

BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION

IN THE MATTER OF THE APPLICATION)
OF PUBLIC SERVICE COMPANY OF NEW)
MEXICO FOR APPROVAL TO ABANDON)
SAN JUAN GENERATING STATION UNITS)
2 AND 3, ISSUANCE OF CERTIFICATES)
OF PUBLIC CONVENIENCE AND)
NECESSITY FOR REPLACEMENT POWER)
RESOURCES, ISSUANCE OF ACCOUNTING)
ORDERS AND DETERMINATION OF)
RELATED RATEMAKING PRINCIPLES AND)
TREATMENT,)
)
PUBLIC SERVICE COMPANY OF NEW)
MEXICO,)
)
Applicant)
_____)

Case No. 13-00390-UT

SUPPLEMENTAL DIRECT TESTIMONY

OF

PATRICK J. O'CONNELL

February 5, 2014

**SUPPLEMENTAL DIRECT TESTIMONY OF
PATRICK J. O'CONNELL
NMPRC CASE NO. 13-00390-UT**

1 **Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.**

2 **A.** My name is Patrick J. O'Connell. I am Director, Planning and Resources, for
3 Public Service Company of New Mexico ("PNM" or "Company"). My address is
4 414 Silver Avenue SW, Albuquerque, New Mexico 87102.

5

6 **Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS**
7 **PROCEEDING?**

8 **A.** Yes. I filed Direct Testimony in this proceeding on December 20, 2013.

9

10 **Q. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL DIRECT**
11 **TESTIMONY?**

12 **A.** My supplemental direct testimony responds to the requirement for supplemental
13 testimony set forth in Ordering Paragraph A of the *Initial Order Requiring Filing*
14 *of Supplemental Testimony* that was issued by the New Mexico Public Regulation
15 Commission ("NMPRC" or "Commission") on January 22, 2014, more
16 specifically:

17 • I address the requirements in Ordering Paragraphs A.2 parts (a) and (b)
18 concerning how PNM intends to coordinate this proceeding with PNM's
19 Integrated Resource Plan ("IRP") proceeding, including when it will
20 complete and file the IRP and whether PNM will update and change the
21 portfolio it proposes here based on the results of the IRP;

22 • I address why the cost estimate from the S&L Cost Study included in Mr.
23 Olson's Supplemental testimony to address the requirement in Ordering

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1 Paragraph A.3 was used for purposes of the analyses presented in this
2 case. I also confirm that the construction cost data from the Fluor EPC
3 contract would not alter the results of my analyses;

- 4 • I address the requirements in Ordering Paragraphs A.4 and A.5 concerning
5 cost estimates for the replacement resource options identified in PNM
6 Exhibit PJO-5 of my Direct Testimony; and
- 7 • I address the part of Ordering Paragraph A.10 requiring additional
8 information regarding the 40 MW solar facility that PNM proposes as one
9 of the replacement resources for San Juan Generating Station (“SJGS”) Units
10 2 and 3 and the current status and projected timeline of PNM’s efforts to
11 procure this facility, including the timing of filing of an application to the
12 NMPRC for approval of the project.

13
14 **Q. PLEASE PROVIDE AN OVERVIEW OF THE TESTIMONY YOU HAVE**
15 **ALREADY FILED IN SUPPORT OF PNM’S REQUEST TO ABANDON**
16 **SJGS UNITS 2 AND 3.**

17 **A.** In the direct testimony I filed on December 20, 2013, I demonstrated that the
18 capacity PNM is requesting to be abandoned at SJGS can be replaced cost-
19 effectively with other resources, that there is more than one portfolio of
20 replacement resources that is more cost-effective than continuing to operate all
21 four SJGS units, and that PNM can certainly obtain a cost-effective portfolio of
22 replacement resources between now and 2017 when part of the SJGS capacity
23 will be abandoned. My testimony describes and compares the economics of two

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1 portfolios, referred to as *Revised SIP with PV Unit 3* and *Revised SIP without PV*
2 *Unit 3* that could replace the capacity in SJGS Units 2 and 3, while maintaining
3 system reliability, and would result in lower cost over the next twenty years.
4 These two portfolios were chosen after considering literally thousands of possible
5 combinations of the resource options identified on PNM Exhibit PJO-5.

