest cost to the consumers of Texas that we serve.

722 ERCOT has an energy-only market. With limited exceptions,
723 generators are paid only for the energy they actually put onto
724 the grid. A number of enhancements have been made to ERCOT's
725 market since it was launched, but the core energy-only principles
726 have not changed. We continue to discuss further refinements
727 with stakeholders and regulators and to consider the appropriate

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728 role for the ERCOT market and operations in accommodating newer
729 technologies that may offer different characteristics whether
730 they are storage, additional renewables, flexible thermal units
731 or distributed generation.

732 Contrary to the national trend, we project an annual average
733 of 1.5 percent load growth over the next 5 years, and in recent
734 years the energy use in ERCOT has grown by an average of about
735 two percent annually. The generation fleet in ERCOT features
736 a diverse fuel mix including more wind than any other state.
737 We currently have over 18,000 megawatts of wind installed and
738 operating in ERCOT.

739 In 2016, the energy produced in ERCOT was predominantly from
740 natural gas plants at about 43 percent, followed by coal at just
741 under 29 percent, wind at 15 percent, and nuclear at 12 percent.

742 That continued load growth and new generation investments
743 support continued investment in transmission in the region. With
744 natural gas playing such a large role in our generation fuel mix,
745 commodity price of natural gas is the primary driver of the
746 wholesale prices in ERCOT. With consistently low gas prices and
747 ample reserve margins, the average wholesale price of power in
748 ERCOT has been very low in recent years. We recognize these low
749 prices effect generation owners' revenues and we are always
750 attuned to the reality and possibility of generation unit
751 retirements that could affect our reserve margin outlook.

752 Like all independent system operators, reliability is our

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753 primary measure of performance. We have successfully updated
754 our operations and market rules to reflect a changing grid and
755 we will continue to work with stakeholders as technologies evolve
756 or issues emerge. Through innovation, our staff and stakeholders
757 have shown an enormous capability to solve new and challenging
758 problems today and in the future. While not a market issue, we
759 are appreciative of and remain committed to our external
760 collaborations with relevant federal and state governmental
761 agencies, the industry, and national labs to enhance everyone's
762 cybersecurity posture. In conclusion, with healthy reserves
763 and low prices in ERCOT's energy-only market, continuing with
764 the current, predictable regulatory structure is important.
765 This allows us to be responsive to all of our regulators as well
766 as the consumer and market participants. We will continue to
767 collaborate to address future challenges and opportunities in
768 the ERCOT region and we will continually investigate the inputs
769 and tools needed to support reliability as the grid continues
770 to change. Thank you for your time today and opportunity to
771 appear before you.

772 [The prepared statement of Ms. Mele follows:]

773 *****INSERT 5*****

774 Mr. Upton. Thank you.

775 Dr. Casey, Keith Casey, vice president of Market &
776 Infrastructure Development, California ISO, welcome to you as
777 well.

778 STATEMENT OF KEITH CASEY

779

780 Mr. Casey. Good morning, Chairman Upton, Ranking Member
781 Rush, and members of the subcommittee. As you noted my name is
782 Keith Casey. I am vice president of Market & Infrastructure
783 Development at the California ISO, and I want to thank you for
784 the opportunity to be here to discuss the operation and
785 effectiveness of the organized wholesale markets in California.

786 We appreciate the committee's attention to this important issue
787 and my comments today will focus on what is working well in our
788 markets and, frankly, some candid discussion around some of the
789 challenges we are having.

790 Since the ISO started operations in 1998, we have almost
791 20 years of operating experience and have been evolving our
792 markets considerably since the Western Energy Crisis occurred
793 17 years ago. Our markets are in far better shape now than they
794 were then, and over the past 15 years have been yielding
795 significant benefits to our market participants. They have been
796 very stable and competitive.

797 In recent years, as I am sure many of you know, California
798 has established itself as a global leader in environmental energy
799 policies that are dramatically transforming the resource mix on
800 the grid. Today, renewables comprise about 30 percent of the
801 total energy produced in our markets and are on track to meet
802 50 percent by 2030, if not sooner. This transition from large

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803 station power to a more diverse and decentralized system has
804 created a new value proposition for the California ISO.

805 Our centralized energy markets are proving to be highly
806 valuable if not essential for successfully integrating and
807 managing a diverse fleet of grid resources. Indeed, our success
808 has encouraged other transmission providers in the West to join
809 our real-time market and form the Western Energy Imbalance Market.

810 That market currently serves five entities comprising
811 approximately eight western states and serves half the electric
812 load of the Western Interconnection. And we have seven other
813 entities that are planning to join the Western Energy Imbalance
814 Market over the next several years. Since its inception in
815 2014, the Western Imbalance Market has created significant
816 benefits not just for California, but for all the participating
817 entities. In addition to the wholesale market, California
818 provides significant value to market participants through
819 facilitating new resource interconnections to the grid and
820 developing long-term transmission planning. Both of these
821 functions have evolved significantly over the years to meet the
822 changing needs of the industry and ISO has used these processes
823 to connect 20,000 megawatts of renewables to the grid and approve
824 over \$7 billion in transmission investments. So
825 notwithstanding these successes, there remain significant
826 challenges to enabling the transformation of the grid. I will
827 highlight two of them. The first is to maintain the resources

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828 we need for essential reliability services during the
829 transformation of the electric grid; and secondly, to ensure the
830 transmission infrastructure needed to support the diverse set
831 of resources across the West can one day be developed.

832 Reliably integrating high levels of renewables into the
833 power system represents a significant challenge that requires
834 a complement fleet of resources that are highly dispatchable and
835 flexible to balance the system and balance the ramping challenges
836 that we face. We also need to make sure we maintain essential
837 reliability services like voltage support, frequency response,
838 and the ability to have a resilient grid that can respond reliably
839 to contingencies.

840 In the near future, California will need to rely primarily
841 on the natural gas fleet to provide these essential grid services.

842 However, as you have heard in testimony last week, the gas fleet
843 in California is under financial duress due to lower energy
844 prices, surplus capacity, and minimal bilateral contracting, and
845 as a result, conventional power plants are beginning to seek some
846 sort of backstop procurement from the California ISO to keep them
847 financially viable or indicating they will otherwise retire.
848 Currently, the ISO is working with the California Public Utilities
849 Commission and our stakeholders to explore regulatory market
850 options for addressing this problem.

851 Just quickly on the second issue which is with respect to
852 tapping the benefits of an expanded Western region. To date,

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853 the majority of California renewable resources are located within
854 state and are predominantly solar photovoltaic and relying too
855 heavily on one particular technology like solar PV exacerbates
856 renewal integration challenges and essentially can create
857 oversupply conditions at certain parts of the day and increase
858 ramping challenges for the ISO to manage.

859 So as California looks to achieve a 50 percent RPS it could
860 take advantage of the opportunity to tap into other high quality
861 renewables across the West, ultimately having a more diverse mix
862 of renewables to meet the RPS goal, will lessen the integration
863 challenges, and may ultimately prove more cost-effective for
864 California.

865 But of course building transmission across multi-states has
866 challenges. There has to be agreement on what the benefits are
867 to each state and ultimately how the costs of that transmission
868 will be shared. That is a significant challenge. It is one best
869 left to the states to resolve, but a major challenge nonetheless.

870 So in summary, I believe the market and grid services
871 provided by the ISO are continuing to provide high value to
872 enabling the transition to a low-carbon, modern grid and we will
873 continue to look for opportunities to enhance our market and
874 address the challenges I mentioned to you so we can continue to
875 yield the benefits. I thank you for your time and look forward
876 to your questions.

877 [The prepared statement of Mr. Casey follows:]

878

879

*****INSERT 6*****

880 Mr. Upton. Thank you.

881 Our last panelist is Craig Glazer, VP of Federal Government

882 Policy, PJM Interconnection, welcome.

883 STATEMENT OF CRAIG GLAZER

884

885 Mr. Glazer. Thank you, Mr. Chairman and Ranking Member
886 Rush. I am Craig Glazer on behalf of PJM. We operate in 13 states
887 from Chicago to North Carolina up to the New York border. I want
888 to start with a personal promise. That is to -- we have operators
889 who have been keeping the lights on in your district, Mr. Chairman,
890 and Mr. Rush's district, Mr. Griffith's, Mr. Johnson's, Mr.
891 McKinley's, Mr. Doyle's district, and I will just give you my
892 personal promise. We will continue to work as hard we can to
893 keep those lights on and keep prices low.

894 Now it was the author Stephen Covey instructed us in his
895 book, The 7 Habits of Highly Effective People, it is sort of a
896 favorite quote of mine where he says the main thing is to keep
897 the main thing the main thing. It is sort of a favorite quote,
898 the main thing to keep the main thing the main thing. And in
899 the case of PJM, Mr. Chairman, Steve Covey's main thing can be
900 summarized in a couple of words. Investors are investing in new,
901 innovative generation in our region. It is funding the
902 all-of-the-above strategy that many people in Congress have
903 talked about. And the generation fleet as a result is more
904 diverse than it has ever been, more reliable than it has ever
905 been, and prices are lower than it has ever been.

906 But I am not asking you to take my word for it. If you had
907 a chance, if we could take a drive around the region we could

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908 start out to show you some of this diversity. We would start
909 out in Mr. McKinley's district.

910 [Photo.]

911 Mr. Glazer. This is the new coal facility known as the
912 Longview Power Station using state-of-the-art coal technology.

913 Okay. Then as we continue that drive around we would find we
914 could go to Cecil County, Maryland.

915 [Photo.]

916 Mr. Glazer. This is an example of a natural gas plant that
917 is self-supplying municipal load. I know we heard a lot about
918 that. This plant is doing that very thing and depending on the
919 PJM market to do it.

920 [Photo.]

921 Mr. Glazer. We then drive over to near Mr. Latta's district,
922 the Fremont Energy Center, another new, another state-of-the-art
923 natural gas facility that is self-supplying another municipal
924 customer.

925 Just to show you the diversity, we could then take a trip
926 to Laurel Mountain, West Virginia.

927

928 [Photo.]

929 Mr. Glazer. You would find a major wind facility there as
930 well as a new, innovative battery facility all of which are
931 depending and selling their output into the PJM market.

932 And frankly, as part of the sort of expect the unexpected,

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933 we could end up near Mr. Rush, near your district that the Shedd
934 Aquarium in Chicago.

935 [Photo.]

936 Mr. Glazer. That is actually using, studying using its
937 pumps at the aquarium to sell into our frequency regulation market
938 as well as they vary the pumps. So a lot of innovation and a
939 lot of diversity that is out there.

940 Now I don't want to mislead you. We at PJM have challenges
941 like everybody else and I hope we can talk about some of them
942 in this hearing. They include enhancing grid resilience,
943 reforming price formation rules, determining and rewarding the
944 attributes of what has come to be called baseload generation,
945 accommodating state policies that was mentioned before, and as
946 was also mentioned before, continually being on the top of our
947 game when it comes to cybersecurity.

948 But the bottom line or, as Mr. Covey said, the main thing
949 is investors are investing, consumers are enjoying the lowest
950 electricity prices, and our system is more diverse and reliable
951 than it has ever been. That is a testimonial to a lot of people.

