STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Vermont Gas Systems, Inc., requesting a Certificate of Public Good pursuant to 30 V.S.A. § 248, authorizing the construction of the "Addison Natural Gas Project" consisting of approximately 43 miles of new natural gas transmission pipeline in Chittenden and Addison Counties, approximately 5 miles of new distribution mainlines in Addison County, together with three new gate stations in Williston, New Haven, and Middlebury, Vermont	)	Docket No. 7970

PROPOSED DECISION SUBMITTED ON BEHALF OF VERMONT GAS SYSTEMS, INC.

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I. Introduction

In this Order, the Vermont Public Service Board ("Board") declines to reopen the record concerning our approval of the natural gas pipeline extension into Addison County (the "Project") by Vermont Gas Systems, Inc ("Vermont Gas," "VGS," or the "Company") in response to the second significant increase in the estimated costs of the Project. Based on careful consideration of the hearing record and the post-hearing filings, we conclude that the new cost information, and other information submitted into evidence, is not of such a material and controlling nature so as to change our previous determination that approval of the Project under 30 V.S.A. § 248 will promote the general good of the state.

We reach our decision based on the following considerations. We conclude that the revised cost estimate is reliable, as it was developed using industry standard methodologies by a team with significant expertise in project management. Although the estimated cost of the Project is significant, the benefits of the Project to the state and its residents are significantly higher and particularly meaningful not only to households but also to those businesses that have started to invest in natural gas infrastructure based on the expectations of natural gas delivery by pipeline. The benefits include, among other things, the opportunity of those served by the Project to use lower-cost natural gas, reduced greenhouse gas ("GHG") emissions due to displacement of fuel oil and propane consumption, positive employment impacts resulting from Project construction, and expanded availability of VGS' energy efficiency programs.

In declining to reopen the record, we have taken into consideration but reject claims by various parties that the Project's economic benefits are minimal and could be achieved in alternate ways. Although compressed natural gas ("CNG") recently became available to several large Addison County customers (in part through the Company's efforts), it is not feasible for residential and most commercial customers. More importantly, the investments necessary for CNG service were made in anticipation that pipeline gas would thereafter be available, and it would therefore be inappropriate to calculate the Project's economic benefits by assuming that CNG would be available in its absence. We also reaffirm our prior determination that heat pumps do not represent a viable alternative to the Project. Based on the latest available information, we conclude that the current 25% cost advantage of natural gas over oil, and 47% over propane, may diminish in the near term but expand thereafter, so that important fuel cost

savings will accrue over the life of the Project. Finally, we are convinced that there are adequate tools to assure that VGS rates remain affordable and competitive, including phased-in rates, rate design mechanisms and other measures. We will consider rates in a later proceeding and ultimately the rate levels and rate design will be established at levels that are just and reasonable. The Project will be an important cornerstone for economic development in Addison County, as other portions of the Company's system have been for Chittenden and Franklin counties for many decades.

II. Summary of Decision

On December 23, 2013, we issued a final order (the "December 23rd Order") granting a 30 V.S.A. § 248 Certificate of Public Good ("CPG") to Vermont Gas to construct the Project, finding that "the expansion of natural gas service to Addison County will provide significant economic benefits to the state, can be accomplished without undue adverse environmental impacts, and will promote the general good of the state."[1] At that time, the estimated Project costs were $86.6 million.

On December 19, 2014, VGS informed the Board that, for the second time, it projected a significant increase in its estimated cost of the Project, which has now reached $154 million (the "Second Cost Update"). After requesting a remand of the pending appeal of the December 23rd Order from the Supreme Court, and following several months of discovery, prefiled evidence, and two days of technical hearings, in today's Order we conclude, pursuant to V.R.C.P. 60(b)(2), that the new cost estimate increase, while significant, is not of such a material and controlling nature so as to change our previous determination approving the Project.[2] As we have previously concluded when faced with similar facts and circumstances involving another large infrastructure project, the Northwest Vermont Reliability Project, "*[w]hile the near doubling of projected costs for the [Project] may, at some visceral level, seem to call for reexamination of the Project, the cost increase in fact is not likely to change the outcome of our ... [initial] Order.*"[3]

Much of the evidence in the current remand proceeding focused on the economic benefit criterion of Section 248(b)(4) and attempts to document the exact degree to which Project

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[1] December 23rd Order at 3.
[2] As noted in Section IV, below, V.R.C.P.(b)(2)(new evidence) is the controlling legal standard by which we evaluate the Second Cost Update. This is the appropriate standard of review under Rule 60(b).
[3] *Petitions of Vt. Elec. Power Co., Inc.*, Docket No. 6860, Order of 9/23/05 at 22 (emphasis added); *see also* October 10th Order at 7 n.13.

benefits may exceed its costs. In making our decision today, we are mindful that "[t]he extent of the economic benefit is one consideration among many that the Board must weigh while engaged in the 'legislative, policy-making process' necessary to the issuance of a CPG."[4] Pursuant to 30 V.S.A. 248(b)(4), we must find that the proposed Project "will result in an economic benefit to the state and its residents."[5] While we have not prescribed a specific methodology for quantifying economic benefits in Section 248 proceedings, we find that the weight of the evidence in this proceeding demonstrates that the Project will provide substantial economic benefits to the state of Vermont and its residents.

According to the Vermont Department of Public Service ("the Department") April, 2015 Vermont Fuel Price Report, today, natural gas remains less expensive on a per-BTU basis than fuel oil, propane, and typical air-source cold climate heat pumps.[6] We note that since the time of our December 23rd Order, the differential in the price of natural gas as compared to the price of oil and propane has shrunk considerably, although natural gas prices today are still about 25% lower than oil and 47% lower than propane.[7] The current contraction of the fuel price differential is expected to continue in the near term, but the gap is expected to increase within the next 5 to 6 years, with increasingly lower natural gas prices relative to oil over time.[8] The energy savings analyses presented by a number of the parties support that natural gas will offer a less expensive and affordable fuel choice for many Vermonters now and in the future.[9]

One of the most important public benefits this Project offers is expanding fuel choice for Addison County businesses and residents.[10] In addition to providing customers with a choice to

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[4] *In re UPC Vt. Wind, LLC*, 2009 VT 19, ¶ 11, 185 Vt. 296, 969 A.2d 144 (quoting *Vt. Elec. Power Co.*, 2006 VT 69, ¶ 6, 179 Vt. 370, 895 A.2d 226).

[5] This criterion requires only a finding of "some, albeit possibly limited, positive impact amounting to 'an economic benefit.'" *Id.* ¶¶ 5-11 (holding that Section 248 "does not set a minimum amount or require that [the Board] be able to quantify benefits with any particular degree of specificity"); *see also Petition of Charlotte Solar, LLC*, Docket No. 7844, Order of 1/22/13 at 15 (finding that Section 248 does not require an "exact accounting" of the anticipated economic benefits); December 23rd Order at 83 (same); *Petition of Ga. Mountain Cmty. Wind, LLC*, Docket No. 7508, Order of 6/11/10 at 25 (same).

[6] Exh. DPS ASH-A; Hopkins pf. at 3-4; finding 124, below.

[7] Findings 178 and 179, below.

[8] Tr. 6/23/15 at 53 (Simollardes); tr 6/23/15 at 231 (Dismukes). The most recent U.S. Energy Information Administration's ("EIA") Annual Energy Outlook 2015 Reference case for oil prices projects that oil prices are expected to rise steadily after 2015 and reach $100/barrel by 2028 and $141/barrel by 2040. Exh. Pet. Reb. 5/27/15 RWH-2 (EIA Outlook 2015) at ES-2.

[9] *See* Sections V.B. and C. of the Findings, below.

[10] December 23rd Order at 72 ("The Comprehensive Energy Plan recognizes that natural gas expansion encourages fuel choice for Vermonters"). In Vermont, about 64% of homes heat with oil or propane; only 15% are heated with natural gas. By comparison, nationally, only 12% of homes use oil or propane while about 50% of homes use

move to a lower cost heating fuel, natural gas expansion into Addison County will bring a range of benefits for Vermonters, including significant fuel bill savings, fuel price stability and the security of regulated pricing, increased reliability, and the opportunity to pursue strategic economic development efforts in Addison County and the region through lower-cost energy. The availability of natural gas has been a backbone for economic growth in the two counties already served by Vermont Gas. Increased competition in fuel prices in Addison County will apply downward pressure on prices and help keep service quality high.[11] In the end, this pattern of stabilizing energy costs and providing choice will also benefit the state's economy by spreading economic opportunity to an additional county within reach of current natural gas service by pipeline.

The Project will also provide Addison County residents and businesses with robust new opportunities for energy efficiency investment in the proposed Addison County service area.[12] In 2013, VGS customers saved $12 million and avoided over 62,000 tons of GHG emissions annually.[13] The quality and effectiveness of the VGS programs has been recognized by the EPA and American Council of Energy Efficient Economy.[14]

Several parties offered economic analysis incorporating the potential rate effects of the Project on the Vermont economy. However, the rate impact figures did not incorporate any rate mitigation or rate design measures, and therefore likely will not reflect the actual cost of the Project reflected in rates.[15] As we held in the first remand proceeding, they are, therefore, relevant to assessing whether the general good of the state and not whether there is a benefit to the state and its residents under Section 248(b)(4)."[16] Rates will be addressed in a future

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natural gas for heating. *Id.* at 66.

[11] Docket No. 7970, Order of 10/10/14 at 72 (the "October 10th Order").

[12] December 23rd Order at 71.

[13] Exh. CLF-EAS-10 (Thermal Efficiency Task Force Report) at 23. VGS has been offering a suite of energy efficiency programs since 1993, saving over 1 billion cubic feet of natural gas. *Id.*

[14] *Id.*

[15] We reached a similar conclusion in the first remand proceeding in this docket. *See* October 10th Order at 22.

[16] October 10th Order at 22, 25 & n.72. We address the issue of rate impacts under Section 248(a)(3) (General Good of the State); *see id.* and Section F of our Findings, below. In the October 10th Order, we noted that AARP and Ms. Lyons had cited to potential costs to ratepayers of over $270 million as grounds for reopening the record. We rejected this argument for a number of reasons. At that stage of the proceeding (and now) there was no competent basis for concluding existing ratepayers will actually pay more. The $270 million figure – which relied upon VGS' rate calculations (assuming no rate mitigation) – did not reflect the rate effect over the 70-year life of the Project, which in our experience is likely to result in downward pressure on rates. In addition, the rate impact figure would have to be adjusted for a number of other factors, not before us, and did not reflect the actual cost of the Project for ratepayers. We therefore found it irrelevant to assessing whether there is an economic benefit to the state and its

proceeding and ultimately the rate levels and rate design will be established at levels that are just and reasonable to customers and VGS.

We also heard considerable evidence about the potential that CNG and electric powered air source heat pumps could replace the need for the Project. In the original proceedings in this docket, Cabot Creamery Cooperative ("Agrimark") noted that it would consider using CNG "if the Project is delayed, but would chose natural gas service from VGS over CNG."[17] Since then, the evidence in this proceeding was that Agrimark and several other large Addison County businesses have installed CNG facilities. This does not change our determination. Pipeline gas remains less expensive than delivered CNG, by about 75%, so the market would choose pipeline gas if available.[18] Moreover, delivered CNG cannot serve residential and small commercial customers.[19] CNG is only available to interruptible customers, which are large business customers, and is not available to customers who don't have an alternate heating source that they can switch on and off when the compressed natural gas is not available.[20]

Heat pumps also do not replace the need for this Project. First, heat pumps only have application in the residential sector, meaning that commercial and industrial customers in Addison County cannot be served by this alternative.[21] Moreover, heat pumps meet only about 80% of residential heating requirements, necessitating the need for back-up heating systems. Importantly, the penetration rates projected for heat pumps are modest at best, forecasted to reach only 25% of the residential market by 2034.[22]

The multi-month investigation in this current proceeding has afforded the parties and this Board with an opportunity to conduct an extensive review as to whether there is evidence to support reopening the December 23rd Order. As set forth in the Findings and discussion that follow, we conclude that the new evidence is not of such a material and controlling nature as will

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residents under Section 248(b)(4). *See* October 10th Order at 22.
[17] December 23rd Order at 71 (citing tr. 9/17/13 at 16 (Pcolar)).
[18] Hopkins pf. at 3; tr. 6/22/15 at 58 (Rendall).
[19] Hopkins pf. at 3.
[20] Tr. 6/22/15 at 57 (Rendall) (explaining that compressed natural gas is delivered by truck and is itself an interruptible commodity that the compressed natural gas provider cannot provide at all times, so there are two levels of potential interruption for a customer: One is the availability of gas to the provider; the other is the logistics of actually transporting the gas by truck which can be interrupted for a variety of reasons, say a storm.). Tr. 6/22/15 at 58-59 (Rendall).
[21] *See* October 10th Order at 17.
[22] *See* Findings in Section V.B.3., below.

probably change the outcome of our December 23rd Order, and therefore, in accordance with V.R.C.P. 60(b)(2) find that there is no basis for reopening the record.[23]

In addition, as result of the broad scope of our investigation, we also conclude that had we reopened the Order, it would not have changed the outcome of our prior decision. We find that the Project remains a valuable and needed addition to the state's energy infrastructure that will bring environmental and economic benefits to Vermonters well beyond the period covered by the analyses of the Project presented in this docket. Although we recognize that the Company could have done a better job earlier of projecting the Project costs, we find the current estimate to be both credible and reliable and further find that at a cost of $154 million, the Project satisfies all applicable Section 248(b) criteria and will promote the general good of the state and its residents in accordance with Section 248(a)(3).

III. Procedural History

Following VGS' submittal of the Second Cost Update, the Department of Public Service (the "Department" or "DPS") and several parties filed Motions for Relief Pursuant to Rule 60(b) requesting that the Board investigate whether the Project remains in the public good in light of the estimated cost increase.[24]

On January 16, 2015, we provided notice to the parties of our decision to seek a second remand of the December 23rd Order from the Vermont Supreme Court in light of the Second Cost Update. We also sought comments from the parties as to the scope of the investigation if a remand were to be granted, as well as the amount of time the Board should take to conduct any further investigations.

