

Matter No. M09548

**In the Matter of a public hearing into Nova Scotia Power Incorporated's Fuel
Adjustment Mechanism (FAM) Audit by Bates White Economic Consulting,
LLC (Bates White)**

**EVIDENCE OF
JOHN D. WILSON
ON BEHALF OF
THE CONSUMER ADVOCATE**

Resource Insight, Inc.

DECEMBER 22, 2020

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Professional qualifications of John D. Wilson

1 **I. Identification**

2 **Q: Mr. Wilson, please state your name, occupation, and business address.**

3 A: I am John D. Wilson. I am the research director of Resource Insight, Inc., 5 Water St.,
4 Arlington, Massachusetts.

5 **Q: Summarize your professional education and experience.**

6 A: I received a BA degree from Rice University in 1990, with majors in physics and
7 history, and an MPP degree from the Harvard Kennedy School of Government with
8 an emphasis in energy and environmental policy, and economic and analytic methods.

9 I was deputy director of regulatory policy at the Southern Alliance for Clean
10 Energy for more than twelve years, where I was the senior staff member responsible
11 for SACE's utility regulatory research and advocacy, as well as energy resource
12 analysis. I engaged with southeastern utilities through regulatory proceedings, formal
13 workgroups, informal consultations, and research-driven advocacy.

14 I have been in my current position since November of 2019. My clients have
15 included a variety of consumer advocate, energy industry, and environmental
16 advocacy organizations.

17 My work has considered, among other things, the cost-effectiveness of pro-
18 spective new electric generation plants and transmission lines, retrospective review
19 of generation-planning decisions, conservation program design, ratemaking and cost
20 recovery for utility efficiency programs, allocation of costs of service between rate
21 classes and jurisdictions, design of retail rates, and performance-based ratemaking for
22 electric utilities.

23 My professional qualifications are further summarized in Exhibit JDW-1.

1 **Q: Have you testified previously in utility proceedings?**

2 A: Yes. I have testified more than twenty times before utility regulators in California and
3 the Southeast U.S. and appeared numerous additional times before various regulatory
4 and legislative bodies.

5 **Q: Have you previously testified in other proceedings before this Board?**

6 A: Yes. I have filed joint testimony in five proceedings. I have also assisted the
7 Consumer Advocate in preparing comments and developing positions in numerous
8 proceedings and stakeholder processes.

9 **II. Introduction and Summary**

10 **Q: On whose behalf are you testifying?**

11 A: My testimony is sponsored by the Nova Scotia Consumer Advocate.

12 **Q: What is the purpose of your testimony?**

13 A: I review aspects of Bates White Economic Consulting's audit of the Fuel Adjustment
14 Mechanism (FAM). To its credit, NS Power has accepted the vast majority of the
15 recommendations made by Bates White. The resulting actions should have a
16 significant impact on the efficiency of NS Power's operations, demonstrating that the
17 FAM Audit is a useful initiative which should be sustained by the Board.

18 The topics I would like to bring to the Board's attention include:

- 19 • Excessive biomass fuel contract costs
- 20 • Proposed study on dispatch practices
- 21 • Impact of carbon shadow pricing on dispatch
- 22 • Planning reserve margin
- 23 • Analysis of the combustion turbine fleet
- 24 • Sustaining capital costs for Point Aconi

1 **III. Excessive biomass fuel contract costs**

2 **Q: Please summarize Bates White’s findings regarding the biomass fuel contract**
3 **costs.**

4 A: Bates White found that the sole supplier of biomass fuel during the Audit Period, [REDACTED]
5 [REDACTED] (hereafter, the supplier), failed in two respects to perform
6 as required under the contract regarding the quality of the biomass fuel provided.

7 First, the supplier failed to source the required [REDACTED] of biomass fuel from Crown
8 lands, and instead procured 83% of its biomass fuel from private sources.¹ In order to
9 avoid excessive fuel costs to customers, the supplier should cover the incremental
10 costs of obtaining biomass fuel from private lands rather than Crown lands.² Bates
11 White states that NS Power reported that it gave “verbal instructions” to the supplier
12 to cover the incremental costs.³ In addition to failing to document those instructions,
13 NS Power “did not provide the total value of these costs” to Bates White. Due to NS
14 Power’s lapses in documentation, it is not possible to determine whether the supplier
15 covered the incremental costs nor what those incremental costs might have been.

16 Second, the supplier procured bark with higher-than-normal moisture content,
17 resulting in an increased dispatch cost for the biomass unit. In response to the
18 deficiency, NS Power reduced its payment rates for bark and chips. Despite the
19 reduction in fuel prices, the average dispatch cost increased as NS Power used more
20 wood chips to compensate for the high-moisture bark.⁴

¹ Bates White, FAM Audit, p. 116.

² Bates White, response to CA-IR-2.

³ Bates White, FAM Audit, p. 116.

⁴ Bates White, FAM Audit, pp. 116-117; response to CA-IR-3.

1 The increase in average dispatch cost for the biomass unit drove up FAM costs
2 both at the biomass unit and at other generation units. Bates White estimates that the
3 total dispatch cost of the biomass unit increased by [REDACTED] during hours in which
4 the biomass unit was dispatched.⁵

5 The high dispatch cost for the biomass unit may have resulted in increased
6 dispatch of more costly units. For example, if the biomass unit should have operated
7 at a cost of \$60 per MWh but actually operated at a cost of \$80 per MWh, and if the
8 marginal (highest priced) dispatched unit operated at a cost between \$60 and \$80 per
9 MWh, then the costs to operate units over \$60 per MWh could have been avoided
10 entirely or in part. Bates White did not conduct an analysis to estimate the total
11 increase in dispatch costs at other facilities resulting from the biomass unit being less
12 economic to dispatch due to the failure to meet the performance requirements under
13 its fuel supply contract.⁶

14 **Q: What do you recommend?**

15 A. NS Power has failed to reasonably enforce its contract with the supplier and obtain
16 appropriate remedies for its customers to address the increased costs.⁷ Therefore,
17 NSPI should refund FAM for higher dispatch costs due to the change in fuel mix
18 resulting from the supplier's failure to meet performance requirements.