952 One is those operators that were there this morning when your
953 constituents woke up and will be there tonight when go to sleep
954 to ensure that the lights stay on. It is also a testimonial to
955 our stakeholders, to our regulator.

956 I want to give a shout-out to the Federal Energy Commission.
957 It is a very professional regulatory agency. I was a former

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958 regulator myself. I wish I had some of the staff that we had
959 at the Federal Energy Regulatory Commission. And a shout-out
960 to the Congress which in this very room devise policies that have
961 enabled this nation to move to a competitive market model which
962 I would posit to you with all kinds of issues around it, but I
963 think overall has served this nation well.

964 We can argue about this market rule with that market rule
965 and legitimately have those discussions and frankly we are our
966 own harshest critics in PJM many times on these issues. But I
967 think when I go back and reflect on the hearings, as many witnesses
968 have stated the Federal Power Act and the competitive market model
969 has served the nation well and would urge everybody to keep that
970 in mind as we debate some of these other issues.

971 So thank you and I look forward to your questions.

972 [The prepared statement of Mr. Glazer follows:]

973

974 *****INSERT 7*****

975 Mr. Upton. Well, thank you all. And at this point we will
976 go to members with questions and we will try to keep to a strict
977 5-minute Q&A to try and get done by early this afternoon.

978 I want to focus a little bit about the participation on
979 cybersecurity efforts. Mr. Van Welie, you talked a little bit
980 about it. I would like to follow up to see the participation
981 with the grid exercises as well as cybersecurity training for
982 ISO New England employees.

983 And Mr. Brown, your comment that you thought your operation
984 were far above the standards which is great, but what can we do
985 to try and help prevent a cyber attack?

986 And Mr. Van Welie, we will start with you.

987 Mr. Van Welie. Well, so I think what --

988 Mr. Upton. What else can we do constructively to help?

989 Mr. Van Welie. Constructively, well, I think with the
990 establishment of the oversight over the NERC by the FERC, the
991 establishment of cybersecurity standards, I think we set a very
992 important baseline in the industry with regard to managing
993 cybersecurity, but those are what I would call a minimum baseline.

994 Ultimately, all of the ISOs in front of you here today employ
995 a defense-in-depth strategy and it is about deploying automated
996 systems to detect issues. It is about training your employees
997 which are often the weakest link in the chain. And I think that
998 if I sort of look back over the past decade, I have seen the
999 electric industry really lift its game with regard to

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1000 cybersecurity.

1001 And that is not to say there is more to be done. I think
1002 there is a lot more to be done. I think the risk is shifting
1003 a lot from whereas we were previously concerned about cyber in
1004 the control centers, I think there is a greater risk out in the
1005 field. And so I see that utilities are going to have to invest
1006 money in this space and I think what Congress can do is to be
1007 supportive of the cost recovery of those investments and I think
1008 it is a necessary investment.

1009 The other thing I worry about, to be honest with you, it
1010 is true and I heard a number of the members today mention the
1011 proliferation of distributed energy resources. The issue with
1012 distributed energy resources is they often are relying on the
1013 internet for communications back to the control centers. And
1014 I think that is a weak link in the chain that we need to pay some
1015 attention to.

1016 If we are going to rely on those resources to be a substantial
1017 part of the capacity to keep the grid going and reliable, we need
1018 to make sure that those resources which are often in private hands
1019 are practicing safe cybersecurity practices as well.

1020 Mr. Upton. Mr. Brown?

1021 Mr. Brown. So what can you do, certainly support the
1022 standard development process, but as Gordon indicated that is
1023 minimum. Policy can never keep up with technology, so we are
1024 constantly communicating among our regions and with the

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1025 government entities on attacks that are occurring in real time.

1026 And that is why I emphasize the standards are important
1027 because we are all in this together, highly interconnected, highly
1028 interdependent, so we must all operate at a minimum threshold.

1029 But in order to keep up with the attacks that are very real-time
1030 we have to go above and beyond the standards because again policy
1031 can never keep up with technology.

1032 Mr. Upton. Anybody else want to comment? Let me -- oh,
1033 Mr. Jones.

1034 Mr. Jones. Yes, thank you. One additional thing that I
1035 think is important and Nick touched on that as well is threat
1036 identification. So from the federal side that is the most
1037 important element for us, threat identification and dissemination
1038 of that information. That allows us to prepare for these threats
1039 and defend against them. Thank you.

1040 Mr. Upton. Let me go to my next question and that is, you
1041 know, it is a good thing that with all of the things that have
1042 been going on that harmful emissions from the power sector have
1043 been reduced, I think, rather significantly. I know, Mr. Jones,
1044 in New York we have seen the NYISO achieve a 98 percent reduction
1045 in SO2 emissions since the markets began operation in 2000. So
1046 with all these changes that are going on whether it be RPS
1047 standards by states, reduction in coal, tell us a little bit about
1048 how you expect to see that continue in the next decade or so.

1049 Mr. Jones. Excellent, thank you. New York State is

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1050 currently undergoing a strong push toward reduction of carbon
1051 emissions, so CO2 emissions in the environment from our generation
1052 fleet. The goal is currently to achieve a 40 percent, 50 percent,
1053 rather, reduction in carbon emissions from 1990 levels by 2030
1054 and an 80 percent reduction by 2050. In order to achieve
1055 that, there are a number of steps that the state has already taken.
1056 Number one, to drive more renewables in the state to achieve
1057 these high renewable penetrations, but they have also stepped
1058 forward recently to preserve the low carbon emissions associated
1059 with a portion of the nuclear fleet in New York. And we have
1060 supported that but we have also supported moving that into the
1061 competitive market environment.

1062 So to the degree that we can do that, the best way to control
1063 emissions of carbon throughout our state would be to integrate
1064 it directly into our dispatch in the energy market side. We are
1065 currently working on that with the state of New York, as I said.

1066 We will have a report coming out very shortly which will identify
1067 the opportunities and the very promising nature of that approach.

1068 We will begin discussing that with our market participants as
1069 well and we hope to have something in the very near future.

1070 Mr. Upton. When you get that report we will be anxious to
1071 take a look at it.

1072 Mr. Jones. Thank you.

1073 Mr. Upton. My time is expired, so let me go to Mr. Rush
1074 for 5 minutes.

1075 Mr. Rush. I want to thank you, Mr. Chairman. My question
1076 is to Mr. Glazer. In your written testimony you state that PJM
1077 works with its stakeholders on proactive rule changes in order
1078 to ensure that the market can continue to accommodate individual
1079 state policies in a manner that still preserves competitive
1080 outcomes without burdening neighboring states that may not have
1081 the same state policy.

1082 As you are aware, to the consternation of some stakeholders
1083 states like Illinois and New York have implemented policies that
1084 take into account the social cost of carbon by giving credit to
1085 their nuclear fleets as safe, reliable, zero-carbon sources of
1086 energy.

1087 Mr. Glazer, how would you address the assertion that adding
1088 value to nuclear fleets unfairly distorts the market? In other
1089 words, how do we incorporate the social cost of carbon in a way
1090 that reflects that cost in energy clearing prices? And on this
1091 question I would also like to hear from Mr. Jones on this issue.

1092 Mr. Glazer. Thank you, Mr. Rush. I appreciate the
1093 question. This whole question about accommodating state
1094 policies, of course we need to accommodate state policies and
1095 we do that. It is not a question of whether we should do it,
1096 there is no question we should do it. It is a how do you do it
1097 question and that is the difficult part. Let me give you just
1098 an example.

1099 Maryland may have one state policy supporting renewable

1100 generation. West Virginia borders Maryland. They have a
1101 completely different policy. It is all an interconnected grid,
1102 the electrons don't respect state borders. So the trick is to
1103 find a way to ensure that Maryland's policy or Illinois policy
1104 is not exported to West Virginia in my example that may not buy
1105 into that same policy.

1106 So how do we do it? There was a discussion, we are working
1107 on sort of almost like, if you will, firewalls, if you will that
1108 would ensure that the market prices are protected, that we don't
1109 export to an unwilling state what that policy is, but at the same
1110 time allow states like Illinois to go forward with what it wants
1111 to do.

1112 So that is the rub here. It is an interconnected grid,
1113 electrons, we don't want to force other states to absorb that
1114 policy, but we want to respect what Illinois did. And that is
1115 what we have got proposals out to accomplish.

1116 Mr. Rush. So do you have a more definitive example of how
1117 you would do that because you have illuminated the problem.

1118 Mr. Glazer. Yeah, we are looking at, for example,
1119 potentially running the market two times, if you will. Running
1120 the market once that would allow the Illinois nuclear units in
1121 this case to participate in the market, but also sort of almost
1122 running it a second time to correct any sort of price-oppressive
1123 effects of the fact that there is a subsidy going to certain
1124 nuclear units in Illinois but not the same nuclear units,

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1125 equivalent nuclear units, in Ohio or Maryland or anyplace else.

1126 So it is a technique that we are looking at. We have actually
1127 got a proposal to do that and it is a vigorous subject of
1128 discussion.

1129 Mr. Rush. Thank you. Mr. Jones?

1130 Mr. Jones. So the proposal in our region is different than
1131 most of the other ISOs. As Mr. Glazer had mentioned, multi-state
1132 ISOs have a difficult time of getting all of the states onto the
1133 same policy position.

1134 In the three ISOs that are led by a single state --
1135 California, Texas, and New York -- it is much easier to implement
1136 state policy directly since we have a single state. In the state
1137 of New York we want to approach this issue through the energy
1138 market. To best say this, in states that are approaching it
1139 through a capacity market the vernacular that is used is to
1140 accommodate state policy into the market. In our state, by using
1141 the energy market we are actually helping to achieve the goals
1142 of the state. It is a rather significant difference but it is
1143 one that we hope to deliver on.

1144 Mr. Rush. I yield back, Mr. Chairman.

1145 Mr. Upton. Thank you. Dr. Murphy?

1146 Mr. Murphy. Thank you, Mr. Chairman.

1147 Mr. Glazer. So I am from southwestern Pennsylvania and
1148 represent an area right in the heart of the PJM area. And as
1149 we are talking about this mix of state and federal regulations,

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1150 can you give a little more detail of how they run into, interfere
1151 with each other, and then I will follow up from there.

1152 Mr. Glazer. Okay. And it is, a prime example is
1153 Pennsylvania has a renewable portfolio standard that includes,
1154 as I understand it, clean coal technology as one attribute of
1155 a portfolio standard. Maryland doesn't have that. So the
1156 question is -- but the electrons don't really care. They are
1157 moving across the border, they don't really care.

1158 So the question is how does Pennsylvania's policy not get
1159 exported to Maryland and vice versa? So what we are looking as
1160 how do we, in a multi-state market how do we accommodate what
1161 every state can do, but not -- in the absence of a national federal
1162 policy on any of these subjects how do we make this all fit
1163 together? We think we can. We think this is very achievable
1164 but it does take some work.

