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CGNP's Opening Brief in FERC Docket AD17-11-000

Attached find a copy of Californians for Green Nuclear Power, Inc.'s (CGNP's) accepted Opening Brief in FERC Docket AD17-11-000 in protest of CPUC Application A.16-08-006 by Pacific Gas and Electric (PG&E) to abandon the safe, efficient, cost-effective and reliable Diablo Canyon Power Plant (DCPP) in 2025. CGNP, as a FERC Intervenor requests proper notice by the California Energy Commission (CEC) of CGNP's Opening Brief. In summary, CGNP supports the continued safe operation of DCPP far beyond PG&E's proposed abandonment date of 2025. CGNP further requests that any CEC requests for information or clarification be sent to the contact email address shown in the document. CGNP expects substantial revision of the upcoming CEC IEPR to reflect CGNP's fact-based perspectives.

Additional submitted attachment is included below.

1 **RE: FERC Docket AD17-11-000 State Policies and Wholesale Markets Operated by ISO New**
2 **England Inc., New York Independent System Operator, Inc., and PJM Interconnection, L.L.C.**

3 SUMMARY: The issues raised in this FERC docket are also relevant to proposed actions
4 in the western United States, specifically the interactions of the California Independent System
5 Operator (CAISO) and PacifiCorp, which operates two Load Balancing Authorities spanning a
6 large part of the western United States. PacifiCorp has been lobbying since about 2003 for an
7 "Energy Imbalance Market" (EIM) that would eventually permit it to sell large amounts of its
8 fossil-fired electricity into the California energy market. Per PacifiCorp's 2015 Integrated
9 Resource Plan (IRP), PacifiCorp operates about 6,000 MW of dirty coal-fired electric power
10 plants and about 3,000 MW of dirty natural-gas-fired electric power plants. The goal of this
11 filing is to alert FERC to the potential negative environmental consequences of this Pacific Gas &
12 Electric (PG&E) California Public Utilities Commission (CPUC) Application A.16-08-006.
13 Californians for Green Nuclear Power, Inc. (CGNP) is the sole CPUC intervenor in this
14 Application that is advocating for the economic interests of California ratepayers and for
15 maintaining a non-carbon-emitting generator in California beyond 2025, namely Diablo Canyon
16 Power Plant (DCPP.) Based on the experiences in southern California when the owners of San
17 Onofre Nuclear Generating Station (SONGS) mismanaged a routine service operation to replace
18 the steam generators, forcing SONGS to shut down in January, 2012, California ratepayers are
19 likely to face billions of dollars/year in increased energy costs if PG&E's application to abandon
20 DCPP in 2025 is granted.

21 As a consequence of length limitations, here are the links to CGNP's CPUC direct and
22 rebuttal testimony - and their accompanying workpapers - and CGNP's Opening and Reply

1 Briefs. CGNP has contributed about 1,000 pages of written testimony and oral evidentiary
2 hearing transcripts to this proceeding. For a quick 21-page summary of the issues, please see
3 the bolded reference - CGNP's Reply Brief. The only thing not mentioned in CGNP's reply brief
4 is the likely role of Portland, Oregon based PacifiCorp, a Berkshire Hathaway Energy Company,
5 in the push to close the highly-functioning and well-maintained DCPP. PacifiCorp's profitability
6 could be boosted as they sell billions of dollars/year of their fossil-fired electricity into the
7 California market if PG&E prevails in their harmful proposal. PacifiCorp is mentioned in CGNP's
8 other filings - and in CGNP's oral evidentiary hearing testimony before the CPUC.

9 http://www.cgnp.org/CGNP_Direct_Testimony_01-27-17.pdf

10 http://www.cgnp.org/CGNP_Direct_Testimony_Workpapers_01-28-17.pdf

11 http://www.cgnp.org/CGNP_Rebuttal_Testimony_03-17-17.pdf

12 http://www.cgnp.org/CGNP_Rebuttal_Testimony_Workpapers_03-17-17.zip

13 http://www.cgnp.org/CGNP-OpeningBrief-A1608006_05-26-17.pdf

14 **<http://www.cgnp.org/CGNP-Reply-Brief-A1608006.pdf>**

15 Several of CGNP's Motions to include additional testimony in this CPUC Proceeding have also
16 been accepted. <http://www.sanluisobispo.com/news/local/article145130504.html> is a 17 April
17 2017 *San Luis Obispo Tribune* article about the CPUC oral evidentiary hearings in application
18 A.16-08-006. CGNP is mentioned in the article.

