

**BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of The Application of Moraine)
Wind LLC for Certification as an Eligible Ohio) Case No. 21-516-EL-REN
Renewable Energy Resource Generating)
Facility.)

In the Matter of The Application of Rugby)
Wind LLC for Certification as an Eligible Ohio) Case No. 21-517-EL-REN
Renewable Energy Resource Generating)
Facility.)

In the Matter of The Application of Elm Creek)
II for Certification as an Eligible Ohio) Case No. 21-531-EL-REN
Renewable Energy Resource Generating)
Facility.)

In the Matter of The Application of Buffalo)
Ridge II for Certification as an Eligible Ohio) Case No. 21-532-EL-REN
Renewable Energy Resource Generating)
Facility.)

In the Matter of The Application of Barton)
Windpower 1 for Certification as an Eligible) Case No. 21-544-EL-REN
Ohio Renewable Energy Resource Generating)
Facility.)

**REPLY COMMENTS
OF
BLUE DELTA ENERGY, LLC**

Respectfully submitted,

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In the Matter of The Application of Moraine Wind LLC for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility.	)	Case No. 21-516-EL-REN
	)	
In the Matter of The Application of Rugby Wind LLC for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility.	)	Case No. 21-517-EL-REN
	)	
In the Matter of The Application of Elm Creek II for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility.	)	Case No. 21-531-EL-REN
	)	
In the Matter of The Application of Buffalo Ridge II for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility.	)	Case No. 21-532-EL-REN
	)	
In the Matter of The Application of Barton Windpower 1 for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility.	)	Case No. 21-544-EL-REN
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**REPLY COMMENTS
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I. INTRODUCTION

The Staff of the Public Utilities Commission of Ohio (Commission) properly applied the deliverability test adopted by the Commission in *In the Matter of Koda Energy LLC* (the *Koda*

Test)¹ to determine that each of the facilities at issue in the above-captioned cases properly qualifies for certification as a renewable energy (REN) resource generating facility in Ohio. Applicants Moraine Wind LLC, Rugby Wind LLC, Elm Creek II Wind LLC, Barton Windpower 1, and Buffalo Ridge II Wind LLC and/or its parent company, Avangrid Renewables, LLC, (collectively, the Applicants) submitted REN certification applications with the Commission (Applications).² In each of the Applications, the Applicants demonstrated that they meet the requirements for REN certification established by R.C. 4928.64(B)(3) and Ohio Adm.Code 4901:1-40-01(F) and 4901:1-40-04.

To obtain REN certification for an out-of-state facility, such as the facilities at issue in the Applications, an applicant must meet three statutory requirements. The Application must concern a facility that represents a “renewable energy resource,” including wind energy.³ The renewable energy resource must also meet the applicable placed-in-service requirement of January 1, 1998.⁴ Lastly, the energy from the facility must be deliverable into Ohio.⁵ For energy from states not contiguous to Ohio to satisfy this requirement requires “a demonstration that the electricity is

¹ *In the Matter of the Application of Koda Energy LLC for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 09-0555-EL-REN (*Koda*), Finding and Order (Mar. 23, 2011).

² *See In the Matter of The Application of Moraine Wind LLC for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-516-EL-REN, Application (Apr. 30, 2021) (Moraine Application); *In the Matter of The Application of Rugby Wind LLC for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-517-EL-REN, Application (Apr. 30, 2021) (Rugby Application); *In the Matter of the Application of Elm Creek II for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-0531-EL-REN, Application (May 3, 2021) (Elm Creek Application); *In the Matter of The Application of Buffalo Ridge II for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-532-EL-REN, Application (May 3, 2021) (Buffalo Ridge Application); and *In the Matter of The Application of Barton Windpower 1 for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-544-EL-REN, Application (May 4, 2021) (Barton Application).

³ *See* R.C. 4928.01(A)(37)(ii); Ohio Adm.Code 4901:1-40-04(A)(2); Ohio Adm.Code 4901:1-40-04(C)(2).

⁴ *See* R.C. 4928.64(A)(1)(a); Ohio Adm.Code 4901:1-40-04(A)(2); Ohio Adm.Code 4901:1-40-04(C)(2).

⁵ *See* R.C. 4928.64(B)(3); Ohio Adm.Code 4901:1-40-04(C)(2).

physically deliverable to the state.”⁶ The Commission determines physical deliverability through the *Koda* Test, which requires “a demonstration of delivery via a powerflow study and/or deliverability study...although not to the extent of requiring signed contracts.”⁷

As explained in Blue Delta’s initial comments, the Applications demonstrate, and Commission Staff correctly determined, that each of the facilities is a wind resource that meets the placed-in-service requirement, thereby satisfying the first two requirements.⁸ To satisfy the third requirement, the Applicants requested for each of the facilities a distribution factor (DFAX) or power flow study from PJM Interconnection, L.L.C. (PJM),⁹ the Regional Transmission Organization (RTO) for Ohio. Each of the facilities is located in a state that is within the Midcontinent Independent System Operator, Inc. (MISO), an Ohio-adjacent RTO that is interconnected with PJM. The Applicants then submitted the results of these studies to Staff.

To satisfy the *Koda* Test, Staff requires that a DFAX study demonstrate an “absolute value of the impact on a transmission line in Ohio...greater than 5% and greater than 1 MW.”¹⁰ In *Koda*, the Commission reviewed the test, initially proposed by Staff, and determined that Staff’s methodology and deliverability criteria “are reasonable and should be adopted.”¹¹ The test has become to be known as the *Koda* Test, named after the first proceeding in which it was applied.¹²

⁶ Ohio Adm.Code 4901:1-40-01(F) (emphasis added).

⁷ *In the Matter of the Commission’s Review of its Rules for Energy Efficiency Programs Contained in Chapter 4901:1-39 of the Ohio Administrative Code*, Case Nos. 12-2156-EL-ORD, *et al.*, Finding and Order at ¶ 181 (Dec. 19, 2018).

⁸ *See, e.g.*, Moraine Application, Staff Report at 3 (Aug. 20, 2021) (Moraine Staff Report); Rugby Application, Staff Report at 3 (Aug. 20, 2021) (Rugby Staff Report); Elm Creek Application, Staff Report at 3 (Aug. 20, 2021) (Elm Creek Staff Report); Buffalo Ridge Application, Staff Report at 3 (Aug. 20, 2021) (Buffalo Ridge Staff Report); Barton Application, Staff Report at 3 (Aug. 20, 2021) (Barton Staff Report).

⁹ *Koda*, Staff Review and Recommendation at 4 (Feb. 28, 2011).

¹⁰ *Id.* at 6-7.

¹¹ *Koda*, Finding and Order at ¶ 8.

¹² *Id.*

Commission Staff applied the *Koda* Test to each of the facilities at issue in the Applications. When doing so, Staff looked for both the highest value for a transmission line with *either* a start or end point in Ohio, and the highest value for a transmission line with *both* a start or end point in Ohio.¹³ Even when taking the lower of each value, Staff correctly concluded that all of the five out-of-state facilities satisfy the third criterion regarding deliverability as the facilities have a greater than five percent DFAX value and are greater than 1 MW.¹⁴ Accordingly, Staff recommended REN certification for each of the Applications pursuant to R.C. 4928.64(B)(3) and Ohio Adm.Code 4901:1-40-01(F) and 4901:1-40-04. Blue Delta Energy, LLC (Blue Delta) continues to support Staff's recommendations and the application of the *Koda* Test to certification applications such as the five in the above-captioned proceedings.

Carbon Solutions Group, LLC (CSG), on the other hand, seeks to challenge the Commission's application of the *Koda* Test. On May 7, 2021, CSG simultaneously sought to intervene in all five of the REN certification Applications, opposing certification.¹⁵ For the purpose of enhancing its profits and that of its clients, CSG seeks to challenge Commission precedent regarding the certification under Ohio Adm.Code 4901:1-40-04(D) of numerous renewable energy resource generating facilities in Ohio, including the five Applications in the above-captioned

¹³ See Applicants Comments, Attachment A, Expert Report at ¶ 4.1.1 ("The DFAX impact column contains two values. The first value is the highest DFAX for the case where either the start or end of the line is in Ohio. The second value is the highest DFAX for a transmission line which has both a starting point and end point in Ohio."); *id.* at ¶ 4.2.1 ("The MW impact column contains two values. The first value is based on the highest DFAX for the case where either the start or end of the line is in Ohio. The second value is based on the highest DFAX for a transmission line which has both a starting point and end point in Ohio.").

¹⁴ Moraine Staff Report at 2; Rugby Staff Report at 2; Elm Creek Staff Report at 2; Buffalo Ridge Staff Report at 2; Barton Staff Report at 2.

¹⁵ See Motion to Intervene, Motion to Consolidate, and Motion to Establish a Procedural Schedule of Carbon Solutions Group, LLC (May 7, 2021) (CSG Motion).

cases.¹⁶ CSG’s proposal would arbitrarily deny certification to a number of out-of-state applicants, while allowing CSG’s facilities or those of its clients to benefit by limiting the number of renewable energy credits (RECs) available in Ohio and therefore increasing the prices of their RECs. This would give CSG unreasonable market power at the expense of its competitors and Ohio load serving entities, with these costs eventually being passed through to Ohio electric customers.

In light of CSG’s challenge, the Commission invited “interested persons” to file comments in response to Staff’s recommendations in these cases.¹⁷ In addition to the Applicants,¹⁸ Blue Delta,¹⁹ 3Degrees Group Inc. (3Degrees),²⁰ and CSG²¹ each filed initial comments. Whereas Blue Delta, 3Degrees, and the Applicants all argued in favor of certification, CSG opposed certification and the Staff recommendations.

After reviewing the Applications, the Staff Review and Recommendations, the DFAQ studies, and the comments filed in the above-captioned cases, Blue Delta continues to support Staff’s use of the *Koda* Test and concurs with Staff’s conclusions and recommendations in the

¹⁶ See CSG Motion; see also *In the Matter of The Application of Wessington Wind Farm for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-110-EL-REN, Motion for Leave to Intervene Out of Time, Motion to Consolidate, and Motion to Establish a Procedural Schedule of Carbon Solutions Group, LLC (Apr. 7, 2021); *In the Matter of The Application of Buckeye Wind Energy Center for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-163-EL-REN, Motion to Intervene, Motion to Consolidate, and Motion to Establish a Procedural Schedule of Carbon Solutions Group, LLC (Apr. 7, 2021); *In the Matter of The Application of Marshall Wind Farm for Certification as an Eligible Ohio Renewable Energy Resource Generating Facility*, Case No. 21-162-EL-REN, Motion to Intervene, Motion to Consolidate, and Motion to Establish a Procedural Schedule of Carbon Solutions Group, LLC (Apr. 7, 2021).

¹⁷ See Entry at ¶ 9 (Oct. 19, 2021).

¹⁸ See Comments of Applicants Moraine Wind, LLC, Rugby Wind, LLC, Elm Creek Wind II, LLC, Buffalo Ridge II, LLC, Barton Windpower, LLC, and Avangrid Renewables, LLC (Nov. 18, 2021) (Applicants Comments).

¹⁹ See Comments of Blue Delta Energy, LLC (Nov. 18, 2021) (Blue Delta Comments).

²⁰ See Initial Comments of 3Degrees Group, Inc. to the Review and Recommendation (Nov. 18, 2021) (3Degrees Comments).

²¹ See Initial Comments of Carbon Solutions Group, LLC (Nov. 18, 2021) (CSG Comments).

above-captioned proceedings regarding such application of the *Koda* Test. The *Koda* Test allows the Commission to accurately determine physical deliverability, and demonstrates that the facilities produce energy that is deliverable into the state. Pursuant to the longstanding application of the *Koda* Test, as the Staff concluded, energy from each facility is deliverable into the state pursuant to R.C. 4928.64(B)(3) and Ohio Adm.Code 4901:1-40-01(F) and 4901:1-40-04. Each facility, therefore, meets the three statutory requirements, and should be granted REN certification.

II. REPLY COMMENTS

In its initial comments, CSG claims that it “did not intervene in these cases to challenge the *Koda* test or certification process.”²² CSG also contends that “Staff’s approach is not at all consistent with *Koda*.”²³ Contrary to CSG’s unfounded claims, Staff has consistently applied the same methodology for years. In *Koda*, the Commission stated that facilities from non-contiguous states could demonstrate physical deliverability across transmission lines by means of power flow studies.²⁴ In the Review and Recommendations that Staff submitted in response to each Application, Staff noted that the Applicants “provided a DFAX power flow study which was performed by PJM Interconnection, LLC” to demonstrate physical deliverability.²⁵ While CSG attempts to argue that it is not challenging the *Koda* Test, it is plainly challenging the underlying methodology, and the Commission’s application of the *Koda* Test, which has remained unchanged since the Commission decided *Koda*.

²² CSG Comments at 10.

²³ *Id.* at 2.

²⁴ *Koda*, Finding and Order at ¶ 8 (Mar. 23, 2011).

²⁵ Moraine Staff Report at 2; Rugby Staff Report at 2; Elm Creek Staff Report at 2; Buffalo Ridge Staff Report at 2; Barton Staff Report at 2.

CSG does not present any evidence or argument that any of the facilities at issue in the Applications fail to meet either the first or second statutory requirements.²⁶ Nor does CSG attempt to dispute the underlying data Staff relied on or submit any contrary evidence.²⁷ Essentially, CSG's entire argument is that the use of the DFAX studies from PJM does not actually demonstrate physical flow of electricity into the state of Ohio. This argument relies on a number of false assumptions by CSG, and should be rejected. DFAX studies by Ohio's RTO clearly demonstrate that electricity from the facilities in the Applications is physically deliverable to Ohio.

A. Electricity is Deliverable Across Regional Transmission Organizations.

CSG's argument appears to be that it disfavors the use of power flow studies, which is based on the assumption that power does not flow from one RTO to another. This is false. The RTOs are not separate electricity grids. They are interconnected, and part of the same grid.

Both PJM and MISO are part of the Eastern Interconnection. Both PJM and MISO are members of the Eastern Interconnection Planning Collaborative, a coalition of RTOs which works together to manage flow across the entire grid. The Eastern Interconnection Planning Collaborative describes the grid as such:

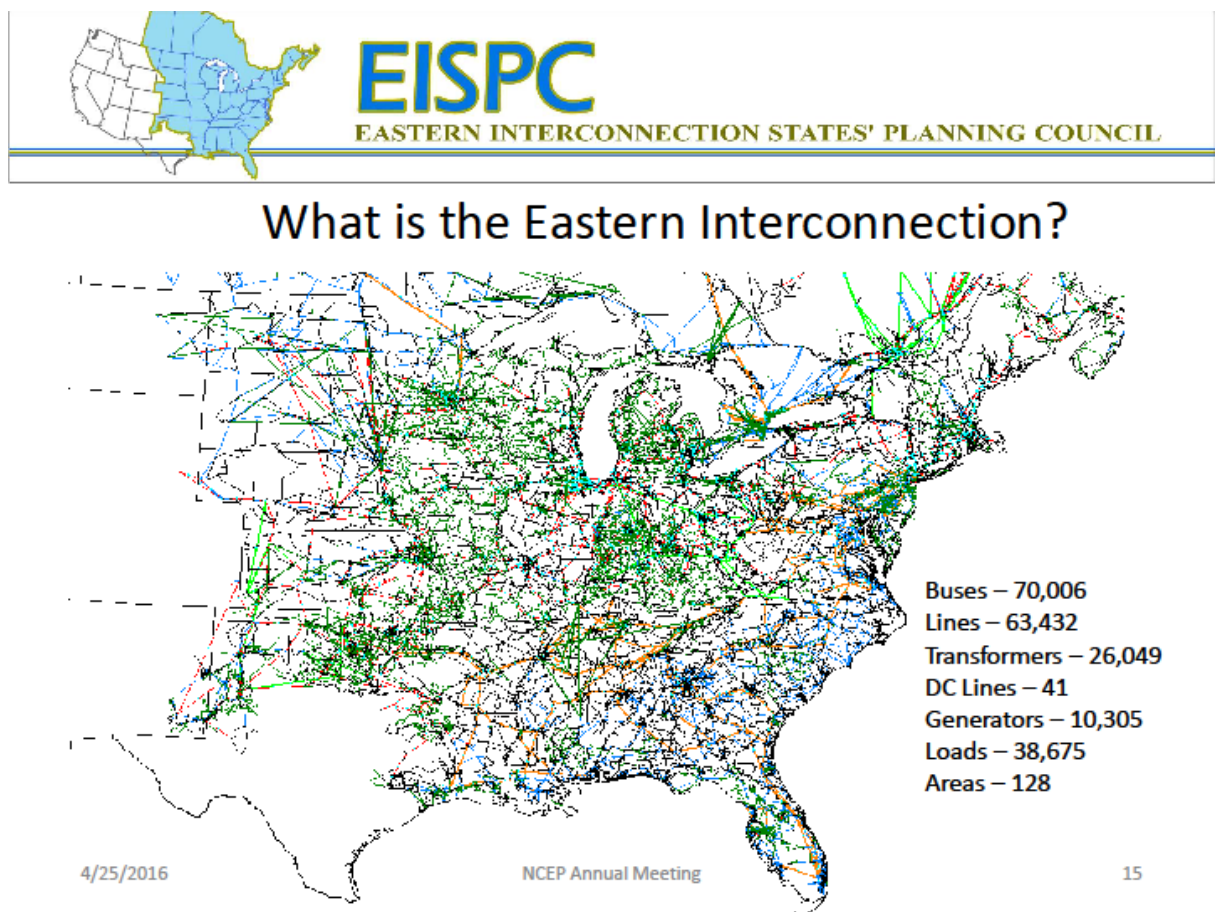
The Eastern Interconnection is a single, interconnected grid with power flows constantly occurring both among neighbors and within individual systems, across the states and international borders. Unlike other types of interstate markets, the electricity market must maintain a perfect supply and demand balance at all times. Different jurisdictions have a long history of mutual support, but as wind and solar resources grow, the broader grid becomes more interdependent and will demand enhanced collaboration among all parties.²⁸

²⁶ See generally, CSG Comments.

