

Part 2

130910184

Mitchell

Witness Rebuttal Testimony Summary

Witness: Mark D. Mitchell

Title: Vice President, Generation Construction

Summary:

Company Witness Mark D. Mitchell provides rebuttal testimony regarding North Anna 3, nuclear license renewal, onshore and offshore wind development, solar cap and capacity costs, and future recommendations.

Pertaining to North Anna 3, Mr. Mitchell testifies that, since receiving the Combined Operating License (“COL”) in June 2017, the Company has paused material development activities. He notes that the COL provides a long term option to build North Anna 3 and that the Company will continue to review the merits of North Anna 3 and cannot predict when it will seek cost recovery.

Mr. Mitchell next addresses testimony about the Company’s nuclear license renewal projects. Specifically, he states that the Company does not have a definite timeframe associated with potential cost recovery for nuclear license extensions, but anticipates that any rate adjustment clause filing would likely be made sometime after January 1, 2020, when the Company is eligible to do so, and that the reasonableness and prudence of any spending would be evaluated at that time.

In response to criticisms regarding onshore wind costs in the 2018 Plan, Mr. Mitchell explains that the onshore wind costs in the 2018 Plan have been revised downward significantly from the 2015, 2016, and 2017 Plans based on an analysis of a project located in Virginia. Overnight installed costs for onshore wind have decreased each year since the 2015 Plan by approximately 58% from \$4,992/kW in 2015 to \$2,112/kW in 2018. He further notes that the challenging terrain of the land available in Virginia, such as on mountain ridges, causes the expected capital construction costs to be higher than an equivalent project located on a relatively flat, open site.

Mr. Mitchell explains that the 240 MW/year cap for solar development was doubled in the 2018 Plan to 480 MW/year to reflect significant advancement in identification, advancement, and permitting of projects by the Company and third parties. Mr. Mitchell also explains the Company’s use of forecasted solar capacity factors. Finally, in response to recommendations for future development, Mr. Mitchell explains why planning for more aggressive deployment of solar resources would not be appropriate.

**REBUTTAL TESTIMONY
OF
MARK D. MITCHELL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2018-00065**

- 1 **Q. Please state your name, position with Virginia Electric and Power Company**
2 **(“Dominion Energy Virginia” or the “Company”) and business address.**
- 3 **A. My name is Mark D. Mitchell, and I am Vice President, Generation Construction for**
4 **Dominion Energy Services, Inc., testifying on behalf of Dominion Energy Virginia. My**
5 **business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement**
6 **of my background and qualifications is attached as Appendix A.**
- 7 **Q. Please describe your areas of responsibility with the Company.**
- 8 **A. As Vice President of Generation Construction, I am responsible for engineering and**
9 **construction of power station capital projects, including both new and existing facilities**
10 **planned by Dominion Energy Virginia and its affiliates.**
- 11 **Q. Have you previously submitted testimony with the State Corporation Commission of**
12 **Virginia (“Commission”) as part of this proceeding?**
- 13 **A. No, I have not submitted pre-filed direct testimony for the 2018 Integrated Resource Plan**
14 **(“2018 Plan” or “Plan”) filing. I did, however, submit rebuttal testimony and testify**
15 **before the Commission as part of the Company’s 2017 Plan proceeding, Case No. PUR-**
16 **2017-00051 (“2017 Plan”) and other prior Plan proceedings.**

1 **Q. What is the purpose of your rebuttal testimony?**

2 A. My rebuttal testimony responds to the testimony of Karl Rábago on behalf of
3 Appalachian Voices (“Environmental Respondents”), Michael Volpe on behalf of the
4 Mid-Atlantic Renewable Energy Coalition (“MAREC”), and Ezra Hausman on behalf of
5 the Sierra Club regarding solar photovoltaic (“PV”) assumptions, as well as the testimony
6 of Hannah Hunt on behalf of MAREC regarding onshore and offshore wind assumptions
7 used within the 2018 Plan. In addition, my rebuttal testimony addresses aspects of
8 Gregory L. Abbott’s and Carol Myers testimony on behalf of the Commission Staff
9 (“Staff”) regarding the nuclear relicensing, North Anna 3 and solar capacity factors.

10 **Q. Are you sponsoring any exhibits or schedules with your rebuttal testimony?**

11 A. Yes. Company Exhibit No. __, MDM, consisting of Extraordinarily Sensitive Rebuttal
12 Schedule 1, was prepared under my direction and supervision, and is accurate and
13 complete to the best of my knowledge and belief.