19

20 21 June 2017 /s/ Gene A. Nelson, Ph.D., Central Coast Government Liaison,
21 Californians For Green Nuclear Power, 1375 East Grand Ave, Suite 103 #523, Arroyo Grande,
22 CA 93420 Tel: (805) 363 - 4697 E-mail: liaison@CGNP.org

1 **PacifiCorp is ready and able to replace DCPD with its fossil-fired generation**

2 **Sponsor: Gene A. Nelson, Ph.D.**



3 **History of WSPP** http://www.wspp.org/about_history.php

4 **The Western Systems Power Pool (WSPP)** began as an agreement among a group of utilities
5 in the western states. The agreement, which was filed with the Federal Energy Regulatory Commission
6 by **Pacific Gas and Electric Company** on behalf of the group, established a multi-state bulk
7 power marketing experiment. The agreement was meant to test whether broader pricing flexibility for
8 coordination and transmission services would promote increased efficiency, competition, and
9 coordination.
10

11 The WSPP began operations in 1987 first as an experiment allowed by the Federal Energy Regulatory
12 Commission (FERC) and then beginning in 1991 as a more permanent entity. Its initial purpose was to
13 allow sales of power for short-term transactions to take place with a maximum of flexibility and minimum
14 of regulatory filings and to test market efficiency and competition.

15 **Comparison of Available Power of PG&E and PacifiCorp 03 27 07 to 01 17 17**

16 The tool available at <http://www.wspp.org/power.php> shows that during the 3,584 days between these
17 two dates that **Pacific Gas and Electric Company (PG&E)** had available power exactly **zero**
18 days during this period.



19

- 1 Thus, it can be inferred that PG&E is a power importer.
- 2 On the other hand, **PacifiCorp** had available power on **2,222 days**, or **62%** of the 3,584 days
- 3 disclosed.

4 **PacifiCorp Available Power October 7, 2016 to October 20, 2016**

WSPP 20 years of enabling competitive power markets

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Available Power - 1 to 15 of 2222

Available Power Post Generation

Hide Search/Restore Original List

Date Posted	Available Date	Organization	Title
		PacifiCorp	
10/20/2016	10/22/2016	PacifiCorp	Estimated Excess Capacity
10/20/2016	10/21/2016	PacifiCorp	Estimated Excess Capacity
10/19/2016	10/19/2016	PacifiCorp	Estimated Excess Capacity
10/19/2016	10/20/2016	PacifiCorp	Estimated Excess Capacity
10/17/2016	10/18/2016	PacifiCorp	Estimated Excess Capacity
10/14/2016	10/17/2016	PacifiCorp	Estimated Excess Capacity
10/14/2016	10/16/2016	PacifiCorp	Estimated Excess Capacity
10/13/2016	10/15/2016	PacifiCorp	Estimated Excess Capacity
10/13/2016	10/14/2016	PacifiCorp	Estimated Excess Capacity
10/12/2016	10/13/2016	PacifiCorp	Estimated Excess Capacity
10/11/2016	10/12/2016	PacifiCorp	Estimated Excess Capacity
10/10/2016	10/11/2016	PacifiCorp	Estimated Excess Capacity
10/07/2016	10/10/2016	PacifiCorp	Estimated Excess Capacity
10/07/2016	10/09/2016	PacifiCorp	Estimated Excess Capacity
10/07/2016	10/08/2016	PacifiCorp	Estimated Excess Capacity

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5

6

1 **PacifiCorp Available Power April 4, 2007 to April 25, 2007**

WSPP 20 years of enabling competitive power markets

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Available Power - 2206 to 2220 of 2222

Hide Search/Restore Original List

Date Posted	Available Date	Organization	Title
		PacifiCorp	
04/25/2007	04/26/2007	PacifiCorp	Excess Capacity
04/24/2007	04/25/2007	PacifiCorp	Excess Capacity
04/23/2007	04/23/2007	PacifiCorp	Excess Capacity
04/20/2007	04/22/2007	PacifiCorp	Excess Capacity
04/19/2007	04/20/2007	PacifiCorp	Excess Capacity
04/18/2007	04/19/2007	PacifiCorp	Excess Capacity
04/17/2007	04/17/2007	PacifiCorp	Excess Capacity
04/16/2007	04/17/2007	PacifiCorp	avail Excess Gen
04/13/2007	04/14/2007	PacifiCorp	Avail Capacity
04/12/2007	04/13/2007	PacifiCorp	available excess gen
04/11/2007	04/12/2007	PacifiCorp	PacifiCorp Avail
04/10/2007	04/11/2007	PacifiCorp	Available Excess
04/09/2007	04/10/2007	PacifiCorp	PacifiCorp Available
04/05/2007	04/05/2007	PacifiCorp	Available Excess Gen
04/04/2007	04/04/2007	PacifiCorp	Available Excess Gen