19 The refund to FAM should include three components.

- 20 • As discussed above, Bates White was unable to determine the cost impact
21 of the supplier sourcing materials from private lands instead of Crown

⁵ Bates White, response to CA-IR-3.

⁶ Bates White, response to CA-IR-3(e).

⁷ Bates White, response to CA-IR-3(a).

1 lands. The Board should direct NS Power to estimate this cost impact, and
2 refund FAM accordingly.

- 3 • The Board should direct NS Power to refund FAM the [REDACTED] in
4 increased direct dispatch costs of the biomass unit due to excessive
5 moisture in bark fuel.
- 6 • As discussed above, Bates White did not conduct an analysis to estimate
7 the total increase in dispatch costs at other facilities. The Board should
8 direct NS Power to conduct a backcasting exercise to estimate this indirect
9 cost impact. The system cost delta could be produced by assuming the
10 biomass fuel prices were reduced by the amount identified by Bates White.
11 Modeling lower fuel prices will result in increased modeled dispatch of the
12 biomass unit, and thus lower modeled dispatch of higher-cost generation
13 units. The Board should direct NS Power to refund FAM based on the
14 system cost delta.

15 If NS Power demonstrates that the increase in dispatch costs was not limited to FAM
16 customers and a portion of the higher costs were billed to other customers, or
17 demonstrates that the supplier has already covered a portion of the higher costs, the
18 Board should reduce the refund accordingly.

19 **IV. Proposed study on dispatch practices**

20 **Q: Please summarize the proposed study on dispatch practices.**

21 A: In its reply evidence, NS Power proposes to commission a study of industry standards,
22 tools and best practices for economic dispatch. NS Power identifies several
23 justifications for this study.

24 First, NS Power “acknowledges that there has been a requirement for manual
25 intervention between the modelled economic solution and the realities of the system

1 security constraints and changes in system conditions.”⁸ As the role of variable energy
2 resources on the NS Power system increases, NS Power proposes to study how
3 additional automation may assist in optimizing system dispatch to reflect the
4 “multitude of near-real-time system constraints.” NS Power proposes to “focus on
5 near-term time frames and include day-ahead business processes for unit commitment
6 and real-time processes for economic dispatch.”⁹

7 Second, NS Power proposes to include several specific processes in the scope
8 of the dispatch study, including:

- 9 • Tufts cove gas purchase;
- 10 • Target levels for Wreck Cove; and
- 11 • Use of the GenCost Dispatch Order.¹⁰

12 Third, NS Power will explore “opportunities for aligning operational dispatch
13 practices and [procurement and resource] planning model studies.”¹¹

14 **Q: What is your response to the proposed dispatch study?**

15 A: I am supportive of the proposed dispatch study but recommend several modifications
16 to the scope, including:

- 17 • Review of current operating reserve provisions, considering the findings
18 from the Integrated Resource Plan.
- 19 • Review of hydro capacity and energy optimization practices.
- 20 • Review of the design of operational constraints, including those that are or
21 may soon be applied to emerging technologies.

⁸ NS Power, FAM Audit Reply Evidence, p. 43 line 6 – p. 44 line 2.

⁹ NS Power, response to CA-IR-4(a).

¹⁰ NS Power, FAM Audit Reply Evidence, p. 43 lines 23-29.

¹¹ NS Power, response to CA-IR-4(a)(i).

- 1 • Examination of dynamic system inertia constraints and operating limits for
2 existing and potential future levels of wind resources.

3 **Q: Why do you recommend that the dispatch study continue review of operating**
4 **reserve provision?**

5 A: In its Recommendation X-3 of the 2016-2017 FAM Audit Report, Bates White
6 recommended that NS Power “document instances of operating reserve surpluses
7 above 150 MW and document their cause(s).” The Board accepted this
8 recommendation, which it characterized as “one of the most important from the
9 audit,” and agreed that NS Power could further analyze the issue in the IRP planning
10 process.¹²

11 In its Integrated Resource Plan, NS Power found:

12 A review of Operating Reserve in the IRP hourly Production Cost model output
13 for Scenario 2.0C, covering years 2021 and 2022, indicates an average of 471
14 MW was carried by the model; this is similar to the average of 423 MW observed
15 in the most recent two-year FAM audit period. Levels of operating reserve above
16 the minimum requirement come about as secondary outcomes of other economic
17 dispatch optimizations and/or operational factors.¹³

18 While I agree with this statement, NS Power’s commentary does not fully answer the
19 question as to what, specifically, may cause higher operating reserve surpluses in
20 practice.

21 It appears that the IRP was not the perfect instrument to fully explore this topic.
22 Provision of operating reserves above the minimum requirement is not cost-free, and,
23 as NS Power correctly notes, must be balanced in practice with, as indicated by NS
24 Power in the quote from its IRP above, “other economic dispatch optimizations and/or

¹² Bates White, FAM Audit Report, pp. 267-268, 270; NS Power, Closing Submission, 2016-2017 FAM Audit Report, Matter No. M08195, p. 10 line 10 – p. 12 line 26.

¹³ NS Power, 2020 Integrated Resource Plan, p. 99.

1 operational factors.” The unanswered question is: How should NS Power’s
2 operational practices ensure this balance?

3 The proposed dispatch study is an appropriate vehicle to answer this question.
4 Accordingly, I recommend that the Board direct NS Power to include in the scope of
5 the dispatch study an examination of whether its current practices – both near-term
6 operations and long-term planning – result in an optimal balance between economic
7 dispatch and other operational factors.