1165 Mr. Murphy. So let's talk about how this is achievable
1166 because states and federal regulators there is this bright line
1167 in some places. But does this take on our part some large
1168 overarching legislation? Do we recognize any of the state
1169 preferences there at all? Because obviously I represent coal
1170 country, every square inch of my district has coal under it, has
1171 Marcellus shale natural gas in multiple layers, Westinghouse
1172 nuclear is, part of it is in my district. We have got it all.
1173 So, but another area may not have that or prefer that so what
1174 is the solution?

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1175 Mr. Glazer. Mr. Murphy, I think it is a great question.
1176 There is no question that the more direction on these issues
1177 that can come from this Congress or from the Administration the
1178 better, because then it is federal policy whatever that policy
1179 is.

1180 And I like to say the markets are like a blender. They are
1181 only as good as the ingredients you put into the blender. But
1182 they do, once you put those ingredients in they produce the most
1183 efficient answer, so the more direction we can get from this
1184 Congress I think that helps. It is when states as Mr. Jones
1185 indicated start going in different directions that it gets
1186 complicated. But your district is a perfect example of having
1187 rich in all of these resources, and I think the PJM market
1188 appreciates it and we all benefit from the richness of those
1189 resources.

1190 Mr. Murphy. Which these electrons get mixed up, so we can't
1191 put a filter at the border. So if a state doesn't like coal we
1192 can't keep the coal electrons out?

1193 Mr. Glazer. That is right. That is right, because
1194 electrons follow --

1195 Mr. Murphy. Are you sure we can't do that because if they
1196 don't want coal I am glad to say, all right, you don't get to
1197 have them. You have a brownout then.

1198 Mr. Glazer. Right.

1199 Mr. Murphy. Can't do that?

1200 Mr. Glazer. Can't do that.

1201 Mr. Murphy. All right, too bad.

1202 Mr. Glazer. They follow the laws of physics and they go
1203 where they go. Yeah, that is the problem.

1204 Mr. Murphy. Mr. Jones, do you have a comment on that too?
1205 I am just curious. He made reference to you there, what we need
1206 to on the federal in ironing out these state-federal differences.

1207 Mr. Jones. Why are there state and federal differences?

1208 Mr. Murphy. Well, how, what we need to do to help overcome
1209 if there is some problems between them.

1210 Mr. Jones. So in multi-state ISOs the difficulty, of
1211 course, is to figure out how to accommodate each individual state
1212 what their particular policy positions. The PJM has issued a
1213 very short white paper that described one way that it could be
1214 done. For example, I think their white paper describes that each
1215 energy market could carry its own price of carbon. Those states
1216 that do not want to have a price of carbon would be adjusted as
1217 the power flows across those interfaces.

1218 So there are ways to do it, it is just much more difficult
1219 than what we might be able to achieve in New York.

1220 Mr. Murphy. Anybody else have a comment on that because
1221 it is part of what we -- Dr. Casey?

1222 Mr. Casey. Yes, I would just note that in California we
1223 have a cap and trade program for carbon allowances within state
1224 and we have the issue of particularly when we run our Western

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1225 Energy Imbalance Market we are dispatching resources all over
1226 the West. How do we attribute which resources are supporting
1227 imports into California that would --

1228 Mr. Murphy. What is it you trade?

1229 Mr. Casey. Well, we are trading energy. So we are
1230 optimizing --

1231 Mr. Murphy. But it has to do with carbon too, right?

1232 Mr. Casey. Yeah.

1233 Mr. Murphy. So if something like a nuclear power plant or
1234 a solar plant doesn't generate carbon they trade what?

1235 Mr. Casey. Well, they wouldn't have a compliance obligation
1236 for purposes of cap and trade if they are not emitting GHG. But
1237 to the extent we are dispatching resources outside of California
1238 that have a carbon emission and they are supporting transfers
1239 into California, we have developed in our market a method to
1240 attribute that that resource in Arizona is supporting a transfer
1241 into California and is subject to a GHG price and ultimately a
1242 compliance obligation for compliance with California's cap and
1243 trade.

1244 So I just mentioned it as it is a market mechanism where
1245 through the dispatch you can try to tease out which resources
1246 are being dispatched to support transfers to another state and
1247 can enforce a carbon price to it.

1248 Mr. Murphy. I think, Mr. Chairman, that is part of the
1249 complexity that we need to figure out on all of that. It sounded

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1250 very convincing, but I have no idea what you just said. Thank
1251 you very much.

1252 Mr. Upton. We will give you 3 days to write a written, okay.
1253 Mr. McNerney is recognized for 5 minutes.

1254 Mr. McNerney. Well, thank you, Mr. Chairman. I appreciate
1255 how business loves stability and predictability especially
1256 utility markets, so I am sort of going to leave that. But I would
1257 like to ask a question and ask each one of you to answer it in
1258 about 15 or 20 seconds starting with Mr. Glazer and moving this
1259 way. What changes, if any, are needed in federal policies to
1260 encourage investment needed for utility companies to manage the
1261 challenges you are facing with the rapidly changing marketplace?

1262 Mr. Glazer. Very quickly, we are moving beyond reliability
1263 standards to look at a more resilient grid. And there is a lot
1264 of attributes of a resilient grid. It will require support.
1265 It is not going to be inexpensive to do, we have to do it wisely.

1266 I think this committee's focus on these resiliency efforts would
1267 be very, very helpful.

1268 Mr. McNerney. Okay.

1269 Mr. Casey. I think in the case of California we have a very
1270 robust investment environment with the integrated resource
1271 planning that goes on at the Public Utilities Commission and the
1272 direction and renewable procurement and the supporting
1273 transmission. So I don't see, really, a need for anything beyond
1274 what we have. I think we have adequate investment incentives

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1275 there.

1276 Ms. Mele. From an ERCOT perspective, I think that as I
1277 stated in my comments is that predictability is what we need to
1278 guide the future there and so I don't think there is anything
1279 that we really need. I think that some of the focus on NERC
1280 standards and making sure cybersecurity standards continue to
1281 develop in that sharing of information is probably largely the
1282 most impactful thing to us from here.

1283 Mr. Doying. I guess I would tend to agree with the other
1284 commenters and that is we do have federal support from NERC for
1285 CIP standards and for resiliency standards. Markets as I noted
1286 are able to adapt to the changes in the underlying market, the
1287 composition of the generation fleet, and I think the most
1288 important thing for us is regulatory stability. We largely have
1289 that through FERC, but to the extent that you have policies that
1290 come out that go in different directions over different periods
1291 of time that that is not beneficial to market participants or
1292 the marketplace.

1293 Mr. McNerney. Mr. Jones?

1294 Mr. Jones. Thank you. From New York's perspective we have
1295 a great deal of investment. We are very comfortable. We have
1296 investment in solar, wind resources, investment in natural gas
1297 field facilities. As I had mentioned to you earlier though, we
1298 have a great deal of need for additional transmission investment.
1299 And I don't believe anything additional from this body needs

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1300 to move forward, but we do need to have continued focus by the
1301 FERC on moving our transmission projects forward. Thank you.

1302 Mr. Brown. No additional policy changes are needed in our
1303 region from this body. I would say though it would help if we
1304 had a quorum at FERC.

1305 Mr. McNerney. All right.

1306 Mr. Van Welie. I agree with the previous speakers that
1307 regulatory certainty is very important. I think that I have
1308 watched the industry struggle with what is the long-term
1309 trajectory on carbon pricing, so from an investment point of view
1310 as one is investing in new long-lived assets that are 30 to 40
1311 years in terms of their economic life, having some certainty
1312 around that question would be very beneficial. And, you
1313 know, I think as a nation we have struggled with that one and
1314 I doubt we are going to resolve it any time soon, but that certainly
1315 would help us achieve that objective through the market if we
1316 could get it more clearly stated at a federal level.

1317 Mr. McNerney. Thank you.

1318 Mr. Casey, one of my priorities has been to support
1319 technologies and projects that are making the electric grid
1320 smarter and more reliable, more resilient, flexible, and secure.

1321 As California ISO meets the challenges of renewable energy
1322 integration and other state policy objectives, what is ISO doing
1323 to support advanced grid technologies?

1324 Mr. Casey. I would say, in short, a lot. I think in many

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1325 ways we are leading the world in advancing new technologies into
1326 the power grid. There is a lot happening on the distribution
1327 network with, as you know with microgrids, energy storage, demand
1328 response, many of those resources are some of them are behind
1329 the customer meter. They are not connected to the transmission
1330 system.

1331 But we have put forward market models to enable those resources
1332 to actively participate as a grid resource so that we can be able
1333 to dispatch them to help meet the system needs.

1334 Demand response is an area in California that I think there
1335 is a huge untapped potential to really more fully develop. We
1336 have been a big advocate with that working with the Public
1337 Utilities Commission to really get to the technology capability
1338 to what demand response can really do. We have a lot of old
1339 programs out there that really you can only call once in a while.

1340 We need more advanced programs in demand response that we can
1341 call every day and it is seamless to the customer, they don't
1342 even know it is happening.

1343 Those are just some examples of what we are trying to do
1344 on the customer side. There are other things we are doing on
1345 the transmission side as well.

1346 Mr. McNerney. Thank you, Mr. Chairman.

1347 Mr. Upton. Mr. Barton?

1348 Mr. Barton. Thank you, Mr. Chairman. Thank you for holding
1349 this hearing. We want to welcome Cheryl Mele who is from ERCOT

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1350 in Texas. We are always glad to have you here. I just have one
1351 question, Mr. Chairman. Several years ago, in the Energy Policy
1352 Act of 2005 we had a very small section, section 1222, get
1353 authorized, the Southwestern Power Administration to build
1354 several new transmission lines. One of those projects has been
1355 approved, the Plains & Eastern Clean project line. It starts
1356 in either Texas and/or Oklahoma, crosses through Arkansas and
1357 goes into Tennessee. The state of Arkansas has filed a
1358 lawsuit, and I don't know if it is the state itself or stakeholders
1359 in Arkansas against that project. I would like to ask the head
1360 of the Southwest Power Pool if he is familiar with this project
1361 and, if so, what your position is on it.

1362 Mr. Brown. So yes, I am very familiar with the project.
1363 It is not a product of a regional planning process that involves
1364 all of our diverse constituents, both regulatory commissions and
1365 all of our very diverse membership, it is a market-driven solution
1366 to delivering wind from the western part of our footprint to load
1367 centers in the East. We are not opposed to the line, I would
1368 just say it is not a product of a regional planning process.

1369 The question is do load centers in the East want to use that
1370 particular DC line as a transportation facility that is
1371 constructed solely for the benefit of the wind generators in the
1372 West and the load centers in the East, or do those load centers
1373 in the East prefer an AC solution that becomes a product of our
1374 regional planning process? The costs can be comparable.

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1375 The utilization of a DC line is limited again to benefit
1376 the buyer on one end and the seller on the other end. An AC
1377 solution benefits everyone in the footprint. Both can reliably
1378 accommodate the same mission. Again it is, you know, what
1379 solution do you prefer.

1380 Mr. Barton. All right. What about the representative of
1381 the MISO, it goes through your territory too. What is your
1382 position on it?