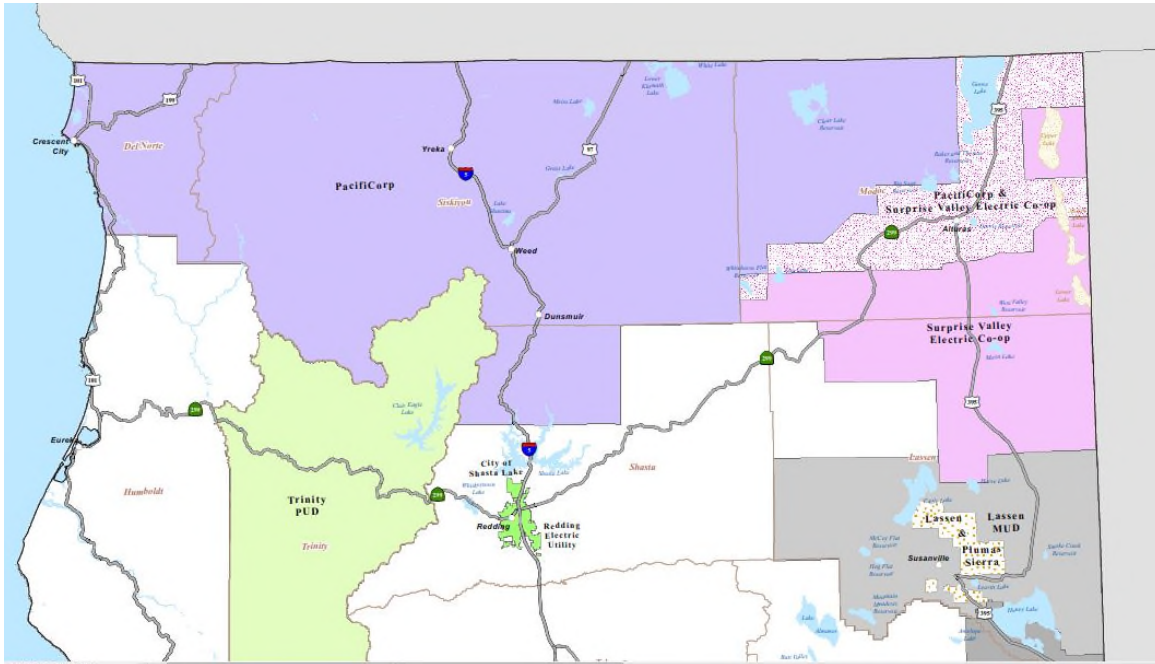
First Previous Next Last

2

3 Thus, it can be seen that PacifiCorp is a significant WSPP power exporter.

4

- 1 Furthermore, per the California Energy Commission (CEC,) PacifiCorp and PG&E service territories
- 2 share a **common border over 100 miles long**. See the detailed version of the "California Electric Utility
- 3 Service Areas Map" at
- 4 http://www.energy.ca.gov/maps/serviceareas/Electric_UTILITY_Service_Areas.html
- 5 (PacifiCorp service territory is lavender and PG&E service territory is white)



- 6
- 7 PacifiCorp is well-capitalized, having been acquired by Berkshire Hathaway in 2005 in a \$9.5 billion dollar
- 8 transaction.¹

¹ "Berkshire Hathaway's \$9.4B deal" by Steve Goldstein, MarketWatch, May 24, 2005.
<http://www.marketwatch.com/story/buffetts-midamerican-to-buy-pacificorp-for-94b>

1 PacifiCorp has almost **6,000**
 2 **GW of coal-fired generating**
 3 capacity and almost **3,000 GW**
 4 **of natural gas fired generating**
 5 **capacity.** ² The WSPPP trading
 6 data above establishes that
 7 PacifiCorp has surplus fossil-
 8 fired generating capacity
 9 available for export to PG&E.
 10 Per the CEC 2015 PacifiCorp
 11 Power Content Label, shown
 12 here, none of PacifiCorp's
 13 power is emission-free nuclear
 14 power.
 15 PacifiCorp is constructing an
 16 "Energy Gateway" power
 17 transmission project that may
 18 be used, in conjunction with
 19 existing transmission facilities
 20 to move power from the
 21 firm's fossil-fired generators to prospective customers.