8 **Q: Why do you recommend that the dispatch study scope include a review of hydro**
9 **capacity and energy optimization practices?**

10 A: In Resource Insight’s comments on the final draft IRP, we questioned the 95%
11 Effective Load Carrying Capability (ELCC) for run-of-river hydro units, as NS Power
12 derated those units for DAFOR only, leaving such operational limitations as reduced
13 capacity at multiple units in dry years and the limited hours of daily operation at full
14 load to other aspects of modeling.¹⁴ Establishing an accurate ELCC is important not
15 only for the IRP, but also for the economic assessment of capital projects for hydro
16 facilities. In this proceeding, however, my interest is in whether the operational
17 limitations that NS Power uses on a near-term basis are optimal, and also whether
18 those limitations are correctly characterized in the Company’s long-term planning
19 models.

20 Even though NS Power assigns a 95% ELCC to run-of-river hydro units,
21 Resource Insight’s analysis found that these units were dispatched at only 63 – 77%
22 of capacity during the top 0.1% of net peak hours (i.e., load minus wind output). In
23 response, NS Power suggested that “other water optimization considerations may

¹⁴ Resource Insight, Comments on draft IRP Report, November 16, 2020, pp. 15-16; and NS Power, 2020 Integrated Resource Plan, Appendix K, p. 243.

1 have been considered as sufficient capacity was available on the system without
2 maximizing hydro.” NS Power further suggested that “Water management to
3 maximize annual energy production is an important consideration in the management
4 of hydro dispatch, not included in the production cost model.”¹⁵

5 Based on Resource Insight’s analysis and NS Power’s response, I recommend
6 that the dispatch study scope specifically include evaluation of these “other water
7 optimization considerations” to determine the most optimal operation of NS Power’s
8 hydro resources. Among the specific areas of inquiry should be NS Power’s use of
9 weather and climate forecasts to optimize the timing of its hydro dispatch. NS Power
10 should also be directed to apply any such considerations in its long-term planning
11 models, so that the ELCC used in economic analysis of capital projects and in future
12 IRPs accurately reflects NS Power’s hydro dispatch practices.¹⁶

13 **Q: Why do you recommend that the dispatch study scope examine the design of**
14 **operational constraints?**

15 A: The proposed dispatch study should review of the design of operational constraints,
16 including those that are or may soon be applied to emerging technologies. NS Power
17 indicates that the proposed study’s current scope may include evaluation of the
18 *impacts* of “operational constraints on economic dispatch but will not include a
19 review of the *design* of those constraints.”¹⁷

¹⁵ NS Power, 2020 Integrated Resource Plan, Appendix L, p. 85

¹⁶ NS Power stated that it “acknowledges that further analyses are required to refine the small hydro ELCC in the context of operational practice, and NS Power will undertake this work as part of system planning model continuous improvement practices.” NS Power, 2020 Integrated Resource Plan, Appendix L, p. 86.

¹⁷ NS Power, response to CA-IR-4(c).

1 NS Power’s proposed scope for the study appears designed to obtain generic
2 advice on “industry standards, tools, and best practices.” With only limited
3 exceptions, noted above, NS Power is proposing to exclude its actual operational
4 constraints from review in the proposed dispatch study.

5 While an expert white paper on standards and best practices will have value, the
6 focus of that white paper can be of greater value to NS Power if the consultants are
7 informed by and engaged with the optimization of NS Power’s operational
8 constraints.

9 NS Power may be concerned that such a review would amount to an operational
10 audit. While the dispatch study should not be prohibited from engaging in audit-like
11 review where initial investigations suggest value could be gained from more detailed
12 records review, I am not recommending an operational audit.

13 Instead, I am suggesting that the dispatch study include in its scope a specific
14 charge to the consultant to conduct an initial review of NS Power’s operational
15 constraints on economic dispatch, comparing the design of those constraints to best
16 practices. Where significant divergence is evident, the consultant should investigate
17 to better understand NS Power’s rationale for its existing practices, and then include
18 specific recommendations where warranted.

19 Furthermore, the scope of the review should not be limited to existing operating
20 circumstances. NS Power is engaged in pilots and other studies of emerging
21 technologies, such as Smart Grid Nova Scotia. The dispatch study should identify
22 relevant elements of those studies for review (as progress allows) and provide
23 guidance on emerging industry standards and best practices that could be applied to
24 emerging technologies.

25 In summary, the goal of the study should not be limited to generic advice that
26 would apply to most any utility, but should also provide actionable recommendations

1 for operating challenges faced by NS Power today and due to emerging technologies
2 over the next several years.

3 **Q: Why do you recommend that the dispatch study scope examine dynamic system**
4 **inertia constraints and operating limits for wind resources?**

5 **A:** Consistent with my recommendation above, wind resources present operating
6 challenges today, and those challenges may increase in the coming years.

7 In its IRP, NS Power commits to “complete system stability studies to determine
8 whether additional dynamic system inertia constraints, operating limits, and/or
9 provision of alternate services like Fast Frequency Response (FFR), are required to
10 enable higher levels of wind integration on the Nova Scotia system.”¹⁸ There should
11 be coordination between the consultants performing the system stability study and the
12 dispatch study in order to identify the dynamic system inertia constraints and
13 operating limits that should be studied in the system stability study. Ideally, the
14 dispatch study would incorporate findings from the system stability study into an
15 overall framework for operation and dispatch of NS Power’s wind resources.

16 **V. Impact of greenhouse gas shadow pricing on dispatch**

17 **Q: Please summarize how NS Power is using greenhouse gas (GHG) shadow pricing**
18 **in its dispatch.**

19 **A:** In response to the announcement of the cap-and-trade program in 2018, NS Power
20 determined that the lowest cost compliance approach would be to use GHG shadow

¹⁸ NS Power, 2020 Integrated Resource Plan, p. 113.