On January 23, 2015, we filed a motion with the Vermont Supreme Court seeking a second remand of the case in light of the Second Cost Update, and the Court issued an order granting remand on February 9, 2015.

On March 2, 2015, we sought additional comments from the parties regarding the scope of the proceeding and proposed a schedule for the proceeding. In response, parties requested that

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[23] Section V of this Order, below, addresses our analysis and conclusions under Vermont Rule of Civil Procedure ("V.R.C.P.") 60(b).

[24] The Department filed its Rule 60(b) Motion on December 22, 2014. On December 23, 2014, Jane and Nathan Palmer (the "Palmers") filed a motion seeking relief from the December 23rd Order under Rule 60(b). On January 12, 2015, AARP and Kristin Lyons, who are represented by the same counsel, filed parallel motions for relief from the October 10th Order pursuant to Rule 60(b). The findings and conclusions of law contained herein apply equally to the motions to reopen the October 10th Order and the December 23rd Order.

the Board evaluate whether to reopen the December 23rd Order or the October 10th Order under V.R.C.P. 60(b)(1) (mistake, inadvertence, surprise), 60(b)(2) (newly discovered evidence), and 60(b)(3) (fraud, misrepresentation, or other misconduct).

On March 18, 2015, we held a status conference at the Board Hearing Room in Montpelier, Vermont.

On March 25, 2015, we issued the *Procedural Order Re: Second Remand,* which established the scope and schedule for the proceeding. We permitted parties to present evidence related to Rule 60(b)(1), (2), and (3), as well as new information related to any criteria that may be affected by the updated cost estimate. In addition, the Board provided an opportunity for parties to comment on the motion submitted by the Palmers to admit all records—both evidentiary and non-evidentiary—from Docket No. 8328 into the record in this proceeding. In addition, the Palmers' motion requested that the Board realign the schedule in this proceeding "to accommodate inclusion of evidence from Docket 8328."[25]

On April 8, 2015, the Board issued an order denying the motion filed by Nathan and Jane Palmer seeking admission of the record of Docket No. 8328 into the evidentiary record in this proceeding. We held that the Palmers' scheduling-realignment request was moot in light of our ruling denying the Palmers' motion and having already adjusted the schedule in this proceeding to reflect the timing of the technical hearing in Docket No. 8328.

On May 26, 2015, Nathan Palmer filed a Motion to Compel Discovery Answers from Vermont Gas. The Board issued an order on May 28, 2015 directing Vermont Gas to respond to the Palmer motion. On June 16, 2015, the Board denied the Palmers' motion to compel discovery.

On June 22 and 23, 2015, the Board conducted technical hearings to receive testimony, evidence, and argument from the parties on the question of whether to reopen the proceedings.

IV. Legal Standard

When determining whether to reopen a prior, final order, the appropriate standard of review for the Board's investigation is governed by V.R.C.P. 60(b),[26] which provides in pertinent part:

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[25] Palmer Motion at 3.

[26] October 10th Order at 6-7; *Petitions of Vt. Elec. Power Co., Inc.,* Docket No. 6860, Order of 9/23/05 at 18.

> On motion and upon such terms as are just, the court may relieve a party or a party's legal representative from a final judgment, order, or proceeding for the following reasons: (1) mistake, inadvertence, surprise, or excusable neglect; (2) newly discovered evidence which by due diligence could not have been discovered in time to move for a new trial under Rule 59(b); [or] (3) fraud (whether heretofore denominated intrinsic or extrinsic), misrepresentation, or other misconduct of an adverse party . . . .[27]

Importantly, Rule 60(b) is not "an open invitation to reconsider matters concluded at trial, but should be applied only in extraordinary circumstances."[28] The Board has discretion in making the threshold determination of whether to reopen a prior decision under Rule 60(b).[29] "In making this threshold determination, it is appropriate to consider the prejudice that would arise from setting aside the judgment."[30] Notably, "Rule 60(b) is not designed to afford parties simply a second, better opportunity to litigate issues already contested and decided in a previous proceeding."[31]

The "burden is on the party seeking relief under Rule 60(b) to present facts with sufficient particularity to warrant a hearing and potential relief."[32] The Board has broad discretion in establishing the specific procedures for deciding a Rule 60(b) motion, in part because "Rule 60(b) was 'designed to give the court the flexibility to see that the rule serves the ends of justice.'"[33]

After considering all of the evidence and positions of the parties, we conclude that there is an insufficient basis to reopen the proceedings under Rule 60(b)(1), 60(b)(2), or 60(b)(3).[34]

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[27] V.R.C.P. 60(b).

[28] October 10th Order at 7 (quoting *John A. Russell Corp. v. Bohlig*, 170 Vt. 12, 24, 739 A.2d 1212, 1222 (1999)).

[29] *Id.* (citing *Lyddy v. Lyddy,* 173 Vt. 493, 497, 787 A.2d 506, 513 (2001)).

[30] *Id.* (citing *Teamsters, Chauffers, Warehousemen, and Helpers Union Local No. 59 v. Superline Transport. Co.,* 53 F.2d 17, 20 (1st Cir. 1992)).

[31] *Pirdair v. Medical Ctr. Hosp. of Vt.*, 173 Vt. 411, 415, 800 A.2d 438, 442 (2002) (citing *Darken v. Mooney*, 144 Vt. 561, 566 , 481 A.2d 407, 411 (1984) ("Rule 60(b) does not operate to afford parties a chance to relitigate matters in which there was ample time to prepare.")).

[32] *Spencer v. Spencer,* 2014 VT 63, ¶ 20, 195 Vt. 543, 91 A.3d 364 (internal quotation marks omitted).

[33] *Goshy v. Morey*, 149 Vt. 93, 99, 539 A.2d 543, 547 (1987) (quoting Reporter's Notes to V.R.C.P. 60)); *see also In re Chittenden Solid Waste Dist.*, 2012 VT 10, ¶ 11, 191 Vt. 593, 44 A.3d 753.

[34] To the extent parties have raised procedural due process claims, they have failed to establish a constitutionally protected interest in this Section 248 proceeding sufficient for a due process claim. *See In re New Cingular Wireless PCS, LLC*, 2012 VT 46, ¶¶ 15-19, 192 Vt. 20, 54 A.3d 141 (denying procedural due process claims on the basis that intervening landowners lacked a constitutionally protected interest in telecommunications proceedings under Section 248a, relying on precedent from "a closely analogous statute, 30 V.S.A. § 248") (citing *Vt. Elec. Power Co. v. Bandel*, 135 Vt. 141, 145, 375 A.2d 975, 978 (1977)); *see also in re Great Waters of Am., Inc.*, 140 Vt. 105, 108, 435 A.2d 956, 958 (1981) ("Analysis of a claim of deprivation of property without due process of law commences

A. Rule 60(b)(1)

Rule 60(b)(1) permits the Board to relieve a party of a final judgment order for "mistake, inadvertence, surprise, or excusable neglect."[35] However, Rule 60(b)(1) "does not operate to protect a party from tactical decisions which in retrospect may seem ill advised."[36]

No party offered evidence of mistake, inadvertence, surprise, or excusable neglect, and we therefore find that there is insufficient ground to reopen the docket on this basis.[37]

B. Rule 60(b)(2)

Under Rule 60(b)(2), the Board may grant relief from a final order on the basis of newly discovered evidence, provided that the new evidence is "'of such a material and controlling nature as will probably change the outcome.'"[38] Rule 60(b)(2) "generally applies when the parties are unaware of evidence existing at the time of the judgment and, through no fault of their own, discover that evidence only after the judgment."[39] In summary, a party seeking relief under Rule 60(b)(2) must demonstrate that:

> (1) the newly discovered evidence was of facts that existed at the time of trial or other dispositive proceeding, (2) the movant must have been justifiably ignorant of them despite due diligence, (3) the evidence must be admissible and of such importance that it probably would have changed the outcome, and (4) the evidence must not be merely cumulative or impeaching.[40]

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with a determination of whether any right requiring constitutional protection in fact is involved."). Moreover, the Board has afforded the parties sufficient process in this matter as there has been three rounds of testimony, written discovery, depositions, and two full days of technical hearings during the roughly 6.5 month interval between VGS' notice of the Second Cost Update and filing of briefs in this case.

[35] V.R.C.P. 60(b)(1).

[36] *Sandgate Sch. Dist. v. Cate*, 2005 VT 88, ¶ 7, 178 Vt. 625, 883 A.2d 774 (internal quotation marks omitted).

[37] As we held in our October 10th Order, estimating pipeline project costs is not an exact science, and the estimated construction costs for pipeline projects typically do not match the corresponding actual construction costs. October 10th Order at Findings 21-22. Consequently, the submission of the Second Cost Update does not give rise to a mistake as that term is used under Rule 60(b)(1). As we previously held, the appropriate standard of review for revised cost estimates is the framework for newly discovered evidence under Rule 60(b)(2). *Id.* at 7. For these reasons, reliance on Rule 60(b)(1) in this remand proceeding is misplaced. Any argument by other parties, that when compared to the increased amount of the Second Cost Update, the cost estimate filed by VGS on July 2, 2014, was a mistake, is unpersuasive. The only witness qualified to testify and having deep experience with cost estimating, Mr. Roam, testified that the methodology used to support this earlier estimate was reasonable and commonly used. Tr. 6/22/15 at 85, 101, 103 (Roam); exh. Pet. RR-1.

[38] *See Petitions of Vt. Elec. Power Co., Inc.*, Docket No. 6860, Order of 9/23/05 at 21 (quoting *In re Petition of Ryegate Wood Energy Co.*, Docket No. 5217, Order of 11/30/90 at 4 (quoting Moore's Federal Practice § 60.23[4] (2d ed. 1990))).

[39] *Tobin v. Hershey*, 174 Vt. 634, 638, 820 A.2d 982, 986-87 (2002).

[40] *United States v. Teamsters*, 247 F.3d 370, 392 (2d Cir. 2001) (internal quotation marks omitted).

In the first remand proceeding, we held that "subsection (b)(2) provides the appropriate standard for our review because the catalyst for any decision to reopen the December 23rd Order would be newly discovered evidence — the revised cost estimate reported by VGS."[41] We noted then that "our decision to proceed under Rule 60(b)(2) is consistent with our precedent relating to the construction of the Northwest Reliability Project."[42] In the *Northwest Reliability Project*, we reviewed a revised cost estimate issued after granting a CPG for that project under Rule 60(b)(2), ultimately concluding that reopening the proceeding was not warranted because "*[w]hile the near doubling of projected costs for the [Project] may, at some visceral level, seem to call for reexamination of the Project, the cost increase in fact is not likely to change the outcome of our January 28, 2005 Order.*"[43]

As set forth in the Findings and discussion in Section V, below, we conclude that parties have not identified any new evidence of such a material and controlling nature so as to change our previous determination that the Project will promote the general good of Vermont pursuant to the Section 248 criteria.

C. Rule 60(b)(3)

Two prerequisites exist for securing relief under Rule 60(b)(3). First, the moving party must prove misconduct—such as fraud or misrepresentation—by clear and convincing evidence.[44] Second, the moving party must show that the misconduct foreclosed full and fair presentation of his or her case.[45]

Although the Palmers insinuate that VGS lied about its cost estimates for the Project, they failed to offer any evidence to suggest that Vermont Gas knowingly engaged in a falsehood.[46] Similarly, Mr. Gross and Ms. Peyser, also on behalf of the Palmers, alleged that VGS and the Department engaged in collusion or force to prevent NG Advantage and Energtek

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[41] October 10th Order at 7.
[42] *Id.* (citing *Petitions of Vt. Elec. Power Co., Inc.*, Docket No. 6860, Order of 9/23/05 at 21).
[43] *Petitions of Vt. Elec. Power Co., Inc.*, Docket No. 6860, Order of 9/23/05 at 22 (emphasis added); *see also* October 10th Order at 7 n.13.
[44] *Gavala v. Claassen*, 2003 VT 16, ¶ 5, 175 Vt. 487, 819 A.2d 760 (citing *Bardill Land & Lumber, Inc. v. Davis*, 135 Vt. 81, 82, 370 A.2d 212, 213 (1977)); *see also Fleming v. N.Y. Univ.*, 865 F.2d 478 , 484 (2d Cir. 1989) ("[A] Rule 60(b)(3) motion cannot be granted absent clear and convincing evidence of material misrepresentations and cannot serve as an attempt to relitigate the merits.").
[45] *See, e.g., Hutchins v. Zoll Med. Corp.*, 492 F.3d 1377, 1386 (Fed. Cir. 2007); *Karak v. Bursaw Oil Corp.*, 288 F.3d 15, 20 (1st Cir. 2002); *Frederick v. Kirby Tankships, Inc.*, 205 F.3d 1277, 1287 (11th Cir. 2000).
[46] Tr. 6/23/15 at 318-19 (Palmer).

from offering CNG service to the residential market. Again, examined, both witnesses conceded they had absolutely no proof of this extreme and unsupported claim.[47]

Accordingly, we find that there is no basis to justify reopening the final order in this docket based upon V.R.C.P. 60(b)(3). We now turn to examining the record evidence under V.R.C.P. 60(b)(2).

V. Findings

A. The Second Cost Estimate Update

1. Background

1. The Project, as approved in December 2013, included estimated Project costs of $86.6 million. December 23rd Order at 80.

2. The Company's original cost estimate was based on "quotes from equipment vendors, discussions with contractors familiar with the work, and historical costs from similar projects," which represents a reasonable methodology, commonly used, when a project is being engineered, screened and routed. Roam 3/27/15 supp. pf. at 8 (quoting Heintz 2/28/2013 supp. pf. at 42); tr. 6/22/15 at 101, 103 (Roam).

3. In mid-February, 2014, Vermont Gas retained PricewaterhouseCoopers ("PwC") to baseline the updated cost estimate for the Project, which had been presented to VGS in January, 2014, by its then-Project manager, Clough Harbor & Associates ("CHA"). Roam 3/27/15 supp. pf. at 1-2; tr. 6/22/15 at 89-90 (Roam); see exh. AARP Cross 48 at 1-2.