6
7 I also described the rigorous analytical processes PNM used to determine that
8 these two portfolios meet reliability criteria and will result in lower cost for
9 PNM's customers compared to maintaining the capacity in SJGS Units 2 and 3
10 and installing costly Selective Catalytic Reduction ("SCR") technology at SJGS.
11 The *Revised SIP with PV Unit 3* portfolio is the least cost portfolio of all possible
12 combinations of resources to replace the SJGS Units 2 and 3 capacity that, with
13 Commission authorization, would be retired. The analysis shows that the most
14 cost effective solution in any scenario is a portfolio that includes Palo Verde Unit
15 3 and additional capacity in SJGS Unit 4.

16
17 For both the portfolio that includes Palo Verde Unit 3 and the portfolio that does
18 not include it, I identified 40 MW of solar capacity and a gas-fired combustion
19 turbine that PNM expects to obtain after utilizing request for proposal ("RFP")
20 processes and receiving the Commission's authorization in future proceedings.
21 Engaging in an RFP process close to the time when the resource will need to be
22 secured ensures that each resource in the replacement portfolio is selected to
23 match load and other operational requirements, and is acquired on a least cost

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1 basis. The analytical process used to select the least cost replacement portfolio
2 has been examined in PNM's current IRP process.

3
4 **Q. PLEASE ADDRESS ORDERING PARAGRAPH A.2 PART A AND PART**
5 **B.**

6 **A.** I addressed the schedule to complete and file the current IRP starting on page 23,
7 line 12, and continuing through page 25, line 15, of the testimony I filed in this
8 case on December 20, 2013. I indicate in my Direct Testimony that PNM's 2014-
9 2033 IRP will be filed by July 2014. My testimony in the present case includes
10 the anticipated four year action plan items that have emerged from the IRP related
11 to PNM's Application in this case. The IRP is not a resource approval filing; it is
12 a planning document against which future applications for resource approval are
13 compared. The IRP is prepared with the understanding that changed
14 circumstances may alter the four-year action plan and almost certainly will cause
15 the twenty-year plan to be revised over time. The resource applications included
16 in this case for CCNs for Palo Verde Unit 3 and 78 MW in SJGS Unit 4 are
17 reasonable because they are components of the least cost resource portfolio to
18 achieve Regional Haze Rule compliance at SJGS. PNM has described in its
19 "Notice of Material Event" filed in Case No. 11-00317-UT the changed
20 circumstances that call for a departure from the four-year action plan contained in
21 PNM's 2011 IRP. PNM has also presented the results of the modeling underlying
22 my testimony in the current IRP Public Advisory group meetings.

23

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1 **Q. WHAT IS THE SOURCE OF THE COST ESTIMATE FOR SCR**
2 **CONSTRUCTION AT SJGS THAT PNM UTILIZED IN ITS ANALYSES**
3 **IN THIS CASE?**

4 **A.** As reflected in the Supplemental Direct Testimony of PNM Witness Olson, PNM
5 used the BART cost study conducted by S&L (“S&L Cost Study”) for its analyses
6 in this case. The S&L Cost Study for construction costs, as well as operation and
7 maintenance (“O&M”) costs of the SCR equipment, is publically available and
8 was provided to the New Mexico Environment Department (“NMED”) and to the
9 Environmental Protection Agency (“EPA”) as part of the BART analysis
10 performed at SJGS to determine the Regional Haze Rule compliance plans. The
11 resource portfolio modeling requires both a construction cost and an operation
12 and maintenance cost estimate.

13
14 **Q. DID PNM USE ANY INFORMATION FROM THE FLUOR EPC**
15 **CONTRACT FOR ITS ANALYSES IN THIS CASE?**

16 **A.** PNM did not use the cost estimates from the Fluor EPC contract in its analyses.
17 While the Fluor EPC contract includes estimated construction costs, it lacks O&M
18 cost estimates which are needed for a proper resource portfolio analysis.

19
20 **Q. WOULD USING THE FLUOR COST ESTIMATE AFFECT YOUR**
21 **CONCLUSION THAT THE PRC SHOULD APPROVE PNM’S REQUEST**
22 **TO ABANDON SJGS UNITS 2 AND 3?**

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1 **A.** Not at all. On page 14, line 22 of my Direct Testimony and on line 43 of PNM
2 Exhibit PJO-3, I showed the difference in NPV between the *Revised SIP with PV3*
3 portfolio and the *FIP (“4 SCR”)* is \$720 million. Using the Fluor construction
4 cost estimate would have the effect of lowering the NPV of the *FIP (“4 SCR”)*
5 portfolio shown on PNM Exhibit PJO-3 by only a small amount and would not
6 change the conclusion that the *Revised SIP with PV3* portfolio is significantly less
7 expensive than the *FIP (“4 SCR”)* portfolio. So, using the Fluor construction
8 estimate instead of the S&L estimate would not affect the conclusions presented
9 in my Direct Testimony.