2015 POWER CONTENT LABEL		
	Power Mix	2015 CA Total Mix**
ENERGY RESOURCES		
Eligible Renewable	8.47%	22%
Biomass & Biowaste	0.30%	3%
Geothermal	0.44%	4%
Eligible hydroelectric	1.16%	1%
Solar electric	0.04%	6%
Wind	6.53%	8%
Coal	59.86%	6%
Large Hydro	3.24%	5%
Natural gas	14.31%	44%
Nuclear	0.00%	9%
Other	1.44%	0%
Unspecified sources of power*	12.68%	14%
TOTAL	100%	100%

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the previous year.

For specific information about this electricity product, contact: Pacific Power 1-888-221-7070

For general information about the Power Content Label, consult: California Energy Commission 1-844-217-4925 <http://www.energy.ca.gov/pcl/>

http://www.energy.ca.gov/pcl/labels/2015_labels/Pacific_Power.pdf
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² PacifiCorp 2015 Integrated Resource Plan, Volume 1 pages 62-63

http://www.pacificcorp.com/content/dam/pacificcorp/doc/Energy_Sources/Integrated_Resource_Plan/2015IRP/PacifiCorp_2015IRP-Vol1-MainDocument.pdf

1 The project includes more than 1,900 miles of new transmission lines. Per this two-page color
2 brochure, "Construction on certain segments begins in 2008, with many major segments in service by
3 2014." Here are two key bullet points from the second page of the PacifiCorp brochure:

4 • All new facilities – whether generation or transmission – are integrated into the existing
5 system. **There is no way to physically distinguish one source of electrons from another**
6 **source traveling along the transmission lines.** (emphasis added)

7 • The region will need all types of resources to meet the growing demand for energy, and
8 conventional resource types, particularly natural gas, will continue to play an important role in
9 coming years.³

10 Furthermore, PacifiCorp has been lobbying many relevant regulatory and oversight bodies, and the
11 government of the State of California to establish a "Regional Load Balancing Authority" (RLBA) or
12 "Regional Grid Operator" (RGO) or an "Energy Imbalance Market (EIM.) Here is a passage found in a
13 June 19, 2014 FERC decision involving both the California Independent System Operator and PacifiCorp.

14 Page 3:

15 1. In this order, the Commission addresses proposed revisions filed by PacifiCorp to its Open
16 Access Transmission Tariff (OATT) in order for PacifiCorp to participate in the Energy Imbalance
17 Market (EIM) being created by the California Independent System Operator Corporation
18 (CAISO). PacifiCorp's OATT revisions will work in parallel with tariff revisions proposed by CAISO,
19 whose revisions will provide neighboring balancing authority areas (BAAs) the opportunity to
20 participate in CAISO's real-time market for imbalance energy.

³ Energy Gateway and Renewable Resources

Major new regional transmission network supports renewable resource development, July 2008
http://www.pacificorp.com/content/dam/pacificorp/doc/Transmission/Transmission_Projects/Energy_Gateway_1.pdf

1 **I. Background**

2 2. The Commission requires public utility transmission providers to offer energy imbalance
3 service to transmission customers and generators as ancillary services under the pro forma
4 OATT.

5 PacifiCorp currently manages energy imbalances across two BAAs—PacifiCorp East and
6 PacifiCorp West3 —by utilizing both automated and manual processes to provide imbalance
7 services from its resources under Schedule 4 (Energy Imbalance Service) and Schedule 9
8 (Generator Imbalance Service) of its OATT. On the other hand, CAISO manages its BAA through
9 the operation of a bid-based real-time energy market that automatically dispatches the least-
10 cost resource every five minutes to serve load while resolving transmission congestion through
11 the use of a detailed network model.

12 Page 4:

13 **3. For several years, industry leaders in the West have examined the potential benefits of a**
14 **regional energy imbalance market that could replace the energy imbalance services that**
15 **utilities in the region, such as PacifiCorp, currently offer under their respective OATTs.**

16 (emphasis added) CAISO and PacifiCorp studied the benefits of an energy imbalance market
17 between their BAAs.