14 **Q. Mr. Mitchell, how is your testimony organized?**

15 A. I address the following areas:

- 16 I. North Anna 3
- 17 II. Nuclear License Renewal
- 18 III. Onshore and Offshore Wind Development
- 19 IV. Solar Cap and Capacity Costs
- 20 V. Future Recommendations

1 I. NORTH ANNA 3

2 **Q. On page 14 of her testimony, Staff Witness Myers states that she is concerned with**
3 **deferred costs associated with North Anna 3 and recommends that the Company**
4 **address the recovery of costs by the first Triennial Review, or sooner. Please**
5 **respond.**

6 **A.** The Combined Operating License (“COL”) for the North Anna 3 facility was received in
7 June 2017. Since that time, the Company has paused material development activities.
8 The COL has an initial term of 40 years, which starts when construction is completed and
9 the project has been approved by the Nuclear Regulatory Commission for initial fuel
10 load. This provides a long term option to build North Anna 3 should economics change,
11 which would provide a large baseload carbon free generation resource. As such, the
12 Company will continue to review the merits of North Anna 3 periodically and cannot
13 predict when it would seek recovery of cost associated with North Anna 3 at this time.

14 II. NUCLEAR LICENSE RENEWAL

15 **Q. Turning to existing nuclear facilities, on page 28 of Staff Witness Abbott’s testimony**
16 **he expresses concern regarding expenditures for the Company’s nuclear license**
17 **renewal projects and states that the nuclear license extensions may not be needed in**
18 **the future.**

19 **A.** The direct and rebuttal testimonies of Company Witness Glenn A. Kelly address the
20 Company’s projections for future generation needs as it relates to projected load. The
21 Company does not have a definite timeframe associated with the potential cost recovery
22 for the nuclear license extensions, though the Company has informed Staff that any rate
23 adjustment clause filing would likely be made sometime after January 1, 2020, when the

1 Company is eligible to do so. The reasonableness and prudence of expenditures on the
2 nuclear license extensions would be evaluated at such time. The Company understands
3 that any spending undertaken by the Company prior to receiving approval for cost
4 recovery from the Commission is being done at our own risk.

5 III. ONSHORE AND OFFSHORE WIND DEVELOPMENT

6 **Q. MAREC Witness Hunt states in her testimony beginning on page 3 that onshore**
7 **wind costs in the 2018 Plan are far higher than current market prices. Please**
8 **respond.**

9 **A.** The onshore wind costs in the 2018 Plan have been revised downward significantly from
10 prior Plans based on an analysis by Black and Veatch on a [BEGIN
11 EXTRAORDINARILY SENSITIVE] [REDACTED]
12 [REDACTED] [END EXTRAORDINARILY SENSITIVE]. Overnight installed
13 costs for onshore wind have decreased each year since the 2015 Plan by approximately
14 58% from \$4,992/kW in 2015 to \$2,112/kW in 2018. As discussed in previous years, the
15 terrain in Virginia is typically on mountain top ridges, which causes the capital
16 construction costs to be higher than an equivalent project located on a relatively flat, open
17 site. The Company continues to monitor the commercial wind industry pricing in the
18 United States and update its Plan prices accordingly.

19 **Q. Ms. Hunt, on pages 3-4, also criticizes the Company's documentation of wind**
20 **assumptions and asserts that it is impossible to evaluate the timeliness of the**
21 **assumptions used. What is your response?**

22 **A.** I would note that neither MAREC nor any other party or Staff to this proceeding
23 requested documentation of all assumptions regarding onshore wind. In this proceeding,

1 in response to MAREC Set 2-4, the Company indicated that its onshore wind pricing
2 information was based on a Black and Veatch analysis. The indicated analysis is
3 included as my Extraordinarily Sensitive Rebuttal Schedule 1. Commercial operations
4 dates are based on the projected earliest in service dates based on a forecasted timeline
5 which includes development, permitting, and construction. This method is consistent with
6 other generation resources included in the 2018 Plan. Escalation rates are applied to
7 overnight cost as is also standard for other generation resources.