10

11 **Q. IS THE INFORMATION REQUESTED IN ORDERING PARAGRAPHS**
12 **A.4 AND A.5 PROVIDED IN PNM EXHIBIT PJO-5 OF YOUR DIRECT**
13 **TESTIMONY?**

14 **A.** Yes. PNM Exhibit PJO-5, Part 1, identifies and describes the database of
15 generation resources used to construct resource portfolios that would meet
16 customer demand requirements over the 20-year planning horizon required by the
17 Commission for the IRP process. All of these generation resources are
18 technically feasible replacement alternatives for capacity to be retired at SJGS.
19 These generation resources include several different types of natural gas turbines,
20 natural gas combined cycle plants (new and existing), reciprocating engines, coal
21 (both new and the existing 78 MW of SJGS Unit 4), nuclear capacity (both new
22 and the existing 134 MW of PVNGS Unit 3), various types of solar, wind,
23 biomass and geothermal facilities.

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1
2 PNM Exhibit PJO-5, Part 2, takes the 15 resource types identified in Part 1 and
3 provides detailed information on a total of 22 resource options, since some types
4 of resources are broken down into varying sizes of MW capacity and sited at
5 different locations (e.g., at San Juan or at a generic location). Additionally, Part 2
6 includes detailed cost information on SCR technology implementation at Four
7 Corners Generating Station (“Four Corners”) and on all four generating units at
8 SJGS, as well as on a full shut-down of all four generating units at SJGS. For
9 capital projects, the detail shown in PNM Exhibit PJO-5, Part 2, includes size in
10 MW, capital cost and cost escalators, operation and maintenance (“O&M”) costs
11 and applicable escalators, heat rates, and emissions data. For purchased power
12 agreements (“PPA”), in addition to the cost per kWh, emissions data is shown if
13 applicable.

14
15 **Q. WHAT WAS THE SOURCE FOR THE INFORMATION IN PNM**
16 **EXHIBIT PJO-5, PARTS 1 AND 2?**

17 **A.** This is addressed at page 20, lines 1-15, of my direct testimony. Information for the
18 renewable generation alternatives was based on the bids PNM received in response to
19 RFPs issued in late-2012 to develop PNM’s Renewable Energy Portfolio Procurement
20 Plan for 2014 that the Commission reviewed and approved in Case No. 13-00183-UT.
21 Costs for natural gas-fired generation and for new coal and nuclear resources were based
22 on estimates developed for recent projects (for example, the second unit at La Luz) or
23 estimates from the Electric Power Research Institute (“EPRI”) Technical Assessment

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1 Guide (“EPRI TAG”) cost database. This database is reviewed and updated annually
2 for resource planning and analysis by the electric power industry. Assumptions
3 regarding future prices for natural gas fuel and carbon dioxide emissions were
4 developed by PACE Global, using models of the natural gas markets and electricity
5 markets. The process employed to develop the cost projections is further described in
6 PNM Exhibit PJO-5, Part 3. Costs for the PVNGS Unit 3 and the 78 MW of SJGS Unit
7 4 reflect the known costs of these existing resources. Additional information
8 concerning these resource alternatives is presented in my direct testimony, as well
9 as in the Direct Testimony of Chris Olson.

10
11 **Q. HOW WAS THE INFORMATION IN PNM EXHIBIT PJO-5 USED IN**
12 **DEVELOPING THE RESOURCE PORTFOLIOS THAT ARE**
13 **DESCRIBED IN YOUR DIRECT TESTIMONY?**

14 **A.** Please refer to the “Overview” paragraph in PNM Exhibit PJO-5, Part 1, and my
15 Direct Testimony at page 10, lines 9-19, and page 12, line 4, through page 13, line
16 10. The information in PNM Exhibit PJO-5, Part 2, is input data for the
17 Strategist[®] resource planning modeling tool that PNM used to evaluate resource
18 portfolio options. Strategist[®] takes this input data to develop up to 5,000 different
19 resource portfolios, ranks the portfolios in terms of NPV of cost thereby
20 identifying a least-cost portfolio. Strategist[®] also provides information on other
21 key portfolio characteristics such as reliability and emissions.