18 **The EIM Benefits Study projected annual economic benefits to PacifiCorp of between \$10.5**
19 **and \$54.4 million** (emphasis added) with benefits for customers resulting from dispatch savings,
20 reduced flexibility reserves, and reduced renewable energy curtailment.

21 4. Following the EIM Benefits Study, CAISO and PacifiCorp executed a memorandum of
22 understanding in February 2013 to begin development of a regional realtime energy imbalance
23 market to commence operations by October 2014. On June 28, 2013, the Commission accepted

1 an implementation agreement between CAISO and PacifiCorp to establish the scope and
2 schedule of implementing the energy imbalance market and to account for PacifiCorp's upfront
3 costs.⁴

4 Clearly, a "Regional Energy Imbalance Market" would benefit the profitability of PacifiCorp. Coupling the
5 history during the past decade of a glut of PacifiCorp fossil-fired electric power to be wholesaled as
6 documented by WSPP market data, the geographic proximity of PG&E and PacifiCorp service territories,
7 the large PacifiCorp fossil-fired generating capacity and transmission network, with evidence of
8 PacifiCorp's lobbying to expand its market all support the contention that PacifiCorp is ready and able to
9 replace the 18,000 GWh that is generated by DCPD by exporting electricity that will be sourced by
10 PacifiCorp fossil-fired generation.

⁴ PacifiCorp Docket No. ER14-1578-000 ORDER CONDITIONALLY ACCEPTING IN PART AND REJECTING IN PART PROPOSED TARIFF REVISIONS TO IMPLEMENT ENERGY IMBALANCE MARKET (Issued June 19, 2014)
www.FERC.gov/whats-new/comm-meet/2014/061914/E-5.pdf

Meet Diablo Canyon Power Plant, California's "Clean Energy Champion."



Updated 05 29 17

2009 photograph
credit: *The San
Francisco Chronicle*

- Diablo Canyon Power Plant (DCPP) emits no carbon while generating huge amounts of electric power. Note the lack of smokestacks in the above photo. The plant typically generates 18 billion kWh/year, enough energy for 3 million Californians to live and work. DCPP is the largest power generator in California.
- DCPP is a reliable, cost effective power generator, running 24/7, 365 days a year. The plant has operated safely for over 3 decades.
- DCPP's desalination plant could supply 825,000 gallons per day (or more) of surplus water to drought-parched San Luis Obispo County.
- In 2014, DCPP generated 131% of the power generated by all wind sources in California or 161% of all the California solar power.
- In 2013, per industry statistics, DCPP avoided 13.43 million metric tons (MMT) of CO₂ emissions. Replace DCPP with Natural Gas = **2.22 million** passenger vehicles emitting for a year. For coal, (as in PacifiCorp generation) the number jumps to **6.58 million** passenger vehicles. The methane leak at the Aliso Canyon Storage Field released the equivalent of 7 MMT CO₂. Running DCPP for only 190 days would mitigate that leak.
- DCPP is California's most powerful weapon against global warming, which has curtailed more than half of California's hydroelectric power generation since 2011. Ocean acidification is causing massive coral die-offs and threatens oceanic food chains.