²⁷ See CSG Comments at 8 ("Questions about the validity of the data Staff relied on can be left for another day.").

²⁸ EASTERN INTERCONNECTION PLANNING COLLABORATIVE, Planning the Grid for a Renewable Future at 7, available at <https://static1.squarespace.com/static/5b1032e545776e01e7058845/t/615c4f5a4db2646842186286/1633439579689/EIPC-Hi+Renewables+WHITE+PAPER+-+FINAL+FOR+POSTING+-+10-5-21%60.pdf>.

As part of its argument, CSG submitted a map of the two relevant RTOs, PJM and MISO.²⁹ But if one compares that map to a map of the Eastern Interconnection, it is obvious that the RTOs are interconnected. As displayed below, various transmission lines physically connect the two RTOs despite their arbitrary borders. Further, reviewing the physical infrastructure that comprises the Eastern Interconnection in the map below, the RTO boundaries are not apparent. Indeed, when several Ohio electric distribution utilities switched RTOs, it was not even necessary to build additional infrastructure.



Source: NCEP ANNUAL MEETING, Apr. 25, 2016,
available at <https://pubs.naruc.org/pub.cfm?id=E0B527BA-E05B-F87E-2CB9-39D6EE39B338>.

²⁹ See CSG Comments at Figure 1: MISO and PJM Borders.

Despite the clear interconnectivity of the two RTOs, both in the Eastern Interconnection, CSG argues that Staff “[fails] to acknowledge” that the facilities at issue in the above-captioned cases “are connected to a different grid.”³⁰ Since the facilities are part of MISO, and the power flow studies were performed by PJM, CSG argues they do not “demonstrate anything of relevance to PJM.”³¹ For CSG to make this argument, it must ignore the fact that the RTOs are not separate grids; they are interconnected planning organizations with arbitrary rather than physical borders which are part of a larger, fully connected grid, across which electricity flows.

The need to consider the Eastern Interconnection in its entirety is not a new concept. Federal and state legislators, regulators, energy and air officials, consumer advocates, and governors’ offices, RTOs and independent system operators, and utility representatives have a long history of collaboration on the operational and planning issues affecting the entire Eastern Interconnection. For example, the Eastern Interconnection States’ Planning Council (EISPC), originally funded by the Department of Energy and now an arm of the of National Council on Electricity Policy (NCEP), is an organization that includes public utility commissioners, state energy officials, and other key government representatives throughout the thirty-nine states, the City of New Orleans, the District of Columbia, and six Canadian Provinces that comprise the Eastern Interconnection. EISPC also coordinates with the Eastern Interconnection Planning Collaborative, the association of Eastern grid balancing authorities referenced earlier. EISPC highlighted the criticality of this coordination at a presentation at the 2016 NCEP Annual

³⁰ CSG Comments at 9, *citing* Staff Reports at 2.

³¹ *Id.* at 8.

Meeting.³² According to EISPC, power does not flow in straight lines, or stay within state or planning authority borders, and ‘stray’ power flows can have economic and reliability consequences.³³ Accordingly, the EISPC roll up provides states an opportunity to observe how the system works as a whole.³⁴

Even if the RTOs were physically separate, which they are not, CSG contradicts its own argument by accepting that electricity from adjacent states in MISO is physically deliverable into Ohio, which is in PJM. For example, CSG claims that certification for facilities from non-adjacent MISO states differs from certification for facilities from adjacent MISO states.³⁵ However, CSG has *also* claimed that “any generation within PJM is generally deliverable anywhere else within PJM.”³⁶ If electricity is freely deliverable across an RTO, and freely deliverable between adjacent states on separate RTOs (both of which are true), it is unclear what physical constraints CSG believes would limit the flow from the facilities to Ohio, as it does not attempt to articulate any. It seems CSG simply seeks to categorically determine deliverability based on RTO status for certain states.

But the Commission has also rejected this very same argument. It recognized that the RTOs do not represent independent networks that determine physical deliverability into Ohio. For example, in a previous rulemaking case, the Commission rejected the argument that electricity

³² See Attachment A, WELCOME TO THE EISPC AND THE NATIONAL COUNCIL ON ELECTRICITY POLICY ANNUAL MEETING, NCEP ANNUAL MEETING, Apr. 25, 2016, available at <https://pubs.naruc.org/pub.cfm?id=E0B527BA-E05B-F87E-2CB9-39D6EE39B338>.

³³ *Id.* at 19.

³⁴ *Id.*

³⁵ See CSG Comments at 5-6 (“of nearly 10,000 facilities certified as qualified renewable resources, only two have been granted to facilities in states not contiguous to Ohio.”); *see id.* at Figure 2: Certified Renewable Energy Facilities.

³⁶ CSG Motion at 4.

from any facility within MISO or PJM was physically deliverable into Ohio.³⁷ The Commission held that power flow studies were still necessary to demonstrate deliverability, and that “physically deliverable” does not necessarily “include any generation originating within the PJM *or* MISO transmission systems.”³⁸

Therefore, the DFAX studies performed by PJM for the Applicants in the above-captioned cases do demonstrate relevant results for facilities on MISO. In fact, in a variety of contexts, both RTOs specifically use power flow studies to measure the flow of electricity across the interconnected grid and between RTOs.

B. The DFAX Studies Demonstrate the Physical Deliverability of Electricity.

Contrary to CSG’s arguments, the power flow studies performed by PJM for the Applicants actively demonstrate physical deliverability into Ohio. In fact, in a variety of contexts, both PJM and MISO use these same DFAX studies to model flow between the RTOs. CSG claims that “Staff only looked at PJM power flow data within Ohio, without considering how the generation behind these power flows would or could get to Ohio in the first place.”³⁹ This is demonstrably false. The DFAX studies show how power physically flows between the RTOs, and into the state of Ohio.

The Review and Recommendations submitted by Staff in each proceeding make it perfectly clear that the power flow studies include transmission lines that carry electricity into the state of Ohio. For example, Staff evaluated the highest value for a transmission line with *either* a start or

³⁷ *In the Matter of the Amendment of Ohio Administrative Code Chapter 4901:1-40 Regarding the Alternative Energy Portfolio Standard, to Implement Am. Sub. S.B. 315*, Case Nos. 12-2156-EL-ORD, et al., Finding and Order at ¶ 180 (Dec. 19, 2018).

³⁸ *Id.* at ¶ 181 (emphasis added).

³⁹ CSG Comments at 2.

end point in Ohio, as well as for a transmission line with *both* a start or end point in Ohio.⁴⁰ The highest value for each Application “occurred on American Electric Power’s Marysville (OH) – Sorenson (IN) 765 kilovolt transmission line,” that is, a line carrying electricity into Ohio.⁴¹ For each Application, this was a significantly higher value than that occurring on a transmission line that both started and ended in Ohio.⁴² Therefore, not only did the power flow studies show how power flows into Ohio, they showed that the transmission line carrying the power into Ohio actually displayed the highest overall impact.

Despite this, CSG makes the confusing claim that “PJM only ‘evaluated the impacts of power flows’ in Ohio, meaning PJM only ran scenarios showing the hypothetical effects of power hypothetically delivered” and that “Staff does not claim that PJM examined how this power might get to Ohio in the first place—hypothetically or otherwise.”⁴³ A simple reading shows exactly “how this power might get to Ohio in the first place.” CSG’s attempts to claim otherwise only hold water if one fails to read the Review and Recommendations submitted in each proceeding.

Furthermore, both PJM and MISO employ DFAX studies to specifically model the flow of electricity across interconnections. Pursuant to PJM and MISO’s Joint Operating Agreement, both RTOs employ DFAX studies to examine the impact of proposed facilities on their transmission

⁴⁰ See Applicants Comments, Attachment A, Expert Report at ¶ 4.1.1 (“The DFAX impact column contains two values. The first value is the highest DFAX for the case where either the start or end of the line is in Ohio. The second value is the highest DFAX for a transmission line which has both a starting point and end point in Ohio.”); *id.* at ¶ 4.2.1 (“The MW impact column contains two values. The first value is based on the highest DFAX for the case where either the start or end of the line is in Ohio. The second value is based on the highest DFAX for a transmission line which has both a starting point and end point in Ohio.”).

⁴¹ See Moraine Staff Report at 2; Rugby Staff Report at 2; Elm Creek Staff Report at 2; Buffalo Ridge Staff Report at 2; Barton Staff Report at 2.

⁴² *Id.*

⁴³ CSG Comments at 9.

networks.⁴⁴ In fact, for interconnection requests, each RTO performs a DFAX study to evaluate the effect of the interconnection *on the other RTO*.⁴⁵ Both RTOs use DFAX studies to calculate available transfer capability.⁴⁶

Overall, CSG’s claim that the DFAX studies performed by PJM for the Applicants do not “demonstrate anything of relevance to PJM”⁴⁷ lacks any factual basis. The DFAX studies describe the flow of electricity across the Eastern Interconnection between the interconnected RTOs. Once again, CSG’s false claims represent a reoccurring theme in this proceeding—CSG seeking to opine on a subject it clearly does not fully understand, or intentionally misrepresents to cause confusion and delay.

C. CSG Does Not Provide Workable Alternatives.

Despite claiming that “Staff’s approach is not at all consistent with *Koda*,”⁴⁸ CSG does not attempt to provide an alternative framework that is supposedly consistent with *Koda*. 3Degrees correctly noted that “‘deliverability’ is inherently a term that will require a Commission-approved framework for assessment,” and that any “replacement test would need to be developed and then analyzed to understand its alignment with the statute and the implications of revising the existing

⁴⁴ See Blue Delta Comments, Attachment A, Expert Report at ¶ 4.1 (“During the course of its interconnection feasibility studies, PJM shall monitor the MISO transmission system and provide to MISO the draft results of the potential impacts to the MISO transmission system. This monitoring will include an examination of the potential for projects to impact the MISO system by determining whether the project under study has a ≥ 3 percent distribution factor on MISO facilities that operate below 500 kV or ≥ 10 percent distribution factor on MISO facilities that operate at or above 500 kV under system intact conditions.”) (citations omitted); *id.* (“After completion of DPP cycle application deadline and at least thirty (30) days prior to the commencement of the DPP Phase I, MISO shall perform screening analysis to monitor the PJM transmission system and provide to PJM the draft results of the potential impacts to the PJM transmission system. This monitoring will include an examination of the potential projects to impact the PJM system through determination if the project under study has a ≥ 3 percent distribution factor or ≥ 5 MW impact or ≥ 1 percent of facility rating on any PJM facilities under normal and contingency conditions.”) (citations omitted).

⁴⁵ *Id.*

⁴⁶ *Id.* at ¶ 5.2.2.

⁴⁷ CSG Comments at 8.

⁴⁸ *Id.* at 2.

rule.”⁴⁹ It is unclear how CSG will help develop a Commission-approved framework in alignment with R.C. 4928.64 when it clearly does not understand the current application of the *Koda* Test. Regardless, the pending proceedings are not the proper venue for the development of a new framework.

In addition to CSG’s numerous inaccurate statements regarding power flow studies, RTOs, and the power grid itself, it also makes numerous false claims regarding the application of the *Koda* Test. CSG claims that “that the applicants did not request these studies from PJM and turn them over to Staff; Staff requested the studies from PJM directly.”⁵⁰ However, the Staff Review and Recommendations clearly state the opposite. According to the Review and Recommendation filed in each proceeding, “[the] Applicant provided a DFAX power flow study which was performed by PJM Interconnection, LLC.”⁵¹ CSG also claims that PJM “performed these ‘studies’ as a courtesy to Staff, and not because they demonstrate anything of relevance to PJM”⁵² Again, this is untrue. PJM performs these studies at the request of the Applicants. And, as discussed above, both RTOs routinely perform DFAX studies to evaluate impacts relevant to *the other RTO*.

It is clear that CSG seeks to opine on an issue it either fundamentally misunderstands or intentionally misrepresents. Without having a clear understanding of power flow studies, RTOs, the power grid, or the application of the *Koda* Test, CSG seeks to challenge Staff’s application of the *Koda* Test for its own benefit. These efforts will not contribute to a well-reasoned Commission-approved framework for assessment, and should be rejected.

⁴⁹ 3Degrees Comments at 5.

⁵⁰ CSG Comments at 8

⁵¹ Moraine Staff Report at 2; Rugby Staff Report at 2; Elm Creek Staff Report at 2; Buffalo Ridge Staff Report at 2; Barton Staff Report at 2.

⁵² CSG Comments at 8. Applicants are unclear why the word “studies” appears in quotation marks in CSG’s pleading, unless CSG is arguing that the studies are not actually studies.

D. Opposition to the Applications or Use of the *Koda* Test Continues to Harm the REC Market and Customers.

As Blue Delta noted in its initial comments, CSG's efforts to manipulate the REC market in favor of CSG and its clients come at the expense of competitors and Ohio customers.⁵³ Since the time Blue Delta filed its initial comments several weeks ago, the price of RECs has continued to rise, reaching over \$14.00—more than twice what it was when these proceedings began. As Blue Delta previously noted, this spike has led to increased costs of compliance, which are passed on to consumers. Additionally, this increase has failed, so far, to have a substantial benefit to renewable generators already located in Ohio, or to lead to increased development of new Ohio renewable projects.

As Blue Delta highlighted in its initial comments, the increased cost of Ohio RECs is unlikely to lead to new renewable energy projects in Ohio.⁵⁴ All Ohio-sited renewable projects utilizing solar, wind, landfill and other biogases, small (less than 30MW nameplate) hydroelectric units, and even wood qualify for other renewable portfolio standards programs in other states which currently trade at a premium compared to the Ohio REC market. As depicted in the below table, the only technologies that the Ohio RPS market seems to support on its own are for waste heat and large hydroelectric projects.

As shown below, the majority of RECs generated from qualifying REN facilities located in Ohio are not retired for compliance with the Ohio renewable portfolio standards.⁵⁵ Updated data since the initial comment period demonstrates that even fewer RECs generated from qualifying REN facilities located in Ohio are retired in-state than previously estimated:

⁵³ See Blue Delta Comments at 12-16.

⁵⁴ See *id.* at 14-16.

⁵⁵ *Id.* at 14-15.

RPS Use of RECs Generated by Ohio Located Facilities ⁽¹⁾⁽²⁾

Technology	OH	DC	DE	NJ	MD	PA	% Retired for OH RPS
Solar	112,101	649				110,442	50.2%
Wind	332,949		19,093	579,084	548,752	433,815	17.4%
Hydro	248,377				11,564		95.6%
Waste Heat	205,297						100.0%
Black Liquor	5,697				89,076		6.0%
Blast Furnace Gas						210,732	0.0%
Landfill Gas	86,846	1,500		141,595	56,059	262,043	15.8%
Other Biogas	7,395				4,638	9,076	35.0%
Wood	1					28,428	0.0%
Total RECs	998,663	2,149	19,093	720,679	710,089	1,054,536	28.5%

Source: PJM GATS

⁽¹⁾ Data is for the most recent RPS Compliance year (Reporting Year 2021 for DE, NJ & PA and

Calendar Year 2021 for DC, MD & OH)

⁽²⁾ Data is updated for New Jersey for Reporting Year 2021 which was due on 12/1/2021.

On the other hand, increased Ohio REC prices and decreased Ohio REC availability makes retail electric service less reasonably priced;⁵⁶ decreases market diversity of electricity supplies⁵⁷ and market access for cost-effective supply- and demand-side retail electric service;⁵⁸ and creates unreasonable market power for CSG and its clients.⁵⁹ CSG's arguments contradict the policy of the state.

By delaying certification of additional facilities and limiting the number of RECs available, CSG has exacerbated the state policy issues. CSG has been given the chance to raise its alleged concerns, advocate for an alternative deliverability standard, or present evidence contradicting the Commission's current standard, but instead, CSG claims it will raise such arguments at a yet-

⁵⁶ See R.C. 4928.64(B).

⁵⁷ See R.C. 4928.02(C).

⁵⁸ See R.C. 4928.02(D).

⁵⁹ See R.C. 4928.02(I).

unscheduled hearing.⁶⁰ CSG has the opportunity to raise its arguments now, but instead chooses to seek more delays.

In addition to improperly seeking to delay certification of additional REN facilities, CSG also improperly requests that the Commission revoke past certifications.⁶¹ This request violates Ohio statutory law and Commission regulations as CSG is essentially filing an untimely rehearing request. CSG did not challenge the certification applications filed in those prior proceedings, and R.C. 4903.10 and Ohio Adm.Code 4901-1-35 only allow a person, firm, or corporation to request rehearing “within thirty days after the issuance of a commission order.”⁶² The time for rehearing has passed in each case in which CSG now wishes to request rehearing. Additionally, for an applicant to request rehearing, the person, firm, or corporation must have either entered an appearance in that case, or demonstrated that its failure to do so was due to just cause and that its interests were not adequately considered in the proceeding.⁶³ CSG has not attempted to do either. Lastly, none of the applicants in those cases are parties to this case. Allowing CSG to attack their REN certification in this proceeding would not only violate Ohio law, but also their due process rights.

⁶⁰ See CSG Comments at 3, fn.4 (“At a hearing, CSG would present evidence demonstrating the shortcomings of *Koda* and alternative approaches to more accurately determine physical deliverability. For present purposes, these comments will focus on Staff’s flawed attempt to apply *Koda*.”); *id.* at 4 (“CSG does not necessarily agree with this premise [the use of power flow studies], but the Commission may accept it for now”) *id.* at 8 (“CSG is confident that at a hearing, PJM would testify that it performed these “studies” as a courtesy to Staff, and not because they demonstrate anything of relevance to PJM—including whether the power flows it modelled are deliverable into PJM.”); *id.* (“Questions about the validity of the data Staff relied on can be left for another day.”)

