

**UE 294 / PGE / 300
Pope - Lobdell**

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

UE 294

**Carty
Generating Station**

PORTLAND GENERAL ELECTRIC COMPANY

Direct Testimony of

*Maria Pope
Jim Lobdell*

Table of Contents

I.	Introduction.....	1
II.	IRP and RFP Processes	2
A.	IRP Process and Identification of Baseload Energy Need	2
B.	Request for Proposals Process and Selection of Resource.....	3
III.	Carty Generating Station	6
A.	Technology.....	6
B.	EPC Contractor and Performance Guarantees	6
C.	Equipment Manufacturer and Long Term Service Agreement.....	8
D.	Transmission Service and Gas Supply	9
IV.	Carty Project Costs.....	12
V.	Carty Timeline and Milestones.....	14
VI.	Qualifications.....	16

I. Introduction

1 **Q. Please state your names and positions with Portland General Electric Company (PGE).**

2 A. My name is Maria Pope. I am the Senior Vice President of Power Supply and Operations
3 and Resource Strategy at PGE. My qualifications appear at the end of this testimony.

4 My name is Jim Lobdell. I am the Senior Vice President, Finance, Chief Financial
5 Officer, and Treasurer at PGE. My qualifications appear in PGE Exhibit 100.

6 **Q. What is the purpose of your testimony?**

7 A. The purpose of our testimony is to describe PGE's new generation resource, the Carty
8 Generating Station (Carty). We provide a brief overview of the integrated resource planning
9 (IRP) process and request for proposals (RFP) process that led to the selection of Carty as
10 the least-cost and least-risk resource. We also discuss Carty's associated costs and
11 construction progress to date. In short, Carty's development continues to be on scope, on
12 budget, and on time.

13 **Q. How is the remainder of your testimony organized?**

14 A. After this introduction, we have five sections:

- 15 • Section II: IRP and RFP Processes
- 16 • Section III: Carty Generating Station
- 17 • Section IV: Carty Project Costs
- 18 • Section V: Carty Timeline and Milestones
- 19 • Section VI: Qualifications

II. IRP and RFP Processes

A. IRP Process and Identification of Baseload Energy Need

1 **Q. Did PGE identify a need for annual average energy in its 2009 IRP?**

2 A. Yes. In PGE's 2009 IRP, we identified a shortfall in our annual average energy need. As a
3 result of the shortfall, PGE developed an Energy Action Plan to acquire additional energy
4 resources by 2015. A baseload resource, such as a high-efficiency combined cycle
5 combustion turbine (CCCT), comprised a portion of the energy resource additions
6 considered.

7 **Q. Did the Commission acknowledge PGE's 2009 IRP Action Plan?**

8 A. Yes. The Commission acknowledged the 2009 IRP Action Plan, with requirements, in
9 Order No. 10-457 on November 23, 2010.

10 **Q. Did any of the updates to PGE's 2009 IRP change the identified need for a baseload
11 resource?**

12 A. No. Pursuant to Order No. 10-457 and IRP Guideline (3)(g), we filed two updates to our
13 2009 IRP: the first update in late 2011 and the second in late 2012. In our 2011 IRP update
14 (filed on November 23, 2011), we assessed load and resources in both 2015 and 2016. In
15 our assessment, we accounted for (1) the impact of modest load growth given the slow
16 economic recovery and (2) the extended regulatory approval process and schedule of our
17 RFPs for new capacity and energy resources. In our 2012 IRP update (filed on November
18 21, 2012), we identified 2016 (compared to the 2015 date in the 2009 IRP) as the likely start
19 year for new baseload resource additions, but our original need for baseload energy
20 remained valid. Specifically, we stated:

“The current forecast indicates that our portfolio will be roughly in balance as of
2016, as measured against our projected annual average energy requirement and

after implementation of the Action Plan. One of the key elements of the Action Plan is the addition of a new, high-efficiency gas-fired Combined-Cycle Combustion Turbine (CCCT) of 300 – 500 MW. Absent a new baseload energy resource, we would instead be nearly 400 MWa short. Therefore, we believe that our Action Plan for new baseload energy remains valid. The Company plans to move forward with its current solicitation for new natural gas-fired generation.”¹

1 **Q. Is the development of Carty consistent with the Commission acknowledged 2009 IRP**
2 **Action Plan?**

3 A. Yes. Carty will provide our customers approximately 441 MW of baseload energy. The
4 development of Carty continues to be on budget, on scope, and on time. We discuss the
5 development of Carty in Section III.