1 pricing in forecasting and dispatch decisions. Accordingly, GHG shadow pricing was
2 implemented in February 2019.¹⁹ NS Power further explains that:

3 This shadow price penalizes energy sources with associated carbon based on the
4 intensity of each fuel, resulting in an increase in lower-emitting sources and a
5 decrease in higher-emitting sources. These carbon price influenced volumetric
6 requirements form the basis of NS Power's hedging decisions.²⁰

7 Notably, adoption of GHG shadow pricing has affected unit commitment and
8 energy resource utilization. NS Power identifies two such significant changes in
9 confidential comments, but provides no quantification of the impact of these
10 commitment/utilization changes.²¹

11 **Q: Please discuss the FAM Audit recommendations and NS Power's response**
12 **related to GHG shadow pricing.**

13 A: Bates White's Recommendation X-4 concerned tracking the dispatch costs associated
14 with reducing GHG emissions. Bates White suggested that NS Power should track
15 differences between its actual dispatch and a hypothetical dispatch, without the GHG
16 shadow price, on an hourly basis.²²

17 Although NS Power disagreed with the recommendation to track the differences
18 on an hourly basis, it proposed to satisfy this recommendation through an annual
19 assessment of the cost of GHG compliance, shared with the FAM Small Working
20 Group (SWG).²³ NS Power also states that it could use its annual backcasting exercise

¹⁹ NS Power, response to CA-IR-2(a).

²⁰ NS Power, response to CA-IR-2(d).

²¹ NS Power, response to CA-IR-3(c)(i).

²² Bates White, FAM Audit Report, p. 271.

²³ NS Power, FAM Audit Reply Evidence, p. 42, line 15 – p. 43, line 2.

1 to provide a high-level estimate of the cost of the GHG cap-and-trade system.²⁴ It
2 stands to reason that such an exercise would also provide a high-level estimate of the
3 changes in unit commitment and energy resource utilization as well.

4 **Q: Do you anticipate that NS Power can estimate the cost of GHG compliance?**

5 A: Yes, but not with precision.

6 I think it is unlikely that NS Power will be able to provide an exact total cost or
7 cost per tonne of GHG emission reductions. While NS Power's dispatch models can
8 provide a hindsight view of what units NS Power might have dispatched as an
9 alternative, those models cannot backcast the exact market response to a different
10 pricing offer by NS Power.

11 The Board and the public should also be aware that the average cost of GHG
12 reductions will always be less than the marginal cost – to be clear, the shadow price
13 is a marginal cost, because NS Power's dispatch models would rarely (if ever) suggest
14 dispatch that would incur GHG reduction costs above the shadow price. Often,
15 however, the dispatch model may identify a marginal GHG reduction opportunity that
16 is significantly less than the shadow price.

17 In the future, the Board should expect NS Power to periodically adjust its
18 shadow price. Changes to the NS Power system, to the import market, and to the GHG
19 credit market could each result in adjustments to the shadow price. The shadow price
20 will, in turn, affect the average cost of GHG reductions. Therefore, to ensure that NS
21 Power is optimizing its GHG reduction costs, it is essential to conduct an integrated
22 assessment of NS Power system operations, the import market, the GHG credit
23 market, and NS Power's choice of a shadow price.

²⁴ NS Power, response to CA-IR-3(e).

1 **Q: Has NS Power conducted an assessment of the costs associated with reducing**
2 **GHG emissions?**

3 A: Yes. On December 18, NS Power staff presented an assessment of the costs associated
4 with reducing GHG emissions to the SWG.²⁵ The details of the presentation are
5 confidential.

6 **Q: How do you recommend the Board respond to NS Power's disagreement with**
7 **Bates White Recommendation X-4?**

8 A: I recommend that the Board accept NS Power's alternative proposal, with two
9 modifications. First, the Board should direct NS Power to provide an updated analysis
10 every six months, rather than annually, through the end of 2021. This is important
11 because of the delays of the Maritime Link and the NS Block energy, which are
12 significant zero emission sources. NS Power should be maintaining a higher degree
13 of scrutiny of its GHG shadow pricing mechanism during this critical transition
14 period.

15 Second, the Board should identify the GHG shadow pricing mechanism as a
16 topic for the next FAM Audit. I believe that it falls within the normal scope of the
17 FAM Audit, but the Board should indicate an interest in the auditor providing a
18 specific opinion on the effectiveness of the GHG shadow pricing mechanism and an
19 assessment of the overall cost of GHG reductions for NS Power. Ideally, the audit
20 findings would not be confidential, such that the public would be aware of this
21 information for purposes of future GHG policy decisions.

22 Third, the Board should accept NS Power's commitment to incorporate the
23 results of these backcasting analyses into its long-term planning models and future
24 IRP analyses. In response to a recommendation to incorporate a shadow price for

²⁵ NS Power, FAM SWG Update: GHG Cap and Trade Compliance (December 18, 2020).

1 GHG emissions in future IRP modeling analyses, NS Power has committed to
2 evaluating the incorporation of GHG reduction value as part of the IRP process.²⁶

3 **VI. Planning reserve margin**

4 **Q: Why is NS Power’s planning reserve margin an issue in the FAM Audit?**

5 A: One of the unresolved issues from the 2016-2017 FAM Audit was the optimal
6 planning reserve margin, as discussed in Recommendation IX-1 of that report. Bates
7 White observed that NS Power’s “thermal generation fleet is also not optimally suited
8 for the operational challenge of backing up such substantial levels of fluctuating wind
9 generation.”²⁷ Bates White considered that as a result, the cycling of its thermal plants
10 could result in higher costs and poorer emissions performance. On the other hand,
11 Bates White observed that NS Power often maintained potentially excessive operating
12 reserve surpluses, as discussed above. The question of whether NS Power has excess
13 capacity (“too many generating units”) is a question of whether the planning reserve
14 margin is too large.²⁸ The Board accepted NS Power and Bates White’s agreement
15 that the optimal planning reserve margin should be resolved in what is now NS
16 Power’s 2020 IRP.²⁹

17 **Q: What did NS Power determine in the IRP?**

18 A: NS Power reached two relevant conclusions. First, based on stakeholder and
19 consultant input, NS Power has determined that the Unforced Capacity method

²⁶ NS Power, 2020 Integrated Resource Plan, Appendix L, p. 87.

²⁷ Bates White, 2016-2017 FAM Audit Report, pp. 146-149.

²⁸ Bates White, 2016-2017 FAM Audit Report, p. 152.