⁶¹ See *id.* at 6, fn.12 (“During 2021, the Commission granted certificates in unopposed applications filed in the following cases: 20-1091 (Elk Wind Energy), 20-1092 (Hawkeye Wind Energy), 20-1150 (Autumn Hills), 20-1637 (Superior Wind Project), 20-1638 (Lakota Wind Project), 20-1692 (Rail Splitter Wind Farm), 20-1761 (Ripley Wind Farm), 20-1821 (Pioneer Trail Wind Farm), and 21-0085 (Clear Creek Wind). Staff’s recommendations in those dockets were unsupported for the same reasons they are unsupported here. The Commission should therefore revoke these erroneously-granted certificates under O.A.C. 4901:1-40- 04(D)(7).”).

⁶² Ohio Adm.Code 4901-1-35(A).

⁶³ R.C. 4903.10(A), (B).

Even if this request were procedurally proper, which it is not, Ohio Adm.Code 4901:1-40-04(D)(7) only authorizes the Commission to rescind certification “due to changes that negate the facility’s certification eligibility.” CSG has not identified any material changes in the eligibility of any of the facilities it lists; it only provides its unsupported assertion that they were “erroneously granted.”⁶⁴

It is clear that CSG simply seeks to artificially limit the Ohio REC market for its own benefit. As such, the Commission should recognize these public policy concerns and reject CSG’s arguments in their entirety and put an immediate end to this baseless challenge intended to delay certification of qualifying renewable facilities.

III. CONCLUSION

The Applicants have demonstrated that each facility at issue in the Applications qualifies for REN certification. Blue Delta, 3Degrees, and the Applicants have articulated why Staff’s application of the *Koda* Test is the proper method of determining physical deliverability. In response, CSG offers meritless, unsupported arguments that fail to provide any workable alternative and violate Ohio policy. As such, the Commission should affirm its use of the *Koda* Test, and pursuant to the Staff Review and Recommendations filed in each of the five above-captioned cases, find that the facilities satisfy the requirements in Ohio law for certification, including that the energy from each facility is deliverable into the state pursuant to R.C. 4928.64(B)(3) and Ohio Adm.Code 4901:1-40-01(F) and 4901:1-40-04, and grant REN certification to the facilities.

⁶⁴ See CSG Comments at 6, fn.12.

Respectfully submitted,

/s/ Kimberly W. Bojko

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Jonathan Wygonski (100060)

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(willing to accept service by email)

Counsel for Blue Delta Energy, LLC

CERTIFICATE OF SERVICE

The Public Utilities Commission of Ohio's e-filing system will electronically serve notice of the filing of this document on the parties referenced on the service list of the docket card who have electronically subscribed to the case. In addition, the undersigned hereby certifies that a copy of the foregoing document also is being served via electronic mail on December 8, 2021 upon the parties listed below.

/s/ Kimberly W. Bojko

Kimberly W. Bojko

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Jacqueline.St.John@puco.ohio.gov

ATTACHMENT A

Welcome to the EISPC and the National Council on Electricity Policy Annual Meeting

The Meeting and Roll Call will begin at 1:00 PM ET
Wi-Fi Information:
Connect Wirelessly to the network: The Dupont Circle Hotel
Then open a new webpage and click on “Connect”

April 25 – 26, 2016
Dupont Circle Hotel, Washington, DC

Acknowledgement

- ▶ Thank you to the U.S. Department of Energy and the National Energy Technology Laboratory for supporting this work



Welcome and Business Items

- ▶ Welcome and Overview
- ▶ Call Meeting To Order
- ▶ Review of NCEP and Guiding Principles
- ▶ Discussion and Q&A

Call Meeting to Order

Hon. Elizabeth B. “Lib” Fleming
South Carolina PSC
NCEP President

Discussion: Welcome and Business Items

Hon. Elizabeth B. “Lib” Fleming
South Carolina PSC
NCEP President

Miles Keogh
NARUC Research Lab Director

Jan Brinch
EISPC Director

Re-Launching the National Council on Electricity Policy (NCEP)

A Bit of History

- ▶ Eastern Interconnection States' Planning Council (EISPC)
 - ▶ ARRA Funded – 2009 - 2015
 - ▶ Focus on electric transmission, gas-electric infrastructure, resource diversity, energy resiliency and reliability
 - ▶ Convening power across the Eastern Interconnection to provide inputs to the Eastern Interconnection Planning Collaborative (EIPC) and conduct studies on key interconnection-wide issues
 - ▶ Collaborative discussion, deliberation, and debate
 - ▶ EISPC to continue as a coordinating function of the National Council on Electricity Policy (NCEP)
 - ▶ *Guiding Principles* approved by the EISPC membership
 - ▶ EISPC's leadership serves as NCEP Executive Committee, with the addition of Mountain and Pacific Representatives
-



NCEP's *Guiding Principles*

To provide technical assistance to states, regions, and multiple stakeholders

To improve understanding of electricity technologies, markets, programs, and policies

To support the deployment of clean, reliable, and affordable electricity infrastructure

To improve interstate and intra-state coordination on electricity issues

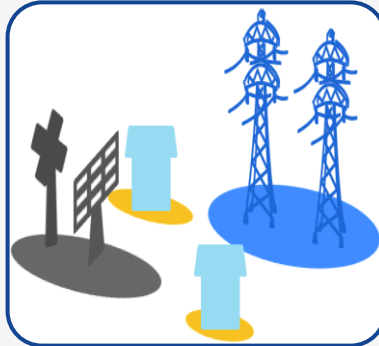
To continue the activities of EISPC – transmission planning and coordination



National Council on Electricity Policy (NCEP)



Explicitly acknowledges and addresses the inter-disciplinary nature of electricity policy across the U.S., not just the Eastern Interconnection



A forum for identifying, discussing, and debating the issues that underpin the evolution of the electricity generation, transmission and distribution grid



Convenes regulators, state legislators, energy and air officials, consumer advocates, and Governors' offices to serve as an incubator for discussions on electricity policy



Coordinates EISPC activities, including coordination with EIPC on transmission studies and analyses



NCEP's Benefits

- ▶ A “marketplace of ideas” encouraging multiple viewpoints, not requiring unanimity but rather an exchange of perspectives
- ▶ A forum for unbiased information, not a policy-making organization
- ▶ No lobbying or legislative advocacy
- ▶ A place to discuss and debate “outside the box” ideas, for peer exchange, and to improve electricity policy for the betterment of all



NCEP Organizational Structure

- ▶ Executive Committee: Composed of seven regional representatives, plus one ex-officio EISPC at-large member
- ▶ Policy Committee: Self-identifying and composed of participating state officials



NCEP Activities

- ▶ Sponsor facilitated meetings, trainings, and other information exchange
- ▶ Conduct research and education activities
- ▶ Host webcasts and other outreach efforts
- ▶ EISPC to continue its interface with EIPC
- ▶ Five work areas, identified and supported by EISPC members:
 - ▶ Air and Energy Resources
 - ▶ Reliability, Resilience and Recovery
 - ▶ Resource Adequacy and Diversity
 - ▶ Transmission

The EIPC and the Transmission Work Group

Jan Brinch
EISPC Director

David Whiteley
EIPC Director (via the phone)

Denis Bergeron
Maine

Hon. Ed Finley
North Carolina



EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

State Collaboration with The Eastern Interconnection Planning Collaborative (EIPC) and the Transmission Work Group

Denis Bergeron – Maine Public Utilities Commission

Presentation to NCEP Annual Meeting

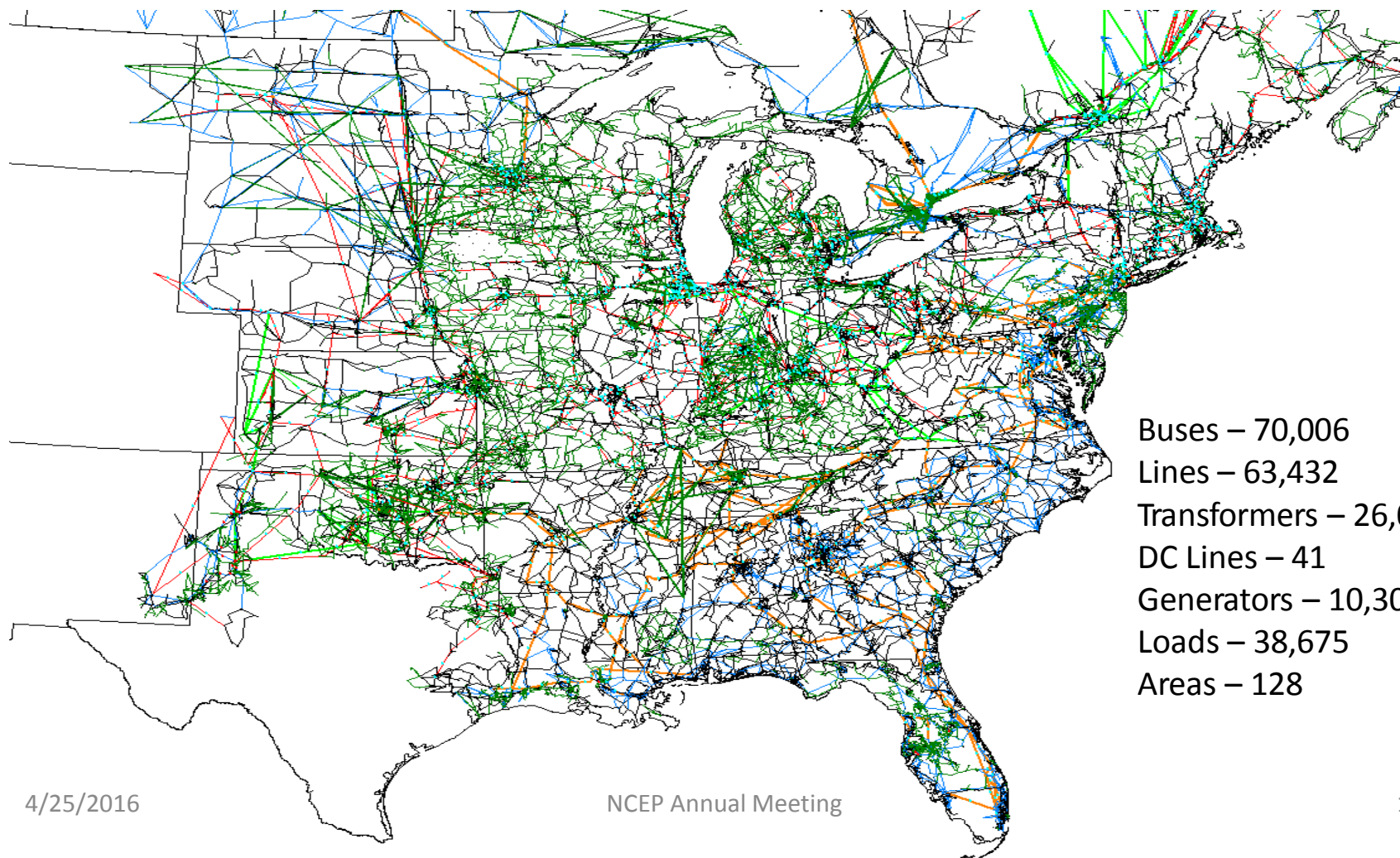
April 25, 2016



EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

What is the Eastern Interconnection?



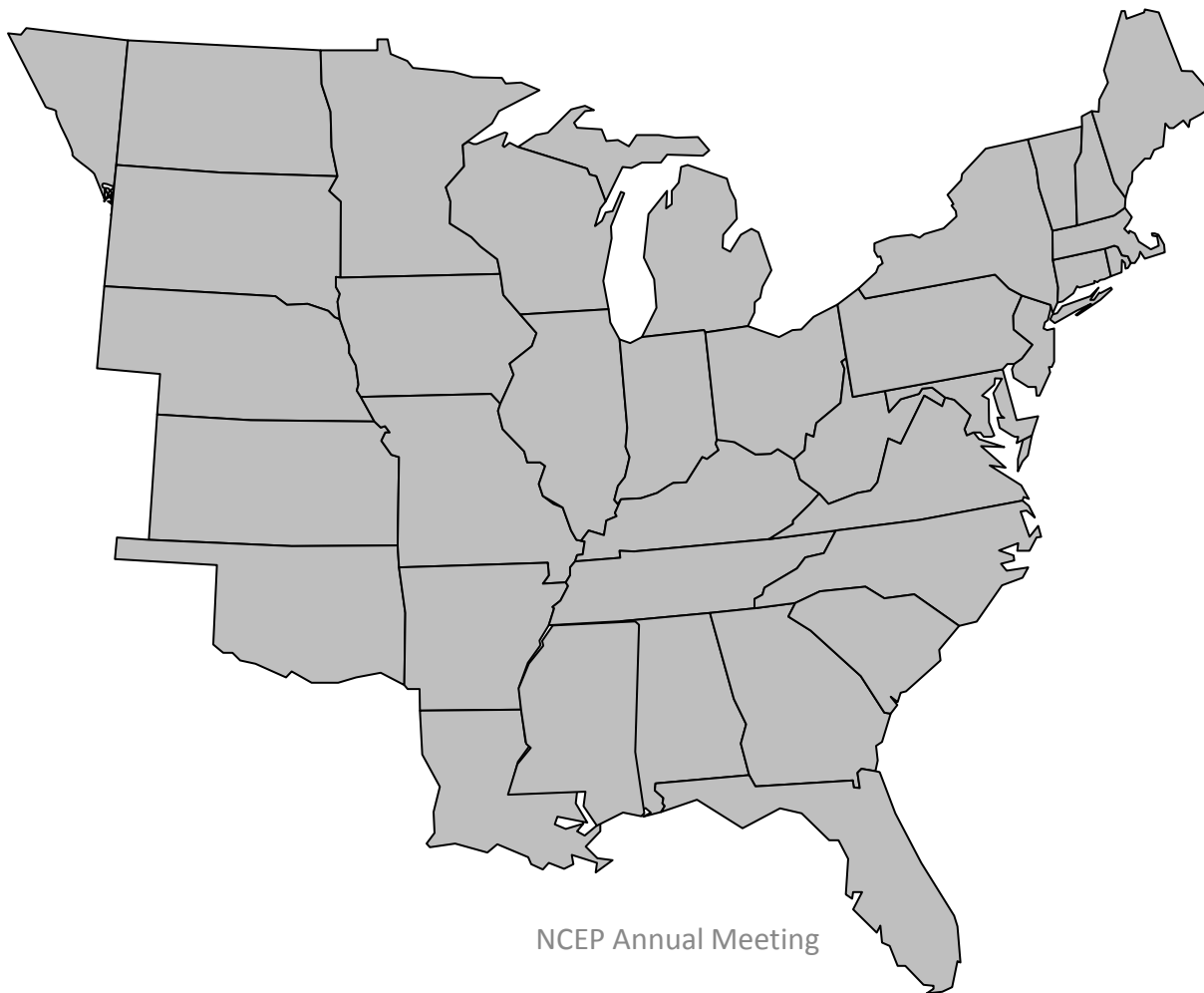
Buses – 70,006
Lines – 63,432
Transformers – 26,049
DC Lines – 41
Generators – 10,305
Loads – 38,675
Areas – 128



EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

What States Does it Cover?





EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

Who Plans It? NERC certified Planning Coordinators.
Current members of the EIPC are:

**Alcoa Power Generating
Duke Energy Carolinas
Duke Energy Florida
Duke Energy Progress
LGE/KU
Florida Power & Light
Georgia Transmission Corporation
ISO-New England
JEA (Jacksonville, Florida)
Midcontinent ISO (MISO)**

**Municipal Electric Authority of Georgia
New York ISO
PJM Interconnection
PowerSouth Energy Coop
South Carolina Electric & Gas
Santee Cooper
Southern Company
Southwest Power Pool
Tennessee Valley Authority**

(and since Order 890 – their stakeholders)



EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

- FERC Order 890: Coordinated, Open, and Transparent Planning
- NERC “Standard” TPL-001-4: Provides guidelines for transmission reliability planning
- But the planning practices of the Planning Coordinators - in the Interconnect varies substantially
- EIPC is the only opportunity to model the system under a common set of assumptions and methodology to observe how it works as a whole



EISPC

EASTERN INTERCONNECTION STATES' PLANNING COUNCIL

Why is This Important to States?

- Power doesn't flow in straight lines
- It doesn't stay within state borders
- It doesn't stay within PA borders
- “Stray” power flows can have economic and reliability consequences
- The EIPC roll up provides states an opportunity to observe how the system works as a whole



Eastern Interconnection Planning Collaborative

Update on Current Activities

David Whiteley – EIPC Executive Director

Presentation to NCEP Annual Meeting

April 25, 2016

EIPC Formation

- In the east, several Planning Authorities started a dialog in early 2009 to establish an interconnection-wide planning process for the coordinated roll-up and expansion of existing regional plans
- Those discussions evolved into the EIPC
- EIPC as an organization officially formed in the fall of 2009



EIPC Purposes

- Develop an open and transparent process through an interactive planning dialogue with industry stakeholders
- Foster additional consistency and coordination in the Eastern Interconnection
- Provide an interface with other interconnections
- Provide policy makers and regulators with current and technically sound transmission planning information

EIPC Scope of Activities (1)

- Modeling and developing input on regulation and policy issues from an interconnection-wide view
- Serve as a resource to facilitate analysis of FERC, DOE, and even State transmission policy issues, providing a broad interconnection view of the potential impacts resulting from possible regulations
- Focus on interconnection-wide (not regional) – similar to the role that WECC and ERCOT play

EIPC Scope of Activities (2)

- Overview and analysis of regional transmission plans using an integrated model of the Eastern Interconnection
- Modeling to help explain broader interconnection-wide impacts and to provide policy makers and regulators with current and technically sound information
- Work closely with state and federal regulators on issues of interest to them

What's a "Roll-up"?