1383 Mr. Doying. I would concur with Nick that it is not part
1384 of the regional planning process. I think this is a great example
1385 of somewhere where the RTOs have the ability to accommodate the
1386 policy decisions that are made by states or by bodies such as
1387 this one. If it doesn't go through the planning process it is
1388 not eligible for cost allocation throughout the rest of the
1389 footprint, which means that to the extent it is approved by states
1390 or other entities and they are willing to pay the bill then it
1391 can certainly go forward and we would certainly accommodate the
1392 transmission within our system. So I certainly don't object to
1393 it and we will wait to see how the litigation plays out.

1394 Mr. Barton. Well, I am told that one of the Arkansas
1395 objections is that they don't receive any of the power, but I
1396 am also told that the line is willing to, and it maybe even has
1397 planned in a connection point in Arkansas that if they wanted,
1398 if Arkansas wanted to it could receive power. Are you familiar
1399 with that?

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1400 Mr. Doying. No, sir. I am not.

1401 Mr. Brown. And yes, I am, and certainly it could be
1402 accommodated. The real question is are there loads in Arkansas
1403 that want that choice of delivery system, a DC line versus an
1404 AC solution that can provide other benefits to the state.

1405 Mr. Barton. I doubt that anybody on the panel understands
1406 the difference between DC and AC. Well, Mr. Shimkus, we will
1407 say Mr. -- okay, Mr. Flores says he does. Mr. -- Morgan, I stand
1408 -- and I am sure Mr. McKinley does, so I stand corrected. I will
1409 say I am the only one that doesn't understand the difference.
1410 Anyway thank you, Mr. Chairman.

1411 Mr. Upton. Mr. Peters?

1412 Mr. Peters. Thank you, Mr. Chairman. I want to thank all
1413 the witnesses. I also want to thank the staff for the excellent
1414 work that they did together to prepare us for this. Dr.
1415 Casey, I wanted to ask you about distributed generation and maybe
1416 you could describe for me what are the challenges in terms of
1417 reliability to the proliferation of distributed generation and
1418 whether the state is looking at weighing in terms of what is the
1419 most efficient way to provide, say, solar power? Is it
1420 large-scale solar farms or is it rooftop? Is the state taking
1421 a position on that and moving it one way or another or are we
1422 just kind of letting that happen?

1423 Mr. Casey. Well, with respect to reliability issues with
1424 distributed energy I think it deals mainly with modernizing the

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1425 distribution network to accommodate it. As you know, these
1426 systems were designed with one-way flow of power from large
1427 central stations to consumers that were kind of static consumers.
1428 The grid of the future is going to be much more dynamic. You
1429 are going to have bidirectional flows, you are going to have a
1430 lot of automation on the system.

1431 So I think from a reliability standpoint, the distribution
1432 utilities are really struggling to keep pace with how they need
1433 to upgrade the distribution network to provide the safety and
1434 controls to make sure that that dynamic can be reliably managed.

1435 I think from a transmission, as a transmission grid operator
1436 that is really not our issue. That is the issue for the
1437 distribution utility. But as I mentioned, you know, we are trying
1438 to leverage those distribution networks as a resource for the
1439 transmission network.

1440 On your question around going forward, you know, is
1441 California going to rely more on large central station renewables
1442 versus distribution, my sense it is going to be both. I think
1443 what is happening on the distribution system is, it is not policy
1444 driven it is consumer driven. People want more control. I know
1445 you are very involved with the naval bases in San Diego. They
1446 want more resiliency with their system with their microgrids.

1447 Other companies are doing the same. So a lot of that is just
1448 happening and we are enabling it, but to achieve ultimately the
1449 environmental policy objectives California has you are going to

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1450 need more large central station solar and wind.

1451 Mr. Peters. I would just ask the panel a question on
1452 cybersecurity and maybe ask it in an overly provocative way is
1453 why should I trust you to take care of cybersecurity? Is there
1454 a federal role for that? What interests you in having federal
1455 participation? What scares you about that? Does anybody want
1456 to offer me some advice about why I should get involved or why
1457 I should sit back?

1458 Mr. Glazer. Mr. Peters, I would be happy to address that.
1459 This is joint effort. We are the people on the front lines.
1460 It is our systems that people are trying to hack into in many
1461 cases. But what the federal government has is the authority
1462 through this Congress to require standards. That is very
1463 important. Also the federal government has information as to
1464 threats that we don't have. We are not an intelligence agency.
1465 So I think this is not an either/or proposition, it is really
1466 a partnership. Mr. Peters. Okay. I think that makes sense to
1467 me. I think that information, best practices, setting standards
1468 makes a lot of sense. And I know we have taken some steps in
1469 the last to make sure that an outage in one place doesn't so greatly
1470 affect the whole country, so I think there is protection. But
1471 if you have any thoughts after this on that I would love to hear
1472 it.

1473 And then Mr. Jones, I am not as familiar with the regulatory
1474 regime in New York. I assume that that is what is driving

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1475 investment in renewables and the reduction in emissions that you
1476 described. Can you just tell me a little bit about whether that
1477 is the case and what it is about the regulatory framework in New
1478 York that is helping?

1479 Mr. Jones. So the regulatory framework coupling with the
1480 efficiencies that are driven out of the markets within our systems
1481 itself is really what has contributed to those reductions, so
1482 more efficient generation has come to our markets to compete.

1483 That more efficient generation has lower emissions than the less
1484 efficient generation. And as the new generation comes to market,
1485 much of the older generation has left that had higher heat rates
1486 and higher emissions, so it has been a combination of both.

1487 On top of that the state of New York has been a driver for
1488 decades in trying to improve the environment throughout New York
1489 and throughout the country for that matter. There is a number
1490 of initiatives in place as I had mentioned earlier. They are
1491 achieving a high renewables penetration, achieving significant
1492 reductions in carbon emissions that are driving changes in our
1493 markets as we attempt to achieve that through the NYISO itself.

1494 Mr. Peters. Thank you very much again to the witnesses.

1495 And Mr. Chairman, I yield back.

1496 Mr. Upton. Mr. Shimkus?

1497 Mr. Shimkus. Thank you, Mr. Chairman. I apologize for
1498 being in and out. Members do that all the time especially when
1499 you have competing hearings and other legislation you are working

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1500 on.

1501 This is an area that I love to talk about and it is evolving
1502 and you all are managing a system that -- I think FERC was here.

1503 I mentioned to some of you who came to visit my office that FERC
1504 was here a year or 2 ago and they basically said, you know, the
1505 Federal Power Act has not been rewritten. It has been vague
1506 enough for us to evolve over time.

1507 So for that I want to thank Mr. Glazer and Mr. Doying for
1508 visiting the office, and Mr. Brown, I am sorry you got Mike Ross
1509 with you. You seemed to be successful even with him there, so
1510 we will keep cheering on -- and a pharmacist dealing in electrons.

1511 So Mr. Glazer, in the last hearing of maybe last week and
1512 we talked about a little bit self-supply debate and issue, can
1513 you talk about that from the aspect of our munis and our co-ops
1514 and especially in the MISO generating area and then the PJM area?

1515 This is an Illinois kind of specific issue. Can you just talk
1516 about if they, if you were asked do you allow self-supply what
1517 would your answer be?

1518 Mr. Glazer. Thank you for the question. And you may have
1519 been out when I said not only do we allow self-supply, in fact
1520 I think I showed some examples. These are some power plants that
1521 in fact are self-supplying.

1522 Mr. Shimkus. My apologies for not being here.

1523 Mr. Glazer. No, no. I understand that. Just so you are
1524 aware, I actually brought pictures of plants that actually today

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1525 are exactly doing that. The particular situation with regard
1526 to the IMEA --

1527 Mr. Shimkus. Well, as long as you have addressed it, I am
1528 good.

1529 Mr. Glazer. Okay, okay. Yeah. The short answer is there
1530 are -- I was a little concerned about the panel because there
1531 was this impression on the last panel that there is some rule
1532 against self-supply, and as I tried to show absolutely we have
1533 self-supply today. We have shaken hands with the public power
1534 entities and worked out those arrangements. So it is happening
1535 today as we speak and we have no intention of changing that.

1536 Mr. Shimkus. Thank you. I want to really dovetail a little
1537 bit on Joe Barton's question because that line also goes through
1538 southern Illinois and it is really more of a siting fight versus
1539 -- and I think the AC and the DC argument is really kind of the
1540 critical debate of what can be used locally versus what is being
1541 used, because the local landowners, in essence eminent domain
1542 fights are like we are not seeing it and they are just forcing
1543 their way through. And I always can blame the Public Utility
1544 Commission of Illinois and FERC without taking direct
1545 responsibility for that.

1546 But it is a difficult process that makes you wonder if public
1547 policy needs to be involved somehow in addressing -- well, Mr.
1548 Glazer, we were talking about this yesterday. When you look at
1549 the maps, and Mr. Doying, when you look at the maps, sometimes

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1550 your RTO, the ISO areas look like political gerrymandering to
1551 some extent. And that is not positive. That is really a negative
1552 comment.

1553 And sometimes because of the engineering aspects they make
1554 more sense than just a visual, but that is why we grapple with
1555 this. That is why I am glad the chairman has these hearings.
1556 Not a question, I guess, just a comment.

1557 I want to also raise to Mr. Jones, you are with the New York
1558 ISO. So it just popped in my mind, and I have a new legislative
1559 staffer who wasn't here, but I raised a couple years ago a concern
1560 of my alma mater which is West Point and their ability to get
1561 a new, some additional transmission into the Academy. I think
1562 I had a meeting or two after that. I don't know the status of
1563 that and I can ask them. I was on the board of visitors at that
1564 time which is the responsibility of that board is to kind of take
1565 a look at the Academy and see if it is accomplishing its mission.

1566 It is training our young men and women to be the best leaders
1567 of our other young men and women.

1568 But also part of that is facilities and the ability of them
1569 to have the opportunity with the electricity and their needs,
1570 so if you would have some people go back and check that on my
1571 behalf I would appreciate it.

1572 Mr. Jones. I would be happy to.

1573 Mr. Shimkus. No other questions. Again I apologize for
1574 not being here. I yield back my time.

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1575 Mr. Upton. Mr. Doyle?

1576 Mr. Doyle. Thank you, Mr. Chairman. Thank you to all the
1577 panelists.

1578 Mr. Glazer, I want to ask you about PJM's report on the
1579 evolving resource mix and system reliability. It sort of
1580 received considerable attention especially for the claim that
1581 PJM's resource portfolio could feature up to 86 percent natural
1582 gas and maintain operational reliability.

1583 I note also in the report though that you acknowledge that
1584 this hypothetical resource portfolio raises questions about
1585 electric system resilience and additional risks were not captured
1586 in the analysis including gas deliverability during polar vortex
1587 type conditions and to go on to include uncertainties associated
1588 with economics and public policy. And we have seen an
1589 incredible increase in the share of natural gas in the markets
1590 and I am a big supporter of natural gas, I am not speaking against
1591 because it has its benefits. But I want to know how you view
1592 this trend going forward? Do you think we are going to continue
1593 to see greater shares of natural gas in our markets and are you
1594 concerned about that from a resiliency standpoint and what does
1595 it mean for the long-term perspective in terms of infrastructure
1596 investment?