²⁹ Bates White, *Audit of Nova Scotia Power, Inc.’s Fuel Adjustment Mechanism for 2018-2019*, Exhibit N-1 Matter No. M09548 (August 21, 2020), pp. 225-226.

1 (UCAP) should be used as its primary metric for measuring the planning reserve
2 margin, although it will continue to report the Installed Capacity method (ICAP)
3 which has been used in the past.³⁰ The UCAP method measures the capacity of
4 thermal generators at their effective capacity, which adjusts the nameplate capacity
5 by incorporating forced outages, as well as better considering the reliability
6 differences between small and large capacity units. The UCAP method is better suited
7 to NS Power's system because it evaluates thermal and wind resources on a more
8 equivalent basis.

9 Second, in a pre-IRP study, NS Power determined that its planning reserve
10 margin should be 9% using the UCAP metric, and that the ICAP equivalent is 20%.³¹
11 In response to feedback from RII, NS Power validated its pre-IRP study with an
12 additional model run, confirming the initial value.³²

13 **Q: Do you recommend that the Board recognize this issue as resolved?**

14 A: Yes. I recommend that the Board accept the 9% UCAP planning reserve margin as an
15 appropriate response to the original recommendation to confirm the 20% ICAP
16 planning reserve margin.

³⁰ NS Power, 2020 Integrated Resource Plan, pp. 34-35, 97-98.

³¹ Energy and Environmental Economics, *Planning Reserve Margin and Capacity Value Study* (July 2019).

³² It should be noted that the confirmation analysis shows that NS Power will have slightly less than its optimal capacity reserves in 2021. Its UCAP planning reserve margin will be 6% rather than 9%. My understanding is that NS Power considers the cost of acquiring additional capacity by 2021 to be unjustified. This approach to short-run reserves is consistent with the practice of setting an optimal long-term target of 9%, which may be exceeded or underachieved in any given year. The result is an increase from a 1 day in 10 years loss of load expectation (LOLE) to 2.5 days in 10 years. NS Power, 2020 Integrated Resource Plan, p.-98.

1 **VII. Analysis of the combustion turbine fleet**

2 **Q: Please summarize the evidence related to analysis of the combustion turbine**
3 **(CT) fleet.**

4 A: In the 2016–2017 FAM audit process, NS Power agreed to “include an evaluation of
5 the costs and benefits of the combustion turbines in its fleet in the upcoming 2019
6 IRP.”³³ NS Power provided this analysis in the IRP. Based on the results of that
7 analysis, NS Power asserts that there is a conclusive case in favor of the continued
8 operation of the diesel CT fleet.³⁴

9 The 2018–2019 FAM audit finds that the diesel CTs were less reliable than
10 expected, but nonetheless were being called on more often than NS Power
11 forecasted.³⁵ These findings raise two concerns.

12 First, in the IRP, NS Power mentions ongoing investments in the diesel CT fleet,
13 such as oil cooling systems. However, it is not yet clear that the extent to which these
14 investments might improve the poor performance of these units identified in the 2018-
15 19 FAM audit.

16 Second, if the diesel CTs continue to operate more than estimated in the Plexos
17 modeling, the O&M and sustaining capital costs may be higher than Plexos reports.
18 Depending on the amount that the diesel CTs are used and the resulting costs, as well
19 as the future cost of distillate oil, adding new storage or other resources may be less
20 expensive than continued operation and rebuilding of the diesel CTs.

21 These concerns need to be kept in mind when considering any long-term
22 investments. The retirement analysis conducted in the IRP only considered retirement

³³ Bates White, FAM Audit Report, p. 229.

³⁴ NS Power, 2020 Integrated Resource Plan, pp. 62-63.

³⁵ *Id.*, pp. 205-207.

1 in 2020. These units will be very old by 2045, the end of the planning period. By only
2 evaluating retirement in 2020, the IRP analysis does not rule out the potential that it
3 may be cost effective to retire these units prior to 2045. Moreover, given that the
4 diesel CTs are operating at higher levels than expected, NS Power should reassess its
5 assumption that sustaining capital for these units can be maintained at a consistent
6 level³⁶

7 **Q: What further commitments to evaluating the diesel CTs did NS Power make in**
8 **its IRP, and what is the status of those commitments?**

9 A: In response to Resource Insight’s comments on the draft IRP, NS Power committed
10 to:

- 11 • Review the performance of its refurbished CTs as part of the FAM Audit or
12 as part of its capital planning, as appropriate;
- 13 • “Provide data to RII and other interested stakeholders data comparing the
14 modeled operational profile (capacity factor, operating hours, number of
15 unit starts, etc.) to recent historical data;”
- 16 • Continue to review the long-term sustaining capital investment in the diesel
17 CTs; and
- 18 • Periodically re-evaluate the economics of the diesel CTs as the cost of
19 storage falls, “monitoring for divergence from the ‘Base’ to the ‘Low’
20 pricing scenarios.”³⁷

21 In response to my request for the data promised above, it is my understanding that NS
22 Power views it as premature to supply those data as it was awaiting further review of

³⁶ In Figure 26, an example sustaining capital forecast suggests that annual costs will be nearly constant except for two regularly scheduled and identical overhauls. NS Power, 2020 Integrated Resource Plan, p. 62.

³⁷ NS Power, 2020 Integrated Resource Plan, p. 115 and Appendix L, p. 84.

1 the IRP by Bates White. Without these data, I am unable to confirm that the modeling
2 of the diesel CTs reasonably reflects their current operational profile.

3 The other commitments would be completed in the future.

4 **Q: What do you recommend with respect to further evaluation of the diesel CTs?**

5 A: I recommend that the Board accept NS Power's commitments to continued review.
6 The Board should emphasize the need for NS Power to pro-actively identify when the
7 diesel CTs may be at greater risk of either failure or a need for greater levels of
8 investment than forecast in the IRP. The Board should also direct NS Power to
9 periodically update its long-term planning models with the latest information
10 regarding the performance and costs of its diesel CTs, and revisit the resource
11 screening analysis periodically to identify whether it may be economic to replace
12 these units.