22

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1 PNM Exhibit PJO-3 shows the results of this analysis. The least-cost portfolio is
2 labeled *Revised SIP with PV3*. This is compared to a portfolio labeled *Revised*
3 *SIP w/o PV3* and each portfolio is compared to a portfolio in which all units at
4 SJGS continue to operate with SCR installed, labeled *FIP ("4 SCR")*, and a
5 portfolio that assumes a shut-down of all four generating units at SJGS, labeled
6 *FIP ("4-Unit Shutdown at SJ")*. All of the resource options identified in PNM
7 Exhibit PJO-5 were considered in the selection of the least cost portfolios. The
8 resource options that do not appear in the portfolios presented in PNM Exhibit
9 PJO-3 are not part of the least cost portfolio for the scenario considered; i.e. a
10 resource is not included in the portfolio because the portfolio containing that
11 resource is more costly.

12
13 PNM Supplemental Exhibit PJO-1 (Supplemental) provides an example of two
14 more portfolios that PNM generated in the course of its analysis – portfolios that
15 contain two versions of natural gas combined cycle units. Neither portfolio is
16 lower in cost than either the *Revised SIP with PV3* or the *Revised SIP w/o PV3*
17 portfolio on PNM Exhibit PJO-3; so, they were not included in the comparison to
18 the best portfolio solution to replace retired capacity at SJGS, which is the
19 *Revised SIP with PV3*. Both, however, are less expensive than the *FIP ("4*
20 *SCR")*, portfolio and, therefore, provide further support for the abandonment
21 PNM has requested in this case.

22

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1 **Q. WOULD IT BE POSSIBLE TO PRESENT OTHER RESOURCE**
2 **PORTFOLIOS IN ORDER TO COMPARE THE COST TO THE *REVISED***
3 ***SIP WITH PV3* PORTFOLIO?**

4 **A.** Yes, but it would not be productive since the result would necessarily be
5 comparisons to higher cost portfolios. The Strategist[®] model ranked the *Revised*
6 *SIP with PV3* portfolio and the *Revised SIP w/o PV3* portfolio from the thousands
7 of resource portfolios precisely because they were the least-cost portfolios that
8 would maintain system reliability. An example of the impact of removing a
9 resource from consideration in the Strategist[®] modeling is the comparison of the
10 *Revised SIP with PV3* portfolio to the *Revised SIP w/o PV3*. The portfolio
11 without Palo Verde Unit 3 is the least cost solution when the Palo Verde Unit 3
12 resource is removed from the portfolio optimization process. Removing Palo
13 Verde Unit 3 results in a higher cost portfolio.

14

15 **Q. WHAT SUPPLEMENTAL DIRECT TESTIMONY REQUIRED BY**
16 **ORDERING PARAGRAPH A.10 ARE YOU ADDRESSING?**

17 **A.** Ordering Paragraph A.10 requires, in part, that PNM provide additional
18 information regarding PNM's proposed 40 MW solar facility, and the current
19 status and projected timeline of PNM's efforts to procure this resource,
20 including the timing of filing requesting Commission approval for the project.

21

22 **Q. WHAT IS YOUR RESPONSE TO THIS REQUIREMENT?**

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1 **A.** On November 18, 2013, PNM issued a Request for Proposals (“RFP”) for
2 renewable resources. Although the RFP was an all-source renewable energy
3 resource solicitation, PNM identified its planning assumption, which was for an
4 amount of renewable energy generation that could be met by 40 MWs of solar
5 facilities. The actual renewable energy plan will be determined after evaluating
6 the bids received in the RFP. PNM received bids from 37 respondents on January
7 10, 2014. Respondents included utilities, co-ops, developers, equipment
8 manufacturers, and Native American entities. PNM received bids for solar, wind,
9 biomass, and geothermal resources and is currently engaged in a thorough review
10 and evaluation of the bids. A short-list will be developed and interviews will be
11 conducted with the short-listed bidders.

12
13 PNM intends to request Commission approval of the resource(s) selected in its
14 Renewable Energy Portfolio Procurement Plan for 2015 (“2015 Plan”) filing by
15 June 1, 2014, pursuant to 17.9.572 NMAC (“Rule 572”). Subject to completion
16 of the ongoing RFP bid evaluation and future contract negotiations, PNM projects
17 that 40 MW of solar facilities will be included in the filing. The specifics are still
18 to be finalized and, as this process continues, PNM will be able to refine a
19 portfolio that is the most cost effective and meets the various resource planning
20 criteria including the Renewable Energy Act. Under the Renewable Energy Act,
21 the Commission will have until the end of November 2014 to review and approve
22 or modify PNM’s 2015 Plan.