1597 Mr. Glazer. Mr. Doyle, thank you very much for that
1598 question. First off, the good news is particularly in your
1599 district you have the strong natural gas pipeline infrastructure

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1600 in that district and in many of the districts that we serve.
1601 That particular report was one of a number of reports that we
1602 have done.

1603 It kind of was looking at the equivalent of if you went to
1604 shop for a car it was asking the question just like you would
1605 ask, you know, what is the size of the gas tank? What is the
1606 miles per gallon? What is the ability to go from zero to 60?

1607 We were looking at different fuels and how they perform as part
1608 of a generation mix and gas served very well in that context as
1609 did coal as did a number of other fuels. But it is just one
1610 part of the puzzle and I think you put your finger on it. The
1611 system is strong. We have tested individual pipeline
1612 dependencies and we look at those. But the next thing we need
1613 to do and we are focused on is resiliency, which is that sort
1614 of high-risk, low-frequency event, what if a lot of pipelines
1615 go out, what happens?

1616 And so that is sort of the next generation. That is where
1617 we are now. We are beyond just the NERC reliability standards
1618 and that is the focus, a big at PJM initiative.

1619 Mr. Doyle. Thank you. I want to talk about price formation
1620 too. You mentioned energy price formation reforms basically
1621 saying that the existing rules fail to appropriately value large
1622 generating plants. And I want to say that I appreciate PJM's
1623 response to a notice of proposed rulemaking from FERC earlier
1624 this year and share the concern that current energy pricing

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1625 mechanisms fail to fully transparently and accurately value an
1626 array of resources in our markets.

1627 So I am interested in PJM's proposal of a load following
1628 product that encourages the development of new, innovative, and
1629 flexible resources. Could you describe what type of issue this
1630 product would address and what type of generation resources would
1631 qualify?

1632 Mr. Glazer. Great, thank you. First of all, let me just
1633 very quickly just sort of analogize to what this problem is because
1634 it gets very wonky very quickly. But imagine you go in the
1635 supermarket. You want to get a can of beans. You want to make
1636 sure that that can of beans, the price you are paying for that
1637 is reflected right there on the shelf, you know what you are
1638 buying.

1639 And because of some ways, the way price formation has
1640 happened, actually what happens is you can see an artificially
1641 low price, then you get to the checkout counter and suddenly there
1642 is an add-on price you never knew about. That is not a great
1643 system. So we need to find ways to both price that so you know
1644 what you are buying and frankly the manufacturer can keep making
1645 the beans, if you will. So that is one aspect of our price
1646 formation.

1647 The second aspect is the load following product. Who can
1648 benefit from this? Wind technology, energy storage, batteries,
1649 anybody that can be flexible it is a way to reward them directly

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1650 and so we are beginning those discussions with FERC. I think
1651 it can be very promising for new technology.

1652 Mr. Doyle. Great. And I want to ask you this question and
1653 the rest of the panel too. You know, Congress is looking at,
1654 I don't know if we are looking at it as we speak, but there is
1655 a lot of talk about passing a carbon tax. And I am curious.
1656 Would PJM have any issue in implementing this policy? Do you
1657 think reliability or resilience would suffer if given the fact
1658 if you were given adequate time to adopt it? What are your
1659 thoughts if we were to enact a carbon tax?

1660 Mr. Glazer. Again the market is a blender. This would be
1661 an ingredient and we could easily absorb that into the market
1662 and it would be reflected in the prices that people pay.
1663 Obviously we continue to ensure the system is reliable, but it
1664 would work. And the market, it actually is adaptable to that
1665 kind of proposal.

1666 Mr. Doyle. Okay, just down the line real quick, yes or no.
1667 Would you be able to, do you think resiliency or reliability
1668 would be affected or could you adapt to it?

1669 Mr. Casey. Well, in the case of California, we are --

1670 Mr. Upton. Want it to be just a yes or no. His time is
1671 expired, so just answer his question yes or no as he asked.

1672 Mr. Casey. Okay, yes.

1673 Ms. Mele. It could be accommodated, yes.

1674 Mr. Doying. Yes.

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1675 Mr. Jones. Yes.

1676 Mr. Brown. Yes, but not the preferable way.

1677 Mr. Van Welie. Yes.

1678 Mr. Doyle. Okay. And Mr. Chairman, thank you.

1679 And I just want to say hello to my friend Mike Ross, a former
1680 member and colleague of ours and a great member of the Energy
1681 and Commerce Committee regardless of what Shimkus says.

1682 Mr. Upton. He was indeed a very good member and still
1683 remains a friend.

1684 Mr. McKinley?

1685 Mr. McKinley. Thank you, Mr. Chairman.

1686 And Mr. Glazer, I think I am going to direct most of my
1687 comments to you with PJM. I appreciate you using Longview as
1688 one of your models, but you are well aware that the current
1689 regulations in this country prevent us from building into the
1690 Longview 2?

1691 Mr. Glazer. Well aware of that, yes.

1692 Mr. McKinley. So why I think it is so important that if
1693 we are serious about developing baseload we have to be able to
1694 take that into consideration on how we are going to be able to
1695 replicate the success that occurred at Longview.

1696 Mr. Glazer. And it is a success story, I agree.

1697 Mr. McKinley. Yeah, absolutely it is. And I had the
1698 pleasure with Secretary Perry there touring the plant just a few
1699 weeks ago and then he went over to NETL to look at some of the

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1700 fossil fuel research facilities and what is underway on that.

1701 So just for the record, we can't do what you want us to do.

1702 The secondly is that you said in your testimony you want
1703 to keep prices low. That is one thing that you said in your --
1704 you are helping to try to keep prices low. But yet we have perhaps
1705 conflict and maybe you can help clarify that in keeping prices
1706 low. West Virginia now has lost its stature of being number two
1707 in lowest cost energy costs to now the 26th, just in 10 years.
1708 Pennsylvania and Ohio are also in that 25 to 28 range on that
1709 so I don't think the utility rates in the PJM market are
1710 particularly low. Do you want to comment about that?

1711 Mr. Glazer. Mr. McKinley, I think it is not a question of
1712 are they, further, we don't see our mission keeping them low as
1713 much as making sure the prices are right, that they are sending
1714 the correct price signals for new investment just like we just
1715 talked about for a future Longview. That is really the goal is
1716 to make sure the prices are fair and right, attract investment
1717 --

1718 Mr. McKinley. Then at the same time we are -- and I support
1719 the chairman's mission for nuclear facilities. For example, in
1720 Illinois we know that the state is going to subsidize or has
1721 already started to subsidize their rates for nuclear. But when
1722 they bid into the PJM market that means that they have a
1723 competitive advantage over coal and gas fired in the East. Do
1724 you want to respond to that?

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1725 Mr. Glazer. And that is exactly the concern with sort of
1726 just a state sort of subsidizing a plant, because it has the effect
1727 of crowding out other plants in the state like West Virginia that
1728 didn't adopt that particular policy because you don't have any
1729 nuclear plants in West Virginia. So you are absolutely right.

1730 It is a concern. That is why we are looking at some mechanisms
1731 to --

1732 Mr. McKinley. So you are trying to develop something that
1733 does that?

1734 Mr. Glazer. We are trying to do something that prevents
1735 the harm, if you will, of the export-- Illinois doing something
1736 that hurts West Virginia coal plants.

1737 Mr. McKinley. Should regulators be rewarding baseload
1738 production and should they be rewarding lowering carbon emissions
1739 as part of their rate base?

1740 Mr. Glazer. Yeah, one of the problems, and I am a former
1741 regulator. One of the problems in this whole area, if you start
1742 picking winners and losers inevitably as a regulator we got it
1743 wrong and then we just create stranded costs and we create
1744 problems.

1745 Mr. McKinley. Would trying to protect our baseload be
1746 something that is subjective?

1747 Mr. Glazer. What I am saying, Mr. McKinley, is picking out
1748 particular power plants.

1749 Mr. McKinley. I am not trying to --

1750 Mr. Glazer. Right. But in terms of a mix of resources we
1751 agree, but the way to get at it is not to say I need x amount
1752 of coal, x amount of nuclear, x amount of gas, because who decides
1753 that question? To us, the best way to look at it is what are
1754 the reliability attributes of those? And frankly our study, as
1755 Mr. Doyle pointed out, the study actually identified many
1756 reliability attributes of coal that are very valuable to it.

1757 Mr. McKinley. And I want to be very supportive of natural
1758 gas because obviously the Marcellus is in Utica, the possibilities
1759 that come forth from that.

1760 Mr. Glazer. Right.

1761 Mr. McKinley. But we look at that and we see during the
1762 polar vortex in 2014 we saw what happened that they went from
1763 about a hundred dollars per megawatt hour up to what, it went
1764 from the average of 30 up to \$1,800 for a megawatt hour during
1765 that polar vortex.

1766 What savings could we have had if we had been using base
1767 price back on coal and, you say coal, for example, coal and
1768 nuclear?

1769 Mr. Glazer. Well, to be honest, we saw power plants that
1770 were not producing during the polar vortex and some cases were
1771 coal and some cases were gas. Overall, the extreme weather hit
1772 the entire fleet pretty hard. So we have actually changed our
1773 system to award that good performance of all those units, coal
1774 and natural gas, and that helps to moderate the fluctuations and

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1775 the energy prices as well.

1776 Mr. McKinley. I have 20 more questions so I guess we will
1777 have to have a meeting.

1778 Mr. Glazer. I will be happy to follow up with you.

1779 Mr. McKinley. Yes, we will, please. Thank you, Mr. Glazer.

1780 Mr. Glazer. Yes, thank you.

1781 Mr. Upton. Mr. Green.

1782 Mr. Green. Thank you, Mr. Chairman, and thank you and our
1783 ranking member for holding this hearing particularly after last
1784 week's hearing we had on electricity and power. Coming from
1785 Texas, I have to admit when -- Ms. Mele, your testimony said that
1786 our natural gas is 43 percent followed by coal at 28 percent and
1787 wind at 15 and nuclear at 12 percent. Do you expect our baseload
1788 to change? Are we seeing more wind power coming to the market?

1789 And by the way, everybody on the committee is used to us in Texas
1790 bragging. I was happy a number of years ago when the Public
1791 Utility Commission to get that wind power from West Texas to the
1792 Dallas-Fort Worth, San Antonio, Austin, and of course the Houston
1793 market where I am from, made a decision and spent was it \$5 billion?

1794 Ms. Mele. Yes, sir. Actually it was a little bit more than
1795 that. About \$6.9 billion was invested under the legislature's
1796 direction to really --

1797 Mr. Green. To make sure that wind could get to the urban
1798 areas where the customers are.

1799 Ms. Mele. Correct. And so today we have about 14,400

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1800 megawatts of wind taking advantage of those CREZ lines, and
1801 actually in the queue of potential interest being shown is an
1802 additional 23,000 megawatts of wind. So we assume that will not
1803 all get built, but that interest in developing wind in Texas in
1804 the western region and the Panhandle continues.

1805 Mr. Green. ERCOT is the only RTO in the nation that is not
1806 regulated by FERC. You offer a perspective of what we are
1807 discussing today. In your testimony you mentioned Competitive
1808 Renewable Energy Zones, CREZ, was mandated by the state
1809 legislature. How has this program evolved since its inception
1810 and do you believe it could be replicated across other RTOs present
1811 today?

