RTP ENVIRONMENTAL ASSOCIATES, INC.®
304-A West Millbrook Road
Raleigh North Carolina 27609
(919) 845-1422

Memorandum

To: Barbara Sprungl, SRP

From: Lynn Hutchinson

Date: November 13, 2014

Re: Review of EPA's Best System of Emission Reduction (BSER) in Proposed §111(d) Rule on Behalf of Salt River Project

---

EPA claims that the measures in building blocks 2, 3, and 4 meet the criteria for inclusion as components of the "best system of emission reduction" (BSER) because, individually and together, they are technically feasible; achieve significant emissions reductions; are not unreasonably costly; and promote the development and implementation of technology improvements for continued emissions reductions. EPA's analysis of its proposed BSER, however, ignores critical information related to technical feasibility, GHG emissions, costs, non-air quality health and environmental impacts, and other impacts.

This memorandum highlights some of EPA's failures in its "system" analysis, and demonstrates that EPA's analyses are so conclusory and superficial that they neither satisfy EPA's own limited criteria for establishing the "best system," nor the Clean Air Act's (CAA's) more expansive requirements.

Background

Section 111(a) of the CAA defines "standard of performance" as an emissions limitation that reflects application of "the best system of emissions reduction." EPA claims that the term "system" is not defined, and thus it must be given its ordinary meaning as "a set of things working together as parts of a mechanism or interconnecting network; a complex whole."[1] Yet, even if this definition is an appropriate definition for "system" under the CAA, which arguably it is not, EPA ignores this ordinary meaning, and the statutory mandates, legislative history, and its own criteria in defining its BSER.[2]

---

[1] *Oxford Dictionary of English* (3rd ed.) (published 2010, online version 2013) http://www.oxfordreference.com.mutex.gmu.edu/view/10.1093/a cref/9780199571123.001.0001/acref-9780199571123

[2] EPA points to no legislative history to support its assertion that Congress intended such a broad definition of "system" for purposes of §111. To the contrary, legislative history supports a more narrow interpretation for purposes of setting a continuous emission reduction standard under §111(d). In 1977, Congress amended §111 to require the Administrator to base standards of performance on the "best technological *system* of continuous emissions reduction" (*emphasis added).* Congress made clear its intent that individual emissions controls apply to each affected facility, and that Congress expected the

In EPA's "Legal Memorandum for Proposed Carbon Pollution Emission Guidelines for Existing Electric Utility Generating Units," EPA identifies five criteria EPA must use in determining whether the "best system of emission reduction" is "best" and "adequately demonstrated." EPA asserts that these criteria are from relevant case law, and include:

1) Technical feasibility;
2) Amount of emissions reductions;
3) Reasonableness of cost;
4) Technology development and implementation; and
5) Energy impacts.[3,4]

Although EPA identifies all of these as relevant factors, EPA notes that it weighed three of the factors (two through four) more heavily in its proposed rule. With regards to factors one and five, EPA provides little analysis and simply concludes, "…that the proposed BSER determination meets the other criteria as well." 79 FR at 34890.

Notably, the statutory language is much broader than the five criteria EPA identifies. It requires the Administrator to consider "cost of achieving such reduction and ***any*** nonair quality health and environmental impact and energy requirements," (*emphasis added*). §111(a)(1). Courts give the term "any" an expansive meaning.[5] Under this expansive meaning, EPA is not free to pick and choose which impacts it recognizes, but must conduct a meaningful assessment of all

---

regulatory change to require wet scrubbers on each affected EGU. Moreover the Congressional record shows that Congress declined to allow intermittent control systems (such as "…load switching from one power plant where dispersion is poor to another where dispersion is more favorable") to qualify as emissions standards - - finding "…these methods are of dubious reliability and enforceability." *See* "Report by the Committee on Interstate and Foreign Commerce to accompany H.R. 6161," 95th Congress, Report No 95-294, at 81-82, (1977). Congress pointed out that, "[e]ven in 1907, it was apparent that pollution must be reduced at its source if injury were to be avoided downstream…And, the only way to minimize pollution and to maximize the potential for long-term economic growth is to achieve continuous reduction of the amount of pollutant *from any source*" (*emphasis added). Id.* at 84 and 86-87.

While Congress removed the reference to requiring a "technological" system in the 1990 CAA Amendments, Congress made clear that this change only reflected its belief that the Acid Rain Program would protect against allowing lower sulfur fuels to displace high sulfur fuels in the market (one concern leading to the 1977 language change) but it did not hint that it changed its expectations that emissions reductions occur at the source.

In fact, Congress viewed the Acid Rain Program as the mechanism to encourage conservation and energy efficiency and control GHGs, not §111. 1990 CAA Leg. Hist. 8338 at 8662-3, and 8677. At the same time Congress created the Acid Rain Program to provide a mechanism for trading allowances, it directed the Administrator to update the EGU NSPS to assure emissions reduction requirements that apply directly to new sources reflect current technology (SCR, low-NOx burners, thermal de-NOx, etc.). *Id* at 8673. Clearly, this shows that Congress understood emissions trading programs but continued to view §111 and the required "system" as a mechanism to reduce emissions directly from the affected facility, and not as an authorization to require displacement or reallocation of production to other emissions sources as part of a "system."

[3] Docket number EPA-HQ-OAR-2013-0602-0419 at 37-38.