6 **Q. What is PGE’s energy load-resource balance after the addition of Carty?**

7 A. Based on PGE’s most recent IRP (PGE’s 2013 IRP), we expect our energy load-resource
8 balance under normal hydro and wind conditions to be generally balanced and possibly
9 slightly surplus at times, until 2019. At that point, growing energy deficits begin to emerge.²

B. Request for Proposals Process and Selection of Resource

10 **Q. When did PGE issue an RFP for baseload energy resources?**

11 A. We began our RFP process in March 2011, and issued our RFP shortly after the
12 Commission’s Order No. 12-215.

13 **Q. Was an Independent Evaluator (IE) selected to oversee the RFP?**

14 A. Yes. Pursuant to Competitive Bidding Guideline (5), Accion Group served as the IE for the
15 RFP. The IE reported directly to the Commission and its work was directed by the Oregon
16 Public Utility Commission Staff (OPUC Staff or Staff). The IE independently scored all

¹ Page 4 of PGE’s 2012 IRP Update. PGE’s 2012 IRP Update can be found at:
https://www.portlandgeneral.com/our_company/energy_strategy/resource_planning/irp.aspx

² Page 3 of PGE’s 2013 IRP. PGE’s 2013 IRP can be found at:
https://www.portlandgeneral.com/our_company/energy_strategy/resource_planning/irp.aspx

1 short-listed bids and submitted closing reports to the Commission after PGE identified the
2 final short list.

3 **Q. How did PGE evaluate the baseload energy bids?**

4 A. PGE assigned each bid a price (600 points) and non-price (400 points) score according to the
5 criteria and scoring methodology described in PGE's RFP.

6 **Q. How did PGE determine the price scores?**

7 A. PGE prepared financial models for all submitted bids. These models calculated a lifecycle
8 economic value for each bid. The final price score was based on the ratio of (1) the bid's
9 total real levelized cost of energy (expressed in \$/MWh) to (2) the real levelized cost of the
10 market alternative over the same term.

11 **Q. How was the final short list developed?**

12 A. In addition to the combination of price and non-price scores used to determine the initial
13 short list, PGE and the IE performed a portfolio analysis to inform the development of the
14 final short list. The portfolio analysis calculated total system production costs for a number
15 of realistic and competitive combinations of energy, flexible capacity and seasonal capacity
16 bids. This analysis, in addition to the price and non-price scores, allowed PGE to create a
17 final short list that identified the resources representing the least-cost and least-risk options
18 for our customers and the company.

19 **Q. Did PGE consider submitting any benchmark resources in the RFP?**

20 A. Yes. As we stated in our 2009 IRP and disclosed in the RFP, we intended to submit a bid for
21 a benchmark resource in the RFP.³ PGE did submit a bid for a CCCT plant at the Carty site.

³ Page 8 of PGE's 2009 IRP and Page 13 of PGE's Final Draft Request for Proposals in Docket UM 1535.