4. The baseline estimate was the starting point for measuring the evolution of Project costs and established a framework for the CHA estimate by providing discrete and unique tasks to which costs were assigned. Roam 3/27/15 supp. pf. at 20; tr. 6/22/15 at 105 (Roam).

5. When PwC began its work to baseline the cost estimate in February, 2014, it reviewed the most recent cost estimates presented by VGS and developed a Work Breakdown Structure (or "WBS") to integrate the schedule and budget-development process. Roam 3/27/15 supp. pf. at 20.

6. The WBS was used to structure a consistent and mutually exclusive set of activities that captures the scope of work to be performed. These activities were sequenced to create a Critical Path Method (or "CPM") schedule. Roam 3/27/15 supp. pf. at 21.

[47] Tr. 6/23/15 at 282-284 (Peyser); tr. 6/23/15 at 301-02 (Gross).

7. The purpose of the CPM schedule was to help Vermont Gas monitor and control costs through progress updates during the Project's life. Roam 3/27/15 supp. pf. at 21; tr. 6/22/15 at 90 (Roam).

8. Vermont Gas accordingly used the baseline budget developed by PwC to monitor and control Project costs beginning after permits were obtained in June 2014 and construction began in July. Tr. 6/22/15 at 85, 89, 105 (Roam), tr. 6/23/15 at 16 (Simollardes).

9. The baselined estimate resulted in a $35 million increase in the estimated capital costs of the Project to $121.6 million ("the First Cost Update"). Simollardes 1/15/15 pf. at 2; tr. 6/23/15 at 15 (Simollardes).

10. In light of the First Cost Update, the Board held hearings in September, 2014, to determine whether the CPG should be reopened. Simollardes 1/15/15 pf. at 2.

11. In September 2014, Vermont Gas observed cost-performance trends of concern for one component of the Project, mainline construction, which informed the Company's decision to re-estimate the Project's cost from the ground up. Tr. 6/22/15 at 74 (Rendall); tr. 6/22/15 at 89-90, 105-06, 114 (Roam), tr. 6/23/15 at 16 (Simollardes).

12. During the first remand proceeding and in accordance with this, Company decision to re-estimate Project costs, Vermont Gas committed to develop future estimates of Project costs using a detailed, bottoms-up review applying industry-recognized standards such as those established by the Association for the Advancement of Cost Engineering ("AACE"), and the Company also committed to provide the Board and the Department with quarterly Project cost updates. Sinclair 1/15/15 pf. at 2; Simollardes 1/15/15 supp. pf. at 2; Rendall 3/27/15 supp. pf. at 6; tr. 6/22/15 at 74 (Rendall).

13. Vermont Gas filed the first quarterly update after the first remand proceeding on October 7, 2014 presenting the same overall cost estimate of $121.6 million, though reflecting adjustments and a reduction or draw-down of the contingency initially budgeted. Roam 5/27/25 reb. pf. at 3; see exh. CLF Cross 6.

14. Vermont Gas began working on the Second Cost Update in October 2014 and completed the work in December 2014. Roam 3/27/15 supp. pf. at 3; tr. 6/22/15 at 105, 114 (Rendall).

15. The Second Cost Update was a comprehensive reassessment of likely costs and contingences as certain Project costs became clearer: As the Project had begun construction,

some costs went from projection to reality, and there were scope and schedule changes and some increases in construction. Rendall 3/27/15 pf. at 6-7.

16. The Second Cost Update required some adjustments to the estimated cost of each of the Project activities. Adjustments to the estimated costs of construction, project management, VGS overhead, and right-of-way accounted for the majority of the budget adjustments as compared to the costs estimated in the First Cost Update. Roam 1/15/15 pf. at 7; exh. Pet. RR-2 (Corrected 1/21/15).

17. The estimated construction costs were also modified to reflect the cost of construction completed to date and costs for winter construction anticipated under the then-planned Project schedule. Roam 1/15/15 pf. at 7.

18. After completing its comprehensive analysis, Vermont Gas filed the Second Cost Update on December 19, 2014, which reflects an overall Project cost estimate of $153.6 million, or approximately $154 million. Simollardes 1/15/15 supp. pf. at 3.

19. This estimate is comprised of forecasted costs of $138 million and a contingency of $16 million. Roam 1/15/15 pf. at 2.

20. This estimate is not just a number: It provides a process to understand what every cost element is, align the cost against the current scope of work, and understand in detail what risks could affect the Project at completion, so that moving forward Vermont Gas would have a road map to manage those Project tasks most critical to cost outcomes. Tr. 6/22/15 at 107 (Roam).

21. This estimate is reliable for several reasons:

- it was conducted in accordance with industry methodology that has been tried and tested;
- the experts retained to conduct the cost estimate analysis have deep experience and knowledge, including experience in Vermont, working on the Northwest Reliability Project, the Southern Loop, and Kingdom Wind, and a track record for delivering outcomes that were on time and on budget; and
- the estimate included a Quantitative Risk Analysis that analyzed risk and uncertainty in ways that the Company had not previously done. Rendall

3/27/15 pf. at 7; tr. 6/22/15 at 60-61 (Rendall); tr. 6/22/15 at 108-09 (Roam).

22. The increased cost estimate for the Project in no way affects the Company's willingness or ability to honor its CPG and Memoranda of Understanding ("MOU") commitments: Vermont Gas stands by all of its commitments under the CPG and MOUs. Rendall 3/27/15 pf. at 8.

23. Vermont Gas has already undertaken a variety of commitments under the MOUs executed in this docket. Rendall 3/27/15 pf. at 8.

2. AACE Methodology

24. The Second Cost Update was developed applying the industry recognized standards developed by AACE . Roam 1/15/15 pf. at 2.

25. Numerous companies and government agencies throughout the world, including the U.S. Department of Energy ("DOE") and ISO-New England, Inc., use the AACE method for estimating utility capital-project costs. Roam 1/15/15 pf. at 2-3.

26. The AACE process is comprised of four main steps: (1) developing a base estimate, (2) determining estimate maturity, (3) establishing a contingency, and (4) comparing the results against industry standards. Tr. 6/22/15 at 94-95 (Roam).

27. Vermont Gas began the process of updating the Project's cost estimate by re-developing the Project's new base estimate, which is an estimate without contingency, that is an allowance for certain known and unknown risk factors. Roam 3/27/15 supp. pf. at 3; tr. 6/22/15 at 86 (Roam).

28. The Project's base estimate was re-developed using common estimating practices for similar projects and accepted industry standards. Roam 3/27/15 supp. pf. at 3.

29. The base estimate was reconstructed by analyzing the Project scope and cost information through a process that included collecting Project documentation, including prior budget information, bid packages, vendor quotes, and contracts; conducting interviews with Project team members to understand the development of and justification for prior budget iterations and inputs; soliciting and evaluating additional quotes from vendors; analyzing Project cost information, including reviewing historic cost data, change orders, invoices, and claims submitted, approved, rejected, pending, and in dispute, as well as quotes received and contracts signed and under negotiation; working with other members of the Project team to model a base

project schedule; and collaborating with other Project team members and vendors to review Project-development data, assess the scope of work remaining, and calculate forecasted costs to complete using historic-cost trends and expected value analysis. Roam 3/27/15 supp. pf. at 4.

30. Schedule assumptions are an important component of the re-developed base estimate as they have a direct bearing on costs associated with contractor support, overheads, and materials, among others. Roam 3/27/15 supp. pf. at 5.

31. The original estimate filed in December of 2012 contemplated that VGS would complete Project construction in December of 2014. The Second Cost Update formulated a Project delivery timeline based on more current data, which resulted in a March 2016 completion date. Roam 3/27/15 supp. pf. at 5.

32. As a result of delays in right-of-way acquisitions and additional regulatory proceedings, VGS now expects to complete construction in the Fall of 2016. VGS has analyzed the potential cost impacts of this schedule adjustment and concluded that it does not change the $154-million cost estimate. Roam 3/27/15 supp. pf. at 6.

33. A significant Project-scope change or a significant delay in the construction schedule would affect the current cost estimate for the Project. Roam 1/15/15 pf. at 8; Sinclair 3/27/15 supp. pf. at 4.

34. Despite the rigor required to develop a mature base estimate, uncertainties and risks inherent in large-scale capital projects are likely to remain throughout the estimating lifecycle to a degree. Roam 3/27/15 supp. pf. at 6.

35. Vermont Gas addressed these uncertainties and risks by engaging in a process to determine estimating allowances and the quantitative models used to establish risk-based contingencies. Roam 3/27/15 supp. pf. at 6.

36. Contingencies are included in project estimates because experience has shown that such costs are historically likely and expected to be incurred, even though they cannot be explicitly determined at the time the estimate is prepared. Roam 1/15/15 pf. at 3; Roam 3/27/15 supp. pf. at 10.

37. Project contingencies are based on the concurrent level of project definition or maturity and under the AACE methodology are an essential element of an estimate because the contingency is expected to be spent over the course of the project. Roam 1/15/15 pf. at 3, 6.

38. As a project progresses and the scope becomes more defined, the set of deliverables becomes more definitive and complete, therefore reducing the uncertainty of the estimate. Roam 1/15/15 pf. at 5; Roam 3/27/15 supp. pf. at 7-8.

39. While the estimating process previously described had produced an updated base estimate, some portions of Project scope continue to be defined. As a result, it was necessary to account for scope uncertainty and risk when setting contingency for the Second Cost Update. Roam 3/27/15 supp. pf. at 10.

40. Applying the AACE classification system, PwC categorized the Second Cost Update as a mature "Class 3" estimate—now "more" mature and very close to a Class 2 estimate—having a relatively moderate to high degree of definition and completion for the majority of deliverables. Roam 1/15/15 pf. at 7; Roam 3/27/15 supp. pf. at 9-10; tr. 6/22/15 at 92, 95 (Roam).

3. Quantitative Risk Assessment ("QRA")

41. To establish a reasonable forecast of the ultimate Project costs, it was also important to consider the "Estimate Accuracy Range." Roam 1/15/15 pf. at 5; Roam 3/27/15 supp. pf. at 10.

42. Estimate accuracy range is an indication of the degree to which the final cost outcome of a project will likely vary from the estimated cost and is expressed as a +/- percentage range around the estimate after application of contingency. Roam 1/15/15 pf. at 5-6; Roam 3/27/15 supp. pf. at 10.

43. The AACE estimate classification matrix provides guidance on the appropriate accuracy range of an estimate at a given estimate classification. Roam 1/15/15 pf. at 5; Roam 3/27/15 supp. pf. at 10.

44. In particular, the accuracy range suggested by AACE for a Class 3 estimate is -20 to +30 and -15 to +20 for a Class 2. These ranges, which overlap between the two classes, provide expectations for the final cost outcomes and illustrate the varying degree of project definition between classes and the overlap that can occur between those classes. Roam 3/27/15 supp. pf. at 10-11.

45. Accuracy ranges are relied upon absent additional analysis. Here, however, PwC performed a QRA in lieu of relying upon the accuracy range to assess the uncertainty risk associated with the cost estimate. Based on the QRA, the updated cost estimate for the Project

has a contingency allowance of approximately 11%. Roam 3/27/15 supp. pf. at 13, 20; tr. 6/22/15 at 93-95 (Roam).

46. A QRA is a stochastic modeling approach that uses statistical probability and simulation to help entities evaluate contingency levels during project development. Roam 3/27/15 supp. pf. at 13.

47. Qualitative modeling tools and techniques have been described and supported by a variety of professional associations, including the American National Standards Institute, Project Management Institute, and AACE. They are also widely used within public and private sectors and are a requirement of various U.S. federal agencies. In addition, QRA is becoming increasingly more common in estimating processes for large utility capital projects and programs. Roam 3/27/15 supp. pf. at 13.

48. The Project team applied the QRA methodology on the Project by analyzing risk in two ways: (1) quantifying risk-based contingency to account for unanticipated events and (2) assessing uncertainties found in an analysis of each of the line items in the base estimate. Roam 3/27/15 supp. pf. at 13.

49. To closely analyze the Project's potential risk events, Vermont Gas conducted workshops with Project team members, outside vendors, and consultants and analyzed the Project governance and controls environment. Roam 3/27/15 supp. pf. at 14.

50. The Company then quantified and rated risks based on impact and likelihood and distributed costs according to probabilistic scenarios. Risk ratings were assigned based on the potential cost impact and probability of occurrence of the discrete risk events. Roam 3/27/15 supp. pf. at 14.

51. For instance, "Encountering Rock" received a risk rating of 25 based on the high probability of encountering rock during Project construction, the additional resources required for blasting, and the risk of contract extension. Roam 3/27/15 supp. pf. at 14.

52. A key aspect of the QRA model is the use of "Monte Carlo" simulation techniques that account for both risk and uncertainty values that are sampled from a probability distribution corresponding to the impact ranges. Roam 3/27/15 supp. pf. at 15-16.

53. Vermont Gas used this method to perform a simulation that used 1,000 iterations, the purpose of which was to provide the likelihood and confidence level of potential, final cost outcomes. Roam 3/27/15 supp. pf. at 16.

54. The simulation reported a range of estimates for the final Project costs, from $146 to $156 million, which the Project team then used to determine the "P90" for the Project. Roam 3/27/15 supp. pf. at 16; tr. 6/22/15 at 96 (Roam).

55. The P90 denotes the risk-adjusted estimate value under which 90% of the results will come; that is, a 90% likelihood exists that the defined Project scope will be completed at or under the P90 value, which in this case is $153.6 million. Roam 3/27/15 supp. pf. at 16.

56. Vermont Gas tested the reasonableness of the contingency by comparing the QRA results to the contingency guidelines contained in tables established by a number of public and private sector entities, including the DOE, the Electric Power Research Institute, and AACE. Roam 3/27/15 supp. pf. at 19.