- From the beginning, EIPC has used the term "Roll-up" to described the technical planning activity required to combine the Regional Planning Coordinator transmission system models into a single model for the entire Eastern Interconnection
- The benefits of this process are:
 - Coordination of the Regional plans as they are assembled – Do the pieces fit?
 - Analysis of the resulting interconnection-wide model – Does the model make sense? Does it perform correctly?
 - Facilitate discussion among Regional planners – Learn from others
 - Make the resulting models available for federal, state, and local planning uses as well as for analysis and studies by EIPC

Past EIPC Studies and Activities

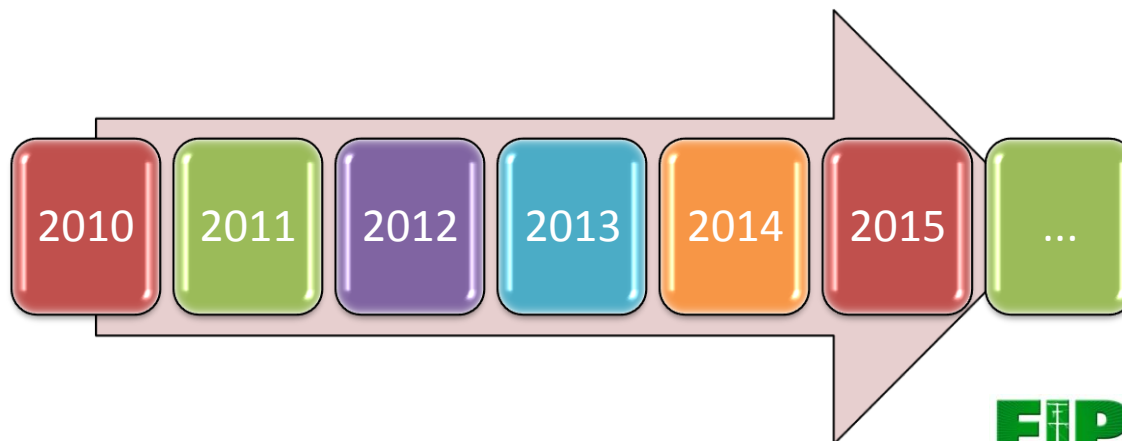
- 2010: Roll-up of 2020 Summer regional plans as input to DOE grant work
 - Modify Roll-up case to accommodate Stakeholder Specified Infrastructure
- 2010 to 2015: DOE Interconnection Studies Grant
 - Three distinct parts – Phase 1, Phase 2, and Gas-Electric Interface
 - Scenario analysis (aka “planning”) vs developing “a plan”
 - Develop process for stakeholders to access study data considered to be CEII
 - Completely transparent process
 - Interface with WECC and ERCOT on their grant work

Past EIPC Studies and Activities (2)

- 2013: Roll-up of 2018 and 2023 Summer regional plans
- 2014: Scenario analysis using 2018 and 2023 cases
 - Heat wave and drought
- 2014 and 2015: Provide input to DOE on the Annual Transmission Data Report
- Provide input to NERC on the revised MOD 32 model development process
- Provide input to DOE-NREL on Eastern Renewable Integration Study and use of EIPC Roll-up modeling as basis for that study

Past EIPC Studies and Activities (3)

- Numerous presentations to industry groups on study results and current work activities
 - Continue to maintain a transparent process through interconnection-wide and regional stakeholder activities
- Provide input to the DOE Quadrennial Review process
- Maintain coordination with EI states through EISPC



Current EIPC Studies

- 2015: Roll-up of 2025 Summer and Winter regional plans
- 2016: Scenario analysis using the 2025 cases
- Provide input to DOE QER version 2 effort
- Provide input to DOE Annual Transmission Data Report
- Development of a new, simplified approach to sharing CEII information for FERC Order 1000 and NERC MOD 32 purposes
- Development of an EIPC-reviewed production cost data base
- Continue interface with industry groups – e.g. EISPC and the new National Council on Electricity Policy
- Continue to support FERC staff

2016 Scenario Analysis

- Roll-up of 2025 Summer and Winter regional plans completed in early 2016
 - Gap analysis indicated where solutions would be needed for reliability purposes
- EISPC scenario suggestions
 - Scenario 1 – Increased EE, DR, DG
 - Scenario 2 – Increased Canadian Hydro imports
- Agreement to put Scenario 1 on hold – various reasons
- Scenario 2 still under discussion. Key issues are:
 - Assumptions on sink points in U.S.
 - Test the existing system or hypothesize new transmission?
 - Practical versus theoretical results

Possible Future Directions

- Continued development of Roll-up cases
- Scenario studies based on stakeholder input
- More in-depth analysis of Roll-up cases, beyond power flow reliability studies, possibly to include production cost simulation and sensitivity analysis
- Study of an integrated model based on regional CPP compliance plans when state and regional directives are more clear
- Continue philosophy that interconnection-wide processes supplement regional planning requirements rather than attempt to replace them



Questions

- Call or email Dave Whiteley
- 314-753-6200
- d.a.whiteley@eipconline.com
- eipconline.com



Energy Zones Mapping Tool

Jan Brinch
EISPC Director

Vladimir Koritarov
Argonne National Laboratory

Update on the Energy Zones Mapping Tool

**Eastern Interconnection States Planning Council and
National Council on Electricity Policy
Annual Meeting**

**Washington, DC
April 25-26, 2016**

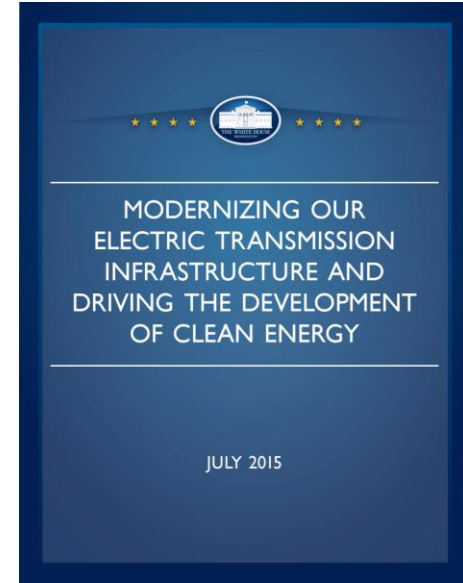
Presented by:

Vladimir Koritarov, Argonne National Laboratory



- Webinars include a short presentation and a live EZMT demo highlighting specific model features:
 - Suitability Modeling of Natural Gas Plants
 - Corridor Analysis
 - Generating and Using Reports
 - New Corridor Route Generation Tool
 - Planning a Potential Energy Zone
 - Energy Planning and Climate Change
 - Demonstrated to National Park Service Trails GIS group

All webinar recordings are available at:
[EZMT YouTube Channel](#)



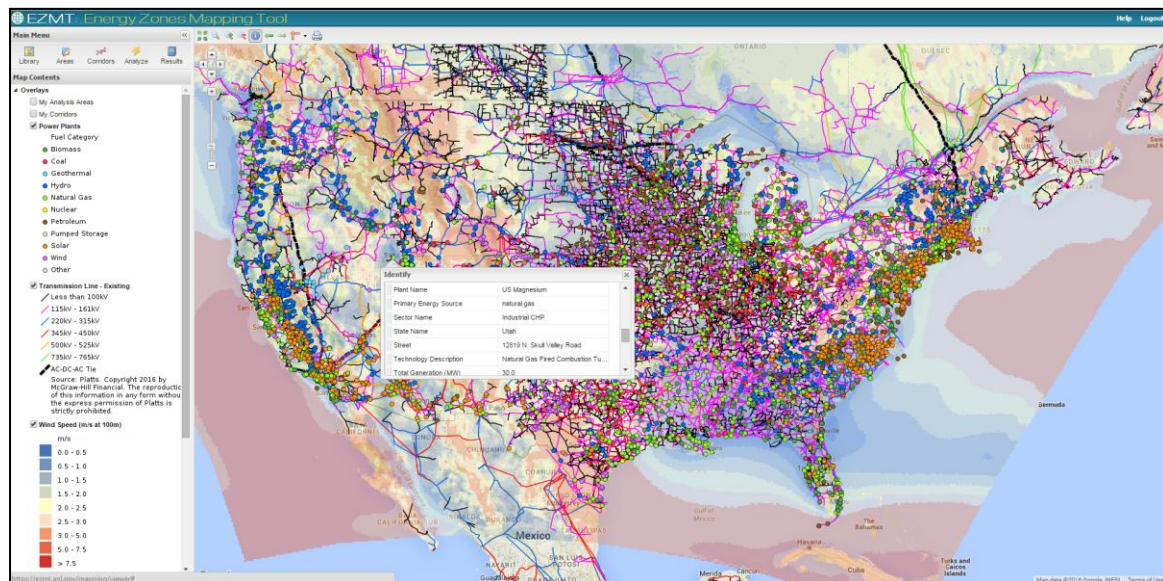
The EZMT was featured in a [White House Report](#)



Recent Activities: Data Updates and Licenses

■ Commercially-licensed data

- All previously licensed commercial data content updated through 2015
- March 2016 activities:
 - Discontinued AWS TruePower wind resource data
 - Added Argonne's wind resource data
 - Discontinued Platts power plant, substation, and pipeline data
 - Renewed Platts transmission line data
 - Added energy infrastructure data from Energy Information Administration (EIA)
 - Updated models
 - All data updates cover full U.S. extent and sometimes North America
 - Report updates are in progress

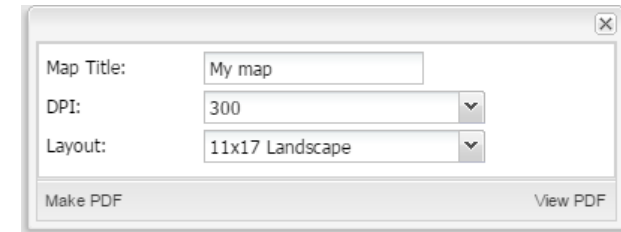


Energy Zones Mapping Tool

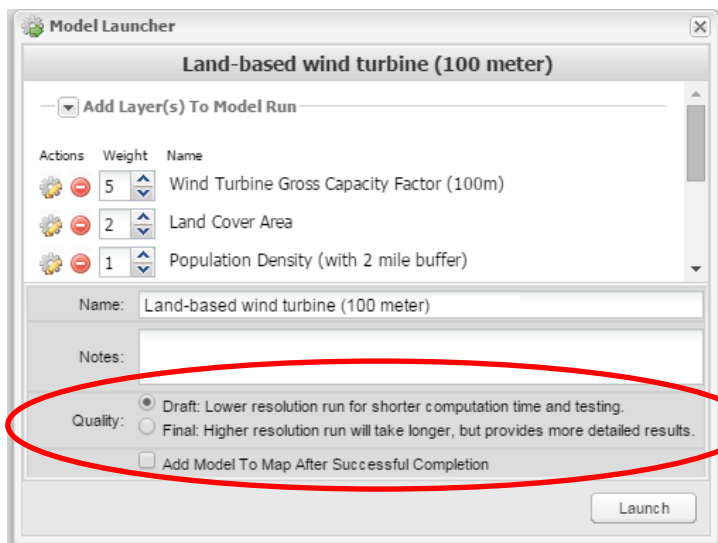
Recent Activities: User Interface

■ User interface enhancements

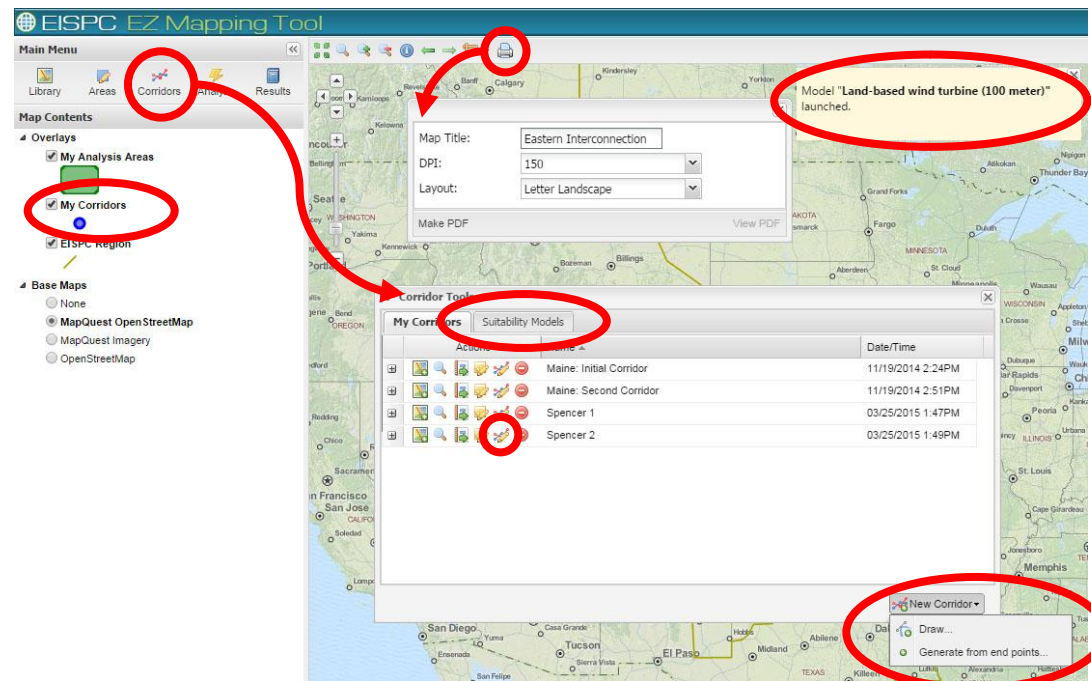
- Added print tool
- Corridor tools enhanced (details later)
- New reports added (details later)
- Models adjusted and recomputed as input data were updated
- Added “Draft” and “Final” option for model computations
- Updated Electrical Transmission report for full data extent (North America)



Print Tool Dialog



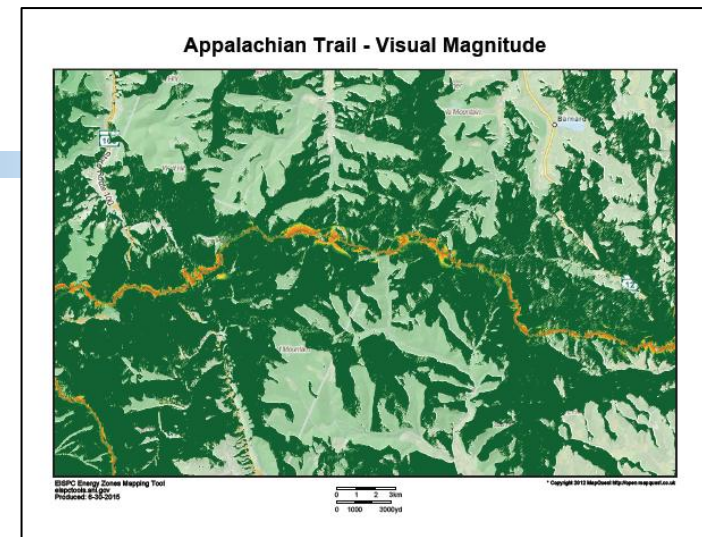
New option for model resolution



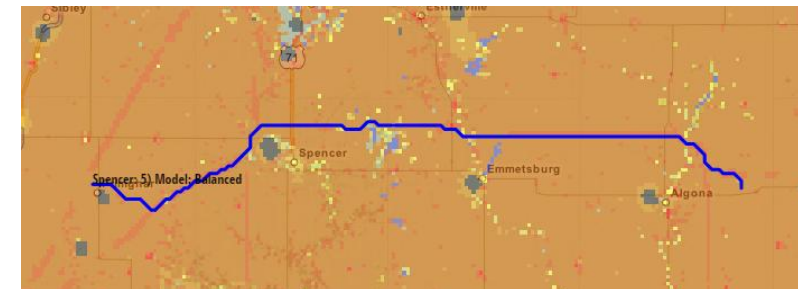
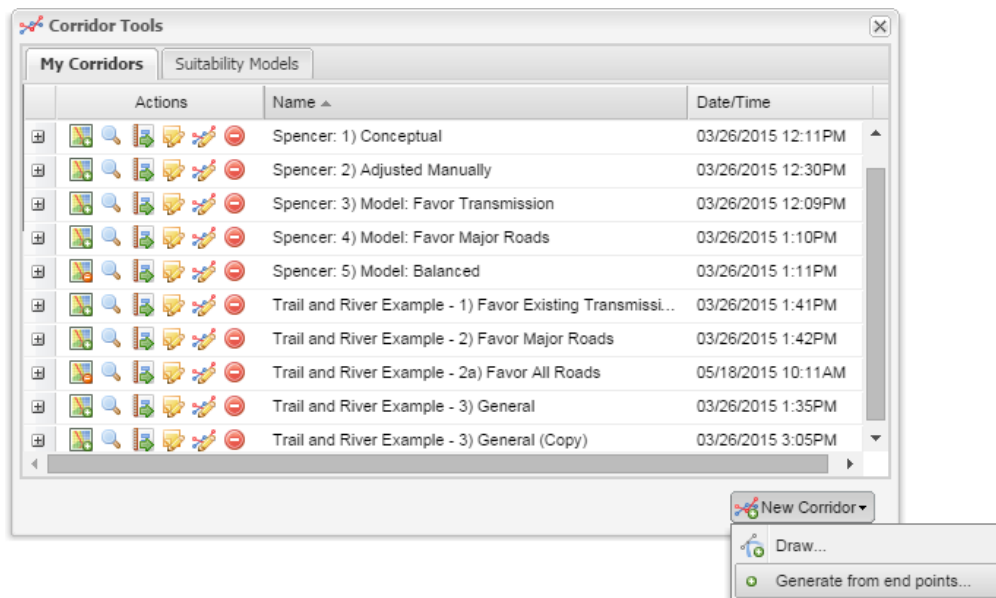
Energy Zones Mapping Tool

Recent Activities: Corridor Tools

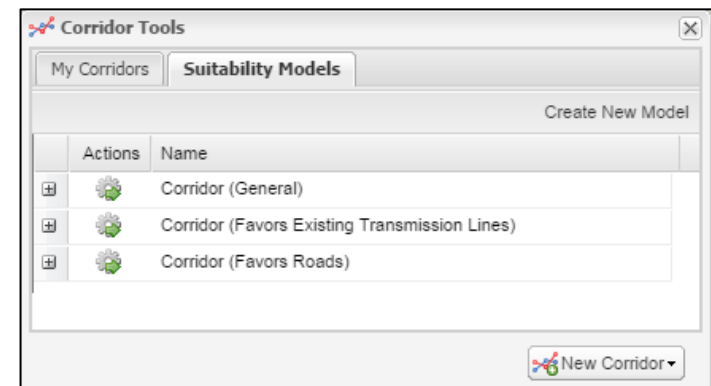
- Corridor tool enhancements
 - Added corridor suitability modeling with three default models
 - Added automated corridor route generation tool
 - Viewshed Analysis: Sample – Appalachian Trail (mapping and modeling layers)



Landscape visibility from the Appalachian Trail (visual magnitude)



Example Route



Recent Activities: Energy-Water Nexus

■ New Energy-Water/Climate Data

- Power Plant Water Use
- Projected Temperature Change
- Trends in Flood Magnitude
- Cooling Degree Days (4 layers)
- Aqueduct Water Risk
- Aqueduct Water Stress Projections
- Thermoelectric Power & Thermal Pollution Model results (Northeast)
- Water Availability, Cost, and Projected Future Use

■ New Energy-Water/Climate Reports

- Power Plant Water Use
- Climate Change
- Water Availability, Cost, and Projected Future Use

Projected Temperature Change and Cooling Degree Days

Over the last 20 years, annual average temperatures typically have been higher than the long-term average: nationally, temperatures were above average during 12 of the last 14 summers. Increases in temperature will result in increased energy use for cooling and decreased energy use for heating. These impacts differ among regions of the country and indicate a shift from predominantly heating to predominantly cooling in some regions with moderate climates. For example, in the Northwest, energy demand for cooling is projected to increase over the next century due to population growth, increased cooling degree days, and increased use of air conditioners as people adapt to higher temperatures (Source: [U.S. National Climate Assessment](#), pg. 116).