1 **Q. Did PGE select its benchmark baseload bid?**

2 A. No. PGE selected another bid that was deemed to be the least cost and least risk.

3 **Q. Which bid did PGE select?**

4 A. PGE selected the bid submitted by Abengoa S.A. for the engineering, procurement and
5 construction of Carty.⁴

6 **Q. Did the IE file a final report?**

7 A. Yes. The IE concluded in its final report filed on January 31, 2013 that the RFP was
8 conducted in a fair manner and resulted in a final short list that identified the resources
9 representing the least-cost and least-risk for our customers and the company:

“...the RFP was conducted fairly, that all bidders were treated in the same manner and the resulting short list of bids is the product of the evaluation process that was developed by PGE with the participation of the IE being fairly employed. The IE believes the short list includes the bids that are the best value considering both price and non-price factors from among all bids presented in the RFP.”⁵

10 On February 14, 2013 the IE filed an addendum to its final report addressing questions
11 submitted by Staff stating:

“...seeking ... 300-500 MW of baseload, natural gas-fired capacity [is] consistent with the acknowledged IRP needs and those needs did not change enough to justify redesigning the RFP categories.”⁶

⁴ A number of affiliated companies are party to the engineering, procurement, and construction agreement: Abeinsa EPC LLC, Abener Engineering and Construction Services, LLC, Teyma Construction USA LLC and Abeinsa Abener Teyma General Partnership.

⁵ Page 39 of Accion Group’s “Report of the Independent Evaluator” in Docket UM 1535.

⁶ Id. at Page 4.

III. Carty Generating Station

A. Technology

1 **Q. Please describe the Carty Generating Station.**

2 A. Carty is a G-class (CCCT), with an overall net capacity of 441 MW (with duct firing).^{7, 8}

3 The CCCT configuration combines the output of two turbines. The first turbine uses natural
4 gas to produce electricity and hot exhaust gas. The exhaust gas is then directed to a heat
5 recovery steam generator (HRSG). The HRSG uses the heat from the exhaust gas to turn
6 water into steam, which is then used by a steam turbine to produce additional electricity.

7 Carty's natural gas combustion turbine is a highly efficient Mitsubishi 501 GAC (air-
8 cooled) combustion turbine with duct firing capability. Mitsubishi has global experience
9 with its G series turbine, and power providers throughout North America have placed orders
10 for the Mitsubishi 501 GAC combustion turbine.

11 Operating characteristics of a gas-fired plant vary somewhat with temperature and
12 humidity. At 55° F ambient design temperature and 60.4% relative humidity, the net plant
13 heat rate for Carty in combined cycle mode will be approximately 6,688 Btu/kWh when the
14 plant is new and all parts are in perfect condition.⁹ Carty's operating characteristics for
15 power cost modeling purposes are more fully described in PGE Exhibit 400.

B. EPC Contractor and Performance Guarantees

16 **Q. Who is the engineering, procurement and construction (EPC) contractor?**

⁷ Carty's fired net capacity of 441 MW is a new and clean measurement at 55° F ambient design temperature. Under modeled January conditions, Carty's net capacity is 449 MW.

⁸ By adding and igniting additional gas, duct firing increases the temperature of the hot exhaust gas produced by the natural gas combustion turbine.

⁹ Under these same conditions, Carty, in combined cycle mode plus duct firing, will have a net plant heat rate of approximately 6,941 Btu/kWh.

1 A. While we commonly refer to the EPC contractor as Abeinsa, a number of affiliated
2 companies are party to the EPC contract. These companies include Abeinsa EPC LLC,
3 Abener Engineering and Construction Services, LLC, Teyma Construction USA, LLC and
4 Abeinsa Abener Teyma General Partnership. Abeinsa specializes in turnkey projects, and
5 has more than 7 GW (i.e., 7,000 MW) of installed power in conventional generation plants.¹⁰
6 Abeinsa has hired Sargent & Lundy (S&L) as their design engineer. S&L has designed
7 more than 300 combined cycle and simple cycle power plants.¹¹

8 **Q. What plant performance guarantees has PGE secured from Abeinsa?**

9 A. Before PGE accepts the plant as substantially complete, the plant must meet a number of
10 performance guarantees including:

- 11 • fired and unfired net plant electrical output,
- 12 • fired and unfired net plant heat rate,
- 13 • emission levels,
- 14 • noise levels, and
- 15 • reliable operations at various load levels.