[4] In EPA's proposed standard of performance for greenhouse gas emissions from new stationary sources, EPA identified only three factors it must consider 1) amount of emissions reductions; 2) cost; and 3) expanded use and development of technology. 79 FR 1430 at 1465 (Jan. 2014).

[5] *See e.g. New York v. EPA*, 443 F.3d 880 (D.C Cir. 2006).

expected impacts. Instead, as outlined below, EPA used rose-colored glasses to highlight only the positive aspects of its BSER, with regards to each criterion EPA considered.

1. Technical Feasibility

EPA's assumption that building blocks 2, 3, and 4 are technically feasible is based on EPA's finding that the measures are currently in use. For example, EPA states that building block 2 is technically feasible because NGCC units are already providing electricity to the grid and have the capacity to generate additional electricity; building block 3 is technically feasible because renewable energy is well-established and would not impair the reliability of the grid; and Block 4 is technically feasible because state and utilities have demonstrated demand-side energy efficiency. But historical "use" of an individual measure, or even collective measures, does not demonstrate that the collective measures are technically feasible in the specific manner EPA prescribes or at the levels EPA assumes. Indeed, if Congress intended the required analysis to be so simplistic, then there would be no need for regulation at all, because the regulation would do no more than codify what is already in practice.

EPA's proposed rule goes far beyond how these measures are used in practice today, and EPA cannot merely point to historical use to prove the feasibility of its proposed system. EPA must show that it is feasible in the future, and within the timeframe EPA prescribes. EPA must also view technical feasibility, not merely in light of whether the technology is possible, but whether the technology can achieve continuous emissions reductions as required by the CAA. As explained below, EPA's analysis fails in both these respects.

A. EPA has not demonstrated that its BSER is technically feasible, because it has not shown that the natural gas infrastructure is capable of meeting the natural gas demand.

EPA asserts that Arizona can switch all electrical demand currently met with coal-fired EGU's to existing NGCC capacity to meet Arizona's interim goal by 2020. Such a large shift in capacity will require natural gas infrastructure improvements, yet EPA does nothing more than quote past history on the rate of pipeline expansion in the U.S. to justify the technical feasibility of meeting an increased natural gas demand in Arizona and throughout the U.S. While history can be instructive, the mere fact that it was done before, cannot prove that it can be done again. EPA's analysis is conclusory and fails to address numerous aspects of the technical feasibility of such a large supply shift.

First, even assuming that infrastructure improvements are feasible, EPA fails to provide any information on the time needed to obtain rights of ways and permit authorizations, to conduct environmental assessments, and to obtain bank financing, etc. before actual expansion can begin. These delays will hinder or prevent industry from meeting an increased natural gas demand on EPA's timetables.

Second, with regards to its IPM feasibility modeling, EPA used 2012 utilization rates to model the capacity in the system for supply shifts. Yet, 2012 was the lowest utilization rate in the past 10 years, and is not representative of an electric utility system under full demand load. Accordingly, EPA's reliance on the modeled outputs does little to prove its theory.

Third, EPA bases its NGCC capacity analysis on the fact that NGCC operate at higher levels at certain times, and assumes that it could operate in a sustained fashion at this level without risks

to pipeline or transmission capacity. But, pipeline capacity is a delicate balance of storage and peak shaving. And, because a demand level is met during a certain hour of the day, potentially through peak shaving and linepacking, does not provide evidence that the transmission system can sustain this level of capacity for prolonged periods.

Fourth, EPA does nothing more than provide EIA data on current pipeline capacities in the U.S. without providing any information on the amount of residual capacity or the capacity necessary to meet EPA's 70% national NGCC capacity load shift; and, EPA certainly does not show that capacity exists to handle the load shift in Arizona. Indeed, actual available capacity may be far below 100% of named capacity due to bottlenecks in the system. Yet, despite the enormous complexity of the system, RTP located no evidence in the docket that EPA even consulted with FERC, US DOT Office of Pipeline Safety, or the Arizona Corporation Commission (ACC) to determine whether experts in the field agree with EPA's "did it before so we can do it again" philosophy. EPA also fails to consider any other infrastructure expansion needs such as trunklines, compressor stations, peaking storage, etc..

Without conducting a thorough assessment of the actual capacity expansion required to meet EPA's projected demand shift, and the time required to build this capacity, EPA failed to show that its proposed BSER is technically feasible.

B. EPA has not demonstrated that its BSER is technically feasible, because it has not shown that its building blocks achieve continuous emissions reductions.

EPA's approach of citing "historical use" to show technical feasibility of its "system" lacks an essential link to the requirement that the standard of performance reflect an emission limitation – a limit on the quantity, rate or concentration of emissions of air pollutants on **a continuous basis**…" (*emphasis added*.) 42 U.S.C §7602. Accordingly, while a technology may be technically feasible with regards to producing some degree of emissions reduction, it may not be technically feasible as a means to generate continuous emissions reduction. Since the CAA requires continuous emissions reductions, EPA must consider technical feasibility in this context.