57. The results of the cost-estimate methodology established a contingency that falls within the AACE guidance for a Class 3 estimate as well as a high degree of confidence that the defined Project scope can be completed for $154 million. Roam 1/15/15 pf. at 8.

58. The QRA was the final step of this Project cost-estimating work, and the final number is not established until the QRA is done, contingency is established, and "you understand what the final cost is," which occurred in December. Tr. 6/22/15 at 114 (Roam).

59. While the cost estimate remains static, the forecast will be adjusted over the Project's life, and the estimate was first adjusted at the time of the Company's quarterly forecast in April 2015. Tr. 6/22/15 at 99 (Roam).

60. It is a normal, recurring, and, for projects of this scale, very common part of the budget-management process to make forecast adjustments to the cost estimate at the line-item (*i.e.,* activity) level. Roam 5/27/15 reb. pf. at 2; tr. 6/22/15 at 98-99 (Roam).

61. While there could be bumps in the road, Vermont Gas is very close to completing the mainline-construction contract to finish the Project and is very confident that the contract pricing will come in consistent with the current cost estimate. Tr. 6/22/15 at 61 (Rendall).

62. With much of the engineering and permitting work completed and material procured, and with right-of-way more than 90% acquired, the Project is well scoped, has used, if any, a relatively small amount of the Second Cost Update's contingency, and is on track inside of the $154-million, Second Cost Update. Tr. 6/22/15 at 54, 60-61 (Rendall).

Discussion

As evidenced by the testimony presented in this proceeding and our Findings, to develop the Second Cost Update Vermont Gas conducted a comprehensive review of estimated Project costs, employing industry-standard, cost-estimating methodology that was applied by experts who have an excellent track record in estimating and managing to budget Vermont utility projects. During hearings on this update, the Company testified that VGS is very confident that its mainline-construction contract will have pricing consistent with its current estimate and that overall the Company has used, at most, a small amount of this estimate's contingency. With engineering and permitting essentially complete, most materials procured and over 90% of right-of-way acquired, Project costs are on track "inside of" the Second Cost Update's $154-million estimate.

Mr. Roam testified, moreover, that the Second Cost Update has a P90 confidence level, that is and assuming no significant scope changes or schedule delays, a 90% likelihood exists that the defined Project scope will be completed at or under this updated estimate. Having analyzed and modeled the Project's known risks and probabilities to establish contingency, the results of the estimate establish a high level of confidence that the Project's defined scope can be completed for $154 million.

Through the testimony of Ms. Peyser, the Palmers contend that a comparison of Vermont Gas' cost estimates reported to the Board in 2014 and 2015 raise issues about the Second Cost Update's accuracy. Previous cost estimates filed by the Company in 2014 were based on an earlier Project budget, structured and presented differently from the update at issue in this docket, and should not be compared to the Second Cost Update that, as noted previously, is the result of a comprehensive, industry-standard re-estimate of Project costs developed between October and December of 2014.

Forecast adjustments, moreover, including variances in line items such as those filed by VGS last April, are a routine part of managing project costs, and these variances resulted from the Company's active management of Project costs and the enhanced controls put in place to manage these costs. While the cost estimate that formed the basis of the Second Cost Update is static, forecasted updates will be made over the remaining life of the Project, reflecting progress towards completion relative to the current Project budget that resulted from the Second Cost Update.

While we will continue to monitor closely Vermont Gas' quarterly cost reports, we conclude that the Second Cost Update forms a reliable basis for our evaluation of whether to reopen this docket in light of the increased costs of the Project presented in this update.

B. Present Need & Demand [30 V.S.A. § 248(b)(2)]

1. The Demand for Natural Gas

63. The "need" for the Project is the demand for natural gas in Addison County. October 10th Order at 15; Findings 64 – 122, below.

64. Despite the increased cost of the Project and changes in the cost of fuels, there will likely be a continued market need for the Project. Hopkins pf. at 2-3; Findings 65 through 119, below.

65. We take administrative notice of the fact that the Addison County Regional Planning Commission ("ACRPC") recently re-affirmed its support for the Project by a vote of 23 to 9 in favor of the Project. ACRPC letter to Susan Hudson, dated July 6, 2015.

66. In Vermont, about 64% of homes heat with oil or propane; only 15% are heated with natural gas. By comparison, nationally, only 12% of homes use oil or propane while about 50% of homes use natural gas for heating. December 23rd Order at 66.

67. Given its limited availability in Vermont, natural gas is currently underutilized as a heating source in the state. December 23rd Order at 66.

68. While competing fuels are expected to be less expensive than they were during the September 2013 hearings, Vermont Gas based its market projections on a relatively conservative pace of conversion, which the revised market conditions may warrant. Consequently, the price differential and conversion to natural gas should be cost-effective. Hopkins pf. at 3.

69. Natural gas remains less expensive on a per-BTU basis than oil, propane, and typical air-source cold climate heat pumps. Exh. DPS ASH-A; Hopkins pf. at 3-4; exh. Pet. Cross 6/22/15 AARP-3 at 50.

70. Christopher Neme, an expert offering testimony on behalf of Ms. Lyons and Principal of Energy Futures Group, performed a comparative assessment of the impacts of fuel-switching residential oil or propane space heating in Vermont to either gas heating or electric heating using cold climate ductless heat pumps. He used a 30 year analysis period for a fuel

switch taking place in 2017, using a 3% real (i.e. after adjusting for inflation) discount rate (same as VGS in its analyses). Exh. Lyons Neme Attach. B at 1.

71. His results showed that a partial fuel switch to a cold climate ductless heat pump could yield residential customers with net present value benefits of roughly $10,000 for Vermonters currently using oil to heat their homes and approaching $20,000 for Vermonters currently using propane to heat their homes. A full fuel switch to gas is even more attractive, with about 30% greater economic benefits over heating with oil. Exh. Lyons Neme Attach. B at 5.[48]

72. Even assuming potentially high conversion costs of greater than $18,000, the 30-year net present value of the decision to switch to natural gas would still be a break-even choice. Hopkins reb. pf. at 4.

73. The customer economics of switching from propane are even more attractive, and the spread from heat pumps even larger, so Mr. Neme's analysis indicates that market demand for natural gas from current propane customers should be robust. Hopkins reb. pf. at 4.

74. Adoption of natural gas likely makes financial sense to a wide range of potential customers. Hopkins reb. pf. at 7.

2. The Project Will Provide Addison County Residents Access to VGS' Energy Efficiency Programs

75. While energy efficiency cannot replace the need for the Project, the Project will give businesses and residents in Addison County access to VGS' energy efficiency programs, creating further opportunities for customer energy savings, GHG emissions reductions, and furthering important state energy policies. Findings 76 through 98, below.

76. VGS has been offering energy efficiency programs to its customers since 1993. VGS currently has energy efficiency programs in the following categories: Residential (including retrofit, low-income retrofit, equipment replacement, and new homes), and Commercial and Industrial (including business retrofit, business equipment replacement, and business new construction). Docket No. 7676, Order of 7/16/13 at 7.

[48] Mr. Neme's rebuttal testimony incorporated changes to the Department's analysis to indicate that heat pumps cost less per unit of heat provided than conversion to natural gas, but that analysis is dependent on assumptions regarding system efficiency and distribution losses that will vary depending on a particular customer's usage. In particular, cost effectiveness of heat pumps is dependent on owner operation and whether conditions, among other factors, and the dynamics of actually operating a heat pump for optimal economic performance are complicated. Tr. 6/23/15 at 110-11 (Hopkins).

77. From 1993 through 2011, VGS' energy efficiency programs have avoided over 7,000 million cubic feet ("Mcf") on peak day. Docket No. 7676, Order of 7/16/13 at 8.

78. VGS' residential equipment replacement program has provided financial incentives for 17,493 installations of high-efficiency equipment, resulting in annualized savings of 148,640 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

79. VGS' residential retrofit program has involved audits of 5,165 homes and the installation of energy efficient measures in 2,518 of these homes, resulting in cumulative savings from these installations of 117,440 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

80. For the 2008, 2009, and 2010 program years, VGS achieved an energy savings realization rate of 0.89 in its market-rate residential retrofit program, a savings realization rate that was substantially higher than those found in the impact evaluations of programs from Massachusetts, Wisconsin, and New York. Docket No. 7676, Order of 7/16/13 at 8.

81. VGS' new homes program has provided energy efficiency incentives for 2,995 homes resulting in estimated annualized savings of 119,010 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

82. VGS' low-income retrofit program has involved 612 projects in 1,483 units, resulting in cumulative savings of 24,000 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

83. VGS' energy efficiency programs have furthered the state's building efficiency goals. From 2008 to 2011, 750 homes participated in the residential retrofit program, 6,634 customers installed high-efficiency heating equipment through the residential equipment-replacement program, and VGS has provided incentives to weatherize 160 low-income projects, representing 255 living units. Docket No. 7676, Order of 7/16/13 at 10.

84. VGS' business retrofit program has performed 720 walk-through audits and provided energy efficiency incentives to 255 customers, resulting in annualized savings of 290,870 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

85. VGS' business equipment replacement program has provided energy efficiency incentives to 564 participants resulting in annualized savings of 185,521 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

86. VGS' business new construction program has performed building analysis for 551 customers and installation of energy efficient measures for 347 customers, resulting in annualized savings of 195,232 Mcf. Docket No. 7676, Order of 7/16/13 at 8.

87. Energy efficiency is the cleanest and lowest cost means to reduce greenhouse gas emissions. December 23rd Order at 136 (citing Stanton pf. reb. at 13).

88. The Company's energy efficiency programs have helped further the state's goal of reducing greenhouse gas emissions. Act 168, enacted in 2006, set specific greenhouse gas reduction goals. From fiscal year 2007 to 2011, VGS' energy efficiency programs have saved 386,181 Mcf, which reduced greenhouse gas emissions by 22,717 tons of carbon dioxide. Docket No. 7676, Order of 7/16/13 at 10.

89. Reduction in Mcf consumption translates to lower energy bills to customers as well as lower GHGs. According to the recent Thermal Efficiency Task Force ("TETF") report to the Vermont General Assembly, in 2013, VGS customers saved $12 million and avoided over 62,000 tons of GHG emissions. Exh. CLF-EAS-10 (TETF) at 23.

90. Since 1993, VGS energy efficiency programs have saved customers in Chittenden and Franklin counties over 1 billion cubic feet of natural gas. Exh. CLF-EAS-10 at 23.

91. Looking to last year alone, customers participating in the Company's efficiency programs saved more than $14 million. Simollardes 5/27/15 reb. pf. at 13-14.

92. Because VGS offers a suite of energy efficiency programs across all customer classes, its program offerings are more comprehensive than most. Docket No. 7676, Order of 7/16/13 at 21.[49]

93. In the years 2007 through 2010, VGS energy efficiency programs achieved greater savings per residential participant than did the average of other utilities that reported savings in the American Gas Association Efficiency Programs Reports. Docket No. 7676, Order of 7/16/13 at 21.

94. The quality and effectiveness of the VGS programs has been recognized by the EPA and American Council of Energy Efficient Economy. Exh. CLF-EAS-10 at 23.

95. This Project provides a double greenhouse gas benefit by (1) switching to the lower emitting natural gas from propane and fuel oil, and (2) increasing the availability of energy efficiency programs to a new customer base. December 23rd Order at 4.

[49] In our December 23rd Order we required VGS to develop an aggressive energy efficiency program for new customers in Addison County. Plans will be implemented as part of our review and approval of VGS programs in Docket No. 7676. Tr. 6/23/15 at 28-29 (Simollardes).

96. VGS' energy efficiency programs have furthered the goals articulated in the 2011 Comprehensive Energy Plan, specifically the goal of making efficiency and conservation a first priority. Docket No. 7676, Order of 7/16/13 at 10.

97. These important conservation and environmental benefits are unchanged by the revised Project cost estimate. Sinclair 1/15/15 pf. at 3-4.

98. In addition, natural gas burns more cleanly and efficiently than other fossil fuels, resulting in lower quantities of the fuel to produce an equivalent amount of energy needed for heating, cooking, drying, etc., than is the case with other fossil fuels. December 23rd Order at 65; exh. Pet. Cross AARP-3 at 50.

3. CNG is Not an Alternative to the Project

99. In the original proceedings in this docket, Agrimark noted that it would consider using CNG "if the Project is delayed, but would chose natural gas service from VGS over CNG." December 23rd Order at 71 (citing tr. 9/17/13 at 16 (Pcolar)).

100. Since then, the evidence in this proceeding was that Agrimark and several other large Addison County businesses have installed CNG facilities. This does not change our determination. Pipeline gas remains less expensive than delivered CNG, by about 75%, so the market would choose pipeline gas if available. Hopkins pf. at 3; tr. 6/22/15 at 58 (Rendall).

101. The Palmers' claim that CNG offers a lower cost per delivered MMBtu than pipeline natural gas lacks a credible evidentiary basis as their witness on this point, Mr. Gross, conceded that his CNG projection is based on a set of assumptions rather than data that is current. Tr. 6/23/15 at 298-99 (Gross).

102. The incentive for those customers to switch to pipeline natural gas from CNG are two-fold: cost and reliability. The principal incentive would be economics. Tr. 6/22/15 at 58 (Rendall).

103. CNG is delivered by truck and is itself an interruptible commodity that the provider cannot provide at all times. Consequently, there are two levels of potential interruption for a customer. One is the availability of gas to the provider. The other is the logistics of actually transporting the gas by truck, which can be interrupted for a variety of reasons, such as a storm. Tr. 6/22/15 at 59 (Rendall).

104. Moreover, delivered CNG is not an alternative because it is not available to serve residential and small commercial customers. CNG is only available to interruptible customers,

which are large business customers, and is not available to customers who do not have an alternate heating source that they can switch on and off when the compressed natural gas is not available.[50] Hopkins pf. at 3; Tr. 6/22/15 at 57 (Rendall).

4. Air Source Heat Pumps Are Not an Alternative to the Project

105. Like CNG, air source heat pumps do not serve as an alternative to the Project. First, they cannot meet the thermal needs of industrial customers or most commercial customers, thus failing to address the demand of a large percentage of the Addison County load. See tr. 9/26/14 at 222-23 (Neme); Hopkins pf. at 4.