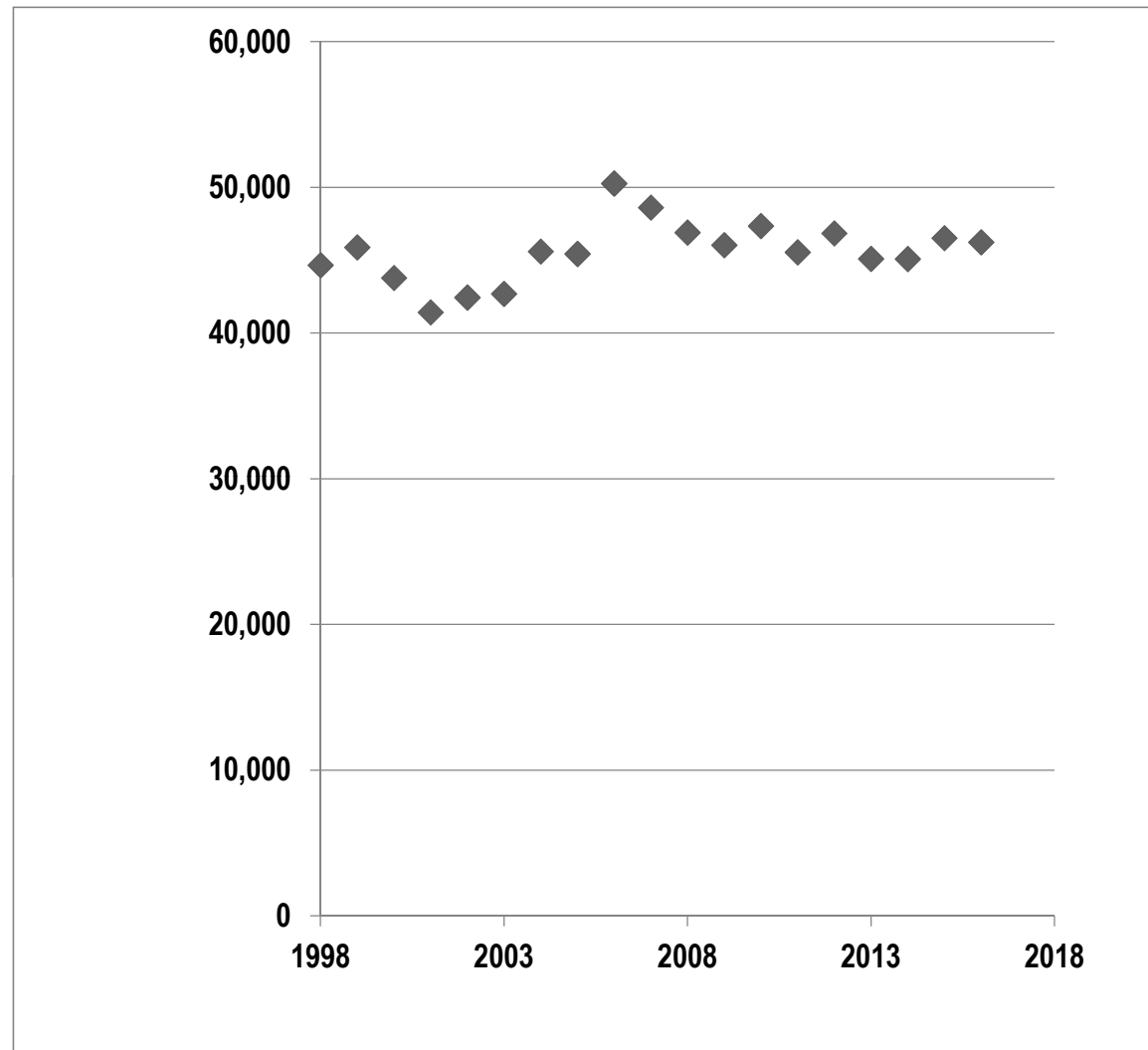
Californians for Green Nuclear Power

Supporting the continued safe operation of DCPP since 2013. <http://www.CGNP.org>



California ISO Annual Peak Load Not Diminishing - 1998 through 2016

Year	Megawatts at Peak Load*	Date	Time
1998	44,659	8/12/1998	14:30
1999	45,884	7/12/1999	16:52
2000	43,784	8/16/2000	15:17
2001	41,419	8/7/2001	16:17
2002	42,441	7/10/2002	15:01
2003	42,689	7/17/2003	15:22
2004	45,597	9/8/2004	16:00
2005	45,431	7/20/2005	15:22
2006	50,270	7/24/2006	14:44
2007	48,615	8/31/2007	15:27
2008	46,897	6/20/2008	16:21
2009	46,042	9/3/2009	16:17
2010	47,350	8/25/2010	16:20
2011	45,545	9/7/2011	16:30
2012	46,846	8/13/2012	15:53
2013	45,097	6/28/2013	16:54
2014	45,089	9/15/2014	16:53
2015	46,519	9/10/2015	15:38
2016	46,232	7/27/2016	16:51



*This value is an instantaneous MW value at the time specified in the Time column

Source: <http://www.caiso.com/Documents/CaliforniaISOPeakLoadHistory.pdf>

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1 Jun 26, 2017 @ 06:00 AM Forbes Energy Blog

2 **Debunking The Unscientific Fantasy Of 100% Renewables** by James Conca, Ph.D.

3 <https://www.forbes.com/sites/jamesconca/2017/06/26/debunking-the-unscientific-fantasy-of-100-renewables/>

4 Note: The PDF/A standard blocks the many blue web links in this article. To follow the web links, please
5 use the above URL to navigate to Dr. Conca's article.

6 Last week, twenty-one prominent scientists issued a [sharp critique to one of their own](#). Mark Jacobson
7 of Stanford said America could easily become 100% renewable by mid-century, but refused to
8 acknowledge sound scientific principles in his research and address major errors pointed out by the
9 scientific community.