EPA readily admits that "renewable EGUs such as wind and solar units … generally operate when wind and sun conditions permit rather than at operators' discretion." 79 FR at 34862. Through this admission, EPA demonstrates the technical ***in***feasibility of renewable energy to serve as a continuous emission reduction measure. This is because the measure cannot provide a continuous assurance of emissions reductions. It can only reduce emissions when operating; it can only operate when weather conditions are favorable; and EPA, States and EGUs cannot control weather variability. The DC Circuit held that a measure must be "reasonably reliable," and in the context of a requirement for "continuous" emissions reductions, renewables lack this reasonable reliability because the amount of emissions reductions expected from the measure vary over time, and a State cannot reliably quantify the emissions reduction in advance.[6]

Similarly, demand-side management lacks "reasonable reliability" of generating continuous emissions reductions. Building block 4 would rely on supply side decreases in electricity demand to generate emissions reductions. Like building block 3, many demand-side changes are temporal in nature. A residential customer might agree to maintain a household thermostat

[6] *Essex Chemical Corp. v. Ruckelshaus*, 486 F.2d 427 (D.C. Cir. 1973).

at 68 degrees during winter months, but this "reduction" is dependent on external temperatures and the length of the winter season. This same customer could, in fact, fail to manage energy use during other months and negate any benefits gained during winter months. An industrial customer might agree to reduce production during high demand periods, but the "reduction" only lasts for the time of the high load demand. While these measures are effective in creating emissions reductions, the reduction is temporal and lacks the permanency and predictability to make the measure "reasonably reliable" for purposes of establishing a §111 emission standard guideline.

Moreover, EPA assumes that the demand side reduction will reduce "fossil fuel" EGU demand, but without mapping the entire electrical system, EPA lacks the accountability to know whether the reduced demand results in actual reductions from a fossil fuel fired EGU or some other form of energy generation. Moreover, given the integrated nature of the electricity grid, EPA is unable to determine if a demand-side measure implemented in Arizona will affect electric demand from utilities located in Arizona. Accordingly, EPA has not demonstrated that block 4 measures are technical feasible in the sense of creating reliable and continuous emissions reductions from fossil fuel EGUs in Arizona or throughout the U.S..

2. Amount of Emissions Reductions

EPA's proposal claims, "…emission reductions from the power sector of approximately 30 percent from CO_2 emission levels in 2005." EPA's estimate of the amount of emissions reduction attributable to its proposed rule is flawed and deceptive because 1) it claims credit for emissions reductions that would occur without the rule; 2) it fails to include emissions increases that occur because of the rule. The following discusses a few ways in which EPA misrepresents the amount of emissions reductions achieved through its proposed BSER.

A. EPA erroneously inflates its estimate of emissions reductions attributable to its proposed BSER by including emissions reductions that would occur irrespective of a final rule.

By using 2005 as the baseline year for comparing emissions changes, EPA claims credit for emissions reductions that already occurred. Since 2005, EPA admits that the electric power infrastructure has experienced demand shifts as the price of natural gas decreased, and renewable displaced some fossil-fuel fired generation. For example, CO_2 emissions from 2005 to 2012 decreased by approximately 17%.[7] By EPA's logic, EPA's could require nothing in its final rule and claim at least a 7% emissions reduction attributable to the rule just by comparing 2005 emissions to its projected base case in 2030.[8]

But EPA's error is more extensive, because emissions reductions from activities in building blocks 2, 3 and 4 would occur absent EPA's rule. A recent study, released by researchers from the University of California and Stanford, modeled effects of changes in the U.S. natural gas supply on GHG emissions. They concluded that increased natural gas availability decreases use of both coal and renewable energy technologies in the future (2013-2055) irrespective of

[7] Total generation was reduced in 2012 which may be related to economic conditions and/or demand-side management programs.

[8] This emission reductions results by comparing EPA's 2005 CO_2 emissions inventory to EPA's estimated CO_2 emissions for the base case in 2030.

any climate regulations.[9] In other words, in the absence of regulation, the increased use of NGCC would occur anyway, but likely at a slower, sustainable pace. Yet, EPA claims credit for all emissions reductions related to building block 2 in its analysis.

EPA continues its shell game by claiming credit for emissions reductions from building block 4. In numerous places throughout the preamble and supporting documents, EPA states with regards to RPS that, "EPA does not expect this anticipated expansion to fall outside the historical norms of deployment or to create unusual pressures for cost increases."[10] In other words, EPA's system will not alter the current course or pace for RPS deployment. RPS system shifts would occur with or without imposition of EPA's "system." Given this eventuality, EPA has not justified inclusion of RPS GHG emissions reductions as a component of its "system." That is, the emissions reductions do not result from the "system," and EPA has not offered evidence showing otherwise. Yet, EPA's entire cost/benefit analysis rests on inclusion of these reductions in its "system" to justify that it meets BSER. In doing so, EPA presents a fabricated and false assessment of the amount of emissions reductions attributable to the proposed rule, and the associated benefits and costs created by its "system."

B. **EPA overestimates the emissions reductions attributable to its proposed BSER by failing to discount expected emissions reductions for foreign exports.**

The Administrator asserts that GHG emissions are a global problem. In this respect, the location of the emissions does not matter; the negative impact of GHG emissions will be realized globally. Yet, in orchestrating a nationwide, premature switch from coal-firing to use of other energy sources in Blocks 2, 3 and 4, EPA has not considered the effect decreased domestic coal use will have on coal exports. EPA raised similar concerns in its own response to FERC's Notice of Intent to Prepare an Environment Assessment for the Planned Cove Point Liquefaction Project which would increase natural gas export capacity.