106. Second, even for residential customers, they cannot meet all of the heating requirements of a building (due to the inability to run below a product-specific outdoor temperature). They would not be expected to meet more than 80% of the residential heating needs. Hopkins pf. at 4; exh. Lyons Neme Attach. B at 4.

107. Moreover, the Northeast Energy Efficiency Partnership ("NEEP") in November, 2014, has recently reported that performance of cold air source heat pumps degrades as temperatures drop, so that at some of the lowest operating temperatures models produced only about 60% of their rated output levels. Exh. Pet. Cross Lyons-1 at 7.

108. Mr. Neme's analysis reported that customers that undertake a full conversion from oil/propane to natural gas will realize a 30% reduction in energy bills as compared to a partial switch to heat pumps. Exh. Lyons Neme Attach. B at 5.

109. We note that for his comparative analysis, Mr. Neme used a Coefficient of Performance ("COP") of 2.7 rather than the 2.4 used by the Vermont Fuel Price Report. This 2.7 value was an average Mr. Neme derived from the NEEP report, it was not an average value that NEEP provided or recommended for analytical purposes. Moreover, the reported COPs varied significantly with temperature and "all studies that attempted to field test for COP reported difficulty in obtaining accurate results." Exh. Pet. Cross Lyons-1 at 8.

110. According to the Department's April 2015 Vermont Fuel Price Report (Exhibit DPS ASH-A), natural gas remains less expensive on a per-BTU basis than typical air-source cold climate heat pumps. Hopkins pf. at 3-4; exh. Lyons Neme Attach. B at 4.

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[50] The significance of the distinction between interruptible and firm customers is that firm customers are entitled to take natural gas service 365 days per year, while interruptible customers must curtail service upon two hours' notice. Tr. 6/23/15 at 37-38 (Simollardes).

111. Significantly, the penetration rates projected for Vermont are very low; both VEIC and DPS estimate that air source heat pumps are not expected to reach even 25% of the residential market until 2034. Exh. DPS ASH-C, Table 4 (citing VEIC and DPS penetration estimates).

112. We note that Mr. Neme also prepared a scenario termed the "societal economics" analysis where he assigned each home a proportional share of the Project's overall costs (which he calculates as $27,000 per home), as well as a cost per home for connecting to the natural gas system ($1,600). Exh. Lyons Neme Sched. B at 6.

113. We do not agree with this unconventional approach nor do we believe it captures "societal economics." Project costs will be recovered in rates over the life of the Project. Simollardes 5/27/15 reb. pf. at 10.

114. Further, in setting rates, we allocate the cost of electric and gas service generally, not based on the actual costs of lines to serve customers. December 23rd Order at 143.

115. We also note that while several parties characterized air source heat pumps as "renewable," this claim could be made only if the source of the electricity were renewable. No such evidence was provided. In fact, Mr. Neme's emissions analysis reports that on a tons per MMBtu basis, electricity used to power heat pumps are higher than for any alternative fuel source, including natural gas. Tr. 6/23/15 at 146-47 (Neme); exh. Lyons Neme Attach. B at 7.

116. The ISO-New England electric-generation supply is predominantly fossil fuel-based, with natural gas generation supplying most of the electric energy supply, both generally and as the marginal source of supply. Between 1999 and 2012, 87% of the new generating capacity added to the New England system was natural gas-fired generation. Exh. Pet. Cross Neme-9 at 16, 17-18 (First Remand).

5. <u>There is Adequate Upstream Capacity to Meet the Project Need</u>

117. Vermont Gas has secured adequate capacity from TransCanada to serve firm and interruptible markets. St. Hilaire 5/27/15 reb. pf. at 3.

118. In December 2014, the Canadian National Energy Board ("NEB") issued an order that fixed the TransCanada Pipelines Limited ("TCPL") tolls for 2015-2017; these tolls are currently reflected in VGS' firm tariff and its February 2015 purchase gas adjustment ("PGA") filing reflected the TCPL tolls that resulted from the NEB order. St. Hilaire 5/27/15 reb. pf. at 2; exh. Pet. Reb. 5/27/15 JSH-2.

119. The NEB Order also set guidelines for a toll updated in both 2017 and from 2018-2020, and instituted changes in the tariff to stabilize toll volatility by instituting 15 year contract terms, prudency review for rolled in tolls, and provided TCPL discretion to set market based rates for interruptible services. St. Hilaire 5/27/15 reb. pf. at 2.

120. To reduce the impact of TCPL tolls, VGS initiated a shift from purchasing supply from Western Canada at the Empress receipt point to the Dawn/Parkway markets in Ontario. St. Hilaire 5/27/15 reb. pf. at 3.

121. The shift in purchasing points, which began in November 2007 and continues to evolve, will reduce the delivered cost of gas to Vermont. St. Hilaire 5/27/15 reb. pf. at 3.

122. As a result, TCPL tolls as a percentage of overall supply costs will drop from approximately 40% today to approximately 28% by November 2016 based on current market pricing. These savings will be passed onto customers through the quarterly PGA filings. St. Hilaire 5/27/15 reb. pf. at 3.

Discussion

The "need" for the Project is the demand for natural gas in Addison County. As we previously concluded, "[t]he estimated cost of the Project was not a direct consideration in the Board's discussion of need in the December 23rd Order. Rather, the estimated cost informed questions such as the demand for natural gas service."[51] The "need" for the Project continues to be the demand for natural gas or the demand for fuel choice.

Natural gas is not currently available in Addison County. Instead, consumers in Addison County must rely upon other fuels, primarily fuel oil and propane, for heating. Businesses also must rely upon these fuels for their needs. Fuel choice and the introduction of natural gas into the Addison county market will enable these customers to manage risks and costs associated with more expensive fuels and fuels that are subject to great price volatility.

Further, while it is not reasonable to hold out efficiency services or another demand-side measure as an alternative to the Project, a significant benefit associated with this Project is that, by extending the Company's service territory into the Addison County market, the Project will bring with it the Company's obligation to provide energy efficiency services to Addison County customers. As demonstrated by our Findings above, since 1993, VGS energy efficiency

[51] October 10th Order at 14.

programs have saved customers in Chittenden and Franklin counties over 1 billion cubic feet of natural gas, saving customers millions each year, playing a significant role in furthering the state's goal of reducing GHG emissions. The Project will allow VGS to expand these important opportunities into Addison County.

Several parties suggest that the "need" met by the Project could be addressed through CNG or heat pumps. We disagree.

With respect to CNG, as demonstrated by the Department, trucked CNG remains more expensive than gas delivered through pipeline. Therefore, CNG does not represent the least cost alternative and the market would chose pipeline gas over CNG if available. More importantly, CNG would be limited to large industrial and commercial customers, passing up residential customers, farms and small commercial customers, the vast majority of the 3,000 expected customers in Addison County. Therefore a CNG alternative could not meet the overall need that the Project will meet. Moreover, CNG does not provide affordable, stably priced and reliable service or the opportunity to expand natural gas service to Rutland.

As we acknowledged in the first remand proceeding, new information regarding heat pumps could have potential implications for whether the Project represents the least-cost option. A review of the evidence regarding heat pumps, however, demonstrates that heat pumps will not have the potential to change our conclusion under Section 248(b)(2). First, heat pumps can serve only residential customers, not most commercial or industrial customers. Since a substantial part of the need for the Project found by the December 23rd Order relates to the industrial and commercial customers, heat pumps do not represent an alternative solution.[52] Moreover, heat pumps also require a back-up heating system, necessitating reliance on another fuel source as well in the residential sector.[53] Finally, the evidence presented was that even in the limited residential sector, the penetration rates projected for heat pumps are modest at best, forecasted to reach only 25% of the residential market by 2034. For these reasons, the Project and heat pumps are not mutually exclusive, but instead are compatible and even complementary under likely scenarios given that heat pumps cannot meet Vermonters' thermal needs on a stand-alone basis.

Therefore, the new evidence presented in the proceeding was not of such a material and controlling nature as to alter our prior conclusion that the Project satisfies Section 248(b)(2).

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[52] *See* October 10th Order at 17.
[53] *See* tr. 9/26/14 at 212-213 (Neme).

C. Economic Benefit [30 V.S.A. § 248(b)(4)]

1. The Weight of the Evidence Demonstrate Substantial Economic Benefits

123. The Project will continue to provide robust economic and environmental benefits to Vermont, including:

- Significant energy savings for Addison County residents;
- Material reductions in greenhouse gas emissions;
- Construction-related economic benefits; and
- Increased property tax payments to Vermont municipalities.

Simollardes 5/27/15 reb. pf. at 2; Findings 124 through 144, below.

124. Today, natural gas is less expensive on a per-BTU basis than oil, propane, CNG, and typical air-source cold climate heat pumps. Exh. DPS ASH-A; Hopkins pf. at 3-4.

125. The economic analysis provided by witnesses for the Department, the Company, and AARP all showed substantial positive construction related benefits and energy savings benefits resulting from the Project. See Exh. DPS ASH-B; exh. AARP Sched. DED-R-1; Simollardes 5/27/15 reb. pf. at 5.

126. VGS' analysis demonstrates that the Project will create over $270.6 million in energy savings on a 35-year net present value ("NPV") basis, applying a 3% real (4.99% nominal) societal discount rate. Simollardes 5/27/15 reb. pf. at 3-4.

127. Vermont Gas netted the direct Project costs against the Project's economic benefits, using a 3% (real) discount rate, to determine the net economic benefit of the Project. VGS did not apply projected rate impacts or impacts to fuel oil dealers. The results reflect that the Project has a net economic benefit of $70.6, $191.0, and $319.3 million on a 20-, 35-, and 55-year NPV, respectively. Simollardes 5/57/15 reb. pf. at 7-8.

128. AARP's analysis showed 35-year NPV benefits of $93.09 million from construction-related economic activity, and over $188.5 million in energy savings. Exh. AARP Sched. DED-R-1.

129. The operations and maintenance expenditures associated with the Project are projected to result in an economic benefit of approximately $12, $17, and $21 million on a 20-, 35-, and 70-year NPV, respectively. Dismukes reb. at 40-41; exh. AARP Sched. DED-R-1.

130. The Department's analysis considered a broad range of Project impacts to the economy, including potential impacts on ratepayers and reported that the Project's benefits range

from a positive $43 million to $79 million NPV benefit (depending on the timeframe and discount rate), not including monetized GHG benefits. Hopkins pf. at 12 (revised May 15, 2015).

131. These monetized economic benefits are in addition to the other important Project benefits of

- increased reliability of the existing natural gas system,
- expanded energy efficiency programs,
- price stability and firm service,
- regulated rates, and
- the addition of significant natural gas infrastructure to meet the goals of Vermont's Comprehensive Energy Plan and to advance economic development in Addison County.

Rendall 3/27/15 pf. at 3-4; Simollardes 5/27/15 reb. pf. at 2; tr. 6/23/15 at 133 (Hopkins).

132. As noted by the Department, non-quantifiable sources of value also need to be included in any consideration of aggregate economic benefit to the state, including increased reliability, energy efficiency program expansion, avoided fuel price volatility for customers served by the Project, and the value of expanded fuel choice and fuel diversity. Hopkins pf. at 13-14.

133. The magnitude of these benefits is not likely to change simply due to the change in estimated costs. Tr. 6/23/15 at 133-34 (Hopkins); Hopkins pf. at 5-6.

134. The Project also increases the likelihood that these benefits, along with energy savings benefits, would be available to other Vermont communities, including Bristol and Rutland. Hopkins pf. at 13-14.

135. Given that projections are always uncertain, the exercise in a Section 248 proceeding is to weigh the probability that there will be a net benefit, although quantifying that value cannot be done precisely. Hopkins pf. at 5.

136. The Project is a valuable and needed addition to the state's energy infrastructure that will bring environmental and economic benefits to Vermonters well beyond the period covered by the analyses of the Project. Rendall 3/27/15 pf. at 5; Simollardes 3/27/15 supp. pf. at 6.

137. As stated above, we note that the ACRPC recently re-affirmed its support for the Project by a vote of 23 to 9. ACRPC letter to Susan Hudson, dated July 6, 2015.

138. Only AARP showed a significant net loss resulting from the Project, estimating that the Project would result in a negative impact on the state's economy, ranging from negative $101 million to negative $117 million over a 20- to 70-year timeframe. Dismukes reb. pf. at 1-2; exh. AARP Sched. DED-R-1.

139. Dr. Dismukes, AARP's witness, did not consider societal benefits at all in his analysis.

140. The net losses reported by Dr. Dismukes are due primarily to the fact that Dr. Dismukes forecasted that the Project would result in significant net losses of approximately $325 million (on a 35-year NPV basis) due to assumed rate impacts, citing the Company's analysis of the breakeven point for the Project, and losses exceeding $142.5 million (on a 35-year NPV basis) for assumed jobs lost to displaced fuel oil and propane dealers if Addison County customers switch to natural gas. Exh. AARP Sched. DED-R-1; tr. 6/23/15 at 168, 173 (Dismukes).

141. We are unconvinced that AARP's calculation of $142.5 million in potential negative "provider impacts" will occur. There was simply no empirical or rational basis for this extreme result.[54] See Findings 165 through 177, below.

142. Moreover, the rate analysis performed by VGS was not meant as a proposed rate increase and should not be treated as such in the economic modelling. Simollardes 5/27/15 reb. pf. at 8; Rendall 3/27/15 pf. at 6; Findings 145 through 155, below.

143. The Department conducted sensitivity analysis to understand how costs and benefits change when key assumptions are altered, such as energy prices and VGS' capital structure. The results of these analysis demonstrate the significant impact of the financial assumptions in projecting costs and benefits, and the degree to which relatively minor changes in these financial assumptions can affect the Project's net value. Hopkins pf. at 10.