16 Some guarantees (e.g., emission levels, noise levels, and reliable operations) are “must fix”
17 items and Abeinsa must remedy any problems that cause the plant to not achieve the
18 guarantees. For other guarantees (e.g., fired and unfired net plant electrical output and heat
19 rate), Abeinsa must meet minimum levels, but is liable for damages for differences between
20 the minimum levels and the guarantees.

¹⁰ A description of Abeinsa’s main conventional generation projects can be found at:
http://www.abainsa.com/web/en/nuestras_actividades/ingenieria_y_construccion/energia_generacion_convencional/index.html

¹¹ A description of S&L’s experience can be found at:
<http://www.sargentlundy.com/home/fossil-power/combustion.html>

C. Equipment Manufacturer and Long Term Service Agreement

1 **Q. Please describe the equipment manufacturer.**

2 A. Mitsubishi Hitachi Power Systems America (MHPSA) will provide the power plant
3 equipment. MHPSA is a leading supplier of equipment and services for the global power
4 generation market. MHPSA's gas turbine experience includes more than 535 installed units
5 worldwide.¹² The company's ultimate parent is Mitsubishi Heavy Industries, Ltd.

6 **Q. Has PGE signed a long-term service agreement for Carty?**

7 A. Yes. PGE and MHPSA signed a long-term service agreement (LTSA) that provides long-
8 term major maintenance services to Carty to ensure ongoing plant reliability. The LTSA is a
9 valuable tool for utilities (like PGE) that can lack the necessary maintenance service
10 expertise for the newer gas and steam turbine technologies. The LTSA provides assurance
11 and predictability of maintenance at a foreseeable cost.

12 **Q. What are the key provisions of the LTSA?**

13 A. The LTSA covers planned maintenance of the gas turbine, steam turbine, and generators
14 with discounts for unplanned maintenance. The term of the LTSA could be as long as 20
15 years but early contract termination is possible with appropriate true-up fees. The LTSA's
16 annual fee structure is based on a variable fee per fired hour and quarterly fixed fees. The
17 agreement has an escalation rate clause based on the consumer-price index.

18 The LTSA carries a warranty that addresses all contract-related work for parts and
19 services. PGE will also receive remote monitoring services from an online monitoring

¹² A description of Mitsubishi's turbine experience can be found at: <http://www.mpshq.com/technology---experience.html>

1 center located in Orlando, FL. The services also comprise data analysis and evaluation to
2 improve Carty's overall gas turbine performance.

3 **Q. PGE has proposed major maintenance accruals in the past for other thermal plants. Is**
4 **PGE proposing a major maintenance accrual for Carty?**

5 A. Yes. As discussed in PGE Exhibit 200, PGE is proposing a major maintenance accrual
6 based on the projection of LTSA expenses. We propose a levelized amortization amount of
7 approximately \$5.4 million per year for five years that would collect the projected expenses
8 over this period, including major maintenance expenses. This major maintenance accrual
9 would smooth out costs for our customers, and also ensure they only pay for costs incurred.

10 **Q. Is the proposed major maintenance accrual similar to what PGE currently uses for**
11 **Coyote Springs¹³, Port Westward 1 (PW1) and Port Westward 2 (PW2)?**

12 A. Yes. PGE has used a similar mechanism for the expenses at Coyote Springs since 1996 (UE
13 93). In UE 262 and UE 283, the Commission approved similar treatment for PW1 and PW2,
14 respectively.