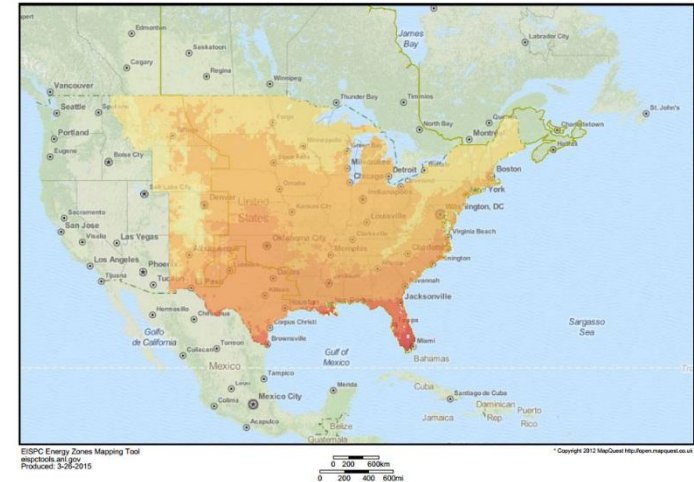
Demands for electricity for cooling are expected to increase in every U.S. region as a result of increases in average temperatures and high temperature extremes. The electrical grid handles virtually the entire cooling load, while the heating load is distributed among electricity, natural gas, heating oil, passive solar, and biofuel. In order to meet increased demands for peak electricity, additional generation and distribution facilities will be needed, or demand will have to be managed through a variety of mechanisms. Electricity at peak demand typically is more expensive to supply than at average demand. Because the balance between heating and cooling differs by location, the balance of energy use among delivery forms and fuel types will likely shift from natural gas and fuel oil used for heating to electricity used for air conditioning. In hotter conditions, more fuel and energy are required to generate and deliver electricity, so increases in air conditioning use and shifts from heating to cooling in regions with moderate climates will increase (Source: [U.S. National Climate Assessment](#), pg. 116).

Emissions Model	2020-2050, Relative to 1971-1999	2070-2099, Relative to 1971-1999	
	Increase in Cooling Degree Days (Days/30 Years)	Projected Annual Temperature Change (Degrees Celsius)	Increase in Cooling Degree Days (Days/30 Years)
A2 (Higher Emissions)	240.2	3.2	928.2
B1 (Lower Emissions)	168.9	1.8	428.6

Sources: Cooling Degree Days - Higher Emissions (2021-2050); Cooling Degree Days - Higher Emissions (2070-2099); Cooling Degree Days - Lower Emissions (2021-2050); Cooling Degree Days - Lower Emissions (2070-2099); Projected Temperature Change.

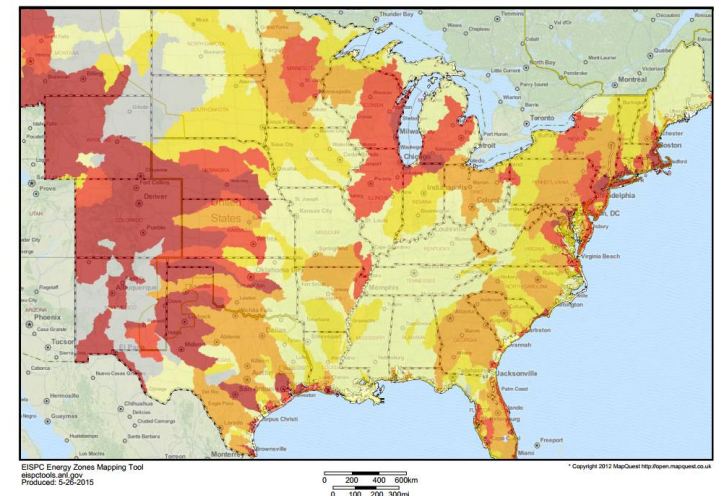
Sample section of Climate Change report

Cooling Degree Days - Higher Emissions (2070-2099)



Projected average change in cooling degree days for 2070-2099 compared to the period 1971-2000.

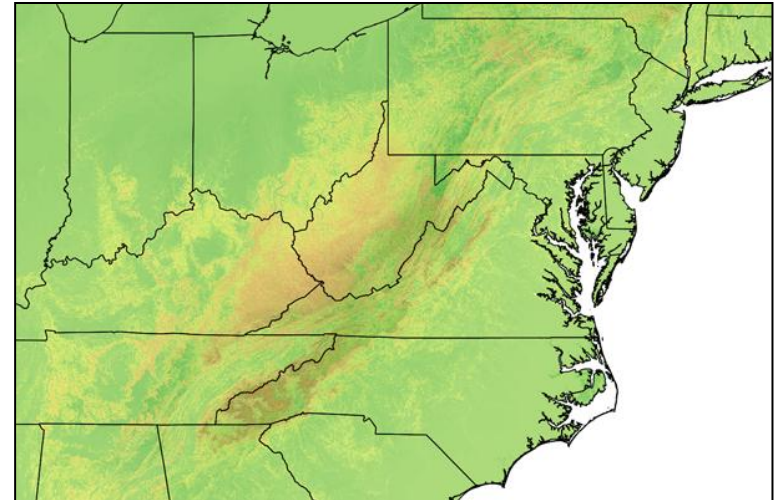
Baseline Water Stress



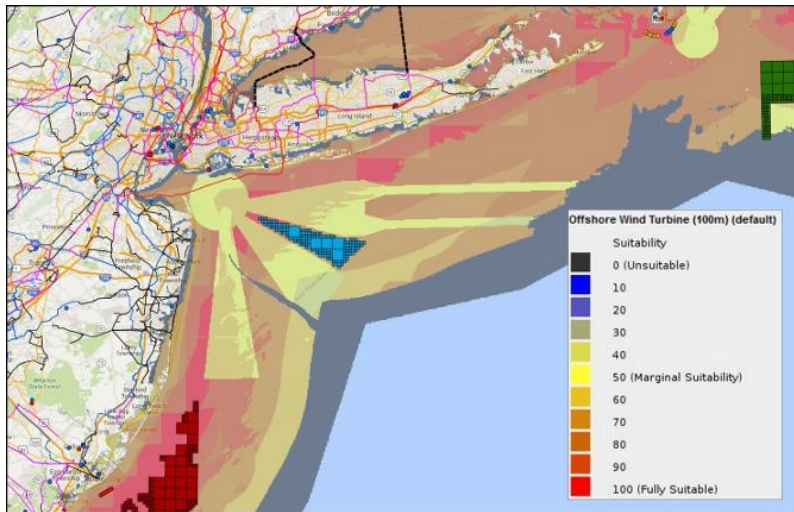
Baseline Water Stress (Withdrawals/Available Flow)

Recent Activities: Other New Data

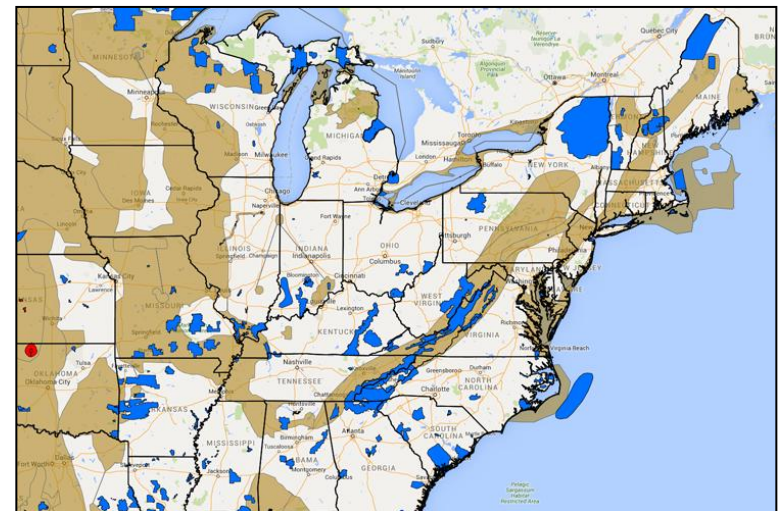
- Digital Elevation Model
- American Bird Conservancy
 - Proposed Global Important Bird Areas
 - Global Important Bird Areas
 - Critical Bird Habitat (ESA-Listed)
 - Corridors and Key Bird Habitat Areas
- Offshore Wind Energy Lease Areas



Elevation and Slope



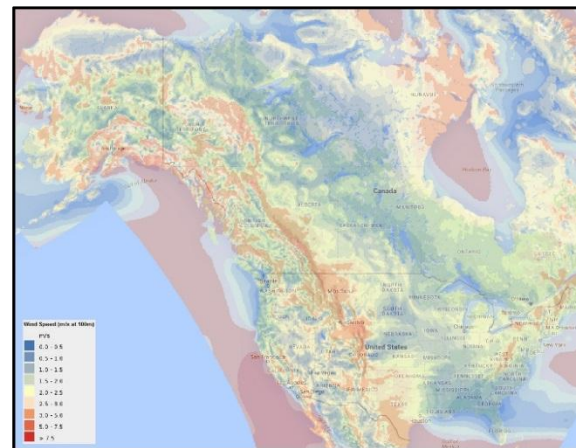
Offshore Wind Energy Lease Areas with Offshore Wind Turbine Model Results



American Bird Conservancy Data

Recent Activities: Extend Geographic Scope to Entire U.S.

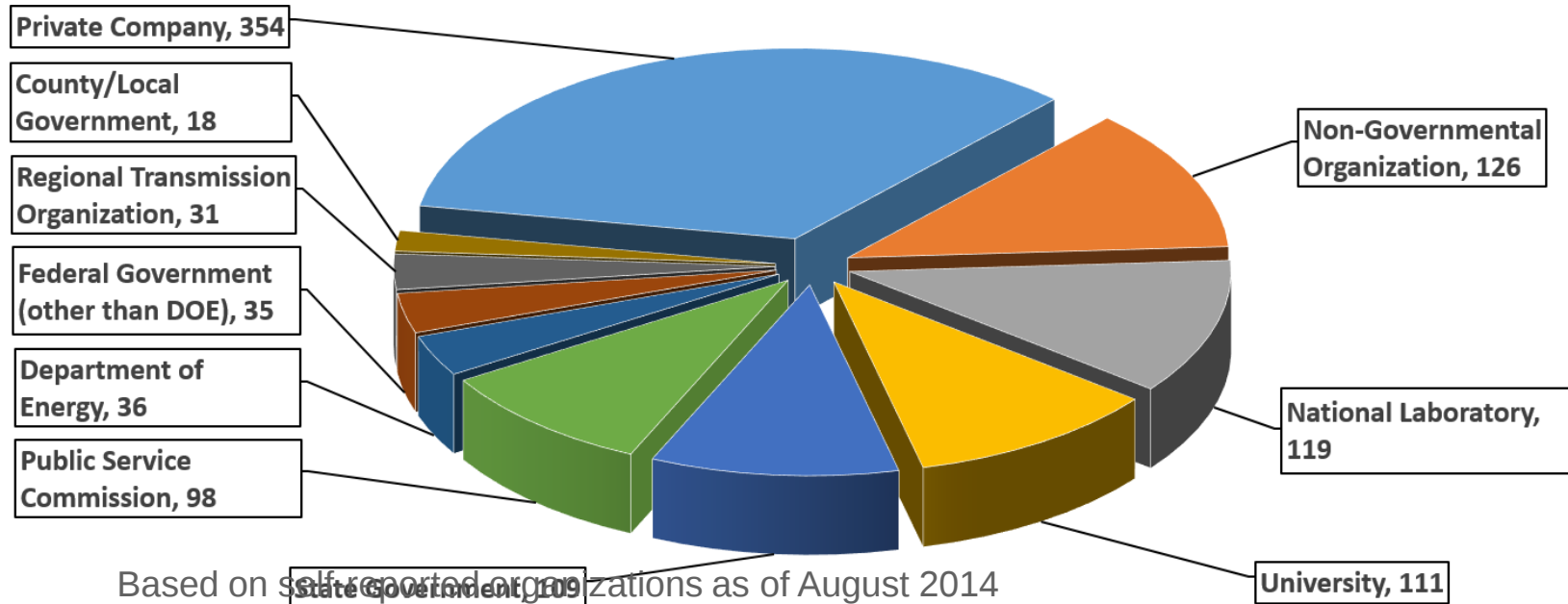
- November 2015: DOE decision to begin extending the geographic scope to the rest of the U.S.
- Phase 1: Mapping Library
 - Approximately 10% of the mapping library extended
 - Prioritized by level of usage of data and use in reports
 - Completed layers
 - Annual average wind speed (80m and 100m) for North America
 - 13 GIS data layers from the EIA, including power plants and pipelines
 - About 25 layers in progress
 - Updated home page and sub-pages to reflect national scope and recent changes
- Phase 2: Power Plant and Corridor Models, and Policy Database (FY17)



Planned and Proposed FY16 Activities

- Argonne FY16 Work Plan
 - System Hosting and Data Updates (funded)
 - Energy Corridor Analysis and Modeling Enhancements
 - Energy-Water Nexus Data and Analytics for Western U.S.
 - Commercially-licensed Data (funded)
 - Increase Geographic Extent to All U.S. States (Phase 1)
 - Interoperability Improvements
- Collaboration with Sandia National Laboratory (FY16 Work Plan)
 - Decision Support: Utilize EZMT to investigate potential challenges in power plant siting within the NEEM regions for EIPC development scenarios, including water-related factors at HUC-8 level.
- Bureau of Land Management (BLM): Section 368 Corridor Analysis
 - EZMT demonstrated to BLM and Western Electricity Coordinating Council (WECC)
 - Will be useful for analysis
- Western Regional Partnership
 - EZMT webinar planned for June

Who Uses the Energy Zones Mapping Tool?



- Since public launch: 1,365 registered users
- Recent increase in registrations and renewals, coinciding with:
 - New changes to geographic extent
 - Updates of wind and energy infrastructure data
 - Energy corridor analysis in western U.S.
 - Newsletters and webinars

*Supplemental slides
provided by
Vince Tidwell (Sandia)*

Exceptional service in the national interest



Exploring the Energy-Water Nexus in the Eastern Interconnection

Vince Tidwell and Barbie Moreland
Sandia National Laboratories



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Pilot Study: Vulnerability of Power Plant Fleet to Extreme Weather

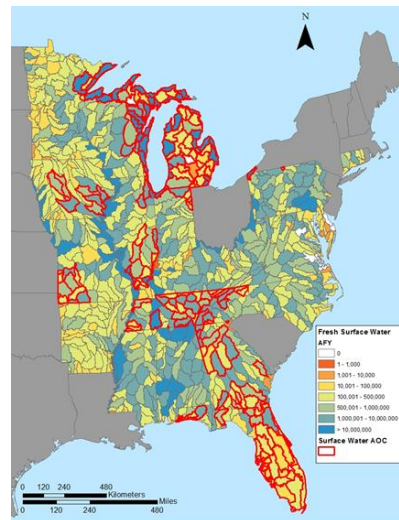
- Pilot study being conducted in Cedar River basin in Iowa.
- Cooperation of DOE National Labs, Corps of Engineers, NOAA and local stakeholders.
- Future scenarios consider changes to:
 - Climate, and
 - Land cover/land use
- Multiple, coupled models will be assembled to assess changes to:
 - Water quantity,
 - Water quality, and
 - Flood vulnerability.
- Assess vulnerability and adaptation strategies for basin energy infrastructure.