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[54] Notwithstanding a 53-page resume with over 108 citations to expert testimony offered in other proceedings, Dr. Dismukes conceded that he had never previously provided testimony on the net economic benefits of a natural gas expansion project, such as the one before us and that he omitted to cite to the single most similar example of a natural gas project where he did provide net benefit analysis. There, he had made recommendations concerning methodology that differed materially from the approach he took in this proceeding. Tr. 6/23/15 at 164-69 (Dismukes).

144. Several key factors were shown to dramatically influence the outcome of the various economic analyses presented. These include the length of the analysis, the discount rate assumed, and the fuel prices and fuel price forecasts used. These are addressed in the Findings that follow.

2. VGS Rates

145. Over the last 3 years, VGS' residential customers' costs have declined by about 15%. Rendall 3/27/15 pf. at 6.

146. Vermont Gas has managed costs and delivered natural gas service without exposing customers to the kind of price increases and volatility that customers of oil and propane have experienced. Rendall 3/27/15 pf. at 6.

147. Vermont Gas replicated the analyses performed in the first remand proceeding to show the annual and cumulative contribution (or shortfall) from the Project each year assuming the carrying costs in VGS' authorized return on equity and to reflect when VGS' anticipated return on equity equals or exceeds the Company's authorized return. Exh. Pet. Supp. 1/15/15 EMS-2.

148. VGS' analysis demonstrates that the Second Cost Update extends only slightly the time when annual Project revenues and costs are equal. Rendall 3/27/15 pf. at 4; Simollardes 1/15/15 supp. pf. at 6.

149. The Second Cost Update has a 3.2% rate impact over 10 years compared to the First Cost Update. The 3.2% 10-year impact is based on an initial rate impact that is approximately 5% greater than the first remand proceeding, followed by a more significant rate decrease in year 10 than was reflected in the first remand proceeding. Simollardes 1/15/15 pf. at 7.

150. This technical analysis replicates the Board's request in the first remand proceeding, addressing the potential incremental rate impacts of the Second Cost Update as compared to the initial estimate. Simollardes 3/27/15 reb. pf. at 8.

151. This analysis should not be interpreted as a proposal for an immediate rate increase. Rendall 3/27/15 pf. at 6; Simollardes 3/27/15 reb. pf. at 8.

152. Because the analysis does not include any rate mitigation (such as adjustment to capitalization and return on equity, utilization of the SERF, phasing-in of rates or rate design),

the results portray essentially a worst case rate impact scenario. See tr. 6/22/15 at 18-19, 28-29 (Rendall); tr. 6/23/15 at 78 (Simollardes); October 10th Order at 22, 25 & n.72.

153. VGS will propose a plan for phasing in the Project's costs that avoids disruptive rate impacts as part of its continuing efforts to manage costs and to deliver service at affordable and competitive rates. Rendall 3/27/15 pf. at 6.

154. Vermont Gas will seek Board approval of rates at levels that continue to be competitive and affordable for its customers compared to other fuels. Rendall 3/27/15 pf. at 5-6.

155. As Vermont Gas invests in the expansion of its system to bring natural gas to new Vermont families and businesses, these investments become part of the Company's cost of service and part of its approved rates. The Company's rates are set on the basis of its cost of service and at levels that are just and reasonable. Therefore, as a regulated utility, Vermont Gas meets the imperative of promoting the public good by bringing the benefits of service to new communities and customers. Rendall 3/27/15 pf. at 5.

3. Length of Economic Benefit Study Period

156. The study period for an analysis of this Project's economic impacts should extend at least 35 years. Findings 157 through 164, below.

157. Some parties questioned whether a 10 or 20 year time period should be used to study the Project's economic benefits. Tr. 6/22/15 at 36-37 (Dumont).

158. We reject that approach. In the past, we have questioned VGS' use of the shorter 10-year horizon for distribution expansions since it frustrated potential expansion we would like to have seen. See December 23rd Order at 144 n.81.

159. Many other jurisdictions are looking at longer periods over which to evaluate the economics of natural gas expansion. Tr. 6/22/15 at 37 (Rendall).

160. Connecticut energy policy is to review expansion costs over a 25 year period, creating an environment where customers can have a choice to switch to choose natural gas. New Hampshire also recently expanded its payback period for distribution expansions to encourage greater penetration. Tr. 6/22/15 at 38-39 (Rendall); exh. Pet. Cross 6/22/15 AARP-3 at 47.

161. The expected life of a capital investment is a reasonable time span for an economic benefit analysis. Exh. Pet. Reb. 5/27/15 RWH-5 at 16, 24; exh. Pet. Cross AARP-2 at 6-1.

162. The pipeline is expected to be in service for 70 years. December 23rd Order at 143; October 10th Order at 22; Simollardes 5/27/15 reb. pf. at 3.

163. Conducting the economic analysis over a 35-year and 55-year period is appropriate here given that VGS depreciated the pipeline over 55 years and its useful life will extend well beyond that. Heaps 5/27/15 reb. pf. at 9.

164. In the case of this Project, energy savings are expected to continue after even 35 years and even assumed (worst case) rate impact projections flip to positive impacts after year 34. In other words, stopping the analysis before 35 years weighs in favor of more negative impact results. See tr. 6/23/15 at 166-69 (Dismukes).

4. Fuel Oil and Propane Provider Impacts Will Be Minimal

165. AARP's witness, Dr. Dismukes, testified that the Project, if successful, will erode the Vermont fuel oil providers' market shares, sales base, and profits. He calculated that overall, the Project will lead to a reduction in economic output of $102.51 million on a 20-year NPV basis, and over $142 million on a 35-year NPV basis, due to a contraction in the fuel oil distribution sector of the Vermont economy. Dismukes pf. at 34; exh. AARP Sched. DED-3.

166. His model outputs translate this into a loss of 1,894 in total Vermont employment opportunities, or an average of about 95 employment opportunities per year. Dismukes pf. at 34.

167. Dr. Dismukes assumed that all displaced workers will remain permanently unemployed, with the losses growing throughout the timeframe of his analysis. Tr. 6/23/15 at 182 , 218 (Dismukes, Young).

168. The results were simply a generalization of the input-output model Dr. Dismukes used. He conceded that there was no empirical basis supporting the results his model created. Tr. 6/23/15 at 182-83, 184 (Dismukes).

169. According to Dr. Dismukes' results, by year 70, there would be the equivalent of 13,779 permanent job losses to employees of Vermont fuel dealers. Tr. 6/23/15 at 198 (Dismukes, Hoffmann).

170. There are only approximately 150 Vermont fuel oil providers in the entire state of Vermont, each employing only about 20 employees. Even if every employee for every fuel dealer were displaced due to the expansion of the Project into Addison County, a result that is not credible, the total losses could not begin to approach the numbers reported by Dr. Dismukes to support his $142.5 million provider impact. See tr. 6/23/15 at 240 (Cota).

171. Mr. Cota, on behalf of the Vermont Fuel Dealers Association ("VFDA"), reported that as a rule of thumb, it takes a fuel dealer about 20 employees to serve every 2,000 customers. Extrapolating from that, only about 30 fuel dealer employees are currently serving the approximately 3,000 Addison County customers expected to be served initially by this Project. In other words, 30, not 13,000, jobs would be lost. See tr. 6/23/15 at 240 (Cota).

172. When modeling, it is critical to maintain a "common sense" filter on your results to see if they make sense. Hopkins reb. pf. at 10.

173. The results provided by Dr. Dismukes appear to have no such filter. The provider impact results reported by Dr. Dismukes were also unreasonable because, while some jobs may be initially lost as customers switch to natural gas, these displaced workers will likely move on to other jobs in the Vermont economy quickly given Vermont's low unemployment rate and declining labor force. Heaps 5/27/15 reb. pf. at 8; exh. Pet. Reb. 5/27/15 RWH-3.

174. If one firm gains a competitive advantage over another because of lower prices, increased productivity, or some other change, the losses to one firm and the gains to the other firm are not losses or benefits to the economy as a whole. Heaps 5/27/15 reb. pf. at 7-8.

175. Dr. Dismukes included economic leakages – lost fuel oil sales that will occur largely out of state – on account of his mistaken assumption that all fuel oil and propane is purchased from Vermont companies. Agrimark's purchases, which are significant, come largely from out-of-state suppliers and will not adversely impact the Vermont economy. Heaps 5/27/15 reb. pf. at 8 (citing Pcolar pf. at 3).

176. As Dr. Dismukes himself has previously testified, the "[a]ccurate estimation of these leakages is crucial in obtaining reasonable economic impacts, since imported goods and services that are not produced in the study area should be treated differently than goods and services that are produced within the study area. Failure to account for leakages can lead to large overestimates of economic impacts." Exh. Pet. Cross 6/22/15 AARP-8 at 22 (Dismukes prefiled testimony before the New Jersey Board of Public Utilities concerning solar investment program).

177. Dr. Dismukes conceded that he failed to account for Agrimark's purchase of 1.8 million gallons – all of its boiler fuel – from Tracy, Quebec in 2012. Tr. 6/22/15 at 187 (Dismukes); Pcolar pf. at 3.

5. Energy Savings

178. Since the time of our December 23rd Order the differential in the price of natural gas as compared to the price of oil and propane has shrunk considerably, although natural gas prices today are still about 25% lower than oil and 47% lower than propane. Tr. 6/22/15 at 65-66 (Rendall).

179. This collapse of the price differential is expected to continue in the near term, but the gap is expected to increase within the next 5 to 6 years, with increasingly lower gas prices relative to oil over time. Tr. 6/23/15 at 53 (Simollardes); tr. 6/23/15 at 231 (Dismukes).

180. As noted in a recent Stanford economic policy brief cited by VFDA, even at $40/barrel, the dollar per MMBTU price of oil is still "substantially in excess of the dollar per MMBTU price of natural gas." Exh. Pet. Cross VFDA-1 at Sec. 4 (Stanford Institute for Economic and Policy Research (SIER) Policy Brief, March, 2015).

181. The current dollar per MMBTU price of Henry Hub natural gas is less than half that amount, which implies further switching away from oil is likely to occur in North America. Exh. Pet. Cross VFDA-1 at Sec. 4.

182. Mr. Cota on behalf of VFDA testified that the 2015 EIA report "agrees" that there is a "high probability" that crude oil remains in the $50-$70 barrel range for the next 25 years. This is not at all accurate. The most recent EIA Annual Energy Outlook 2015 Reference case for oil prices projects that prices are expected to rise steadily after 2015 and reach $100/barrel by 2028 and $141/barrel by 2040. Exh. Pet. Reb. 5/27/15 RWH-2 (EIA Outlook 2015) at ES-2.

183. In calculating energy prices, the Department, Mr. Neme, and VGS all used as a 2015 starting point the recent five-month average of fuel prices as reported by the Department Energy Price Report. Exh. DPS ASH-C at 8; exh. Lyons Neme Attach. B at 2; Simollardes 5/27/15 reb. pf. at 4.

184. Those starting prices were then adjusted for future years based on the EIA Annual Energy Outlook ("AEO") 2015 price forecast for the New England, released on April 14, 2015. Exh. Lyons Neme Attach. B at 2-3; Hopkins reb. pf. at 5; Simollardes 5/27/15 reb. pf. at 4; exh. Pet. Reb. 5/27/15 RWH-2.

185. To produce a fuel oil and propane price forecast, Dr. Dismukes used the April 2015 Vermont average fuel oil and propane prices from the Department's Fuel Price Report, and then escalated them based on the annual differences projected in the 2014 AEO from the EIA.

The 2014 AEO was published in April, 2014, and projected flat to declining oil prices through 2017, before beginning to climb through 2040. Hopkins reb. pf. at 19.

186. The 2014 AEO was correct that oil prices would fall, but it did not project the sharp fall in prices that occurred in late 2014, which brought current prices well below its projection. By using the 2014 AEO, but referencing it to a 2015 starting point, Dr. Dismukes' projection essentially includes two reductions in the price of oil. Hopkins reb. pf. at 19.

187. Dr. Dismukes' approach also departed from that used by DPS, VGS, and Mr. Neme in that he used only one month of data from the Fuel Price Report to establish the starting point for his analysis. He used the April, 2015 price for an annual average price. Hopkins reb. pf. at 19.

188. Using the five month average, which covers the critical heating months, is a reasonable approach to establish a proxy for the year's prices and is consistent with the approach taken by the Department and Mr. Neme. Heaps 5/27/15 reb. pf. at 5; Hopkins reb. pf. at 19; exh. DPS ASH-C at 8; exh. Lyons Neme Attach. B at 2.

189. The Fuel Price Report is based on prices the Department collects on the first Monday of each month, so Dr. Dismukes has effectively chosen the price on a single day on the edge of heating season as a stand-in for the annual average price. While we do not yet know what fuel oil and propane prices will be in late 2015, when heating season returns, using the average over multiple months' survey data (December 2014 through April 2015) is a much better approach for a proxy for the year's prices. Hopkins reb. pf. at 19.

190. As a result of his approach, Dr. Dismukes energy forecast is well away from the EIA AEO 2014 and 2015 forecasts in absolute terms. He is 16% below the 2015 AEO over the period to 2040 and closer to the EIA low oil price case in all years but 2015. Hopkins reb. pf. at 19-20; exh. DPS ASH-F.

191. Under VGS' projection, energy savings in Addison County will be in excess of $159 million on a 20- year NPV and $270 million on a 35-year NPV. Looking forward to year 55, the savings increase to $391 million. Simollardes 5/27/15 reb. pf. at 4; exh. Pet. Reb. 5/27/15 EMS-2.

192. When these energy savings are combined with the construction and tax benefits and monetized greenhouse gas reductions, the Project has economic benefits of $232, $353, and $482 million on a 20-, 35-, and 55-year NPV, respectively. Simollardes 5/27/15 reb. pf. at 7-8.

193. The updated energy savings analysis indicates that the Project still has solid economic benefits even with natural gas having a decreased competitive position relative to fuel oil. Simollardes 5/27/15 reb. pf. at 4; Simollardes 1/15/15 supp. pf. at 8.