10 And then he played politics.

11 The critique is so unusual that the group of scientists only decided to issue it when Jacobson refused to
12 correct [obvious scientific errors](#) even as he began to seriously influence public policy and political action.

13 Jacobson [published a paper in 2015](#) that claimed we could get rid of all other energy sources except
14 wind and solar, and a tiny bit of other renewables, by 2050, and that it would be easier and cheaper
15 than any other alternative mix. The paper was a redo of one [Jacobson wrote in 2009 and published in](#)
16 [Scientific American](#), again without any real scientific peer-review.

17 Jacobson's claim is at complete odds with serious analyses and assessments, including those performed
18 by the Intergovernmental Panel on Climate Change, the National Oceanic and Atmospheric
19 Administration, the National Renewable Energy Laboratory, the International Energy Agency, and most
20 of academia. These other mixes understand the importance of diversity. They still contain huge amounts
21 of renewables, but they also have significant amounts of nuclear, hydro and even some natural gas.

22 It's not that we could never get to 100% renewables, it's that Jacobson states it's just political will that's
23 lacking, not that the technologies, science and engineering are really difficult and challenging. The route
24 to that goal actually matters as much as the goal. Bad assumptions and poor science will have serious
25 repercussions that we will not have the luxury to fix later.

26 Jacobson's paper has become the bible of alternative energy and is the most referenced paper on the
27 subject used by policymakers and activist groups. And that is scary. Another ideology masquerading as
28 science.

29 Jacobson has even formed a non-science advocacy group with celebrity board members like Mark
30 Ruffalo, Leonardo DiCaprio and Van Jones, supported by weighty politicians like Bernie Sanders, that
31 have embraced Jacobson's ideological mix and push it blindly.

32 **Which would be OK if it were correct. But it's not.**

33 Published in the [Proceedings of the National Academy of Sciences](#), the same journal as the original
34 paper, the reader can go over the rebuttal by these twenty-one scientists, and the original paper by
35 Jacobson, at their leisure. The details are not as important as the ideological issue and the break with
36 the scientific method. However, a [few of the obvious problems](#) do underscore the seriousness of these
37 errors and assumptions. Jacobson's plan:

38 - assumes a [nuclear war every 30 years](#) or so (did we have a nuclear war that I missed?), absurdly and
39 unethically tying war to nuclear power even though nuclear power has nothing to do with nuclear
40 weapons; you can't make weapons from commercial spent fuel

- 1 - assumes the rate that we can build renewable energy systems is ten times greater than we've ever
2 done, with no regulatory issues that would slow renewable projects
- 3 - assumes that 15 million acres covered by wind and solar would have no environmental impacts or
4 public concerns even though that much area would exceed all the roadways, building surfaces and
5 human-covered land in existence today (was he not paying attention to off-shore wind in New England?)
- 6 - assumes that intermittency (wind stops blowing, sun sets) is not an important issue and can be dealt
7 with easily with no baseload power, which hasn't happened so far and is why we install so much natural
8 gas alongside wind
- 9 - assumes energy storage with hydrogen and heat stored in rocks buried underground will be the best
10 storage method, even though they have never been put in place in any practical way and large storage
11 has been moving in other directions, e.g., [vanadium flow batteries](#) and [pumped hydro storage](#).
- 12 - assumes cost is no problem and that costs will continue to go down for the next 50 years, even for
13 steel, copper, cement and rare earth elements, unlikely in the extreme
- 14 - assumes that scaling technologies up from the lab to the field is trivial, contrary to every single
15 technology we have ever developed

16 - **assumes unlimited hydroelectric power as backup, with new installations equivalent to 600 Hoover
17 Dams; this is more power than we produce from all sources today.**

18 This last one is quite bizarre since most renewable advocates want to decrease hydro, not expand it
19 fifteen-fold. And Jacobson doesn't include this huge expansion in the energy mix itself, it's just there to
20 back-up the intermittency of wind and solar, even though he claims intermittency isn't a problem.

21 The Department of Energy and the National Hydropower Association have [an ambitious plan to expand
22 hydro](#), but it's for less than 10% of this amount. And that's ambitious. Huge regulatory and public
23 opposition to hydro are hampering any hydro expansion.

24 There is no possibility that America could install that much hydro, especially with Jacobson's additional
25 claim that it could be done with 'zero increase in dam size, no annual increase in the use of water, and
26 no new land use,' simply by adding a lot more turbines to existing dams.