D. Transmission Service and Gas Supply

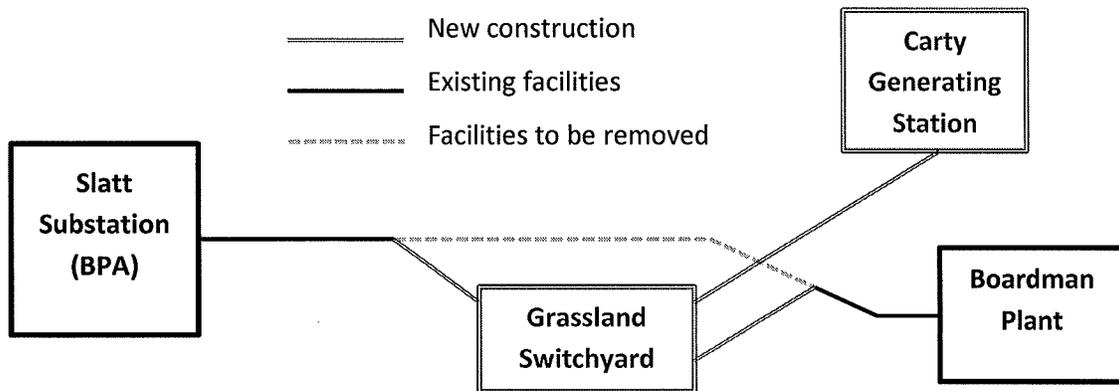
15 **Q. How will Carty interconnect and deliver energy to PGE's customers?**

16 A. Carty will deliver energy to customers under a transmission service agreement granting PGE
17 firm transmission from BPA's Slatt Substation (Slatt). The figure below shows the work
18 underway to interconnect Carty to Slatt. Presently, PGE interconnects the Boardman power
19 plant (Boardman) at Slatt. Abeinsa will construct a 500kV switchyard, known as the
20 Grassland Switchyard (Grassland), to integrate Carty into the existing Boardman-Slatt

¹³ Coyote Springs consists of two units. While PGE operates both units, the major maintenance accrual applies only to Coyote Springs Unit 1. Coyote Springs Unit 2 is owned by Avista Corp.

1 generation lead. Abeinsa will remove a portion of the existing facilities transferring energy
2 between Boardman and Slatt (identified by the dashed line). Carty, along with Boardman,
3 will be connected to Grassland, and a single generation lead will continue to run to Slatt.

Figure 1: Carty Interconnection



4 Grassland will allow one plant to continue to deliver energy even if the other plant trips
5 offline.

6 **Q. When will Grassland be placed into service?**

7 A. The Grassland switchyard is scheduled to be placed into service by June 2015. This
8 in-service date allows Abeinsa to energize Grassland during Boardman's scheduled outage
9 in 2015. Boardman will begin to use Grassland to serve customers once it is energized.
10 Furthermore, the in-service date is necessary to ensure that Abeinsa can complete Carty's
11 gas-fired testing in November 2015 prior to Carty's planned commercial operation in the
12 second quarter of 2016.

13 **Q. Please describe the plan for Carty's gas transportation.**

14 A. Carty will be fueled with pipeline quality natural gas from a new gas pipeline that connects
15 to the Gas Transmission Northwest LLC (GTN) pipeline. GTN will construct, own, and
16 operate approximately 25 miles of pipeline from the GTN mainline to Carty. PGE has

1 executed a 20-year Firm Transportation Agreement for 75,000 Dth/day of GTN mainline
2 capacity from the Kingsgate hub to the interconnect of the Carty lateral. Carty's gas
3 transportation contracts are more fully described in PGE Exhibit 400.

IV. Carty Project Costs

1 **Q. Is the project within budget and on schedule?**

2 A. Yes. The project is currently within budget and on schedule.

3 **Q. What are the forecast costs associated with Carty?**

4 A. PGE's forecast for Carty consists of the following major categories:

- 5 • Gross plant in-service totals approximately \$488.3 million. This includes allowance
6 for funds used during construction (AFDC) and property taxes, but excludes the
7 capital cost (and AFDC) associated with Grassland. Grassland will go into service in
8 2015 and is therefore part of PGE's base revenue requirement forecast.¹⁴ Our
9 estimate for the total capital cost (including AFDC and property taxes) of Carty and
10 Grassland is equal to the total project cost of the RFP bid, which included Grassland.
- 11 • Production O&M expenses total approximately \$10.1 million in the 2016 test year
12 before consideration of the dispatch benefits in Net Variable Power Costs (NVPC).
13 As described in Section III, Carty's major maintenance accrual annual expense totals
14 approximately \$5.4 million. The remainder of production O&M consists of
15 approximately \$2.2 million in labor costs plus \$2.5 million in non-labor costs.
- 16 • Insurance and A&G expenses total approximately \$1.6 million.
- 17 • NVPC will decline when Carty is added to PGE's system. The details of this cost
18 impact are discussed in PGE Exhibits 200 and 400.