> Natural gas markets in the United States balance in response to increased natural gas exports largely through increased natural gas production…We believe it is appropriate to consider the extent to which implementation of the proposed project, combined with implementation of other similar facilities nationally, could increase demand for domestic natural gas extraction…[11]

Like natural gas, an intrinsic relationship exists between domestic coal use, production and coal exports. In fact, in the last few years, as domestic use of coal steadily declined, coal exports steadily increased. Data from the EIA shows an 18% decline in domestic coal used for electric power users from the period 2005 to 2013. Yet, over this same period, coal exports increased by over 67 million tons. This increase represents approximately 16% of the domestic decrease from power users.[12] As EPA's "system" approach drives the price of coal further down,

---

[9] *See* Shearer, Christine, *et.al.,* "The effect of natural gas supply on US renewable energy and CO2 emissions," Environmental Research Letters, (Sept. 2014). Available at: http://iopscience.iop.org/1748-9326/9/9/094008/article.

[10] *See e.g.* 79 FR at 34869.

[11] *See* Memorandum from Jeffrey D. Lapp, Associate Director Office of Environmental Programs, United States Environmental Protection Agency, Region III *to* Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, November 15, 2012. (FERC Docket No. PF12-16-000, Accession No. 20121116-5007). Available at: http://elibrary.ferc.gov/idmws/file_list.asp?document_id=14068573.

[12] *Compare* Total Consumption Excel Data Spreadsheet *to* Export Quantity from total World Excel Data Spreadsheet, from US Energy Information Administration, Sept. 8, 2014. In 2005, electric sources used 2.3 billon tons of coal, while in 2013 this figure decreased by approximately 415 million tons to 1.9 million

domestic coal will become even more competitive in foreign markets, and thus one expects that coal exports will continue to increase, and it is unreasonable for EPA to assume that IPM projected reductions in coal mining and demand shifts represent real GHG emissions reductions.

Researchers at the University of Manchester estimate that from 2008-2011, the U.S. avoided 650 $MtCO_2$ through decreases in coal use, yet 340 $MtCO_2$ were emitted overseas instead.[13] This means that potential emissions decreases from shifts in coal use may be overstated by as much as 50 percent, because of an overseas shift in coal exports. EPA cannot pretend that it has properly considered the "amount of emission reductions" from its "system" when it ignores this critical information.

EPA emissions estimates attributed specifically to building block 2 are equally suspect. EPA uses its IPM model to predict emissions decreases from building block 2 through an increase in natural gas use by 2020 with a corresponding expansion in the natural gas development infrastructure. Then, EPA predicts that natural gas use will decline below baseline levels ten years later and produce emissions reductions from an upstream decrease in emissions. EPA has not explained how natural gas producers will re-capture the costs of infrastructure expansion over a 10 year timeframe, and why developers would suddenly abandon this increased capacity. Logic dictates that they would not. Once capacity expands, that capacity will be used, if not domestically, then through foreign exports. Accordingly, EPA's GHG emissions assessment, based on a declining upstream GHG emissions from NGCC use in the later years of its "system," are not reliable because the system does not measure how its system promotes increased foreign exports of natural gas.

Moreover, as EPA manipulates the domestic coal and gas market to further its agenda, it actually increases the GHG footprint associated with both coal-firing and natural gas by driving up GHG emissions that occur at the front end of the delivery system (e.g. far more energy will be expanded to ship coal and natural gas overseas than would occur if the resources were used domestically.) Since, however, EPA's assessment does not include transportation and mobile source GHG emissions, its assessment fails to capture these GHG emissions increases. The shift also accomplishes little with respect to decreasing GHG emissions reductions from the backend of the lifecycle, it merely shifts those emissions overseas. Thus, EPA grossly inflated the GHG emissions reductions that would occur in this part of the system.

C. EPA underestimates the emissions increases attributable to its proposed BSER by excluding known sources of GHG emissions from its analysis.

EPA readily admits that it omitted significant GHG emission sources from its analysis. "Not included are vented and fugitive CO_2 emissions from natural gas systems, such as vented CO_2 emissions removed during natural gas processing, or energy-related CO_2 such as emissions from stationary or mobile combustion."[14] Natural gas exploration and drilling activities can produce a large quantity of GHG emissions in the form of methane - - a more potent GHG than

---

tons (electric power; electric utility; independent power producers; electric utility non-cogen and electric utility cogen). While over this same period, coal exports increased by 67 million tons.

[13] *See* Broderick, John *and* Anderson, Kevin, "Has US Shale Gas Reduced CO2 Emissions?" TyndallManchester Climate Change Research, October 2012. Available at: https://www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man-scw:211539&datastreamId=FULL-TEXT.PDF.

[14] RIA at 144.

CO_2. Many have engaged in life-cycle analysis to quantify the difference in use of these two natural resources.[15] Scientists have concluded that natural gas results in substantially higher GHG emissions compared to coal when looking at the front-end (extraction and delivery) of the life cycle. Although early works on life-cycle analysis suggested that natural gas showed a lower GHG footprint on the back-end of the life cycle compared to coal, today, with EPA's recent changes to both the emissions factors and global warming potentials of the GHG pollutants, these life cycle analyses would show that there is no clear advantage in using gas over coal in the long term.[16,17] Accordingly, by omitting key sources of emissions, EPA failed to conduct a meaningful assessment of the real GHG emissions reduction potential of its "system."