194. There was some discussion during the hearings that the Project's energy savings should be measured against a baseline that reflects the fact that some large, industrial customers in Addison County have converted from fuel oil and/or propane to CNG since the Project was initially approved. We do not agree with this approach for a number of reasons. See, e.g., tr. 6/23/15 at 117, 159 (AARP and CLF).

195. As an initial matter, the proposition ignores the fact that CNG is not an alternative to the Project in that it would not serve residential Vermonters, who constitute the majority of the 3,000 customers in Addison County that this pipeline is expected to serve. See Findings 99 through 104, above.

196. The investments necessary for CNG service were made in reliance that pipeline gas would thereafter be available, and it would therefore be inappropriate to calculate the Project's economic benefits by assuming CNG would be available in its absence. See VGS 7/9/15 Response to Board Information Requests.

197. While AARP has criticized VGS and the Department for not accounting for current CNG usage, its own expert witness did not conduct a baseline analysis that included the use of CNG in Addison County. Tr. 6/23/15 at 206 (Dismukes).

198. As Dr. Dismukes explained, the primary changes since the Project was approved concern the fuel price side of the equation in valuing the savings, not the penetration rates of potential customers or how those industrial customers may transition from a "temporary solution" with CNG to a more permanent one when the pipeline is constructed. Tr. 6/23/15 at 206 (Dismukes).

199. For these reasons, the Board has before it no reliable evidence to support an economic benefit analysis that accounts for customers who have converted to CNG.

6. Discount Rate

200. Discounting can substantially affect the NPV of costs and benefits when there is a significant difference in the timing of costs and benefits, such as with policies that require large initial outlays or that have long delays before benefits are realized. Exh. Pet. Cross AARP-2 at 6-4 (EPA Guidelines).

201. Both VGS and Mr. Neme used a 3% real (4.99% nominal) societal discount rate for their analyses. DPS performed analyses at various discount rates including 3% real. Exh. Lyons Neme Attach. B at 1; Simollardes 5/27/15 reb. pf. at 4.

202. A societal discount rate, also referred to as "a social rate of time preference," means the rate at which a society discounts future consumption flows to their present value. Heaps 5/27/15 reb. pf. at 5; exh. Pet. Reb. 5/27/15 RWH-4 at 33-34.

203. Social discounting is discounting from the broad society-as-a-whole point of view. Private discounting, on the other hand, is discounting from the specific, limited perspective of private individuals or firms. Exh. Pet. Cross AARP-2 at 6-1 (EPA Guidelines).

204. Using a 3% real societal discount rate, energy savings in Addison County were calculated by AARP to be in excess of $224 million on a 35-year NPV basis. An adjustment to a higher discount rate of 7.938%, reflecting the Company's weighted cost of capital, decreased projected energy savings over the same period by over $100 million. Exh. AARP Sched. DED-4 at 2; tr. 6/23/15 at 177-78 (Dismukes).

205. In this Section 248 analysis, a societal discount should be applied because the evaluation is focused on the economic impacts from the Project that will flow to the economy of the state as a whole and whether it is a beneficial investment from society's perspective. Heaps 5/27/15 reb. pf. at 5-6.

206. Use of the Company's cost of capital would be appropriate when looking at utility investment decisions, but not in a regulatory review focused on the public good of the Project and how it will impact consumer consumption activity in the state economy going forward. Heaps 5/27/15 reb. pf. at 5-6; tr. 6/23/15 at 205-208 (Dismukes).

207. Using a societal rate for this evaluation is consistent with guidance provided by the White House Office of Management and Budget ("OMB"), which sets discount rates for cost benefit analyses performed by federal agencies. The OMB instructs that when examining the effects of investment that do not fall exclusively or primarily on the allocation of capital in the private sector, such as the effect on consumption due to lower consumer prices for goods, a lower social rate of time preference or societal discount rate is appropriate. Exh. Pet. Reb. 5/27/15 RHW-4 at 33.

208. The OMB guidance also provides that the real rate of return on long-term government debt may provide a fair approximation of the societal discount rate. Heaps 5/27/15 reb. of. at 7; exh. Pet. Reb. 5/27/15 RHW-4 at 33.

209. As of the week ending May 15, 2015, the 30-year Treasury yield was 3.02% (nominal, which implies a real rate of about 1.2% with underlying inflation running at 1.8%). This suggests that the 4.99% nominal discount rate (equivalent to a 3.0% real discount rate) that VGS utilized for its rebuttal analysis may in fact be conservative. Heaps 5/27/15 reb. pf. at 7; exh. Pet. Reb. 5/27/15 RWH-6.

210. The OMB also advises that a sensitivity using a discount rate lower than 3% should be considered when a project yields important intergenerational benefits. Exh. Pet. Reb. 5/27/15 RWH-4 at 36; exh. Pet. Cross AARP-2 at 6-19 (EPA Guidelines).

211. The EPA guidance cited by Dr. Dismukes for performing economic benefit analyses recommends that if a policy or regulatory action has a long time horizon (more than 50 years), it is appropriate to use a consumption or societal rate of discount or a time-declining schedule of discount factors. Exh. Pet. Cross AARP-2 at 6-19.

212. The longer the time horizon in the intergenerational policy context implies greater uncertainty about the investment environment and economic growth over time. This additional uncertainty has been shown to imply effective discount rates lower than those based on observed market discount rates whether or not the estimated investment effects are predominantly measured as private capital or consumption (societal) terms. Exh. Pet. Cross AARP-2 at 6-16 (EPA Guidance, citing, among others, citing renowned economist Martin L. Weitzman 1998, 2001).

213. In 2012, a panel of expert economists evaluated how costs and benefits should be discounted in an intergenerational context, and concluded that theory provides compelling arguments for certainty-equivalent declining discount rates (Weitzman) when conducting intergenerational analyses. Exh. Pet. Cross AARP-1, at abstract.

214. Weitzman's Discount Rate Schedule defines "medium term" as occurring within a time period of 26-75 years, and identifies a 2% marginal discount rate. This schedule was developed when Weitzman asked 2,000 Ph.D. economists what rate should be used to discount the costs and benefits associated with programs to mitigate climate change. Exh. Pet. Cross AARP-1 at 15, 31.

215. Dr. Dismukes' use of the Company's WACC (7.938%) as the only discount rate is inappropriate because the Board's analysis under Section 248 considers whether the Project will result in an economic benefit to the state and society as a whole rather than whether the Project will generate benefits for VGS, as is discussed in greater detail above. Heaps 5/27/15 reb. pf. at 5-7.

216. Notwithstanding the fact that using a 7.938% discount rate is inappropriate, VGS ran a sensitivity that discounted the energy savings at that higher figure. Even under the higher discount rate, the 20-, 35-, and 55-year NPV of the energy savings are $121.1, $218.8, and $207.7 million, respectively. Simollardes 5/27/15 reb. pf. at 5; exh. Pet. Reb. 5/27/15 EMS-2.

217. In recent testimony before the New Jersey Board of Public Utilities, Dr. Dismukes noted that OMB guidance recommends using a societal discount rate when investments primarily impact private consumption, and recommended that this societal discount rate be used in the alternative if the New Jersey Board of Public Utilities decided not to use the petitioning utility's WACC. Heaps 5/27/15 reb. pf. at 6; exh. Pet. 5/27/15 Reb. RWH-5 at 22, 24.

218. We have adopted a societal discount rate of 3% (real) for cost-effectiveness screening of energy efficiency measures, because the screening is from the perspective of society as a whole. On the other hand, we recently decided to apply the utility weighted cost of capital as a discount rate in determining levelized rate schedules for qualifying facilities under Rule 4.100, because the focus of that inquiry is the carrying cost of capital for utilities to invest in generation. *Compare Order Re Cost-Effectiveness Screening of Heating and Process-Fuel Efficiency Measures and Modifications for State Cost-Effectiveness Screening Tool*, Order of 2/7/12 at 20-21, *and Order approving updated avoided costs for use by the Energy Efficiency Utilities*, EEU-2013-07, Order of 12/20/13 at 8, *with Investigation into Establishing Rates for Power Sold to the Purchasing Agent Pursuant to Public Service Board Rule 4.100*, Docket No. 8010, Order of 2/9/15 at 34, 39.

219. Taken together, these orders are consistent with the guidance of the OMB and EPA that choosing the appropriate discount rate turns on whether the particular investment or initiative is being evaluated from the perspective of a private individual or company or society as a whole.

220. Further, as the Vermont Supreme Court recently confirmed, in a Section 248 proceeding, "the sole issue [is] whether the requested certificate advance[s] the public good."[55] Neither the private interests of the utility or of adjacent landowners are at issue. As such, a societal discount rate, rather than a private discount rate, should apply.

221. We note that even under the higher discount rate used by Dr. Dismukes, the Project is still projected to generate many millions of dollars in benefits to the state. Exh. AARP Sched. DED-R-1.

7. Monetized GHG Emissions Reductions

222. The value of the avoided GHG emissions associated with the Project are $21 million on a 20-year NPV and $31 million on a 35-year NPV. As of year 55, the avoided GHG value is projected to be $39.5 million.[56] Simollardes 5/27/15 reb. pf. at 6-7; exh. Pet. Reb. 5/27/15 EMS-3.

223. When calculating the GHG benefits of the Project, it is appropriate to use a full life-cycle analysis emissions factor. Using only an end-use emissions factor understates the avoided emissions of the Project. Simollardes 5/27/15 reb. pf. at 6.

224. VGS' avoided GHG value was calculated at $100/ton, which is the same value that the Board adopted for screening energy efficiency measures, and the same value that the Department used for its independent economic benefit analysis. Using the $100/ton value is appropriate in this Section 248 proceeding because the value of avoided GHG emissions should be the same regardless of whether the avoidance comes from energy efficiency or fuel switching. Simollardes 5/27/15 reb. at 6 (citing EEU-2013-07, Order of 12/20/13); Hopkins pf. at 8; tr. 6/23/15 at 123-24 (Hopkins). Dr. Dismukes also understates the GHG benefits by using only an end-use emission factor rather than a full life-cycle analysis valuing the avoided emissions at $40/ton instead of the $100/ton value used in Board proceedings. Simollardes 5/27/15 reb. pf. at 6; Bluestein 5/27/15 reb. pf. at 2.

Discussion

Pursuant to 30 V.S.A. 248(b)(4), we must find that the proposed Project "will result in an economic benefit to the state and its residents" before issuing a certificate of public good. The

[55] *In re Pet. of New Cingular Wireless PCS, LLC*, 2012 VT 46 ¶15 (citing *Bandel*, 135 Vt. at 145, 375 A2d at 977).
[56] For purposes of the GHG benefit calculation, VGS used a 3% real discount rate (equivalent to a 4.99% nominal discount rate) since the value of the avoided GHG emissions were expressed in real dollars. Simollardes 5/27/15 reb. pf. at 7.

Vermont Supreme Court has held that this criterion requires only a finding of "some, albeit possibly limited, positive impact amounting to 'an economic benefit.'"[57] Section 248 does not require nor have we prescribed an "exact accounting" methodology for addressing the anticipated economic benefits.[58] Nor are we required to quantify benefits with any particular degree of specificity.[59]

The overwhelming evidence in this proceeding demonstrates that at the higher estimated costs of $154 million, the Project will still produce significant economic benefits to the state and its residents, including millions of dollars of economic benefits to the state, meaningful fuel savings and fuel price stability for Addison County residents, material reductions in greenhouse gas emissions, and the opportunity to expand energy efficiency investments in Addison County, furthering even more energy savings and greenhouse gas reductions.

AARP's economic analysis prepared by Dr. Dismukes stood alone in projecting net economic losses from the Project. We observe that this is not altogether surprising, given that Dr. Dismukes has never produced a net economic benefit analysis for an energy investment that resulted in a positive net benefit.[60] We are very troubled, however, that Dr. Dismukes failed to disclose in his lengthy, fifty-three page resume, the single and most relevant piece of testimony previously provided by him involving his net economic analysis for a proposed natural gas pipeline investment in New Jersey. The New Jersey testimony provided by Dr. Dismukes is not only directly on point, but there he offered contradicting testimony that supported a study period commensurate with the pipeline investment, and acknowledged the OMB's recommendations for use of a lower, societal discount rate. Had he applied those assumptions here, his net loss results would have flipped to net savings.[61] Further, we find that the "Provider Impacts" suggested by Dr. Dismukes not only lack credibility, they are not grounded in reality. For these reasons, we reject Dr. Dismukes' findings.

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[57] *In re UPC Vt. Wind, LLC*, 2009 VT 19, ¶ 7.
[58] *Petition of Charlotte Solar, LLC*, Docket No. 7844, Order of 1/22/13 at 15 (finding that Section 248 does not require an "exact accounting" of the anticipated economic benefits); December 23rd Order at 83 (same); *Petition of Ga. Mountain Cmty. Wind, LLC*, Docket No. 7508, Order of 6/11/10 at 25 (same).
[59] *Joint Petition of Green Mountain Power Corp., et al.*, Docket No. 7628, Order of 5/31/11 at 38 (citing *UPC Vt. Wind*, 2009 VT 19, ¶¶ 5-11).
[60] Tr. 6/23/15 at 169-71 (Dismukes).
[61] Heaps 5/27/15 reb. pf. at 2; exh. Pet. Reb. RWH-1.

We therefore conclude that the new evidence presented in the proceeding was not of such a material and controlling nature as to alter our prior conclusion that the Project satisfies Section 248(b)(4).

D. Greenhouse Gas Emissions [30 V.S.A. § 248(b)(5)]

225. The GHG analysis presented by Vermont Gas is a life cycle analysis of GHG emissions from natural gas, which includes the upstream emissions associated with the extraction, processing, and transportation of the fuels, as well as the direct combustion emissions. Bluestein 5/27/15 reb. pf. at 2.

226. The GHG emissions factors used by Dr. Dismukes were only for direct combustion impacts; therefore, his analysis did not fully include GHG impacts and is not comprehensive. Bluestein 5/27/15 reb. pf. at 2.