8 **Q. On page 12 of her testimony, MAREC Witness Hunt testifies that the Company is**
9 **incorrect regarding the amount of land available for onshore wind in Virginia.**
10 **Please comment.**

11 A. As with previous MAREC witnesses, Ms. Hunt lists the potential capacity or nameplate
12 of wind resources available for development in Virginia, but does not account for the
13 expected capacity factors or firm capacity, which can have a significantly lower range.
14 PJM values wind capacity at only 13% of its nameplate capacity. MAREC Witness Hunt
15 only takes into account National Renewable Energy Laboratory (“NREL”) and
16 Department of Energy (“DOE”) data on the technical amount of wind capacity in
17 Virginia. Logistics for delivering wind turbines can be challenging in the mountains of
18 Virginia with certain sites potentially not accessible or accessible at a higher cost due to
19 road construction to deliver the components, which can further limit the benefits from
20 using larger turbines. In addition, wind data at specific sites is not readily available to
21 confirm production at the higher hub heights. The Company continues to evaluate the
22 newer turbine technologies and market data for projects in Virginia.

1 **Q. Ms. Hunt compares the assumptions used by Dominion Energy Virginia in the 2018**
2 **Plan to those used by Appalachian Power Company (“APCo”). Specifically, on**
3 **page 9, she notes that APCo’s integrated resource plan assumes an onshore wind**
4 **project with a 2023 commercial operations date and a 35% capacity factor costs**
5 **approximately \$57/MWh, which is approximately 40% less than the \$94.10/MWh**
6 **assumed by the Company on a projecting using a 37% capacity factor. Please**
7 **respond.**

8 A. As described in previous responses to MAREC witnesses, capital costs associated with
9 onshore wind is dependent on project location. The Company uses in-state resources for
10 use in its Plans. To date, the Company has only received one proposal through the
11 Request for Proposals process for an onshore wind facility. The proposal was not
12 selected due to project economics. The Company cannot comment on APCo’s cost per
13 MWh for onshore wind because it does not know the project(s) location or operating
14 parameters.

15 **Q. MAREC Witness Hunt, at page 13, states that the Company likely used outdated**
16 **technology assumptions to support its claim that Virginia only has three feasible**
17 **sites for onshore development. Please respond.**

18 A. As discussed in my previous response, the NREL and DOE data do not account for the
19 siting and permitting challenges of wind development. With this understanding, the
20 Company has developed onshore wind estimates based on the three mountain-top sites
21 under its control, which provides a representative sample of various size sites in different
22 locations.

1 **Q. Did MAREC Witness Hunt express any support for the Company's efforts as they**
2 **relate to wind development?**

3 A. Yes. On pages 19-20 of MAREC Witness Hunt's testimony, she expresses support for
4 the Company's commitment to have 3,000 MW of wind and solar in operation or under
5 development by 2022, as well as the Company's efforts to pursue offshore wind project
6 development in a responsible and cost-effective manner.

7 We are pleased to have Ms. Hunt's support on the prudent development of the
8 Company's Coastal Virginia Offshore Wind ("CVOW") Project. We agree on her
9 statement that "offshore wind energy costs are expected to decline in the near term,
10 increasing the resource's cost-competitiveness compared to other energy resources."
11 Through the development of a robust domestic supply chain and efficiency gained
12 through increased turbine sizing, pricing for offshore wind is expected to drop in the
13 future, similar to what occurred in Europe.

14 **IV. SOLAR CAP AND CAPACITY FACTORS**

15 **Q. On pages 20-22, Environmental Respondents Witness Rábago, calls the solar**
16 **development cap used in the 2018 Plan, subjective, arbitrary, and unjustified**
17 **constraints on solar development. MAREC Witness Volpe (pages 3-5) and Sierra**
18 **Club Witness Hausman (pages 31-33) express similar concerns. Please respond.**

19 A. In its 2017 Plan, the Company prudently established an annual limit on utility scale solar
20 projects of 240 MW. This approach took into account a learning curve for permitting,
21 labor, and other siting and construction considerations as was discussed in the 2017 Plan
22 proceeding.

1 In the 2018 Plan, the Company doubled its annual limit on utility scale solar projects,
2 increasing from 240 MW to 480 MW. This reflects the significant advancement in
3 identification, advancement, and permitting of projects by the Company and other third
4 parties, as well as the development of the labor force to support an increased number of
5 projects.

6 As the Commission has recognized, the Plan is a snapshot in time based on circumstances
7 that exist when the Plan is developed. As such, inputs are reevaluated every year. I
8 would also note that, as stated above, the Company has committed to 3,000 MW of new
9 solar and wind resources being in operation or under development by 2022. The projects
10 will be a combination of assets developed and procured by the Company.