EPA's BSER requires rapid expansion of gas pipeline capacity to supply the natural gas demand for its proposed BSER. Even without EPA's rule, as natural gas availability increases in the U.S., infrastructure expansions are inevitable, but EPA's artificially-imposed deadline compromises industry's ability to plan and employ the most effective mitigation strategies. In this respect, EPA utterly fails to consider the premature GHG impacts (and environmental impacts) that tearing down trees (an important GHG sink) to lay new pipeline will cause. In EPA's words, "Removal of trees, shrubs, and other vegetation…can take up to 20 years or more [to regenerate] making the construction impacts to these resources long term and in some cases permanent."[18] Here, the life cycle analysis would show a substantial difference between coal and natural gas in that much of the environmental damage from existing coal mines already occurred at some time in the past. Yet, EPA's BSER would throw away the remaining useful life of the mine and the benefits to be gained for the price already paid (both economic and environmental), and create new GHG emissions impacts over an artificially shortened timeframe.

EPA also failed to include emissions increases from building block 3 in its assessment. While the lifecycle impact of renewable energy is likely lower than coal and natural gas, it is not negligible. "Most estimates of life-cycle emissions for photovoltaic systems are between 0.07 and 0.18 pounds of carbon dioxide equivalent per kilowatt-hour." [19] "Most estimates of wind turbine life-cycle global warming emissions are between 0.02 and 0.04 pounds of carbon dioxide equivalent per kilowatt-hour."[20]

---

[15] *See e.g.* Mark Fulton, *et al.,* "Comparing Life-Cycle Greenhouse Gas Emissions from Natural Gas and Coal," Worldwatch Institute, Aug. 25, 2011, *and* Timothy Sloan, *et. al., "*What is the life cycle GHG footprint of domestic natural gas extraction and delivery to the large end-users?" National Energy Technology Laboratory, date unknown.

[16] *See "Leaking Profits,"* Susan Harvey, *et.al.,* Natural Resource Defense Council, Mar. 2012.

[17] Robert W. Howard *et.al.,* "Methane and the Greenhouse-Gas Footprint of Natural Gas from Shale Formations," DOI 10.1007/s10584-011-0061-5, Springerlink.com, Mar. 13, 2011.

[18] *See* memorandum from Christine B. Reichgott, Manager, Environmental Review and Sediment Management Unit, United States Environmental Protection Agency, Region 10, *to* the Honorable Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, "SCOPING COMMENTS - The Oregon LNG Export Project and Washington Expansion Project. EPA Region 10 Projection Number: 12-0055-FRC. FERC Docket NOs.PF12-18-000 and FP12-20-000." Dec. 26, 2012. Available at: http://www.fossil.energy.gov/programs/gasregulation/authorizations/2012_applications/sierra_exhibits_12_101_lng/Ex._08_-_EPA_OR_LNG_Scoping_Comments.pdf.

[19] *See e.g. "*Environmental Impacts of Solar Power" available at: http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-solar-power.html#.VC2UUWd0yUk.

[20] *See e.g.* Environmental Impacts of Wind Power" available at http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-wind-power.html#.VC2XnWd0yUk.

EPA simply failed to conduct a realistic assessment of the amount of emissions reductions attributable to its proposed BSER by excluding these GHG emissions increases in its "system" analysis. EPA recommended disclosure of "GHG emissions and climate change effects resulting from the proposed Oregon LNG Export project during all project phases, including 1) preconstruction (e.g. transportation, mobilization, and staging), 2) construction, (3) operation, (4) maintenance, and (5) decommissioning." [21] Yet, here EPA would march forward with blinders to claim GHG emissions reduction benefits for the outcome it wishes to promote, but fails miserably at justifying it in light of the known GHG emissions increases its "system" will create.

D. EPA failed to justify the approach it selected for analyzing upstream GHG impacts associated with its proposed BSER.

In conducting its upstream GHG impacts assessment, EPA's RIA explains that it used the methodology developed for the Sixth US Climate Action Report to estimate upstream impacts of its proposed BSER. But, other than stating that this methodology underwent public review, it provides no explanation on why it selected this particular methodology. Indeed, EPA recommended use of a different approach in comments to FERC.

> We recommend that FERC establish reasonable spatial and temporal boundaries for the analysis of GHG emissions, and that the FEIS quantify and consider the lifecycle GHG emissions associated with the proposed action. The methodologies for conducting that analysis are available and well developed; FERC could draw on good examples of lifecycle GHG emissions done in NEPA analyses by other federal agencies….We recommend the FEIS consider the extent to which the implementation of the proposed project could increase the demand for domestic natural gas extraction; as well as the environmental impacts associated with the potential increased production of natural gas.[22]

Moreover, others have undertaken more complete lifecycle analyses that include contributions from transportation.[23] In absence of an explanation on how EPA selected its methodology over other available approaches, EPA's selection is arbitrary and capricious, and fatally lacking in completeness - - making all of its GHG emissions estimates unreliable.

Curbing climate change is too important, for EPA to act with tunnel vision. "EPA must consider the amount of emissions reductions that the system would generate."[24] EPA's proposal leaves a colossal void in this respect, because it fails to even attempt to consider large amounts of GHG emissions increases in its "system" assessment. Accordingly, EPA has not shown that its proposed "system" satisfies its second criteria for defining the "best system."