13 RII will further evaluate the consistency of modeling of the diesel CTs with
14 historical operational data when NS Power provides the data, and provide comments
15 to the Board in an appropriate forum if there are any issues of concern.

16 **Q: Does this conclude your testimony?**

17 A: Yes.

JOHN D. WILSON

Resource Insight, Inc.
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SUMMARY OF PROFESSIONAL EXPERIENCE

- 2019–Present* **Research Director, Resource Insight, Inc.** Provides research, technical assistance, and expert testimony on electric- and gas-utility planning, economics, and regulation. Reviews electric-utility rate design. Designs and evaluates conservation programs for electric utilities, including conservation cost recovery mechanisms and performance incentives. Evaluates performance of renewable resources and designs performance evaluation systems for procurement. Designs and assesses resource planning and procurement strategies for regulated and competitive markets.
- 2007-19* **Deputy Director for Regulatory Policy, Southern Alliance for Clean Energy.** Managed regulatory policy, including supervision of experts in areas of energy efficiency, renewable energy, and market data. Provided expert witness testimony on topics of resource planning, renewable energy, energy efficiency to utility regulators. Directed litigation activities, including support of expert witnesses in the areas of rate design, resource planning, renewable energy, energy efficiency, and resource procurement. Conducted supporting research and policy development. Represented SACE on numerous legislative, utility, and private committees across a wide range of climate and energy related topics.
- 2001–06* **Executive Director, Galveston-Houston Association for Smog Prevention.** Directed advocacy and regulatory policy related to air pollution reduction, including ozone, air toxics, and other related pollutants in the industrial, utility, and transportation sectors. Served on the Regional Air Quality Planning Committee, Transportation Policy Technical Advisory Committee, and Steering Committee of the TCEQ Interim Science Committee.
- 2000–01* **Senior Associate, The Goodman Corporation.** Provided transportation and urban planning consultant services to cities and business districts across Texas.
- 1997–99* **Senior Legislative Analyst and Technology Projects Coordinator, Office of Program Policy Analysis and Government Accountability, Florida Legislature.** Author or team member for reports on water supply policy, environmental permitting, community development corporations, school district financial management and other issues – most recommendations implemented by the 1998 and 1999 Florida Legislatures. Edited statewide government accountability newsletter and coordinated online and internal technical projects.
- 1997* **Environmental Management Consultant, Florida State University.** Project staff for Florida Assessment of Coastal Trends.
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1992-96 **Research Associate, Center for Global Studies, Houston Advanced Research Center.** Coordinated and led research for projects assessing environmental and resource issues in the Rio Grande / Rio Bravo river basin and across the Greater Houston region. Coordinated task force and edited book on climate change in Texas.

EDUCATION

BA, Physics (with honors) and history, Rice University, 1990.

MPP, John F. Kennedy School of Government, Harvard University, 1992. Concentration areas: Environment, negotiation, economic and analytic methods.

PUBLICATIONS

“Urban Areas,” with Judith Clarkson and Wolfgang Roeseler, in Gerald R. North, Jurgen Schmandt and Judith Clarkson, *The Impact of Global Warming on Texas: A Report of the Task Force on Climate Change in Texas*, 1995.

“Quality of Life and Comparative Risk in Houston,” with Janet E. Kohlhase and Sabrina Strawn, *Urban Ecosystems*, Vol. 3, Issue 2, July 1999.

“Seeking Consistency in Performance Incentives for Utility Energy Efficiency Programs,” with Tom Franks and J. Richard Hornby, *2010 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Buildings*, August 2010.

“Monopsony Behavior in the Power Generation Market,” with Mike O’Boyle and Ron Lehr, *Electricity Journal*, August-September 2020.

REPORTS

“Policy Options: Responding to Climate Change in Texas,” Houston Advanced Research Center, US EPA and Texas Water Commission, October 1993.

Houston Environmental Foresight Science Panel, *Houston Environment 1995*, Houston Advanced Research Center, 1996.

Houston Environmental Foresight Committee, *Seeking Environmental Improvement*, Houston Advanced Research Center, January 1996.

Florida Coastal Management Program, *Florida Assessment of Coastal Trends*, June 1997.

Office of Program Policy Analysis and Government Accountability, *Best Financial Management Practices for Florida School Districts*, Report No. 97-08, October 1997.

Office of Program Policy Analysis and Government Accountability, *Review of the Community Development Corporation Support and Assistance Program*, Report No. 97-45, February 1998.

Office of Program Policy Analysis and Government Accountability, *Review of the Expedited Permitting Process Coordinated by the Governor's Office of Tourism, Trade, and Economic Development*, Report No. 98-17, October 1998.

Office of Program Policy Analysis and Government Accountability, *Florida Water Policy: Discouraging Competing Applications for Water Permits; Encouraging Cost-Effective Water Development*, Report No. 99-06, August 1999.

“Smoke in the Water: Air Pollution Hidden in the Water Vapor from Cooling Towers – Agencies Fail to Enforce Against Polluters,” Galveston Houston Association for Smog Prevention, February 2004.

“Reducing Air Pollution from Houston-Area School Buses,” Galveston Houston Association for Smog Prevention, March 2004.

“Who’s Counting: The Systematic Underreporting of Toxic Air Emissions,” Environmental Integrity Project and Galveston Houston Association for Smog Prevention, June 2004.

“Mercury in Galveston and Houston Fish: Contamination by Neurotoxin Places Children at Risk,” Galveston Houston Association for Smog Prevention, October 2004.

“Exceeding the Limit: Industry Violations of New Rule Almost Slid Under State’s Radar,” Galveston Houston Association for Smog Prevention, January 2006.

“Whiners Matter! Citizen Complaints Lead to Improved Regional Air Quality Control,” Galveston Houston Association for Smog Prevention, June 2006.

“Bringing Clean Energy to the Southeastern United States: Achieving the Federal Renewable Energy Standard,” Southern Alliance for Clean Energy, February 2008.