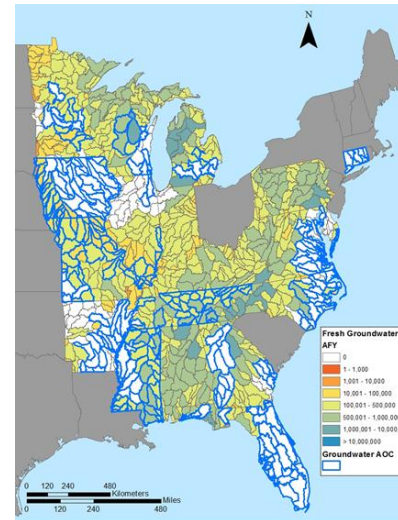
Water Supply Availability

- Mapping water availability, cost and future use in East for over 1200 watersheds.
- Four sources considered:
 - Fresh surface water,
 - Fresh groundwater,
 - Wastewater, and
 - Brackish groundwater.
- Western U.S. completed previously.
- Data can be used to inform siting of future thermoelectric power.

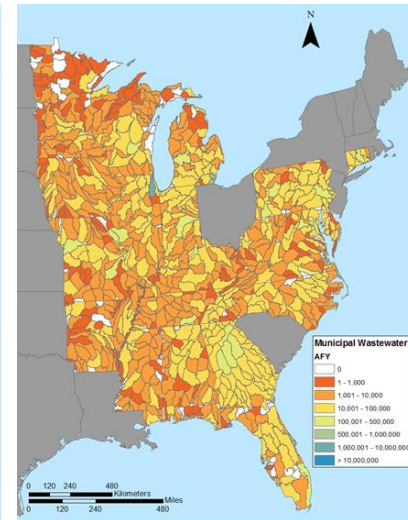
Fresh Surface Water



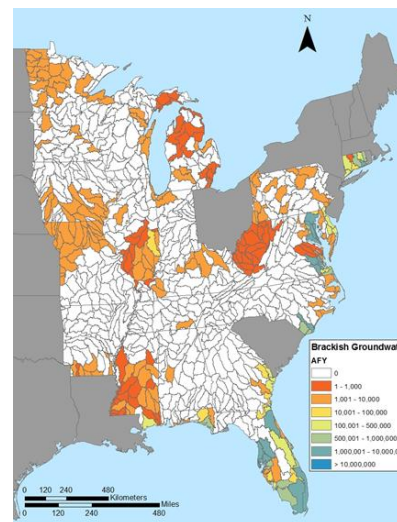
Fresh Groundwater



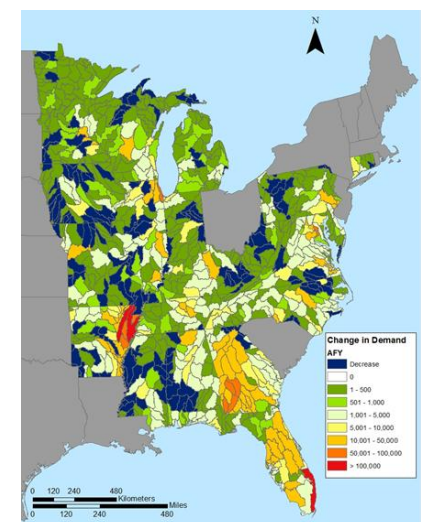
Municipal Wastewater



Brackish Groundwater



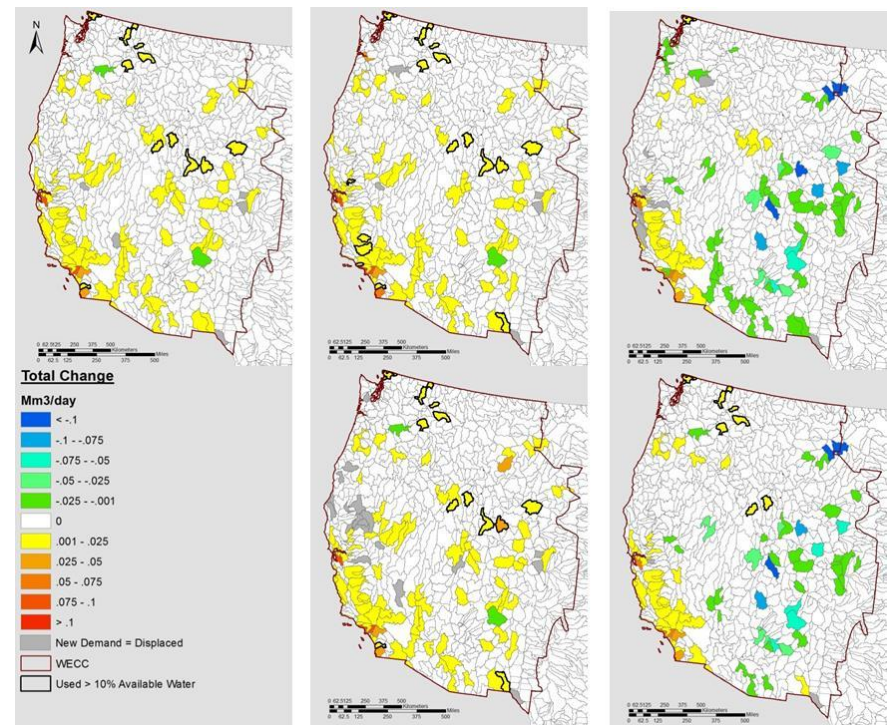
Consumptive Demand 2010-2030



Water Footprint of EIPC Scenarios

- Will calculate changes in thermoelectric water withdrawal and consumption associated with the three primary EIPC/EISPC planning scenarios.
- Estimated changes in water use are due to:
 - Projected power plant retirements, and
 - Additions of new generation.
- Will associate changes in projected thermoelectric water use with available water supply to identify potential energy-water nexus issues.

Example from Western Electricity Coordinating Council's long-term transmission planning: Differences in thermoelectric water use for five future planning scenarios




Energy Zones Mapping Tool

[Help](#)
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[About the Project](#)
[Background Resources](#)
[Data](#)
[Policies & Regulations](#)
[Maps](#)
[Documents](#)
[Links](#)


[Launch Tool](#)



EZMT

Energy Zones Mapping Tool

A map-based tool for identifying areas within the United States that may be suitable for clean power generation.


[Launch Tool](#)

About the Tool

The Energy Zones Mapping Tool is a free online mapping tool to identify potential clean energy resource areas within the United States.

This web site provides information about the [project](#), background on the [energy resources](#), and details on the [data](#) layers used in the tool. There are also links to [policies and regulations](#), [printable maps](#), [documents](#), and [related links](#).

See our [YouTube Channel](#) for an archive of EZMT webinars and training videos.

Features

- Nine energy resources: [Biomass](#), [Clean Coal](#), [Geothermal](#), [Natural Gas](#), [Nuclear](#), [Solar](#), [Storage](#), [Water](#), and [Wind](#)
- Flexible modeling of power plant and corridor siting factors such as slope and land protections
- Tools to generate and analyze potential corridor routes
- Searchable database of policies and regulations

Getting Started

Click the [Launch Tool](#) button above to start the tool, on the image below to view an introductory video, or use the [Help](#) menu at the top of the page for more detailed directions.



EZMT
Energy Zones Mapping Tool

We are interested in your feedback. Please email your comments to ezmt@nrel.gov.

News

April 14, 2016

[Updated Web Pages](#)
 Content on the EZMT home page, and other sub-pages was reviewed and updated....

March 16, 2016

[New Energy Infrastructure and Related Data](#)
 The following energy infrastructure layers, and related themes, have been added to the...

March 15, 2016

[Updates to Commercially Licensed Data](#)

Partners and Sponsors

This project is funded by the U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability. The Eastern Interconnection States' Planning Council (EISPC) led the original development, with research support and technical assistance from Argonne National Laboratory, National Renewable Energy Laboratory, and Oak Ridge National Laboratory. [More >](#)







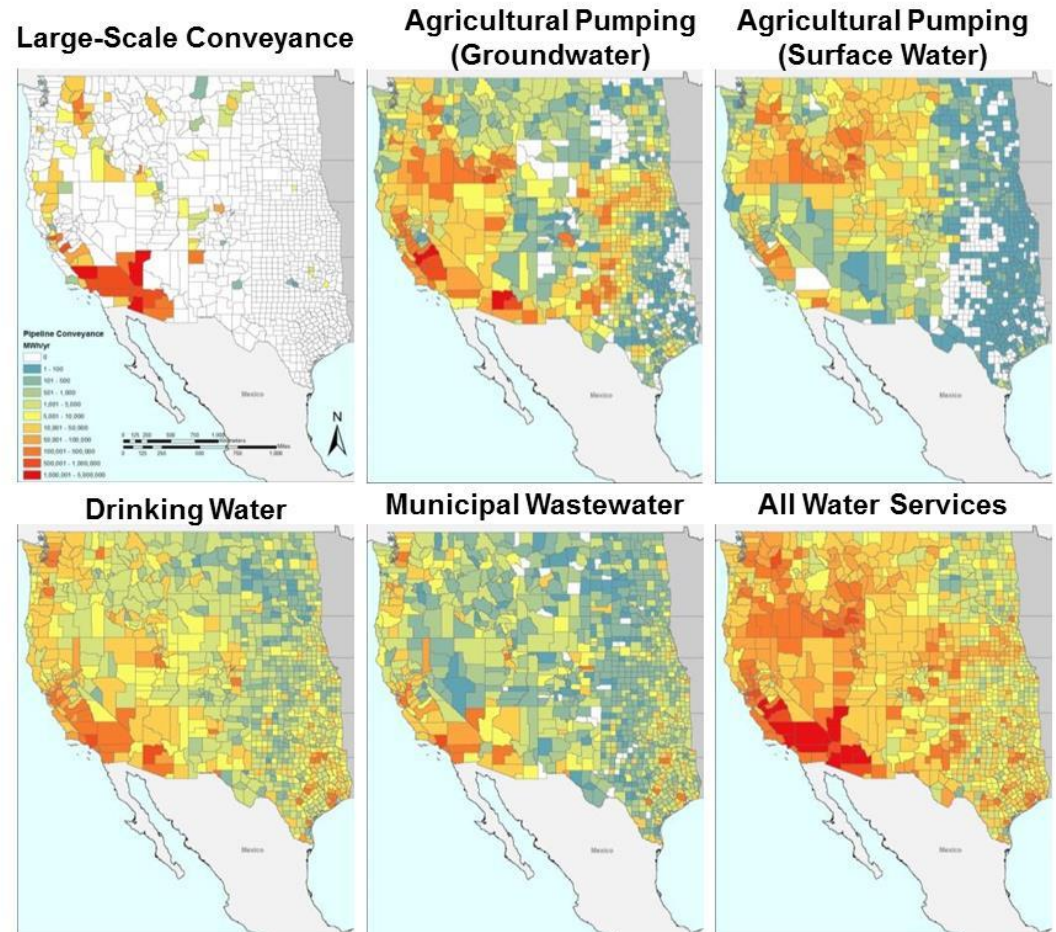
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-

Electricity for Water Services

- Mapping electricity use to provide key water services at county level:
 - Large-scale conveyance,
 - Agricultural pumping,
 - Wastewater, and
 - Drinking water.
- Data helps inform projections of future electricity demand.

Example of Energy for Water Mapping in the Western United States





Questions and Comments

- Register for, and access the tool here:
<http://ezmt.anl.gov>
- Questions/comments:
ezmt@anl.gov

Break

Meet back at 2:45 PM Eastern

U.S. DOE Laboratory Briefing and the Grid Modernization laboratory consortium (GMLC)

Jan Brinch
EISPC Director

David Meyer
U.S. DOE

Vladimir Koritarov
Argonne National Laboratory

Stan Hadley
Oak Ridge National Laboratory

Update:

DOE's Grid Modernization Laboratory Consortium

David Meyer
Senior Advisor
April 25, 2016

GMLC Portfolio: 88 Projects, \$220 Million, 3 years

Multi-year Program Plan

Devices and Integrated Systems

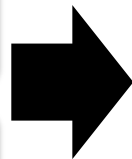
Sensing and Measurement

System Operations and Control

Design and Planning Tools

Security and Resilience

Institutional Support



Topical Areas for Regional and State Partnerships

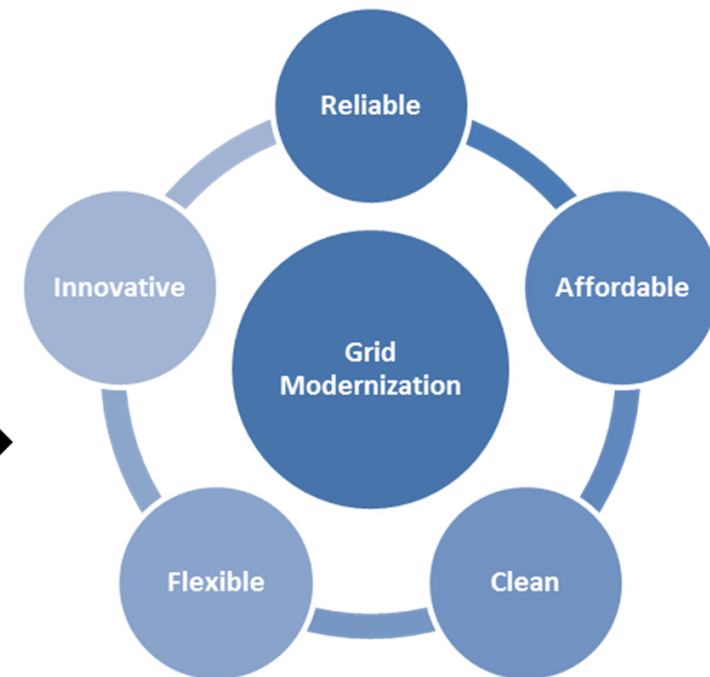
Distributed Energy Resources (DER)

Resilience

Grid Architecture



Modernized Grid



For project-level information, go to:

<http://www.energy.gov/doe-grid-modernization-laboratory-consortium-gmlc-awards>

Five Questions to Consider re Grid Modernization

1. How can we develop an inclusive functional map of our electricity supply system – one that shows all of the system's interactive components, and how specific parts strongly influence the operation of other parts?
2. Looking ahead five years, what are our system's most important strengths and weaknesses?
3. What important changes would we like to see become operational in the next 5-10 years?
4. If we decide to make changes, how can we protect ourselves against the risk of triggering unintended consequences?
5. How can we devise a least-regrets strategy for going forward?

DOE POC: David.Meyer@hq.doe.gov

Vladimir Koritarov, Argonne NL Slides

DOE Grid Modernization Initiative – Institutional Support Task

EISPC/NCEP Meeting
April 25, 2016 - Washington, DC

Vladimir Koritarov

Center for Energy, Environmental, and Economic Systems Analysis

Energy System Division (ES)

ARGONNE NATIONAL LABORATORY

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Argonne, IL 60439

Tel: 630-252-6711

Koritarov@ANL.gov

Grid Modernization Initiative Focuses on Six Key Areas

Institutional Support

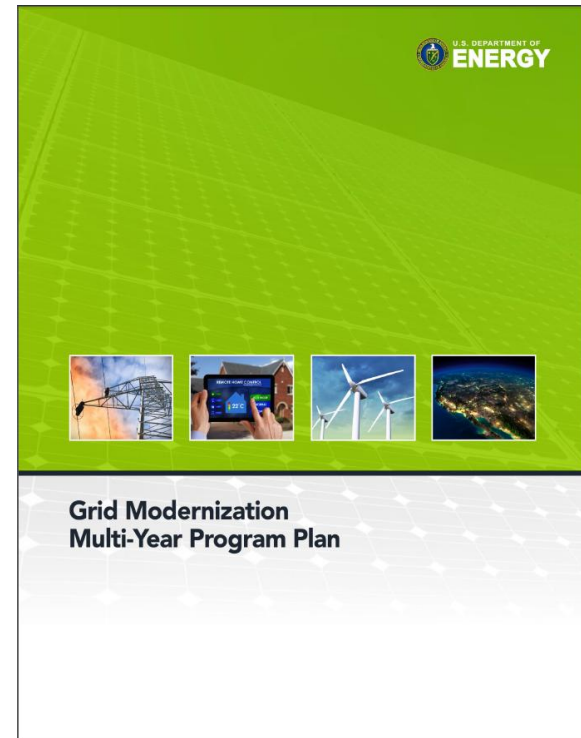
Devices and Integrated
System Testing

Sensing and
Measurements

System Operations,
Power Flow, and Control

Design and Planning
Tools

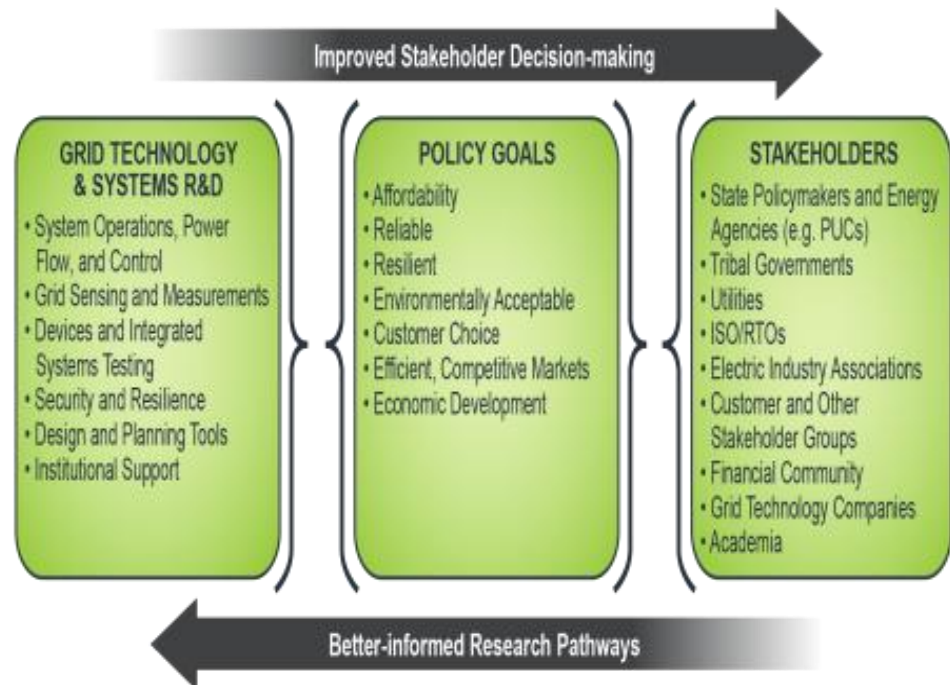
Security and Resilience



Institutional Support Area has Four Main Activities

- Provide Technical Assistance to States and Tribal Governments
- Support Regional Planning and Reliability Organizations
- Develop Methods and Resources for Assessing Grid Modernization: Emerging Technologies, Valuation, and Markets
- Conduct Research on Future Electric Utility Regulations

Each activity has specific goals and target achievements to be completed by 2020.