3. Reasonableness of Cost

---

[21] *Id.*

[22] *See* Memorandum from Debra A. Griffin, Associate Director, Compliance Assurance and Enforcement Division, Region 6 U.S. EPA *to* Kimberly D. Bose, Federal Energy Regulatory Commission, "RE: Cameron LNG, LLC and Cameron Interstate Pipeline Draft Environmental Impact Statement," (March 3, 2014) (FERC Docket No. CP13-25-000, Accession No. 20140328-0021. Available at: http://elibrary.ferc.gov/idmws/file_list.asp?document_id=14198869.

[23] *See* Fulton at 25.

[24] *See* required criteria for a "best system," EPA's legal memorandum at 39-40.

RTP did not conduct an analysis of EPA's cost assessment but notes two apparent issues with EPA's analysis. First, because EPA grossly overestimated the emissions reductions attributable to its BSER, it correspondingly failed to accurately assess the cost effectiveness of the rule. In failing to properly assess the cost of the rule, EPA could not present a supportable argument on the reasonableness of the cost.

Second, EPA's cost analysis is further flawed because it failed to consider lost revenue in its analysis. In EPA's proposed rule for standards of performance for GHG emissions from new EGUs, EPA stated that a proper cost analysis must consider "revenue enhancement." Revenue enhancement is "generated by the sales of any by-products of the control process." 79 FR 1430 at 1464. Because EPA considers revenue enhancement an essential cost offset, it likewise must consider lost revenue of saleable by-product a cost deficit. For example, while EPA identifies reduced solid waste from coal combustion, it fails to also consider the loss of revenue from coal ash sales.

4. Technological Development

In EPA's proposed NSPS for EGUs, EPA cites "expanded use and development of technology" as a criteria for defining a "best system." 79 at 1430 at 1465. In EPA's ESPS proposal, EPA calls this criteria "promotion of implementation and development of technology" and states that the Administrator weighed this criteria "heavily" in her decision-making. 79 at 34890. But, EPA's explanation of this specific criteria is deceptive as neither Congress nor the Courts have included "expanded use" of existing technology in describing the technology-forcing goal of §111 (except with respect to technology transfer[25]). Instead, Congress and the Courts have focused on promoting (or not discouraging) innovative technologies.

In 1977, Congress specifically found that the Administrator's 1970 CAA implementation of §111 "operate[s] as a disincentive to the improvement of technology for new sources." And, it sought to change the CAA to assure vendors of new technologies that there would be a market for their product. [26] Much of the discussion in the Congressional record for both the 1977 and 1990 CAA Amendments shows that Congress' vision for encouraging innovative technologies would generate clean, coal-burning alternatives. In other words, Congress intended the promotion of new technology for the affected source, and did not specifically identify "expanded use" of technology for sources outside the affected source as a driving criteria for innovative technology development under §111.

But even if EPA's interpretation of this criterion is permissible, EPA's application in this proposed rule is arbitrary and capricious, because 1) the EPA applies circular logic in evaluating this criterion to justify the chosen "system" as "BSER;" and 2) EPA fails to consider how its BSER creates disincentives for technology innovation at coal-fired EGUs. The following discusses these failures.

A. EPA's consideration of "promotion of implementation and development of technology" is conclusory and unsupported and does not serve to show that its proposed BSER is "best."

EPA's consideration of "promotion of implementation and use of technology" entails its declaration that its chosen BSER requires use of technology and therefore it satisfies the BSER

[25] Technology transfer occurs when an undemonstrated technology is applied to a new type of source.
[26] Report 95-294 at 186-7.

criteria for promoting technology. The extent of EPA's discussion of this pre-eminent criteria in the proposed rule includes the following statements:

- "Building block 1 encourages the spread of more advanced technology to EGUs currently using components with older designs";
- "Building block 2 promotes greater use of the advanced NGCC technology installed in the existing fleet of NGCC units";
- "The renewable measures in building block 3…encourage technological innovation in improved renewable technologies as well as more extensive deployment of current advanced technologies" ; and,
- "Creating incentives for additional demand-side energy efficiency is also consistent with the goals of encouraging technological innovation in energy efficiency and encouraging deployment of current advanced technologies." 79 FR 34881-34884.

In sum, EPA's argument for supporting its proposed BSER as meeting this criteria is - - we are requiring it, so it is best.

If EPA is to apply such an overly broad interpretation of this criteria, it must do so in a manner that does not rely on circular logic, but instead, allows one potential approach to be distinguished from another, based on how each differs with respect to the criteria. Because any approach would satisfy EPA's approach of – it is because we say it is - EPA has not supported its proposed BSER as "best" in light of this criterion.

Moreover, EPA's statements are demonstratively false with regards to building blocks 2, 3, and 4. As previously stated, deployment of advanced NGCC is ongoing and would occur absent this rule - - just at a pace that is sustainable from an economic and environmental perspective. In fact, studies show that increased availability of natural gas is the driving force for NGCC deployment.[27] As discussed previously, EPA concedes that its BSER will not alter the rate of deployment of renewable energy. Finally, EPA also admits that "[g]reater demand-side energy efficiency is already a common policy goal among states." In light of these statements, EPA has not provided compelling support for how its proposed BSER drives technology improvements.