23

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1 **Q.** **DOES THIS CONCLUDE YOUR SUPPLEMENTAL DIRECT**
2 **TESTIMONY?**

3 **A.** Yes, it does.

GCG # 517505

PNM EXHIBIT PJO-1 Supplemental

Consisting of 1 page

PNM Exhibit PJO-1 Supplemental

Summary of Regional Haze Compliant Portfolio Comparisons			
Scenario Description	Revised SIP with PV3	Revised SIP w/o PV3 (Market NGCC)	Revised SIP w/o PV3 (New NGCC)
[1] Gas Pricing	PACE Reference Case	PACE Reference Case	PACE Reference Case
[2] CO2 Pricing	PACE Reference Case (\$11 in 2020)	PACE Reference Case (\$11 in 2020)	PACE Reference Case (\$11 in 2020)
[3] Energy Efficiency Forecast	2014 IRP Forecast	2014 IRP Forecast	2014 IRP Forecast
[4] PV DG Forecast	2014 IRP Forecast	2014 IRP Forecast	2014 IRP Forecast
[5] Demand Response Forecast	2014 IRP Forecast	2014 IRP Forecast	2014 IRP Forecast
[6] Resource Alternative Database	EPRI TAG/PNM Estimates	EPRI TAG/PNM Estimates	EPRI TAG/PNM Estimates
[7] Renewable Procurements	2014 REPP + Projections	2014 REPP + Projections	2014 REPP + Projections
[8] Palo Verde 3 Available	\$2,500/kW	No	No
[9] NOx Control at San Juan	SNCR's on 1 & 4	SNCR's on 1 & 4	SNCR's on 1 & 4
[10] San Juan O&M Harvest Savings	Units 2 & 3	Units 2 & 3	Units 2 & 3
[11] San Juan Investment Recovery	\$16,401,523	\$16,401,523	\$16,401,523
[12] SJ Retirements	Units 2 & 3 (Dec 2017)	Units 2 & 3 (Dec 2017)	Units 2 & 3 (Dec 2017)
[13] 2014			
[14] 2015	Red Mesa (102 MW) 2015 Solar (23 MW)	Red Mesa (102 MW) 2015 Solar (23 MW)	Red Mesa (102 MW) 2015 Solar (23 MW)
[16] 2016	Aeroderivative (40 MW) Solar (40 MW)	Aeroderivative (40 MW) Solar (40 MW)	Aeroderivative (40 MW) Solar (40 MW)
[17] 2017			
[18] 2018	Large GT (177 MW)	1x1 NG CC Participation (250 MW)	1x1 CC (250 MW)
[24] 2019	Palo Verde 3 (134 MW) San Juan Acquisition (78 MW)	Solar (20 MW) San Juan Acquisition (78 MW)	Solar (20 MW) San Juan Acquisition (78 MW)
[25] 2020		Wind (100 MW)	Wind (100 MW)
[28] 2021	Wind (100 MW)	2nd Aeroderivative (40 MW)	2nd Aeroderivative (40 MW)
[29] 2022			
[30] 2023			
[31] 2024			
[32] 2025		Aeroderivative (40 MW)	Aeroderivative (40 MW)
[33] 2026	Solar (20 MW)		
[34] 2027	2nd Aeroderivative (40 MW)		
[35] 2028		Large GT (143 MW)	Aeroderivative (40 MW)
[36] 2029	Aeroderivative (40 MW)		
[37] 2030			Reciprocating Engines (93 MW)
[38] 2031	Small GT (85 MW)		
[39] 2032			
[40] 2033			
[41] 20-Year LOLH	51.20	56.45	81.75
[42] Average NPV	\$6,640,253,862	\$6,697,099,558	\$6,757,260,865
[43] Difference to Revised SIP with PV3 Average NPV	-	\$56,845,696	\$117,007,003
[44] 95th Percentile Risk	\$194,357,382	\$233,206,779	\$232,284,070

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Case No. 13-00390-UT

AFFIDAVIT

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

Patrick J. O’Connell, Director, Planning and Resources, Public Service Company of New Mexico, upon being duly sworn according to law, under oath, deposes and states: I have read the foregoing **Supplemental Direct Testimony of Patrick J. O’Connell** and it is true and accurate based on my own personal knowledge and belief.

SIGNED this 3 day of February, 2014.



PATRICK J. O’CONNELL

SUBSCRIBED AND SWORN to before me this 3rd day of February, 2014.

Ronda Morehead

NOTARY PUBLIC IN AND FOR
THE STATE OF NEW MEXICO