Activity 1: Provide Technical Assistance to States and Tribal Governments

Target achievements:

- Provide technical assistance to all states and tribes to inform their decision making for electricity policy, accelerating policy innovation in at least seven states.
- Provide technical analyses to at least 10 states—including guidance on how to consider new technologies such as distributed energy resources—allowing them to establish formal processes to review utility distribution system plans.
- Assist at least 10 other states in developing comprehensive energy system plans.



Technical Assistance to States: Topic Area and Issues

Topic Area	Issues
Cross-cutting Issues	• Resource valuation and cost/benefit analysis • <i>Market designs and rules that enable development and appropriate valuation of clean energy resources</i> • Future electric utility regulation (see technical area 4) • <i>Early-stage planning for electrification of transportation</i>
Energy Efficiency	• EE Policy frameworks (e.g., EERS, requirements to acquire all cost-effective efficiency, IRP) • DSM planning processes and administration options for: program design, cost-effectiveness screening, potential studies, EM&V, strategies for financing EE • State-administered programs: Energy-saving performance contracting, building codes, benchmarking and disclosure
Demand Response	• <i>Demand Response programs and resources in a post-FERC Order 745 world</i> • Policy and market barriers to DR providing ancillary services; DR as enabler for higher levels of variable generation • Design and evaluation of time-varying pricing and DR programs with customer enabling technologies
Distributed Generation and Micro-grids	• Policies such as net metering, feed-in tariffs, bi-directional tariffs, CHP solicitations, RPS carve-outs, state tax credits, rebates, utility ownership or leasing, and multi-party micro-grids • Treatment in IRP, distribution and transmission system planning • Valuation, including locational- and time-based benefits and costs • Interconnection standards/procedures and standby rates • <i>Interactions and coordination with utility distribution systems under normal and emergency operating conditions</i>

Technical Assistance to States: Topic Area and Issues (table continued)

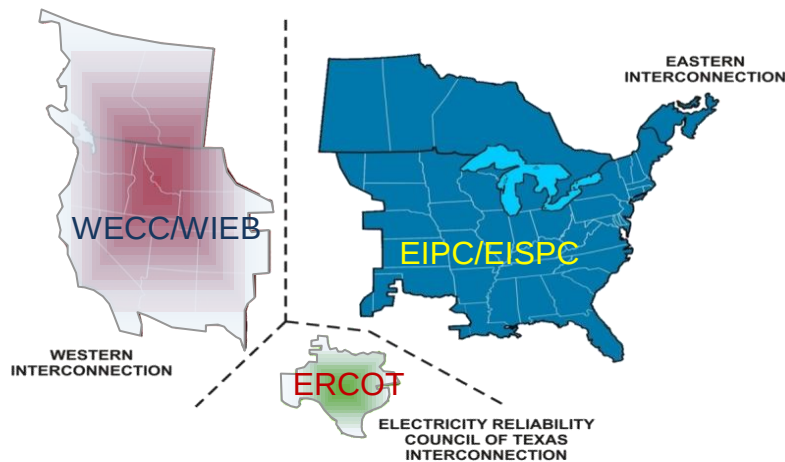
Topic Area	Issues
Energy Storage	• Policies, regulations, and market designs that support energy storage; treatment in utility resource and T&D planning • <i>Valuation and compensation strategies, including providing ancillary services, and increased flexibility</i> • <i>Role in supporting critical service providers (e.g., hospitals and fire stations) and as enabling technology for higher levels of renewable resources</i> • <i>Role of demonstration projects and incentive programs</i>
Utility-Scale Renewable Resources	• State policies (e.g., RPS and renewable energy credits) • Treatment of utility-scale renewable resources in resource planning and procurement • Flexibility metrics for resource planning and acquisition
Fossil Fuel and Nuclear Resources	• <i>Role of natural gas, including as a flexibility resource</i> • <i>Role of nuclear power, including as a clean energy resource</i> • <i>Role of coal, including carbon capture and sequestration</i> • <i>Impacts of potential environmental regulations on system reliability and fuel diversity</i> • <i>Treatment of potential future environmental regulations in planning and acquisition of generation resources and analysis of potential power plant upgrades</i>
Distribution System Planning and Operation	• <i>Planning to enable two-way flows of energy and information, including integration of advanced monitoring, controls, volt/VAR optimization, IT management, and communications systems</i> • <i>Optimizing voltage and reactive power on distribution systems</i> • <i>Integration of non-wires solutions, including geo-targeting</i> • <i>Adapting state utility regulations to changes in distribution system operations</i> • <i>Avoiding adverse effects of distribution-level technologies on the transmission system</i>
Transmission System Planning and Operation	• Treatment of transmission in utility integrated resource planning • Integration of utility resource planning and sub-regional/regional transmission planning • <i>Integration of energy efficiency, DR, DG, variable generation, and energy storage in utility transmission planning</i> • Reliability, security, and resiliency

Activity 2: Support Regional Planning and Reliability Organizations

Target achievements:

- Support regional planning and reliability organizations in developing institutional frameworks, standards, and protocols for integrating new grid-related technologies.
- Coordinate a regional long-term planning process that uses standardized planning assumptions and publicly available databases of transmission topology and regional resource data.
- Facilitate long-term regional planning in each U.S. interconnection.

North American Electric Reliability Corporation Interconnections



Activity 3: Develop Methods and Resources for Assessing Grid Modernization

Target achievements:

- Develop new methods for valuing distributed energy resources and services.
- Develop analysis tools and methods that facilitate states' and tribes' integration of emerging grid technologies into their decision making, planning, and technology deployment.
- Track grid modernization progress in states and tribes through standardized data collection methods and performance and impact metrics.

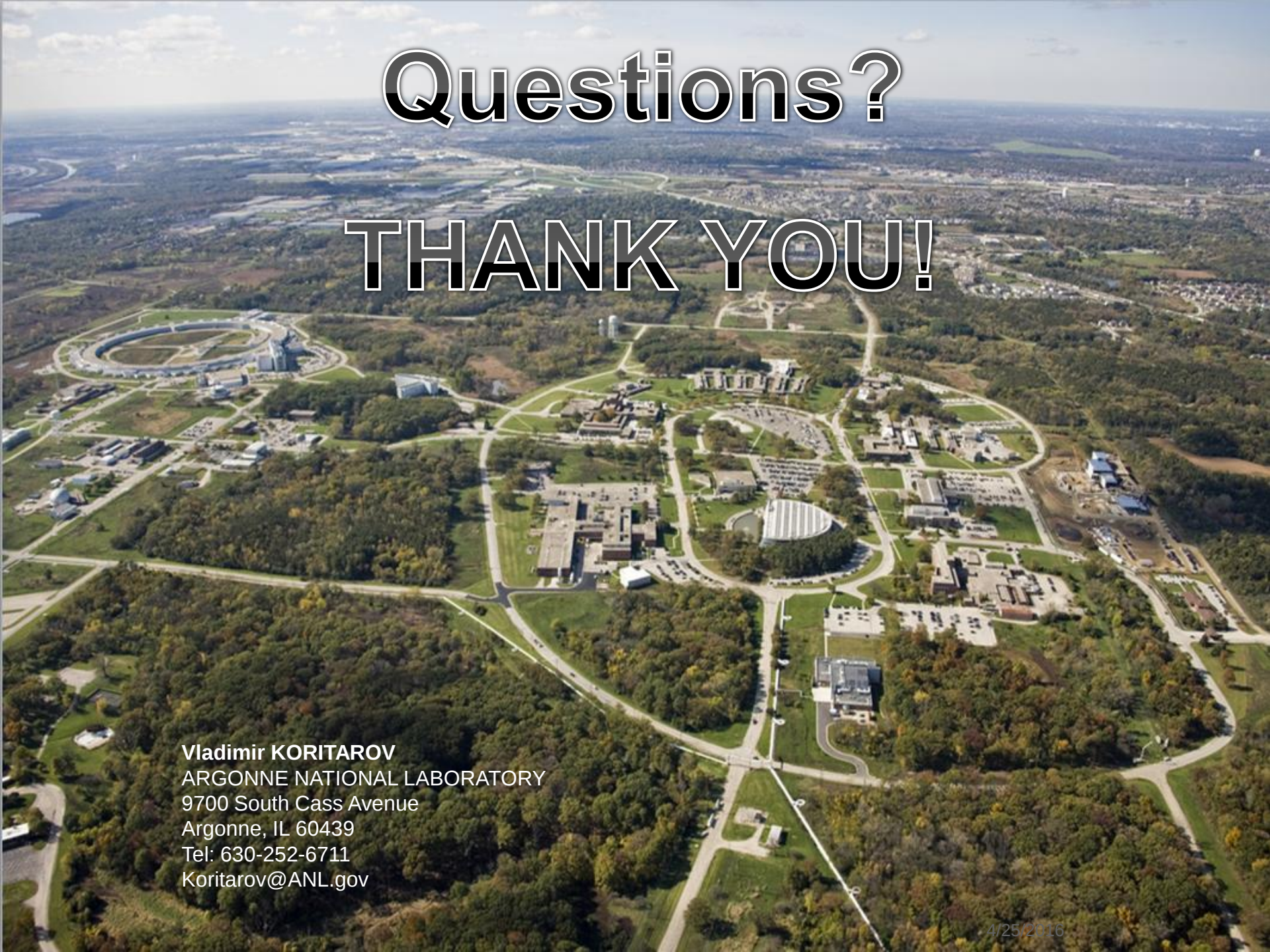


Activity 4: Conduct Research on Future Electric Utility Regulation

Target achievements:

- Provide technical assistance to at least eight state PUCs and utilities on ratemaking alternatives using DOE-supported financial analysis tools, other analytic resources, or stakeholder-convened discussions.
- Provide technical assistance to at least five states and utilities that are considering fundamental changes to the existing regulatory model.
- Provide technical assistance to at least five states that are considering allowing third-party access to customer hourly interval load data and pricing of value-added services, which could spur new energy services



An aerial photograph of the Argonne National Laboratory campus. The image shows a large, sprawling facility with numerous buildings, parking lots, and green spaces. A prominent circular road or track is visible on the left side. The campus is surrounded by dense trees and greenery. In the background, a city skyline is visible under a clear sky.

Questions?

THANK YOU!

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4/25/2016

ORNL Institutional Support Projects

- **Grid Valuation Framework**
- **Electric Planning Principles**
- **Project Finance Mapping Tool**

Stan Hadley

Power & Energy Systems

Oak Ridge National Laboratory

April 25, 2016



Grid Services and Technologies Valuation Framework

- Currently many valuation processes are being used
 - Different technologies (solar, wind, hydro, storage, EE, nuclear, smart grid)
 - Different users (DOE, utilities, regulators, consumers)
 - Different value streams (avoided energy, capacity, ancillary services, T&D impacts, environmental)
 - Different metrics (affordability, sustainability, reliability, security, flexibility, resiliency)
- Lack of underlying framework
 - prevents comparison or consolidation
 - Causes duplication of effort
 - Leads to conflict over “correct” method

Valuation methods are based on needs, purposes, and resources of the user

- Technology screening or policy analysis will have different data needs and resources available than rate-setting or construction.

?	Simple?	Complexity?	Involved?
Coarse?	Purpose: 3 Screening?	Purpose: 1 Multi-region?	Evaluation of?
Accuracy?	Data? required: 1 Low?	? technologies? and? services?	
	?	Data? required: 1 Geographic? or?	? technology? high??
Precise?	Purpose: 3 Single? Project? developer?	Purpose: 1 Rate-setting, 1 major? project?	
	Data? required: 1 High? for? project, 1 low?	? construction? decision?	
	? for? test? of? grid?	Data? required: 1 High?	

Grid Modernization Project

- Three-year project of seven national laboratories with a stakeholder advisory group including regulators, industry, and advocacy groups
- Two key dimensions to the project
 - **Advance the science** to develop a clear, consistent, transparent, flexible **process for weighing the values** of different technologies and grid services
 - Develop the process in an **open** manner with **participation** of industry, regulators, and interest groups to ensure a robust, **well-accepted** process

Overall Project Vision

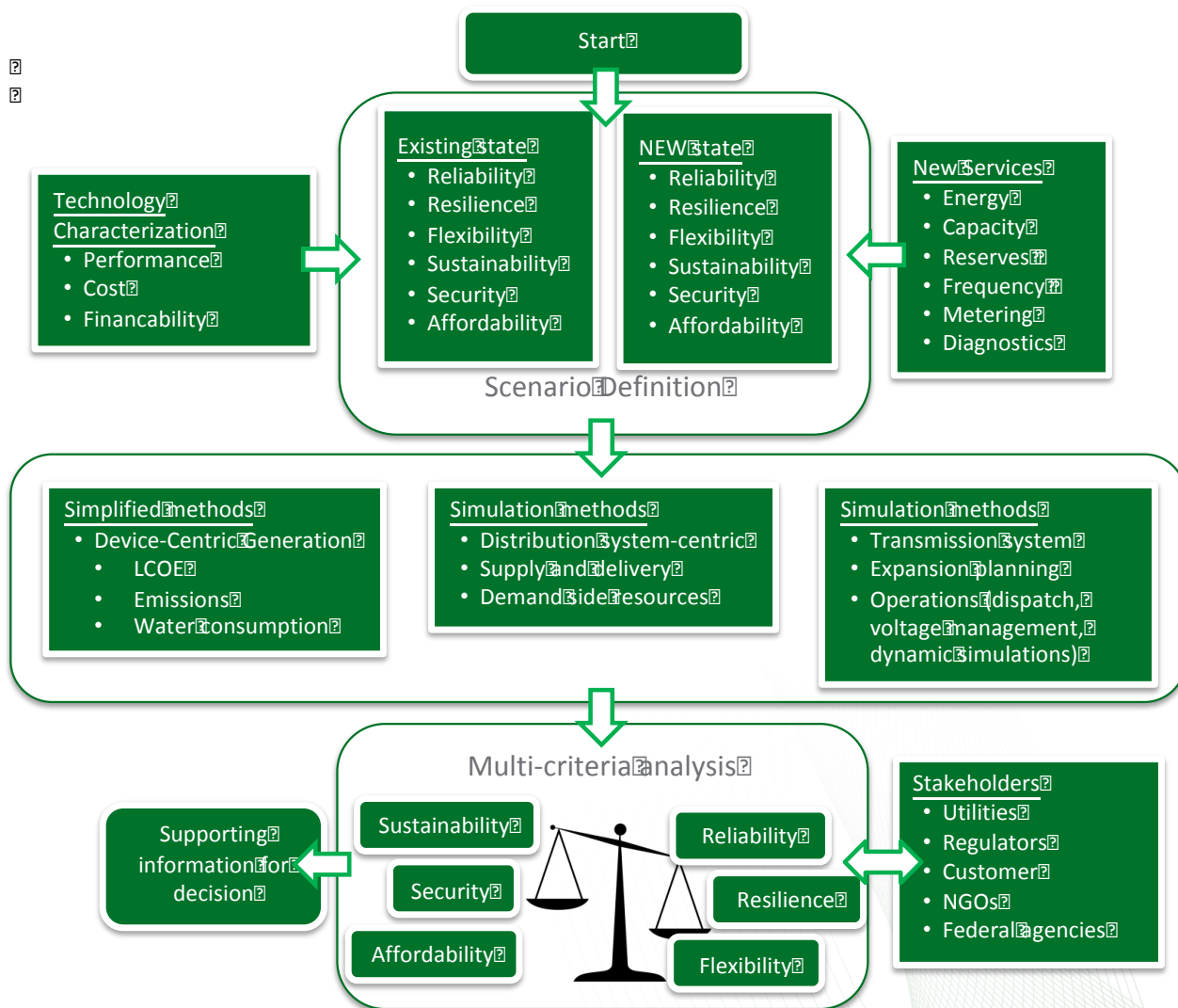
- Identify a **comprehensive strategy for valuation** that encompasses generation, transmission, distribution, storage, and distributed energy resources and services (including energy efficiency).
- Develop a process for **stakeholders** including industry, regulators, policy makers, DOE, and others to **examine, compare, and make decisions** regarding new and existing technologies.
- Incorporate the **institutional and market context** so that the majority of these values can be captured to allow **new and existing technologies** to fairly compete, cooperate, and be compensated.

Outcomes for 3-Year Project

1. A **compendium of existing valuation methodologies and tools** that quantify values of grid-related services and technologies;
2. A tested valuation framework that consists of a **set of methodologies to quantify specific values** that a broad stakeholder community will need for investing in modernizing the nation's electric infrastructure; and
3. A key resource to **inform the DOE R&D agenda** for model enhancements and development and serve as a **model for state resource planning** processes and NERC planning councils.