11 **Q. Sierra Club Witness Hausman asserts on page 33 that removing the 480-MW annual**
12 **cap would reduce costs for customers. Do you agree?**

13 A. I do not agree. Witness Hausman assumes that an infinite amount of solar can be built in
14 a given year. If this were possible, Dr. Hausman would be correct as the Company could
15 take full advantage of the federal investment tax credit. Within any given year only a
16 fraction of the projects in the PJM queue are able to be constructed. Without such a cap,
17 the simultaneous deployment of large scale solar could result in inefficiencies and
18 increased costs.

1 Q. On the opposite end of the spectrum, Staff Witness Abbott urges additional caution
2 by the Company. On pages 29-30, he notes that in looking at the Company's 2013
3 Plan compared to the current 2018 Plan, the costs of solar have decreased
4 substantially and that by delaying deployment of 5,000 MW of solar from 2013 to
5 2018, a total estimated cost savings of \$10.6 billion was realized from just a five-year
6 delay. Thus, based on history, it may make sense to take a more cautious approach
7 in order to take advantage of the continuing decline in the costs of solar. Do you
8 agree?

9 A. I do not. The Company has developed a systematic, phased approach for solar
10 installation, which still allows projects to take advantage of the federal investment tax
11 credit, technology advancements, and potential future declining cost curve. In addition,
12 solar deployment has been leveled over time, as previously discussed, which will
13 promote efficient use of resources. All of these savings accrue to ratepayers. The solar
14 industry has seen a dramatic reduction in costs over recent years due to technology
15 advancements and supply. This was the case in 2013, which was selected as the starting
16 point for Staff Witness Abbott's analysis. However, the cost reductions are beginning to
17 level out. For example, the cost per dc watt for solar panels was approximately \$0.60 for
18 projects going in service in 2016 compared to non-tariff pricing in 2018 in the \$0.30/watt
19 range. Even with technology advancements, this rate of decline is not sustainable. In
20 addition, labor cost are escalating. Thus, we do not expect to see the same rate of cost
21 reductions going forward when compared to the 2013-2018 time period. In fact,
22 unexpected events, such as the recent tariff, can cause unexpected increases in solar
23 deployment cost.

1 Staff Witness Abbott's analysis assumed the entire 5,000 MW of solar projects would be
2 constructed in one year, either 2013 or 2018, for the financial comparison. This is not a
3 realistic approach due to a limited amount of solar deployment per year as previously
4 discussed. The 2018 Plan and future Plans, as well as specific projects filed in the future,
5 do and will consider the cost of deployment compared to other generation resources at the
6 time of deployment.

7 **Q. Staff Witness Abbott, on page 7 of his testimony, discusses the difference between**
8 **actual solar capacity factors and forecasted capacity factors. Please explain why the**
9 **Company believes the forecasted capacity factors included in the 2018 Plan are**
10 **appropriate to use rather than the capacity factors actually experienced by the**
11 **Company.**

12 A. The Staff's use of actual historical capacity factors is not representative of longer term
13 average capacity factors as it does not consider short-term irradiance variations or other
14 technical aspects, as further explained below. When these factors are considered and the
15 data is normalized, the capacity factors used in the 2018 Plan are appropriate.

16 The 2018 Plan uses representative capacity factors for solar projects. The representative
17 capacity factors include key inputs such as (1) a long term average projection of
18 irradiance, (2) outage rates, and (3) constant DC to AC ratios. These factors can have
19 significant impacts to the capacity factor for a specific project; thus, comparisons must be
20 normalized for project specific parameters.

21 Solar irradiance is the amount of sunlight, or solar "power." The parameters used in the
22 PLEXOS model for the 2018 Plan come from NREL Typical Meteorological Year data,

1 which is a historical look at solar irradiance. The 2018 Plan used NREL data averaged
2 for years 1991-2005 for a representative site location. Accordingly, this data provides a
3 long-term view of solar irradiance.

4 Gross capacity factors used in the 2018 Plan are 22.8% for a generic fixed-tilt solar
5 facility and 25.8% for a generic horizontal tracker solar facility. An outage rate of 1.5%
6 was applied to the gross capacity factors, which resulted in a generic net capacity factor
7 of 22.5% and 25.4% for fixed-tilt and horizontal tracker, respectively.

8 DC to AC ratios are the amount of DC capacity installed (solar panels) divided by the AC
9 ratio. For example, the generic 2018 Plan solar project uses a 1.34 ratio. Increasing this
10 ratio will result in an increased capacity factor for a given site. For individual projects,
11 capital cost are evaluated against annual generation to optimize the ratio and equipment.