1812 Ms. Mele. I don't know if I can offer comment to the other
1813 RTOs, they can probably add their own. But I do think that that
1814 certainty of having a resource like the CREZ lines built certainly
1815 has enabled the interest of wind to develop, but also is serving
1816 some our industrial loads in West Texas associated with our
1817 natural gas and oil businesses. And it also is starting to show
1818 a value for the solar development that is beginning to grow in
1819 that western region as well.

1820 Mr. Green. What are ERCOT's projections for the
1821 incorporation of large-scale solar projects and how the
1822 additional solar impact on your current fuel generation mix under
1823 ERCOT jurisdiction?

1824 Ms. Mele. Yeah, today we have just over 700 megawatts of

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1825 utility-scale solar installed in ERCOT. As we look down the road
1826 at what is in the cue for development we are seeing significant
1827 interest in solar. It is in the thousands of megawatts over the
1828 next several years. When we did our long-term system assessment
1829 and really looked at what resources are likely to be developed
1830 in Texas based on the resource that we do have in solar and wind
1831 and natural gas and those, that tends to be where the interest
1832 is being expressed in the applications that we see for
1833 interconnection requests, so we believe that will continue.

1834 But just looking at the solar development, we have an
1835 expectation of about 850 megawatts in 2018, over 7,000 megawatts
1836 is expressed interest in 2019, and 8,000 megawatts-plus the
1837 following year, so this is going to be another big resource that
1838 can take advantage of those CREZ lines.

1839 Mr. Green. And so you see these numbers in your testimony
1840 shifting over the years because solar is not part of it now but
1841 there is growth. And I go home every weekend and I love when
1842 I drive to South Texas to see grandchildren, starting about north
1843 of Corpus with those windmills and then they skip a little bit
1844 of the urban area, but then between King Ranch, from King Ranch
1845 to Raymondville almost in the South Texas area there that -- is
1846 it potential for any offshore? I have heard of offshore wind
1847 power also being developed, but again on the Texas coast it is
1848 all land-based.

1849 Ms. Mele. Yeah, it continues to be land-based, you know,

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1850 and the virtues of that southern and coastal wind that we have
1851 is that it tends to be there and available during the peak
1852 consumption hours in the afternoon. And so that resource
1853 development has really been valuable to our state.

1854 Mr. Green. What is the difference in the wind power, say,
1855 in South Texas as compared to West Texas and the megawatts that
1856 they deliver?

1857 Ms. Mele. The actual installations in South and coastal
1858 Texas are quite a bit lower. I don't have those exact numbers,
1859 but I would say it is probably over in maybe 3- to 5,000 megawatts.

1860 Mr. Green. Okay.

1861 Ms. Mele. I can certainly confirm those numbers for you.

1862 Mr. Green. So the wind blows more in West Texas than it
1863 does in South Texas.

1864 Ms. Mele. Well, the wind blows predictably in South Texas,
1865 but it blows more in West Texas.

1866 Mr. Green. Okay. Thank you, Mr. Chairman.

1867 Mr. Johnson. [Presiding.] I thank the gentleman for
1868 yielding back. I recognize Mr. Griffith for 5 minutes.

1869 Mr. Griffith. Thank you very much, Mr. Chairman. I
1870 appreciate it. As you may realize if you watch this committee
1871 very often, you have entered into the coal sector of this panel
1872 starting with Mr. McKinley, or Mr. Shimkus, then Mr. McKinley,
1873 myself, and Mr. Johnson, and others.

1874 Coal fueled power is still critical to our electrical supply.

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1875 It provides about 30 percent of the power we use and is a workhorse
1876 that if we don't kill it is always available. It helps prop up
1877 intermittent wind and solar and uninterruptable natural gas
1878 without a hundred percent firm guaranteed contract power sources,
1879 yet it has been under severe regulatory assault and victimized
1880 by generous subsidies, e.g., wind, PTC and solar ITC, and
1881 mandates, e.g., state renewable portfolio standard requirements
1882 offered to competing power sources.

1883 We have lost about 60,000 megawatts of coal generation over
1884 the last 5 years and the remaining coal plants in competitive
1885 markets are very much at risk. In my understanding of how power
1886 markets work, and I want to clarify some of that if I am wrong.

1887 But my understanding is, is that those generators don't get
1888 compensated for the resiliency they provide the grid. So it is
1889 a perfect storm for fuel secure baseload generators like coal
1890 units and each of the individual clouds in that storm is the result
1891 of a policy decision.

1892 Now earlier, Mr. Glazier, you said something about rewarding
1893 those that are available and I interpreted that as resiliency.

1894 So tell me how that works because that ought to be helping my
1895 coal-fired plants.

1896 Mr. Glazer. Thank you, Mr. Griffith. And we actually see
1897 this initiative as doing just that. It was one of my supermarket
1898 analogy with the price of a can of beans making sure that the
1899 full price is reflected in what you buy. And in the case of coal

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1900 to the extent it is providing a service to customers, ensuring
1901 that that is reflected in the price, absolutely.

1902 Mr. Griffith. Well, I hope, and if you can give me some
1903 more information on that I would appreciate it.

1904 Mr. Glazer. Sure.

1905 Mr. Griffith. And I hope you will continue with that because
1906 when you start talking about resiliency I don't think there is
1907 anything better than coal. I too have natural gas. I don't have
1908 as much as Mr. Shimkus or Mr. McKinley have, but it is important
1909 that we have a mix.

1910 Now one of the other things that you said earlier that
1911 intrigued me when you were talking to Mr. McKinley about cost
1912 is you said, of course we don't want to have stranded costs.
1913 But in my district alone there have been several facilities that
1914 still had life that were shuttered because of regulations. And
1915 when those are shuttered and there is a stranded cost, isn't it
1916 the ratepayer that ends up picking up that cost in the long run?

1917 Mr. Glazer. Well, and we --

1918 Mr. Griffith. I just need a yes or no because of time.

1919 Mr. Glazer. Yeah, yeah. And we moved to a market to try
1920 to not put it all on the backs of the customers, to be honest
1921 with you.

1922 Mr. Griffith. And I appreciate that but I think it ends
1923 up pretty much on their backs, notwithstanding your good efforts.

1924 Now I have got to get something straight because I don't

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1925 understand.

1926 Mr. Glazer. Okay.

1927 Mr. Griffith. So when we had our previous hearing the folks
1928 were talking about, you know, the payment for self-supply and
1929 self-supply. And you are here today and you have pictures of
1930 some self-supply facilities and I think it is great and we have
1931 got some great coal plants out there that are working on some
1932 of this type of stuff.

1933 Clearly there is a disconnect so I need your help in filling
1934 in the gaps. Is it what they get paid if they sell back to the
1935 PJM or others? I mean where is the disconnect? Because I think
1936 both sets of witnesses are honest brokers trying to do the best
1937 they can, but clearly there is something that doesn't fit.

1938 Mr. Glazer. Yeah, and it is a fair point.

1939 Mr. Griffith. Help me understand what -- I have your
1940 position, I have their position, but where is the disconnect?

1941 Mr. Glazer. Yeah, yeah. No, and it is a fair point, so
1942 two things very quickly. One is, I think they were referring
1943 to there is a court of appeals decision that puts some uncertainty
1944 around this self around the various rules that we have. Embedded
1945 within that was the self-supply exemption we worked out with
1946 public power. The court didn't overturn that but it did overturn
1947 the rest of it, so there is a little bit of uncertainty going
1948 forward but not for lack of wanting to honor that deal or even
1949 FERC wanting to honor that deal. So I think that is really part

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1950 of what we were talking about.

1951 And, you know, the public power says we should just have
1952 a totally different model in terms of how we buy capacity. I
1953 don't want to take a lot of time, but that has got its own set
1954 of problems with it, one of them being there is no price
1955 transparency. If everybody can just do bilateral deals it is
1956 like going to the supermarket. There is no prices. You just
1957 wait until the checkout line and then you have to negotiate what
1958 the price is and you don't know what the person -- it just doesn't
1959 work very well. So that is, I think, where the essence of the
1960 beef.

1961 Mr. Griffith. All right, so, you know, is it something that
1962 we ought to resolve? I mean I personally think it is much better
1963 if we let you all figure it out, but at the same time if we need
1964 to resolve that so that we guarantee that both the urban markets
1965 and the more rural markets are being served and getting a fair
1966 rate, I am happy to wade into that if that is necessary.

1967 Mr. Glazer. And we will keep the dialogue going. I think
1968 it actually, in a large part it has been worked out. We have
1969 got to work out what is the impact of this court decision and
1970 we will keep you posted on that.

1971 Mr. Griffith. Thank you very much and I yield back.

1972 Mr. Johnson. I thank the gentleman for yielding back. I
1973 now recognize Mr. Kennedy for 5 minutes.

1974 Mr. Kennedy. Thank you, Mr. Chairman. Thank you to the

1975 witnesses. Thank you to the committee for calling an important
1976 hearing. Thank you, Mr. Van Welie, for coming down. Thank you
1977 for the time to speak with the New England delegation yesterday,
1978 and your team as well.

1979 I am going to echo some of the comments of my colleagues
1980 I think, first and foremost, to say this is really a complex area
1981 of a critically important market and so I think you have seen
1982 from the folks on this side of the dais anyway a real effort to
1983 understand it. Some obviously do better than others.

1984 But in that I haven't been around Congress too long, but
1985 I do know that the greater the complexity the harder it is, one,
1986 to oversee, and the more likelihood is that incentives aren't
1987 perhaps structured quite as well as, or there is opportunities
1988 there for incentives to skew to folks that happen to know this
1989 industry really well, particularly if those that are overseeing
1990 it don't have that same degree of expertise.

1991 Mr. Van Welie and his team has been generous with their time
1992 in walking us through some of the challenges that we face in New
1993 England including a conversation yesterday and I wanted to further
1994 engage in that conversation. ISO New England has been very
1995 effective in driving down those wholesale market rates to very
1996 low levels and those prices have come down.

1997 One of the challenges that we face again that we talked about
1998 yesterday is that while those wholesale rates are low, those
1999 retail rates aren't and that once the energy comes out from that

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2000 wholesale marketplace because of a whole bunch of factors that
2001 is not under ISO's control, some of which isn't directly under
2002 federal government or Congress's control, all of a sudden the
2003 price that the end user gets is not cheap. And that is something
2004 that I hear actually from constituents and particularly as they
2005 are trying to bring back a manufacturing industry in the Northeast
2006 when those energy costs start to be a driving factor for their
2007 own businesses. And so what is the best way -- we ran into
2008 some problems here with FERC, obviously an FCA 8, without having
2009 a sufficient quorum. What is the best way and do you have any
2010 suggestions to ensure that there is some sort of, whether it is
2011 a public advocate or some way to make sure that the public has
2012 a way, a seat at the table and some method to push back on a system,
2013 the price increase? Because understanding that the wholesale
2014 rates are low trying to explain this at a town hall, not all that
2015 productive from somebody that has tried and failed. And with
2016 due respect it is not all that great to say, well, the wholesale
2017 rates are low but da-da-da-da-da. They don't care what the
2018 wholesale rates are. They care what they are having to pay.