“Cornerstones: Building a Secure Foundation for North Carolina’s Energy Future,” Southern Alliance for Clean Energy, May 2008.

“Yes We Can: Southern Solutions for a National Renewable Energy Standard,” Southern Alliance for Clean Energy, February 2009.

“Green in the Grid: Renewable Electricity Opportunities in the Southeast United States,” with Dennis Creech, Eliot Metzger, and Samantha Putt Del Pino, World Resources Institute Issue Briefs, April 2009.

“Local Clean Power,” with Dennis Creech, Eliot Metzger, and Samantha Putt Del Pino, World Resources Institute Issue Briefs, April 2009.

“Energy Efficiency Program Impacts and Policies in the Southeast,” Southern Alliance for Clean Energy, May 2009.

“Recommendations for Feed-In-Tariff Program Implementation In The Southeast Region To Accelerate Renewable Energy Development,” Southern Alliance for Clean Energy, March 2011.

“Renewable Energy Standard Offer: A Tennessee Valley Authority Case Study,” Southern Alliance for Clean Energy, November 2012.

“Increased Levels of Renewable Energy Will Be Compatible with Reliable Electric Service in the Southeast,” Southern Alliance for Clean Energy, November 2014.

“Cleaner Energy for Southern Company: Finding a Low Cost Path to Clean Power Plan Compliance,” Southern Alliance for Clean Energy, July 2015.

“Analysis of Solar Capacity Equivalent Values for Duke Energy Carolinas and Duke Energy Progress Systems,” prepared for and filed by Southern Alliance for Clean Energy, Natural Resources Defense Council, and Sierra Club in North Carolina NCUC Docket No. E-100, Sub 147, February 17, 2017.

“Seasonal Electric Demand in the Southeastern United States,” Southern Alliance for Clean Energy, March 2017.

“Analysis of Solar Capacity Equivalent Values for the South Carolina Electric and Gas System,” Southern Alliance for Clean Energy, March 2017.

“Solar in the Southeast, 2017 Annual Report,” with Bryan Jacob, Southern Alliance for Clean Energy, February 2018.

“Energy Efficiency in the Southeast, 2018 Annual Report,” with Forest Bradley-Wright, Southern Alliance for Clean Energy, December 2018.

“Solar in the Southeast, 2018 Annual Report,” with Bryan Jacob, Southern Alliance for Clean Energy, April 2018.

“Tracking Decarbonization in the Southeast, 2019 Generation and CO₂ Emissions Report,” with Heather Pohman and Maggie Shober, Southern Alliance for Clean Energy, August 2019.

“Seasonal Electric Demand in the Southeastern United States,” with Maggie Shober, Southern Alliance for Clean Energy, April 2020.

“Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement,” with Mike O’Boyle, Ron Lehr, and Mark Detsky, Energy Innovation Policy & Technology LLC and Southern Alliance for Clean Energy, April 2020.

PRESENTATIONS

“Clean Energy Solutions for Western North Carolina,” presentation to Progress Energy Carolinas WNC Community Energy Advisory Council, February 7, 2008.

“Energy Efficiency: Regulating Cost-Effectiveness,” Florida Public Service Commission undocketed workshop, April 25, 2008.

“Utility-Scale Renewable Energy,” presentation on behalf of Southern Alliance for Clean Energy to the Board of the Tennessee Valley Authority, March 5, 2008.

“An Advocates Perspective on the Duke Save-a-Watt Approach,” ACEEE 5th National Conference on Energy Efficiency as a Resource, September 2009.

“Building the Energy Efficiency Resource for the TVA Region,” presentation on behalf of Southern Alliance for Clean Energy to the Tennessee Valley Authority Integrated Resource Planning Stakeholder Review Group, December 10, 2009.

“Florida Energy Policy Discussion,” testimony before Energy & Utilities Policy Committee, Florida House of Representatives, January 2010.

“The Changing Face of Energy Supply in Florida (and the Southeast),” 37th Annual PURC Conference, February 2010.

“Bringing Energy Efficiency to Southerners,” Environmental and Energy Study Institute panel on “Energy Efficiency in the South,” April 10, 2010.

“Energy Efficiency: The Southeast Considers its Options,” NAESCO Southeast Regional Workshop, September 2010.

“Energy Efficiency Delivers Growth and Savings for Florida,” testimony before Energy & Utilities Subcommittee, Florida House of Representatives, February 2011.

“Rates vs. Energy Efficiency,” 2013 ACEEE National Conference on Energy Efficiency as a Resource, September 2013.

“TVA IRP Update,” TenneSEIA Annual Meeting, November 19, 2014.

“Views on TVA EE Modeling Approach,” presentation with Natalie Mims to Tennessee Valley Authority’s Evaluating Energy Efficiency in Utility Resource Planning Meeting, February 10, 2015.

“The Clean Power Plan Can Be Implemented While Maintaining Reliable Electric Service in the Southeast,” FERC Eastern Region Technical Conference on EPA’s Clean Power Plan Proposed Rule, March 11, 2015.

“Renewable Energy & Reliability,” 5th Annual Southeast Clean Power Summit, EUCI, March 2016.

“Challenges to a Southeast Carbon Market,” 5th Annual Southeast Clean Power Summit, EUCI, March 2016.

“Solar Capacity Value: Preview of Analysis to Date,” Florida Alliance for Accelerating Solar and Storage Technology Readiness (FAASSTeR) meeting, Orlando, FL, November 2017.

“Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement,” Southeast Energy and Environmental Leadership Forum, Nicholas Institute for Environmental Policy Solutions, August 2020.