12 Individual project annual production and capacity factors are modeled using an industry
13 standard program such as PVSyst. This program is recognized as an industry standard
14 and accounts for the factors listed above, in addition to many other factors such as
15 degradation of the facility over time. When comparing actual capacity factors to
16 expected capacity factors, you would use the PVSyst model for the specific site to
17 generate the expected result for a given time period.

18 To date, the Company has built three regulated solar facilities: Woodland Solar (20 MW),
19 Whitehouse Solar (19 MW) and Scott Solar (17 MW). Each of these facilities became
20 commercially operational in December 2016, meaning that – as of today – there is less
21 than two years of operating experience. The average actual capacity factor for these three
22 sites for the annual period ending on July 31, 2018, was 18.6%. When normalized for the

1 above, the average capacity factor is approximately 25.4%, which supports the generic
2 capacity factor used in the 2018 Plan.

3 V. FUTURE RECOMMENDATIONS

4 **Q. On page 34, Sierra Club Witness Hausman recommends that the Commission direct**
5 **the Company to include at least one alternative with a much more aggressive**
6 **schedule of solar deployment in the next Plan filing. Environmental Witness**
7 **Rábago, on page 21, also recommends inclusion of an alternative with higher levels**
8 **of solar development. Please respond.**

9 **A. A more aggressive deployment of solar resources would not be appropriate. The**
10 **Company has stated previously that the 480 MW per year deployment is only an average**
11 **and may fluctuate from year to year. If every project in the PJM queue were to be**
12 **constructed in a given year, project economics would be constrained due to an increase in**
13 **the demand for materials and labor.**

14 **Q. Dr. Hausman also testifies on page 34 that for future Plan proceedings the Company**
15 **could initiate a market solicitation to obtain third-party proposals for solar**
16 **deployment at a rate that might exceed the Company's presumed annual maximum**
17 **or consider exceeding limits by evaluating solar and storage solutions, like other**
18 **utilities. What is your response?**

19 **A. As addressed previously, the Company has stated its plans to have 3,000 MW of solar**
20 **and wind in service or under development by 2022, of which approximately 25% is**
21 **expected to be through third-party contracts. The Company annually addresses its**
22 **capacity and energy needs and reviews all appropriate generation resources.**

1 Q. Mr. Mitchell, does this conclude your rebuttal testimony?

2 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
MARK D. MITCHELL**

As Vice President of Generation Construction for Dominion Energy Virginia, Mark Mitchell is responsible for the engineering and construction of existing and planned power station capital projects for the Company and its affiliates. Since 2000, he has been responsible for the installation of numerous generation projects for the Company, including major plant retrofits, new combined-cycle gas turbines, new simple-cycle gas turbines, wind turbines, solar, new nuclear development, and the VCHEC Project.

Mr. Mitchell joined the Company in June 2000 as a project manager in charge of a 750 MW gas turbine project in Illinois. From 2001 through 2004, he was in charge of the 1200 MW Fairless Energy Combined Cycle project near Philadelphia, Pennsylvania. During this project, he was promoted to Project Director. In 2004, he was named Director, Fossil & Hydro Projects, and from 2004 through 2007 was in charge of projects performed across the fossil generation fleet, as well as new generation project development. In 2007, he assumed management of the VCHEC construction project as Director of Fossil and Hydro Projects – Generation Construction. Mr. Mitchell was promoted to his current position in January 2014.

A native of Ashland, Virginia, Mr. Mitchell received a Bachelor of Applied Science degree from the University of Delaware in 1991 and a Master's degree in business administration from Wilmington College in 1993. He is a registered professional engineer in Virginia and Pennsylvania in the electrical engineering field. He also attended the Reactor Technology Course for utility executives at MIT and The Executive Program at the Darden School of Business at the University of Virginia.

Prior to joining the Company, Mr. Mitchell worked for Reynolds Metals from 1995 to

2000 on various projects in the United States, Europe, and Africa. From 1982 to 1995, he worked in the utility industry on various projects for large utilities, including construction and startups for four nuclear plants.

Mr. Mitchell has previously testified before the State Corporation Commission of Virginia.

180910184

Company Exhibit No. __

Witness: MDM

Rebuttal Schedule 1

Extraordinarily Sensitive Pages 1 through 19

Entirely Redacted