2019 So how do we get to a point where we can address some of
2020 these concerns where the public actually feels like they have
2021 a seat at the table?

2022 Mr. Van Welie. So yes, a great question. I would say that
2023 there are some well-established structures for the public to have
2024 a voice both the wholesale and at the retail levels. So just

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2025 to describe briefly what happens with the structure around the
2026 ISO, we are compelled to take every rule change through a
2027 stakeholder process. There are six sectors in that stakeholder
2028 process, one of which is end users. There is another sector for
2029 public power.

2030 So public is represented right at the table when we are
2031 discussing all the market rule changes at the wholesale level.

2032 We also, several years ago, established something called the
2033 Consumer Liaison Group and so that is a place where consumer
2034 advocates and the public can have a voice with directly to the
2035 ISO as well. So the states are also represented through their
2036 regulatory commissions.

2037 Mr. Kennedy. Can I push you to get to the retail level
2038 because we have about a minute left.

2039 Mr. Van Welie. Okay. And well, at the retail level I think
2040 you have a similar structure in place around the Public Utility
2041 Commissions in each of the six states, so I think there are many
2042 opportunities for the public to engage in this discussion.

2043 I think the issue that you started this with though is the
2044 complexity. And so getting an understanding of how wholesale
2045 affects retail prices and what is in the retail price and what
2046 has been added in there, I think is a very daunting task for
2047 somebody who is uneducated. And I would be happy to talk more
2048 offline about how we can perhaps improve upon that.

2049 Mr. Kennedy. Well, I would certainly appreciate it. As

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2050 we look at the focus, in 30 seconds, ISO is focused on reliability,
2051 obviously stems from the reason for your work. The challenge
2052 then comes on that cost side if the issue on reliability ends
2053 up being, well, we can make it reliable at a certain price point
2054 where generators will come in and say we are willing to enter
2055 this marketplace but at a set price, would those prices then get
2056 passed along to consumers?

2057 And again we have seen those wholesale rates come down, but
2058 at a retail level that anger ends up getting channeled in certain
2059 levels, town halls are a great place for that anger to get
2060 channeled. But there is a tension there that is going to break
2061 at some point particularly given the resource-constrained
2062 environment that we might find ourselves in. So let's continue
2063 the conversation. And sorry for going over, thank you.

2064 Mr. Johnson. I thank the gentleman for yielding back. The
2065 chair will now recognize himself for 5 minutes.

2066 Mr. Glazer, in your testimony you stated PJM is concerned
2067 about potential retirements of additional coal resources and that
2068 the relevant question is how best to respond to that. You asked
2069 to have your feet held to the fire to devise market-based solutions
2070 to address these challenges. What can and should Congress do
2071 to play a role in this process? Anything else you would like
2072 to expand on in relation to this issue?

2073 Mr. Glazer. Thank you, Mr. Johnson, for that great
2074 question. Really is the subject as we are going to look at what

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2075 the future is we have got to focus on this question of resilience.
2076 And part of resilience is who decides? Who decides what is a
2077 credible threat and who decides as many consumers argue it is
2078 gold plating the system. Where is that balance? We need input
2079 from the federal government with that. We need oversight from
2080 this committee on those kinds of questions. It is a whole new
2081 area for all of us.

2082 Mr. Johnson. Okay. All right, well, I thank you for that.
2083 Perhaps you have already touched on this next issue with some
2084 of your previous answers, but as you know FERC began a stakeholder
2085 process to reform the process at which market prices are
2086 determined and paid back. Does PJM believe that these price
2087 formation rules have been successful thus far?

2088 Mr. Glazer. We think what they have done has been very
2089 helpful, but we need to and we have been, frankly, pushing on
2090 the Commission to move on this next level which is what I talked
2091 about before how we do a load following product, how we focus
2092 on these inflexible units that ought to be able to set price.

2093 My supermarket example with the can of beans, that is the
2094 kind of stuff, frankly, we are asking the new Commission when
2095 it gets seated to take this to the next level. What they have
2096 done has been helpful. This is a big issue and might help a lot
2097 of those issues that you have raised.

2098 Mr. Johnson. Okay, all right. Well, what remaining areas
2099 of price formation reform are of greatest concern to your RTO?

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2100 Mr. Glazer. This one is probably the largest which is do
2101 we let these large block loaded units, which in some cases are
2102 coal units or large natural gas units, could even be nuclear units,
2103 to set price? That is a very big issue. I think if we truly
2104 got our hands around that it is not a panacea but would help to
2105 take some of the pressure off this whole question about baseload.

2106 So we are just beginning that dialogue in fairness to FERC,
2107 but this committee's oversight over that would be appreciated.

2108 Mr. Johnson. Okay. And you mentioned the word resiliency
2109 just a few minutes ago and you also touched on it in your testimony,
2110 a very important topic that has been receiving a lot of increasing
2111 attention. So what steps are PJM taking to promote a resilient
2112 power grid especially in the context of extreme events?

2113 Mr. Glazer. And great question. We have got, actually we
2114 just outlined for the stakeholders literally a complex map of
2115 things we are doing, some of it is just done in the control room
2116 operating the system more conservatively at times when we are
2117 seeing issues on pipelines, for example. Some of them are
2118 operational. Some of them are these price formation type issues.
2119 Some of these are planning.

2120 We have got some critical transmission substations. How
2121 do we make them less critical so that in fact something happens
2122 they don't have this big impact? Those are the kind of things
2123 we are looking at. We have got a whole map that we have outlined
2124 of those initiatives which I would be happy to share with the

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2125 committee.

2126 Mr. Johnson. Okay, great. Well, let it be noted that the
2127 interim chairman yielded back over a minute of his time. Yes,
2128 I will recognize Mr. Pallone.

2129 Mr. Pallone. Thank you, Mr. Chairman. I have to get to
2130 a couple of things here, so for the first question if I could
2131 just ask all the panelists to just answer either yes or no,
2132 otherwise I am not going to get to the other question.

2133 So the question for everyone yes or no is does your RTO or
2134 ISO have a designated body responsible for consumer input or
2135 advocacy? Just yes or no.

2136 Mr. Van Welie. Yes.

2137 Mr. Brown. Yes.

2138 Mr. Jones. Yes.

2139 Mr. Doying. Yes.

2140 Ms. Mele. Yes.

2141 Mr. Casey. The answer no to that.

2142 Mr. Pallone. You said no, Dr. Casey, okay.

2143 Mr. Glazer. And I would say yes.

2144 Mr. Pallone. Okay, so everyone was a yes except for Dr.
2145 Casey. Thank you. All right, so let me move on. This is a more
2146 specific to my congressional district.

2147 In my congressional district, Jersey Central Power and
2148 Light, a subsidiary of First Energy, has proposed the Monmouth
2149 County Reliability Project, a ten-mile, 230 kilowatt transmission

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2150 line and substation enhancement project. But a lot of questions
2151 have been raised about the necessity of the project for meeting
2152 its proposed goal of increasing reliability of the push into the
2153 grid serving Monmouth County. I have raised these myself at
2154 public hearings. And this project was recommended by PJM's
2155 Transmission Expansion Advisory Committee and approved by its
2156 board of managers.

2157 So Mr. Glazier, assuming you understand what I asked, if
2158 not I will repeat it, critics say that the process for approval
2159 of transmission projects lacks transparency, consumer advocate
2160 input, and true independent oversight. What can PJM do to address
2161 some of those concerns, if you will?

2162 Mr. Glazer. Mr. Pallone, I appreciate the question. I do
2163 not agree with the premise of it because these meetings are open,
2164 the material is published, and we don't just passively do that.
2165 We reach out to the consumer advocates, they are very active
2166 in our process -- to the states as well, the BPU in New Jersey,
2167 so people are there.

2168 The problem comes in then you go to a siting process months
2169 later and people, the public is hearing about it for the first
2170 time. So maybe we need to do more, admittedly, to sort of reach
2171 out to the public on these things than we do and that is a fair
2172 point that we will talk about to address some of those issues.

2173 We are not deciding authority here, but people do need to
2174 understand what the need is and there probably is more we could

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2175 do, to be honest.

2176 Mr. Pallone. So what you are saying to me is that it is
2177 not, you believe that there is opportunity for consumer input
2178 and oversight, but the problem is they just may not be aware of
2179 what those opportunities are.

2180 Mr. Glazer. Right, and in fairness we need to do more in
2181 that area.

2182 Mr. Pallone. All right. Well, again I appreciate that and
2183 if we can work together on thinking about better ways of doing
2184 that I certainly appreciate it. I just wanted to say, you know,
2185 I understand the need to prepare so there is enough electricity
2186 generation to cover the needs of the market, but I also worry
2187 that drastically overestimating load forecasts on a regular basis
2188 can lead to unnecessary build-out that ultimately has to be paid
2189 for by the ratepayers.

2190 And to that point some are peak load forecasts for PJM's
2191 annual reliability planning have been consistently and
2192 significantly overestimated for the past 8 years even as the
2193 actual use of electricity in my state has declined. So some
2194 projects that have been approved by PJM and have been constructed
2195 based on what I consider overly optimistic forecasts have resulted
2196 in underutilized transmission lines. So Mr. Glazier, what
2197 checks and balances are in place to encourage PJM not to
2198 overexaggerate forecasts?

2199 Mr. Glazer. Thank you for the question. This is a Gordian

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2200 knot, because if you overestimate consumers would pay too much,
2201 if you underestimate you could run short and then be in a serious
2202 reliability problem. So it is a Gordian knot to find the right
2203 mix. It has been very tough over the past couple of years, not
2204 an excuse but a reality, because we have seen the economy, the
2205 impacts of the recession, and we have seen energy efficiency.

2206 As the economy picks up we are not seeing the load picking up,
2207 which is showing us that maybe there is some permanent energy
2208 efficiency changes which are then affecting the load forecast.

2209 But it is kind of a difficult area to ping it exactly right,
2210 but we are trying to work very hard on getting this more
2211 sophisticated.

2212 Mr. Pallone. All right, let me just throw in one more thing.

2213 What can PJM do, in your opinion, to minimize transmission
2214 projects that are approved, built, and then underutilized
2215 resulting in unnecessary high cost to ratepayers? Is there any
2216 recommendation you would have?

2217 Mr. Glazer. We generally don't have a problem of
2218 underutilized transmission lines, they are pretty utilized at
2219 this point. As I was talking about with Mr. Shimkus, got a
2220 situation where I can't get power into Chicago because the system
2221 is too tight, so generally they are well utilized once they are
2222 built.

2223 This whole question of do you build it just in time or do
2224 you look forward a little bit and predict is a very tough one

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2225 because it takes a couple years to get a transmission line built,
2226 so it is difficult. We are trying to -- if anything, we have
2227 canceled a whole bunch of transmission lines in response to let's
2228 not overbuild the system. Sometimes I worry maybe we canceled
2229 too many, but in fact we have canceled a bunch of lines. So we
2230 have tried to be responsive to the changing needs of the system,
2231 very much so.