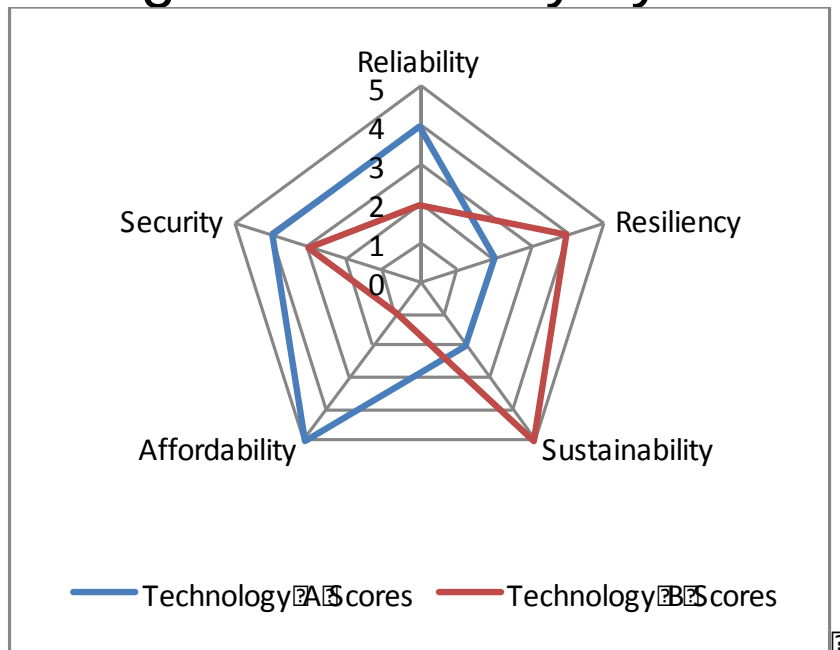
Provide Architecture for Technology Valuation Process

- Framework provides both a **taxonomy** and a **decision process**
- Relate Valuation processes to Grid Architecture from GMLC Project 2
- Coordinate grid services definitions with GMLC Project 18

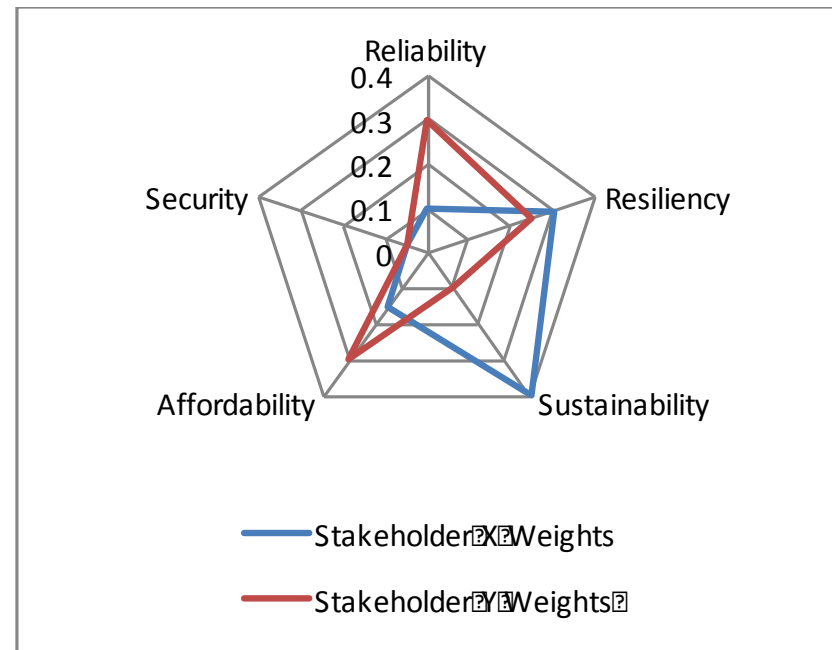


Framework to use tools to address multiple metrics

- Create process for multi-criteria assessment using metrics and process from GMLC Project 1
- Technologies will have different strengths that will be weighed differently by various stakeholders



Technologies Differ Across Important Metrics



Stakeholders Differ on How They Value Key Metrics

DOE Office of Energy Policy and Systems Analysis Whitepaper on Electricity Planning Principles

- DOE/EPISA whitepaper on planning principles
 1. Conduct an open and transparent planning process
 2. Consider the regional characteristics and needs of your system
 3. Formulate clear reliability questions
 4. Leverage previous work from power utility sector organizations
 5. Integrate first-hand knowledge with publicly vetted data, assumptions, and methods
- NREL, PNNL, and ORNL researchers adding discussion, checklists, data, and regional highlights for each principle
- Should be useful for stakeholders (e.g., state air offices) who are less familiar with electric sector planning processes

Project Finance Mapping Tool

- The Project Finance Mapping Tool (PFMT) is a **visual interface tool** for EPSA analysts and others to rapidly explore the impacts of different **policies** on the **financial** viability of new power projects in **every state**.
- Three levels of operation:
 - **Excel** Workbook, written by Stan Hadley
 - **Tableau** Desktop, written by Supriya Chinthavali
 - Tableau Server, written by Supriya Chinthavali
- Major users include EPSA analysts and potentially other policy analysts

Major Data Inputs

- Eight Technologies modeled currently

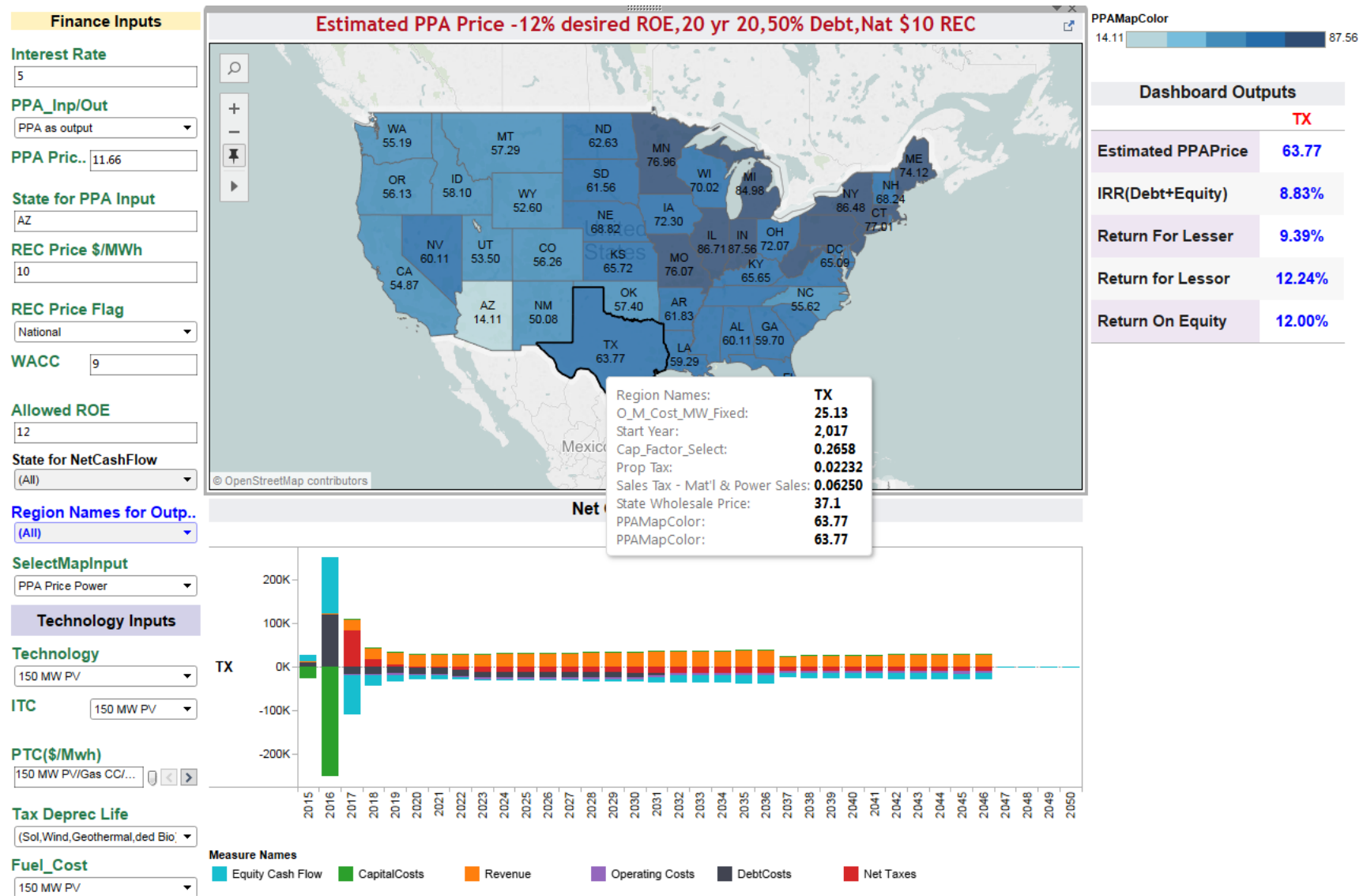
Large PV	Small PV	Biomass	Onshore Wind
Geothermal	Gas CC	Gas CT	Offshore Wind

- Includes construction, operating, fuel costs, lives
- Financial parameters include:
 - State and Fed tax rates, debt rates, return on equity, contract terms, system prices
- Policy parameters
 - Investment tax credits, production tax credits, tax depreciation rate, exemptions, REC prices, CO₂ cost

Main Output is on Dashboard

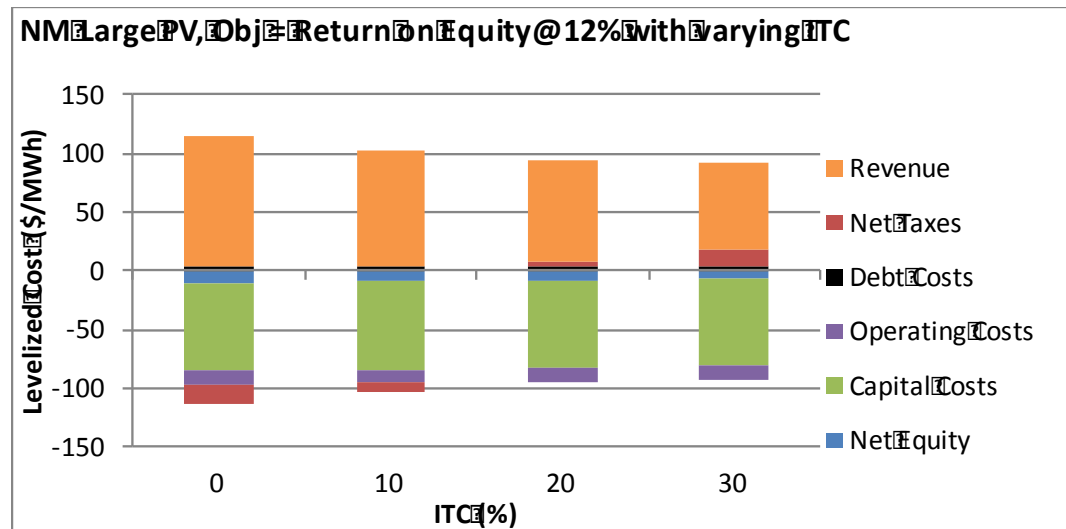
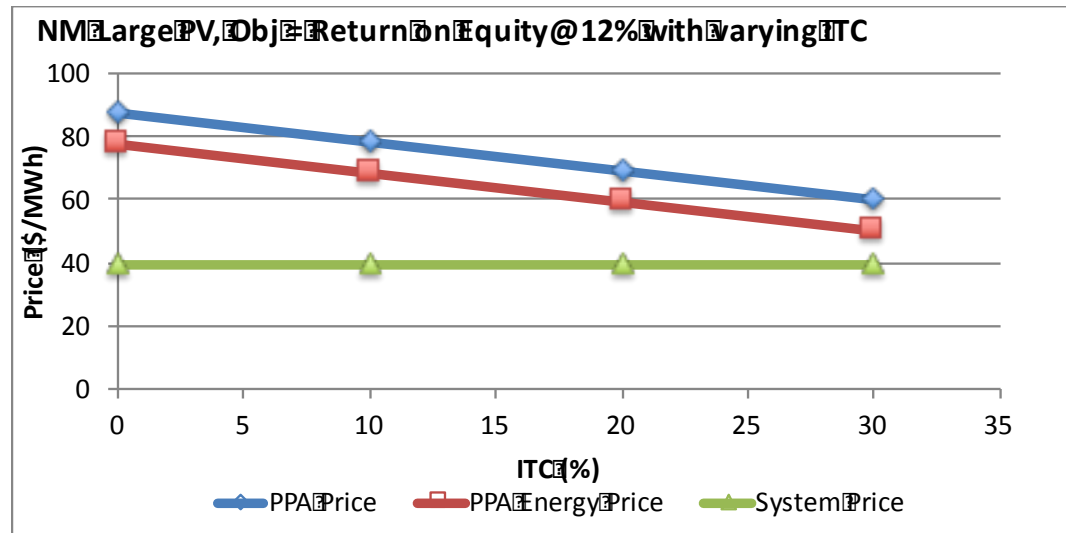
- Map of the US showing power prices, differences, changes, returns, etc.
- Other graphs available show:
 - Time-series cash flow for individual state
 - Scatter-plot of prices compared to state system prices
 - Table of key financial factors
- Dashboard allows user to modify key variables
- Detailed data available from Tableau and Excel

Output Format of Tableau Dashboard

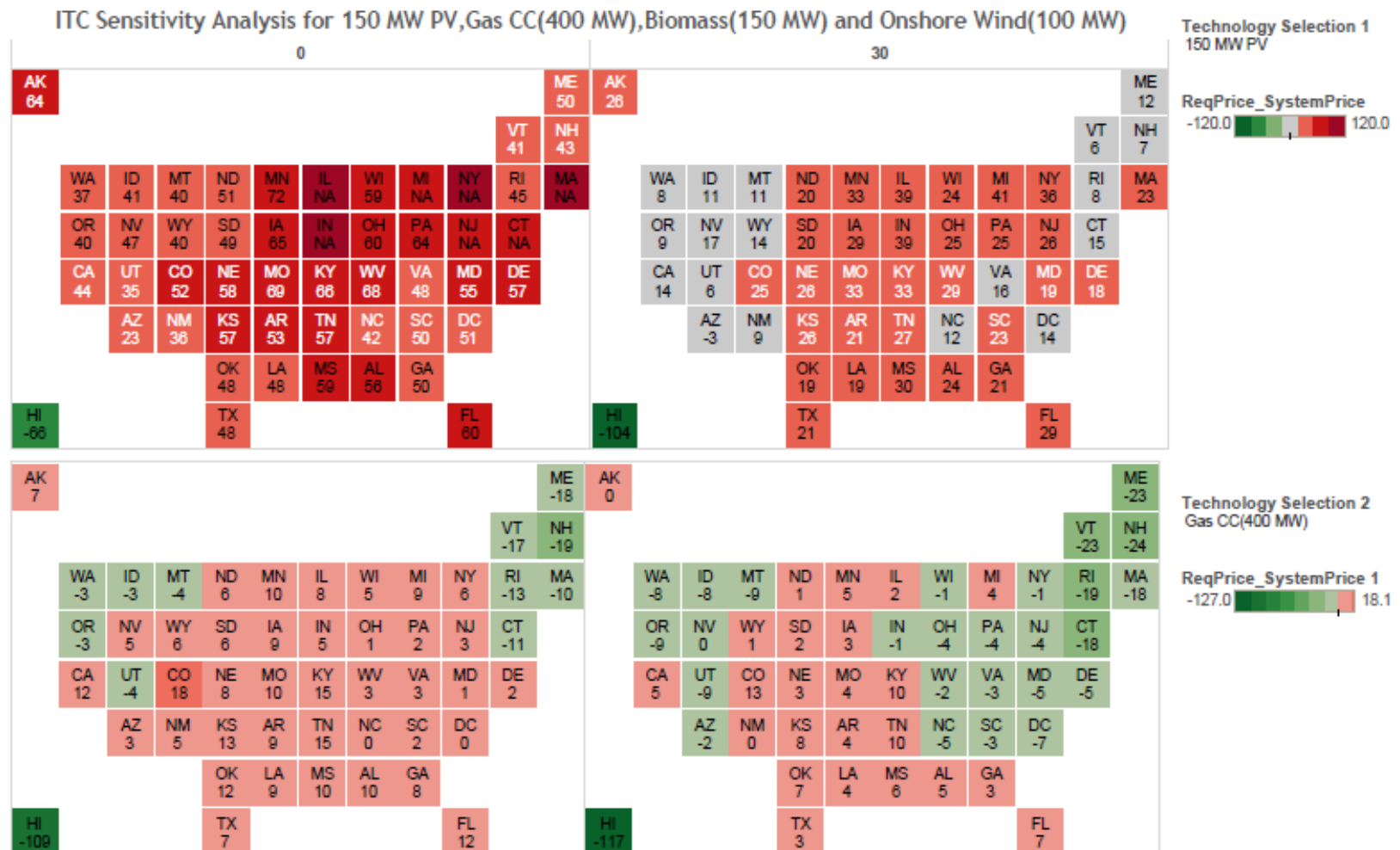


Additional Graphs and Tables

- Other graphs display multiple cases and parameters
- Allows user to examine impacts of parameter changes



Sensitivity Analyses on various policy parameters (e.g., ITC, PTC, tax rates)



Summary

- The PFMT will be a useful tool for analysts to examine the impacts of policies on energy projects.
 - The **assumptions are based on accepted sources** while allowing the analyst to test alternatives.
 - The methods provide many of the **main financial factors** involved though not with the complexity of a full business plan.
 - It can be applied to **federal or state tax policies** or other **finances**.
 - Available for **broad use** through a browser or more **intense work** through the Tableau Desktop or Excel.
 - Periodic **updating** of data and model will be needed in this rapidly **changing market**.

Topics in the Evolving Electricity Sector: EPSA v FERC – Federal and State Simultaneity

Miles Keogh
NARUC

Jeff Dennis
Akin Gump

Max Minzner
FERC

Hon. Ed Finley
North Carolina

**This foregoing document was electronically filed with the Public Utilities
Commission of Ohio Docketing Information System on**

12/8/2021 5:02:07 PM

in

**Case No(s). 21-0516-EL-REN, 21-0517-EL-REN, 21-0531-EL-REN, 21-0532-EL-
REN, 21-0544-EL-REN**

Summary: Comments Reply Comments of Blue Delta Energy, LCC electronically
filed by Mrs. Kimberly W. Bojko on behalf of Blue Delta Energy, LLC