EXPERT TESTIMONY

- 2008 **South Carolina PSC** Docket No. 2007-358-E, surrebuttal testimony on behalf of Environmental Defense, the South Carolina Coastal Conservation League, Southern Alliance for Clean Energy and the Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.
- 2009 **North Carolina NCUC** Docket No. E-7, Sub 831, direct testimony on behalf of Environmental Defense Fund, Natural Resources Defense Council, Southern Alliance for Clean Energy, and Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.
- Florida PSC** Docket Nos. 080407-EG through 080413-EG, direct testimony on behalf of Southern Alliance for Clean Energy and the Natural Resources Defense Council. Energy efficiency potential and utility program goals.
- South Carolina PSC** Docket No. 2009-226-E, direct testimony in general rate case on behalf of Environmental Defense, the Natural Resources Defense Council, the South Carolina Coastal Conservation League, Southern Alliance for Clean Energy and the Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.
- 2010 **North Carolina NCUC** Docket No. E-100, Sub 124, direct testimony on behalf of Environmental Defense Fund, the Sierra Club, Southern Alliance for Clean Energy, and Southern Environmental Law Center. Adequacy of consideration of energy efficiency in Duke Energy Carolinas and Progress Energy Carolinas' 2009 integrated resource plans.
- Georgia PSC** Docket No. 31081, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power's 2010 integrated resource plan, including cost effectiveness, rate and bill impacts, and lost revenues.
- Georgia PSC** Docket No. 31082, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power's 2010 demand side management plan, including program revisions, planning process, stakeholder engagement, and shareholder incentive mechanism.

- 2011* **South Carolina PSC** Docket No. 2011-09-E, allowable ex parte briefing on behalf of Southern Alliance for Clean Energy, South Carolina Coastal Conservation League, and Upstate Forever. Adequacy of South Carolina Electric & Gas’s 2011 integrated resource plan, including resource mix, sensitivity analysis, alternative supply and demand side options, and load growth scenarios.
- South Carolina PSC** Docket Nos. 2011-08-E and 2011-10-E, allowable ex parte briefing on behalf of Southern Alliance for Clean Energy, South Carolina Coastal Conservation League, and Upstate Forever. Adequacy of Progress Energy Carolinas and Duke Energy Carolinas’ 2011 integrated resource plans, including resource mix, sensitivity analysis, alternative supply and demand side options, cost escalation, uncertainty of nuclear and economic impact modeling.
- 2013* **Georgia PSC** Docket No. 36498, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power’s 2013 integrated resource plan, including cost effectiveness, rate and bill impacts, and lost revenues, economics of fuel switching and renewable resources.
- South Carolina PSC** Docket No. 2013-392-E, direct testimony with Hamilton Davis in Duke Energy Carolinas need certification case on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. Need for capacity, adequacy of energy efficiency and renewable energy alternatives, and use of solar power as an energy resource.
- 2014* **South Carolina PSC** Docket No. 2014-246-E, direct testimony generic proceeding on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. Methods for calculating dependable capacity credit for renewable resources and application to determination of avoided cost.
- 2015* **Florida PSC** Docket No. 150196-EI, direct testimony in Florida Power & Light need certification case on behalf of Southern Alliance for Clean Energy. Appropriate reserve margin and system reliability need.
- 2016* **Georgia PSC** Docket No. 40161, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of renewable energy in Georgia Power’s 2016 integrated resource plan, including portfolio diversity, operational and implementation risk, analysis of project-specific costs and benefits (including location and technology considerations), and methods for calculating dependable capacity credit for renewable resources.

- 2019 **Georgia PSC** Docket Nos. 42310 and 42311, direct testimony with Bryan A. Jacob in Georgia Power's 2019 integrated resource plan and demand side management plan on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of renewable energy in IRP, retirement of uneconomic plants, and use of all-source procurement process. Shareholder incentive mechanism for both renewable energy and DSM plan.
- 2020 **Nova Scotia UARB** Matter No. M09519, direct testimony with Paul Chernick in Nova Scotia Power's application for approval of the Smart Grid Nova Scotia Project on behalf of the Nova Scotia Consumer Advocate. Cost classification, decommissioning costs, justification for software vendor selection, and suggested changes to project scope.
- Nova Scotia UARB** Matter No. M09499, direct testimony with Paul Chernick in Nova Scotia Power's 2020 annual capital expenditure plan on behalf of the Nova Scotia Consumer Advocate. Potential to decommission hydroelectric systems, review of annually recurring capital projects, use of project contingencies, and cost minimization practices.
- Nova Scotia UARB** Matter No. M09579, direct testimony with Paul Chernick in Nova Scotia Power's application for the Gaspereau Dam Safety Remedial Works on behalf of the Nova Scotia Consumer Advocate. Alternatives to proposed project, project contingency factor, estimation of archaeological costs, and replacement energy cost calculation.
- Nova Scotia UARB** Matter No. M09609, direct testimony with Paul Chernick in Nova Scotia Power's application for the Advanced Distribution Management System Upgrade on behalf of the Nova Scotia Consumer Advocate. Need for the ADMS and integration with the Distributed Energy Resources Management System.
- Nova Scotia UARB** Matter No. M09707, direct testimony with Paul Chernick on Nova Scotia Power's 2020 Load Forecast on behalf of the Nova Scotia Consumer Advocate. Impacts of recession, application of end-use studies, improvements to forecast components, and impact of time-varying pricing.
- California PUC** Docket A.19-10-012, direct and rebuttal testimony with Paul Chernick in San Diego Gas & Electric's application for the Power Your Drive Electric Vehicle Charging Program on behalf of the Small Business Utility Advocates. Ensuring that utility-installed chargers advance California goal for electric vehicles. Budget controls. Reporting requirements. Evaluation, monitoring and verification processes. Outreach to small business customers.

California PUC Docket A.19-08-012, direct testimony in Southern California Edison's 2021 general rate case (track 2) on behalf of the Small Business Utility Advocates. Reasonableness of remedial software costs to be included in authorized revenue requirement.

Georgia PSC Docket Nos. 4822, 16573 and 19279, direct, rebuttal and surrebuttal testimony in Georgia Power Company's PURPA avoided cost review on behalf of the Georgia Large Scale Solar Association. Reviewing compliance with prior Commission orders. Application of capacity need forecast in projection of avoided capacity cost. Calculation of cost of new capacity. Proposal of standard offer contract.