2232 Mr. Pallone. So you don't have any suggestions about trying
2233 to minimize that problem?

2234 Mr. Glazer. The way we do it is to continuously question
2235 --

2236 Mr. Johnson. If you can answer that quickly, Mr. Glazer,
2237 the time is expired.

2238 Mr. Glazer. Yeah, to continually question what we have
2239 done, to look at it year by year and cancel projects we don't
2240 need any longer.

2241 Mr. Pallone. All right, thank you.

2242 Thank you, Mr. Chairman.

2243 Mr. Johnson. I thank the gentleman, his time has expired.
2244 I now recognize Mr. Flores from Texas.

2245 Mr. Flores. I thank the chairman. By the way Mr. Chairman,
2246 I want to share the news with you that a member of this committee,
2247 Steve Scalise, has been released from the hospital, so we look
2248 forward to him joining us soon. Prayers for his continued
2249 recovery.

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2250 I have a couple of micro questions just because I am a little
2251 bit of a nerd on some of these things, and then I want to come
2252 back out to the macro. I was just checking my home solar system,
2253 we are producing about 86 percent of my daily needs right now.
2254 We will go up to about 130 percent maybe less because my wife
2255 is home with the thermostats under her sole control.

2256 In any event, Ms. Mele, this raises sort of an issue. Do
2257 you have an idea in ERCOT how much distributed power is behind
2258 the meter like what I am doing? Do we have a way to measure that?

2259 Ms. Mele. That is something that we are currently
2260 discussing with our stakeholders and we recognize that as an
2261 important thing for us to keep our eyes on. So really, with
2262 something like your rooftop solar we have proposed in a white
2263 paper to the stakeholder community and market participants that
2264 we start to talk about how we get a view of that perhaps through
2265 aggregation.

2266 As the transmission operator and wholesale market operator,
2267 we don't really want to get down into the distribution system,
2268 but we do think it is important where they start to see a
2269 significant amount of that building up at a transmission load
2270 point that there would be some visibility to come back to ERCOT.

2271 That is for our operational readiness as well as for our planning.
2272 Not different than the conversation we just had about
2273 transmission resources, you know, we need to consider how we use
2274 that information in our transmission planning process.

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2275 So at this time we don't have a exact picture of how much
2276 is out there. There are some reports that are filed to the Public
2277 Utility Commission that do give us some insight into that.

2278 Mr. Flores. Okay. I was just curious, because I mean
2279 implied in your answer is that it does have an impact on
2280 distribution and reliability or dispatch and reliability.

2281 And so that sort of I want to come out to just another level
2282 up, in Texas, because of the tax credits for certain types of
2283 power, we have had negative pricing enter into the market and
2284 so that seems to be disruptive to being able to dispatch with
2285 transparency and reliability.

2286 Can you tell us what the challenges are because this has
2287 to do with wind primarily and some solar. What has that done
2288 to your job?

2289 Ms. Mele. So I think the important thing to think about
2290 for our job as the people who are responsible to forecast and
2291 procure the resources that we believe are going to be needed to
2292 get through the day as well as the ancillary services to close
2293 the gap between the load forecast and, you know, the operational
2294 difference in real time, what we have focused on is really the
2295 accuracy of forecasting. We have done a lot of work especially
2296 with wind to look at how accurate we can get that forecast,
2297 considering where we are, and looking at what that net load ramp
2298 potential is. So here is what might change based on where we
2299 currently are with wind and here is load is going and trying to

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2300 really focus in on that.

2301 We have actually added a new operating desk in our control
2302 room. It has been in place now for about 8 months, and some of
2303 their primary responsibilities are really looking at that,
2304 looking closely at forecast. We use some pretty sophisticated
2305 software to do both our load forecasting and monitoring our wind.

2306 In addition to that they are looking at, you know, what is the
2307 inertia on the grid as we have this changing resource mix.

2308 Mr. Flores. Right, right. Well, that takes us to the next
2309 area I wanted to go and I welcome comments from any of you on
2310 this and I want to start with Ms. Mele. We have got the challenges
2311 in managing baseload and also renewables which by the way they
2312 are structured are intermittent.

2313 Recently in Australia there was an incident that was weather
2314 related that caused their wind energy, wind resources, to drop
2315 off line in southeast Australia and putting 1.7 million people
2316 in the dark. And they really hadn't factored in that type of
2317 an event and so they didn't have enough baseload ready, enough
2318 inertia, if you will, to be able to back the system up and bring
2319 people back on line. What are each of you doing about that
2320 particular issue? And I only have about 49 seconds. We will
2321 start with you, Mr. Glazer.

2322 Mr. Glazer. This is one of those resilience issues. It
2323 deals with things like black start to be able to -- resilience
2324 isn't just preventing things but restoring the system rapidly.

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2325 Those are some of the things that we are digging into.

2326 Mr. Flores. Okay. Dr. Casey?

2327 Mr. Casey. A couple of things, one, carrying reserves.

2328 Mr. Flores. Quickly.

2329 Mr. Casey. To make sure when that happens we have backup
2330 so at least they can step in. And secondly, making sure the
2331 inverter technologies with these new technologies can ride
2332 through events on the system.

2333 Mr. Flores. Right.

2334 Mr. Casey. It is a relatively new technology. We are
2335 learning as we go, but we are discovering issues and we are trying
2336 to fix them.

2337 Mr. Flores. Let me just quickly through the rest of you,
2338 are each of you familiar with this incident and are learning from
2339 this incident? Okay, thank you. I used up all my time. Thank
2340 you, I yield back and I will submit additional questions for the
2341 record.

2342 Mr. Johnson. I thank the gentleman for yielding back and
2343 recognize now Mr. Tonko for 5 minutes.

2344 Mr. Tonko. Thank you, Mr. Chair. Because of a conflict
2345 I apologize for missing the beginning of the hearing and for
2346 hitting any topics that may have already been covered. And I
2347 thank all of you for participating this morning, it is a wealth
2348 of talent to have at the table.

2349 And if I might do my hometown, or home state shout-out to

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2350 Mr. Jones, thank you for being here and for all of the great work
2351 that you do to guarantee great reliability throughout my home
2352 state of New York and for your work to keep our state on the cutting
2353 edge of our nation's energy transformation.

2354 So we are very happy with the results. New York has launched
2355 a number of ambitious state policies including environmental and
2356 fuel diversity goals, the Reforming the Energy Vision, the REV
2357 concept, and clean energy standards are keeping the state at the
2358 forefront of our changing energy system. ISO clearly benefits
2359 from dealing with a single state government so there are not
2360 competing state interests or goals to balance.

2361 Mr. Jones, based on your testimony it sounds like RTOs can
2362 play a role in achieving state policy goals. How has NYISO been
2363 involved in New York's REV initiative?

2364 Mr. Jones. Thank you, Mr. Tonko. REV initiative is
2365 primarily directed at animating our customers in a way that the
2366 customers can participate in both the retail and the wholesale
2367 markets. From NYISO's perspective we have gotten engaged on that
2368 issue and that we launched last fall a DER roadmap. A roadmap
2369 provided some clarity to our approach going forward to individuals
2370 that are proposing to invest in distributed resources.

2371 Those resources now we are bringing into a pilot program.
2372 The pilot program is intended for us to develop the types of
2373 communications that we will communicate both price and dispatch
2374 these individuals and the settlement process is to make sure that

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2375 happens. We hope in a 3-year period to be able to solidify all
2376 of the wholesale market interactions. We are currently also
2377 working with our distribution companies within the state of New
2378 York to assist them in developing their systems.

2379 Mr. Tonko. Thank you. Obviously that effort with
2380 distributed resources provides great value to the grid.

2381 Mr. Jones. Yes, sir. We see great opportunity to by
2382 animating those customers to reduce overall needs for both
2383 transmission and new generation resources to provide significant
2384 value to our customers.

2385 Mr. Tonko. Super, thank you. And at the market
2386 participants' hearing last week we heard complaints from some
2387 witnesses about out-of-market subsidies. Now New York's ISO
2388 recently commissioned a study from the Brattle Group to explore
2389 the potential to pursue state environmental and other goals within
2390 its market structure. You have suggested that this could
2391 incentivize cleaner generation, provide proper price signals in
2392 the competitive markets, and help achieve state policy goals.

2393 How might that work?

2394 Mr. Jones. Just to put it as simply as I can, the way it
2395 would work is that we would charge generators that produce carbon
2396 emissions. We would charge them for the value of those carbon
2397 emissions. That money then we would return to customers. But
2398 because those individuals are being charged for that cost, that
2399 cost would be reflected into the marketplace, the price, and low

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2400 carbon emissions resources then would benefit by that higher
2401 clearing price. Mr. Tonko. And is there a timeline that you
2402 have for considering the possibility of adopting these types of
2403 changes?

2404 Mr. Jones. Yes. We are about to launch the Brattle report
2405 or Brattle, rather, will launch it on our behalf within the next
2406 several days. At that point we will begin to engage our market
2407 participants as we have been working closely with the PSC, the
2408 Public Service Commission of New York, throughout the last several
2409 months. We will engage our market participants. I would hope
2410 that in a period of 3 years we could have that implemented within
2411 our markets.

2412 Mr. Tonko. Thanks a lot. And your 2017 Power Trends Report
2413 identifies transmission constraints as a limitation for New York
2414 to get clean energy resources to some high demand areas. We are
2415 also seeing this on a larger scale throughout the nation where
2416 renewable resource potential is high in the Midwest. Can you
2417 explain how New York's ISO's role in overcoming these constraints
2418 is working?

2419 Mr. Jones. It is working quite well. We need to continue
2420 to drive the process to improve it and speed the process up.
2421 We currently have two projects that are well underway, one from
2422 Western New York to Central New York, one project that will take
2423 power from Central New York down into New York City and Long
2424 Island. We see additional needs going forward and we proposed

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2425 those to the Public Service Commission. They are currently
2426 evaluating those. We hope to move those forward very quickly.

2427 Mr. Tonko. Thank you. And just for those in the eastern
2428 portion of our nation that are here as witnesses, you have created
2429 capacity markets. Do you think that the capacity markets are
2430 the optimal in least-cost means to determine the mix of generation
2431 resources that we need to serve our customers? Mr. Glazer?

2432 Mr. Glazer. I think, you know, nothing is perfect, but I
2433 think they have accomplished the goals of in getting new
2434 investments very efficiently, retiring inefficient investments,
2435 so I think they are overall working well.

2436 Mr. Tonko. Mr. Van Welie, please?

2437 Mr. Van Welie. Yes, I do think so.

2438 Mr. Tonko. And Mr. Jones?

2439 Mr. Jones. Yes, very much so.

2440 Mr. Tonko. Thank you. Again thank you for the work you
2441 do. It is so valuable in this given transformation period, so
2442 thank you. I yield back, Mr. Chairman.

2443 Mr. Johnson. I thank the gentleman for yielding back.

2444 And seeing there are no further members wishing to ask
2445 questions, I would like thank all of our witnesses once again
2446 for being here today. In pursuant to committee rules, I will
2447 remind members that they have 10 business days to submit
2448 additional questions for the record and I ask that witnesses
2449 submit their response within 10 business days upon receipt of

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2450 the questions. Without objection, the subcommittee is
2451 adjourned.

2452 [Whereupon, at 12:22 p.m., the subcommittee was adjourned.]