227. In the December 23rd Order, the Board recognized that a life cycle analysis of natural gas was the appropriate approach. Bluestein 5/27/15 reb. pf. at 2; Docket No. 7970, Order of 12/23/13 at 98-99.

228. Vermont Gas uses a 100-year time horizon for the comparing the global warming potential ("GWP") of methane to carbon dioxide. Bluestein 5/27/15 reb. pf. at 3.

229. Conservation Law Foundation's GHG witness stated that a 100-year GWP for methane is the most appropriate for the analysis of the Project. Stanton 6/14/13 pf. at 14.

230. The 100-year value for GWP is the most commonly used for analyses and GHG inventories and is "the internationally accepted standard for reporting GHG emissions." Bluestein 5/27/15 reb. pf. at 3-4; exh. Pet. Reb. 5/27/15 JB-2.

231. For example, the 100-year GWP is used for: (1) the U.S. EPA Inventory of U.S. Greenhouse Gas Emissions, which is the official U.S. report of emissions to the UN Framework Convention on Climate Change; and (2) the U.S. EPA Greenhouse Gas Reporting Program, which is the mandatory GHG reporting program for large GHG emitters. Bluestein 5/27/15 reb. pf. at 3-4; exh. Pet. Reb. 5/27/15 JB-1; exh. Pet. Reb. 5/27/15 JB-2.

232. The time horizon used for GWP is an analytical concept that does not reflect or determine the concern over climate change or potential for action in the near term. Rather, the GWP affects how we assess the effects of the emissions on long-term climatic processes over the lifetime of the project. Tr. 6/22/15 at 129, 134 (Bluestein).

233. In selecting the 100-year GWPs, the EPA pointed out that the parties to the United Nations Framework Convention on Climate Change ("UNFCCC") agreed to use GWPs that are based on a 100-year time period for preparing national inventories, and the reports submitted by other signatories to the UNFCCC use GWPs based on a 100-year time period, including the GWP for methane and certain GHGs identified as short-lived climate pollutants. The EPA further noted that although the UNFCC has updated the international reporting guidelines to reference GWPs from AR4 for the year 2015 and beyond, the guidelines continue to specify GWPs with a 100-year time horizon. Bluestein 5/27/15 reb. pf. at 4; exh. Pet. Reb. 5/27/15 JB-2.

234. Applying the International Panel on Climate Change's revised GHG emission factor of 36 (previously 25), increases Mr. Bluestein's original estimate of life cycle GHG emissions by 7% over the 100-year time horizon. Consequently, the life cycle emission factor for gas is still 17% lower than oil and total emissions are 22% lower, including boiler efficiency. Bluestein 5/27/15 reb. pf. at 5; exh. Pet. Reb. 5/27/15 JB-9.

235. Dr. Hopkins from the Department relies on a GWP emissions factor of 34 over 100-year period. Exh. DPS ASH-C.

236. Several recent studies have found consistent or lower emissions from some sources than estimated in the EPA emissions inventory or other estimates. Bluestein 5/27/15 reb. pf. at 6-8; exhs. Pet. Reb. 5/27/15 JB-5, JB-6, JB-7, and JB-8.

237. Ms. Peyser references an article published by Howarth et al. that concludes that natural gas has higher GHG emissions than coal or oil. Peyser pf. at 31-32.

238. The Howarth article, however, inappropriately relies on a 20-year time period for comparing the GWP of methane to carbon dioxide. It also relies on an article by Brandt et al. (Exhibit Petitioner Reb. 5/27/15 JB-3) that concludes that EPA emissions inventory is underpredicting the amount of methane observed in the atmosphere. However, the EPA inventory has only a small role in Mr. Bluestein's analysis. The Brandt article also states that identifying the source of methane emissions (natural gas production vs. other sources) is difficult and does not come to a conclusion on that account, does not account for recent regulations that reduce methane emissions from natural gas operations, and points out that many cost-effective technologies are available to reduce methane emissions. Bluestein 5/27/15 reb. pf. at 2-3, 5-6; exh. Pet. Reb. 5/27/15 JB-3.

239. The capacity utilization of the Project is not a significant factor in determining emissions from the distribution system because if there is a leak in the pipe, the amount of flow from the leak is not strongly correlated to how much is going through the pipe. Tr. 6/22/15 at 123 (Bluestein).

240. Similarly, capacity utilization is not a large factor in upstream emissions except for the fact that since the analyses demonstrate that using natural gas reduces greenhouse gas emissions, it follows that if you use twice as much, you would reduce twice as much. Tr. 6/22/15 at 123 (Bluestein).

241. Mr. Bluestein estimates that GHG emissions from heating oil with 20% biodiesel would be approximately equal to those of natural gas on an 100-year basis. Bluestein 5/27/15 reb. pf. at 9.

242. The legal requirement for biodiesel blends in Vermont is well below 20%. While there are some Vermont fuel dealers that offer a 5% biodiesel blend, there is no indication that a 20% blend will be offered in the near term. Simollardes 5/27/15 reb. pf. at 14-15.

243. While heating fuel with 20% biodiesel can be sold, it does not appear that it is available on the market in Vermont today. Tr. 6/22/15 at 117 (Bluestein); tr. 6/23/15 at 243-245 (Cota).

244. Vermont Gas' GHG analysis is conservative as it does not account for any GHG reductions that will result from VGS' energy efficiency programs, nor does it account of increased upstream GHG emissions for heating oil and oil sands production in Canada or "tight oil" in North Dakota. Bluestein 5/27/15 reb. pf. at 9; tr. 6/22/15 at 120 (Bluestein).

E. Public Health & Safety [30 V.S.A. § 248(b)(5)]

245. The Project has been designed and will be constructed and operated to meet or exceed all applicable state and federal codes and standards, including Part 192 of Title 49 of the Code of Federal Regulations (the safety standards of the Office of Pipeline Safety at the U.S. Department of Transportation), the 831.8 Code of the American Society of Mechanical Engineers (governing the design of gas transmission and distribution piping systems), and PSB Rule 6.100 (pipeline safety). December 23rd Order at 87; St. Hilaire 5/27/15 reb. pf. at 4.

246. An article published in Pipeline Gas and Journal (Exhibit NP-2R-Palmer-Exhibit 7) that compared data acquired from the Pipeline Hazardous Material Safety Administration ("PHMSA") from 1984-2014 related to "natural force damage" and "other outside force," relied

on a data set that consisted of 129 incidents associated with cold weather. St. Hilaire 5/27/15 reb. pf. at 4; exh. NP-2R-Palmer-Exhibit 7.

247. Two of the cold weather incidents were attributed to Vermont Gas; both incidents have been addressed to prevent further occurrences. St. Hilaire 5/27/15 reb. pf. at 4-5; tr. 6/22/15 at 208-10 (St. Hilaire).

248. The first occurred in 1989 when a frost heave caused a mechanical service tee fitting on a steel distribution main to leak. VGS responded by instituting a program to take the mechanical type service tee fitting out of active service and moved to welding of steel pipe or fusing plastic pope to reduce the likelihood of reoccurrence. St. Hilaire 5/27/15 reb. pf. at 4-5.

249. The second occurred in 2003 when a large chunk of ice and snow fell from a roof and damaged a fitting on the above-ground meter set. VGS now maintains a program to identify and install protective covers over meter sets to prevent such damage. St. Hilaire 5/27/15 reb. pf. at 5.

250. The author of the article also notes that that the type of pipe and connection are an important factor in determining the risk of frost heaves. VGS will utilize high density polyethylene and a fusing process to connect distribution components to ensure a ductile and continuous system. When intersecting a large metering station, a transition fitting will be used an all steel pipe sections shall be welded. St. Hilaire 5/27/15 reb. pf. at 5.

251. The article concludes by listing several items that have higher than average vulnerability to cold weather events. Only one of the listed items will be present in the Project—pipes located above soils susceptible to frost heaves—and this will be mitigated by installing a ductile and continue polyethylene system and implementing VGS' leak protection and repair protocols. St. Hilaire 5/27/15 reb. pf. at 5-6.

252. The proposed Project distribution system is designed to industry standards using high density polyethylene and the fusing of distribution components to reduce the risk of frost related incidents. St. Hilaire 5/27/15 reb. pf. at 6.

253. Vermont Gas follows Title 49 of the Code of Federal Regulations, Part 192.327 by requiring a minimum of 36 inches of cover for buried pipelines. St. Hilaire 5/27/15 reb. at 4.

254. VGS has a strong safety history over the last 45 years of operation and routinely reports fewer total leaks than the national average. St. Hilaire 5/27/15 reb. pf. at 6.

255. During the period 2007 to 2013, VGS experienced 1/3 the number of total leaks per 100 miles than the national average based on PHMSA data. St. Hilaire 5/27/15 reb. pf. at 6.

256. Unlike most utilities, VGS carries zero leaks on its leak book by repairing leaks when they are found. St. Hilaire 5/27/15 reb. pf. at 6.

F. General Good of the State [30 V.S.A. § 248(a)]

At the currently estimated cost of $154 million, the Project will continue to result in significant economic and other important benefits that are in the general good of the state and its residents. One of the most important public benefits that this Project offers to Vermont is fuel choice for Addison County businesses and residents.[62] The energy savings analyses presented by all parties support that natural gas will offer a less expensive and affordable fuel choice for Addison County customers now and in the future.

In addition to providing customers with a choice to move to a lower cost heating fuel, natural gas expansion into Addison County will bring a range of benefits for Vermonters, including significant fuel bill savings, fuel price stability, the security of regulated pricing, and robust new opportunities for energy efficiency investment in the proposed Addison County service area. The Project will also result in increased competition in fuel prices in Addison County, applying downward pressure on prices and helping keep service quality high. The availability of natural gas has been a backbone for economic growth in the two counties already served by Vermont Gas.

The Project is consistent with and will further specific goals articulated in the Vermont Comprehensive Energy Plan (the "CEP" or "Plan"). The Plan explicitly encourages "the increased use of natural gas by supporting economically viable expansion of the natural gas service territory,"[63] and seeks "to eliminate Vermont's reliance upon oil by mid-century by moving toward enhanced efficiency measures, greater use of clean, renewable sources for electricity, heating and transportation, and electric vehicle adoption, while increasing our use of natural gas and biofuel blends where nonrenewable fuels remain necessary."[64]

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[62] December 23rd Order at 72 ("The Comprehensive Energy Plan recognizes that natural gas expansion encourages fuel choice for Vermonters"). In Vermont, about 64% of homes heat with oil or propane; only 15% are heated with natural gas. By comparison, nationally, only 12% of homes use oil or propane while about 50% of homes use natural gas for heating. *Id.* at 66.

[63] 2011 CEP, vol. 2, p. 220.

[64] 2011 CEP, vol. 1, p. 3.

The State of New Hampshire recently adopted similar policy recommendations. The New Hampshire 2014 State Energy Strategy notes that while transitioning to renewables and increasing resiliency through distributed generation are important goals, customers face challenges associated with the dependency on expensive and volatile heating fuels. Increasing fuel options available to consumers, including natural gas, is therefore identified as an important means to help them manage their risks and costs.[65] This observation applies equally to Vermont.

Expanding VGS service offerings to Addison County will also further the goal of the CEP to make efficiency and conservation a first priority.[66] Because VGS offers a suite of energy efficiency programs across all customer classes, its program offerings are more comprehensive than most and have saved Vermonters millions in energy bill savings each year. The Project will allow customers in Addison county to participate in these programs. VGS energy efficiency programs also play an important role in furthering the state's goal of reducing greenhouse gas emissions. From fiscal year 2007 to 2011, VGS' energy efficiency programs reduced greenhouse gas emissions by 22,717 tons of carbon dioxide.[67] These important conservation and environmental benefits are unchanged by the revised Project cost estimate.

Having reached these conclusions, we are mindful that some parties question whether the Project should be approved only if VGS can achieve a 10-year or 20-year break-even point by which the Project can pay for itself without customer rate contributions. We rejected that approach in our December 23rd Order and we do again, for the same reasons we explained previously. As we stated previously, "the pipeline is expected to be in service well over twenty years. This means that from year twenty to the end of the life, the new customers will cover the costs of the Project and provide a contribution to other costs. Although in the near term there may be cross-subsidization from existing customers, over the long term that is not correct. For a project that has such an extended life, we find this outcome acceptable."[68] We also do not believe it is appropriate or accurate to portray potential economic impacts assuming rate effects that do not reflect the actual cost of the Project to ratepayers.

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[65] *See* Exh. Pet. Cross 6/22/15 AARP-3 at 50.
[66] Docket No. 7676, Order of 7/16/13 at 10.
[67] Docket No. 7676, Order of 7/16/13 at 21.
[68] December 23rd Order at 143-44. In fact, as we previously stated, using a longer timeline may make expansion into other areas more cost-effective. We also allocate the cost of electric and gas distribution service generally, not based on the actual costs of lines to serve customers, *see id.* at 143, contrary to statements made by parties in this proceeding.

Further, at this stage of the proceeding there is no evidentiary basis for concluding what ratepayers will pay. The rate effect over the 70-year life of the Project will in our experience likely result in downward pressure on rates. In addition, the rate impact figures developed by VGS at our request did not include any rate mitigation and as such reflect a worst case scenario – they would clearly be adjusted for a number of other factors, not before us, and as such do not reflect the actual cost of the Project for ratepayers.

We also emphasize that the Company's rates are set on the basis of its cost of service. Therefore, as a regulated utility, Vermont Gas meets the imperative of promoting the public good by bringing the benefits of service to new communities and customers at rates that are just and reasonable.[69]

VI. CONCLUSION

After examining the evidentiary record and analyzing the legal arguments put forth by the parties in this docket, we find that neither the Second Cost Update or other new evidence presented is of such a material and controlling nature as would have changed the outcome of our December 23rd Order granting VGS a CPG to build the Project. We therefore find no basis under V.R.C.P. 60(b) to reopen the record. The evidence in this docket supports that the Project still satisfies the criteria of Section 248(b) and will promote the general good of the state and its residents.

[69] Rendall 3/27/15 pf. at 5.

DATED at Burlington, Vermont this 8th day of July, 2015.

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