B. EPA's system is not the best "system" because it fails to promote technological innovation for coal-fired EGUs, a required element of a "best system."

Contrary to EPA's assertion, EPA's proposed BSER could not be more short-sighted in failing to promote technological innovation and effective control measures for the affected sources, and as such, it does not meet this basic requirement for a standard of performance. From cradle to grave, natural gas has numerous points in the system that result in GHG emissions- - from drilling, to compressor stations, to gas line leaks, to storage tanks, to name only a few. On the other hand, coal has two non-trivial points of GHG emissions – the fugitive emissions from the mine and non-fugitive emissions from the EGU related to combustion. In this respect, coal presents much greater opportunity to reduce GHG emissions through future technological innovation because of the ability to research within this limited focus.

In contrast, EPA does not yet even understand the nature and magnitude of the GHG emissions from natural gas production. The EPA's Office of Inspector General "underscored the need for

[27] *See* Shearer, Christine, *et.al.*. (Sept. 2014).

EPA to gain a better understanding of emissions and risks" from natural gas production.[28] EPA cannot pretend that its "system" promotes technological innovation over the compliance horizon, when ordinarily one must first study the problem before solving it - - meaning EPA is a long way from developing solutions for natural gas GHG emissions. Rather than investing in solutions aimed at controlling emissions from two known and well-characterized emissions points, which could eventually lead to significantly lower GHG emissions from coal-fired EGUs, EPA's proposed BSER would phase out use of coal all together in Arizona. This is hardly technologically innovative.

Congress made clear its expectations with regards to research and development, "Finally, it establishes firmly that research and development on control technology is to be focused on recycling of pollutants and confined and contained disposal of pollutants, and not on ways of putting pollutants into the ambient environment." [29] Moreover, Congress clearly expressed concern that measures such as load switching could "stifle research and development efforts by utilities, and emissions control equipment vendors, to find methods for the clean burning or pretreatment of coal."[30] EPA cannot claim that it properly considered "promotion of implementation and development of technology" when it provided no consideration to the way in which its proposed BSER creates disincentives for further technology developments for the affected facility.

5. Energy Impacts

Legislative history makes clear Congress' expectations with regards to defining a system, "[T]he Administrator should take into consideration all of the processing steps performed on a material from its natural state through to final usage in determining the requirements under this section for a technological continuous emissions reduction system." [31] "The term 'best system' necessarily involves consideration of factors such as water and land impacts of the system."[32] And, "new technology should not be encouraged if it would solve one pollution problem by creating a greater one."[33]

It is manifestly apparent, however, that in defining is fifth criterion as "energy impacts"-only, EPA gives short shrift to expressed statutory language that requires the Administrator to consider ***any*** non-air quality health and environmental impacts and energy requirements before determining that a "system" qualifies as the best. Like EPA's GHG emissions reductions assessment, EPA's environmental, energy and other factors assessment could not be shoddier and fails to meet Congress' documented expectations for a "system." The following discusses EPA's failure to meet its statutory obligation for considering "any non-air quality health and environmental impacts and energy requirements."

A. EPA failed to show that its proposed "system" is the "best system," because EPA did not properly account for non-air quality health and environmental impacts, and other factors in defining its "system."

---

[28] "EPA Needs to Improve Air Emissions Data for the Oil and Natural Gas Production Sector," U.S. Environmental Protection Agency, Office of Inspector General, Report No. 13-P-0161, Feb. 20, 2013.
[29] Senator Muskie, Cong. Rec. Senate 19183, June 12, 1973.
[30] Report 95-294 at 87-88.
[31] *Clean Air Act Amendments of 1977, Committee on Interstate and Foreign Commerce; Report No.* 95-294; p 189, May 12, 1977.
[32] *Id.* at 190.
[33] *Id.* at 197.

EPA gives nothing more than lip service to this statutory mandate and does not even identify non-air quality health and environmental impacts as an important criterion in its decision-making. The following appears to represent the sum total of statements the Administrator makes with regards to these considerations (79 FR 34881-34884):

1. Heat-rate improvements cause fuel to be used more efficiently reducing the volumes of and therefore the adverse impacts associated with disposal of coal combustion solid waste products.
2. Coal combustion for electricity generation produces large volumes of solid wastes that require disposal, with some potential for adverse environmental impacts: these wastes are not produced by natural gas combustion.
3. NGCC units generally require less cooling water than steam EGUs.
4. Generation from wind turbines does not produce solid waste or require cooling water, a better environmental outcome than if that amount of generation had instead been produced by a typical range of fossil fuel-fired EGUs.
5. Nuclear poses unique waste disposal issues (although avoids the solid waste issues specific to coal-fired generation). We do not consider that potential disadvantage of nuclear generation relative to fossil fuel generation as outweighing nuclear generation's other advantages as an element of building block 3.
6. Demand-side energy efficiency avoids the non-air health and environmental effects of the fossil fuel-fired generation for which it substitutes.

EPA cannot turn its head to known impacts from its "system" and pretend they do not exist. The statute requires EPA to consider "any" non-air quality health and environmental impact, and EPA has not discussed known impacts.