¹⁴ As discussed in Exhibit 200, gross plant in-service for the Grassland switchyard totals approximately \$25.5 million.

- 1 • Depreciation expenses total approximately \$14.4 million in the 2016 test year and are
2 based on the Commission approved depreciation study from Docket UM 1679, Order
3 No. 14-297.
- 4 • Property taxes total approximately \$2.4 million.

5 **Q. Are there chemical costs associated with Carty?**

- 6 A. Yes. The chemicals required for Carty's operation include ammonia, similar to the Port
7 Westward 1 plant. The cost of ammonia is not included in plant O&M. Rather, PGE
8 includes the cost of ammonia in NVPC, because the rate of Carty's ammonia use varies
9 directly with Carty's output. The cost and use of ammonia is discussed in PGE Exhibit 400.

10 **Q. What is the net revenue requirement impact of Carty?**

- 11 A. The revenue requirement for Carty, net of dispatch benefits, is approximately \$83.6 million.
12 Details for this calculation are also provided in PGE Exhibit 200.

V. Carty Timeline and Milestones

- 1 **Q. Has Abeinsa provided a substantial completion deadline for Carty?**
- 2 A. Yes. The substantial completion deadline is May 16, 2016. Abeinsa will be liable for
- 3 liquidated damages if the work is not completed by the substantial completion date.
- 4 **Q. How far along is construction at this time?**
- 5 A. Construction of the plant is proceeding on schedule. Plant construction is approximately 37
- 6 percent complete as of December 31, 2014. We commenced major equipment delivery in
- 7 August 2014 and have installed all 12 modules of the HRSG units. Work is ongoing for the
- 8 completion of Grassland and subsequent Boardman interconnection.
- 9 **Q. What are the construction and testing milestones associated with Carty?**
- 10 A. Table 1 below lists the construction and testing milestones, both completed and estimated.

Table 1
Carty Milestones

<u>Milestone</u>	<u>Actual/Scheduled Completion</u>
Start of Construction	January 9, 2014*
Start of Boardman Interconnection Work	March 2014*
Start of Transmission Tower Installation	March 2014*
Major Equipment Delivery	Commenced August 2014*
Deliver Gas Turbine	February 2015
Deliver Steam Turbine	April 2015
Grassland Switchyard Complete	June 2015
First Fire	November 2015
Commercial Operation	Second Quarter of 2016

* Asterisk identifies Actual Completion dates

1 **Q. When is PGE requesting Carty be included in customer prices?**

2 A. We request that prices recovering Carty's net revenue requirement become effective shortly
3 after a PGE officer has provided an attestation that Carty has been placed in service in the
4 second quarter of 2016. PGE will update our cost estimates before that time.

VI. Qualifications

1 **Q. Ms. Pope, please describe your qualifications.**

2 A. I received my Bachelor of Arts degree from Georgetown University in 1987 and my
3 Master's degree in Business Administration from the Stanford University Graduate School
4 of Business in 1992. I am currently Senior Vice President of Power Operations and Supply
5 and Resource Strategy, a position I have held since March 2013. Prior to that, I was Senior
6 Vice President, Chief Financial Officer and Treasurer of PGE beginning in January 2009.
7 From January 2006 through December 2008, I served on the PGE Board of Directors.
8 Previous to January 2009, I served as Vice President, Chief Financial Officer at Mentor
9 Graphics Corp., an Oregon-based software company, where I was responsible for multiple
10 departments including the company's financial affairs, corporate development and
11 operations. Before I joined Mentor Graphics in 2007, I served 12 years in a variety of
12 capacities at Pope & Talbot, Inc. and worked previously at Morgan Stanley, Inc. and Levi
13 Strauss & Co.

14 **Q. Does this conclude your testimony?**

15 A. Yes.