27 This is not physically possible and is laughable if it weren't so serious. He doesn't seem to understand
28 how hydroelectric works. This error alone negates Jacobson's entire plan.

29 PHOTO CAPTION: McNary Hydroelectric Dam on the Columbia River along the Washington-Oregon
30 border. Is it possible to increase hydro in America 1500% without increasing dam size, using more water
31 or land, and without even using that power except as back-up to wind? Of course not.

32 Unfortunately, the paper has spawned a horde of state and federal policies which mandate goals that
33 can't be achieved with available technologies at reasonable prices. This has led to 'wildly unrealistic
34 expectations' and 'massive misallocation of resources,' according to David Victor, a researcher at the
35 University of California, San Diego, and one of the coauthors of the critique. 'That is both harmful to the
36 economy, and creates the seeds of a backlash.'

37 Especially against scientists.

38 **The Scientific Peer-Review Process**

39 Unknown to the public, scientists don't have any decision-making power. We provide as much data as
40 we can on subjects we're experts in, but politicians, business people and non-scientists actually make
41 the decisions, often ignoring us.

1 So it's frightening when a scientist enters the political arena to push an agenda that is not backed-up by
2 science, especially given the anti-science sentiment flooding America. It never ends well.

3 Jacobson cried that all the scientists criticizing him were shills for the industry. One doesn't usually think
4 of scientists from the MIT, UCSD, Caltech, Columbia, Carnegie Mellon, Berkeley and several co-authors
5 from his own Stanford, as shills but, hey, this is just weird on so many levels.

6 **Jacobson also stated that 'There is not a single error in our paper.'**

7 What? Scientists do not talk like that. There is always a possibility of error. There are always issues we
8 haven't foreseen, data we don't know, but that may be known by other researchers. It's why we have
9 what is known as the peer-review process, to catch mistakes and reign in such hubris.

10 What makes this rebuke so unusual is that this kind of intense interpersonal scientific debate is usually
11 reserved for the non-public peer-review process that scientists have developed and used over the last
12 hundred years to police ourselves.

13 Peer-review is slow and mind-numbing in many ways because it is extremely technical, conservative and
14 requires back-and-forth exchanges for years on scientific issues only a handful of people know and
15 understand. Just look at [the back-and-forth exchange of this present paper](#).

16 Think of a refereed three-year chess game by mail.

17 Non-scientists may not appreciate the whole process of peer-review and how important it is, especially
18 in the new world of alternative facts and fake news. But the only other people who can truly evaluate a
19 scientific study are scientists in that field or in fields closely aligned with it.

20 Biologists don't peer-review cosmochemistry papers and electrical engineers don't peer-review geology
21 papers on plate tectonics. And you can't just Google a subject and become an expert that can seriously
22 evaluate cutting-edge science.

23 **Flouting the peer-review process is really what got this group of scientists upset with Jacobson.** When
24 a bunch of your peers say, 'Hey you got these points wrong' or 'This assumption is not quite right' or
25 'This set of numbers is incorrect', you're supposed to pay attention and go back and fix it. Not thumb
26 your nose at them and say 'Too bad, I don't care'.

27 **And then go lobby a bunch of politicians and celebrities to make policy decisions based on it.**

28 The peer-review process is what made science so powerful and crucial in the 20th century and is what
29 made America the Greatest Nation on Earth. It goes hand in hand with democracy and truth. It's why
30 the Soviet Union [failed so badly in their scientific endeavors](#). They did not have much peer-review, and
31 dissenters seemed to end up in Siberia.

32 When a scientist doesn't follow the peer-review process, it hurts science. I can understand Jacobson
33 going with this, since he's gotten huge accolades by celebrities, politicians, activists and non-scientists.
34 His work is often the only reference many use to support the 100% renewable push.

35 But it undermines any real hope we have to attain an environmentally-friendly energy mix, which will be
36 a diverse mixture of non-fossil fuels with as little fossil fuel as possible. There is no renewable silver
37 bullet.

38 Increased natural gas has had the beneficial side-effect of decreasing coal, but so far, increased
39 renewables has only increased natural gas use. **Jacobson's ideology is also killing our largest source of
40 low-carbon energy – nuclear energy. And every time a nuclear plant closes, natural gas takes its place,
41 not renewables.** To pretend that's OK, and still say you care about the planet, is really alternative facts
42 at its worst.