For example, EPA notes with respect to building block 2 that NGCC combustion does not produce solid waste and uses less cooling tower water than coal combustion. But, in fact, natural gas extraction creates solid waste, contributes to ozone formation, and carries risks of potential groundwater contamination.[34] Land disturbance and noise pollution are other known impacts. EPA recognized these impacts in its comments on the Oregon LNG Export Project and Washington Expansion Project. " Construction, operation, and maintenance of a buried natural gas pipeline may impact sources of drinking water…could propagate invasive species…cause or be affected by increased seismicity in tectonically active zones….displace ...bird and wildlife species…etc.," but EPA does nothing here to consider these impacts.[35] Moreover, EPA merely makes a conclusory statement that hazardous waste generated by nuclear electric production is better than the solid waste generated from coal electric production

[34] *See e.g.* Tom Meyers, "Potential Contamination Pathways from Hydraulically Fractured Shale to Aquifers," Ground Water, Volume 50, Issue 6, pages 872-882, November/December 2012.; *and* Marco A. Rodriguez *et. al, "*Regional Impacts of Oil and Gas Development on Ozone Formation in the Western United States," Air and Waste Management, 59:111-1118, Sept. 2009.

[35] *See* memorandum from Christine B. Reichgott, Manager, Environmental Review and Sediment Management Unit, United States Environmental Protection Agency, Region 10, *to* the Honorable Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, Dec. 26, 2012.

without any evidentiary support. Such unsupported, conclusory statements are not entitled to any deference, and highlight the arbitrary and capricious nature of EPA's proposal.

While EPA tries to hide these deficits by touting benefits from reducing other criteria pollutant emissions (which does not qualify as a proper assessment of **non-air** quality health and environmental impacts), it is unclear whether EPA's assessment considers upstream criteria pollution emissions increases from the natural gas sector and renewable energy sources in its system. For example, it appears EPA did not consider that drilling rigs can produce substantial NOx emissions (13- 15 tons NOx/well) and that its "system" may promote more rapid drilling of thousands of exploratory and production wells. Drilling is also required to install offshore windmills. It appears that EPA also did not consider the fugitive emissions impacts from increased road traffic associated with natural gas development. In some areas of the country, fugitive emissions from natural gas development represents a significant component of the PM10 emissions inventory.[36] EPA cannot tout its proposed BSER as "promoting implementation and development of [these] technologies," and then at the same time, fail to consider the known impacts of implementation. EPA's logic is inherently flawed in this regard.

It also appears that EPA did not consider water impacts and hazardous waste production from increased Solar PV cells production. Concentrated Solar Thermal Plants (CSP), with wet-recirculating technology, withdraw between 500 and 800 gallons of water per megawatt-hour of electricity produced for use in cooling towers - - the same amount as a coal-fired or nuclear power plant.[37] Many of the regions in the United States that have the highest potential for solar energy also tend to be those with the driest climates, so production in these areas will stress water resources, or alternatively require production in alternative locations that increase the cost and impact of transporting the cells onsite.

And, while EPA claims an environmental benefit from reduced solid waste disposal from coal combustion, EPA again fails to look at the consequences of this outcome. In fact, reducing availability of coal ash can negatively affect the GHG emissions footprint of other industries. In February 2014, EPA released the following statement about coal ash:

> Using a newly developed methodology, the U.S. Environmental Protection Agency (EPA) today released its evaluation of the two largest beneficial uses of encapsulated coal combustion residuals (CCR or coal ash): use in concrete as a substitute for portland cement, and the use of flue gas desulfurization gypsum as a substitute for mined gypsum in wallboard. EPA's evaluation concluded that the beneficial use of encapsulated CCRs in concrete and wallboard is appropriate because they are comparable to virgin materials or below the agency's health and environmental benchmarks.
>
> These two uses account for nearly half of the total amount of coal ash that is beneficially used.
>
> "The protective reuse of coal ash advances sustainability by saving valuable resources, reducing costs, and lessening environmental impacts, including

[36] "Oil and Gas Mobile Sources Pilot Study," Prepared for U.S. EPA, Project Number 06-20443, July 2011.
[37] "Utility-Scale Solar Power Responsible Resource Management," Solar Energy Industries Association, Mar. 2010.

> reducing greenhouse gas emissions," said Mathy Stanislaus, assistant administrator for EPA's Office of Solid Waste and Emergency Response.[38]

In view of these statements, EPA cannot claim a benefit from reducing solid waste without considering 1) the impact decreased solid waste generation could have on increasing GHG emissions from the Portland cement and gypsum wallboard industries, and 2) other environmental impacts that could result if these industries are forced to rely on less environmentally-suitable material in cement and wallboard. These are precisely the kinds of considerations the DC Circuit has ordered EPA to conduct in the past. "The Administrator should consider, as a matter of economic costs, contentions and presentations submitting that the standard as adopted unduly precludes supply of cement, including whether it is unduly preclusive as to certain qualities, areas, or low-cost supplies.[39]

These are just a few examples in ways EPA's assessment is unclear on how and if EPA considered impacts from its energy demand shifts. Again, EPA's impacts assessment appears to fail even the lowest standard for acceptability, and EPA may not proceed to finalize an existing source performance standard, until it conducts this assessment and allows for public comments on its proposed conclusion.

38

http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceeac8525735900400c27/6a5375ff509189a185257c7800562d51!OpenDocument

[39] *See* *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 388 (D.C. Cir. 1973).