



SEEA

SOUTHEAST ENERGY EFFICIENCY ALLIANCE

WEBINAR SERIES

A New Lens for Cost-Effectiveness Testing: Arkansas Case Study

Chris Neme, Energy Futures Group

Katherine Johnson, Johnson Consulting Group

Robert Booth, Arkansas Public Service Commission Staff

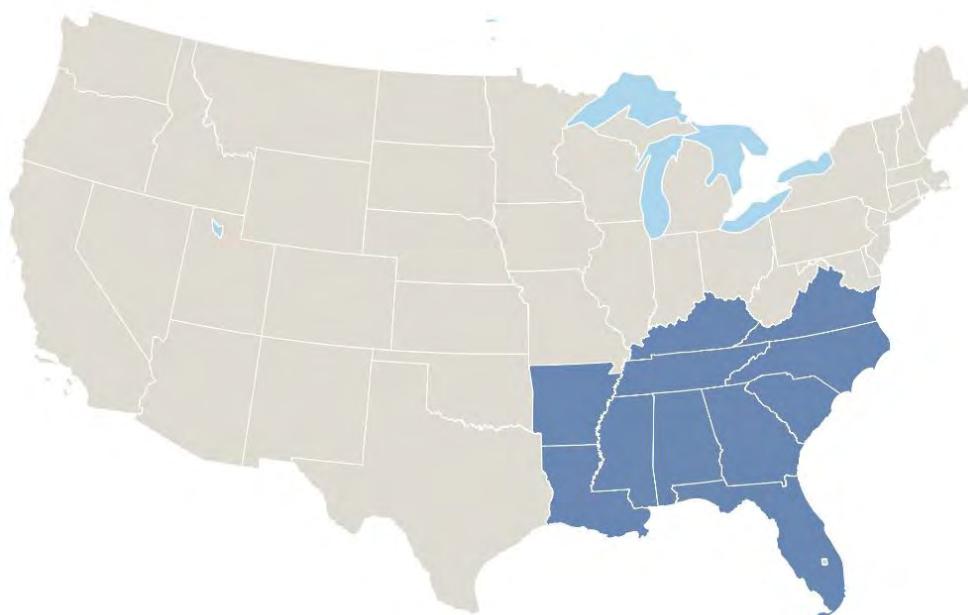
SEEA Serves the Southeast

Mission

The **Southeast Energy Efficiency Alliance (SEEA)** works to ensure people in the Southeast have the knowledge, resources, and opportunities to optimize energy use.

Vision

Energy efficiency is a primary driver of a prosperous, healthy and sustainable Southeast.



Work Areas:

Built Environment

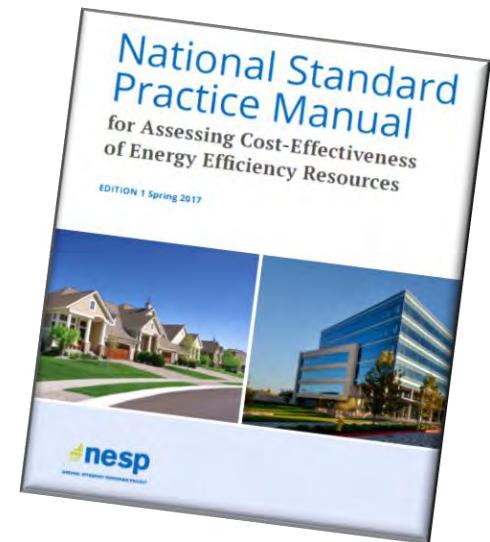
State, Local & Utility Policy

Energy Equity

Innovative Finance



National Standard Practice Manual for Energy Efficiency Cost-Effectiveness (Edition 1.0)



The National Efficiency Screening Project

Presentation Overview

- NSPM Overview
 - Why it was developed
 - What it does/offers
- Intro to the Arkansas Case Study
 - Context for its initiation
 - Overview of work done, process and timeline
- Arkansas Case Study Results
 - Summary of key questions raised by each NSPM principle
 - Alignment of current Arkansas test w/NSPM principles
- Conclusion and Next Steps
- Q&A



NSPM OVERVIEW



The Need for an NSPM

Test Selection

- Traditional tests (UCT, TRC, SCT)
not meeting states' needs
 - No underlying principles
 - Don't directly address policy goals/needs
 - Lack of clarity on their conceptual constructs
 - Only 3 options, despite much greater variability in state needs
 - Many states modified the tests
 - A good thing if done well, but that has only sometimes been the case...



Test Use

- Absence of ***standard guidance*** on proper application of tests
 - Inputs to tests Arkansas often problematic

Most problems with both (A) test selection/design & (B) test use/inputs lead to under-valuing – often significantly – of efficiency (vis-à-vis supply)

Development of the NSPM

NSPM Drafting Committee

- Tim Woolf, Synapse Energy Economics
- Chris Neme, Energy Futures Group
- Marty Kushler, ACEEE
- Steve Schiller, Schiller Consulting
- Tom Eckman (Consultant)



NSPM Coordination and Funding

- Coordinated and funded by E4TheFuture
- Managed by Julie Michals (essentially another co-author)

Development Process

- ~15 months
- Several rounds of external review
 - ~40 experts (PUCs, Utilities, Consumer Advocates, Enviro Groups, etc.)
- Published May 2017

NSPM Outline

Executive Summary

Introduction

Part 1: Developing Your Test

1. Principles
2. Resource Value Framework
3. Developing Resource Value Test
4. Relationship to Traditional Tests
5. Secondary Tests

Part 2: Developing Test Inputs

6. Efficiency Costs & Benefits
7. Methods to Account for Costs & Benefits
8. Participant impacts
9. Discount Rates
10. Assessment Level
11. Analysis Period & End Effects
12. Analysis of Early Retirement
13. Free Rider & Spillover Effects

Appendices

- A. Summary of Traditional Tests
- B. Cost-Effectiveness of Other DERs
- C. Accounting for Rate & Bill Impacts
- D. Glossary

*Executive
Summary*

Introduction

Part 1

Part 2

Appendices

NSPM Principles

- 1. *Recognize*** that energy efficiency is a resource.
- 2. *Account*** for applicable policy goals.
- 3. *Account*** for all relevant costs & benefits, even if hard-to-quantify impacts.
- 4. *Ensure symmetry*** across all relevant costs and benefits.
- 5. *Conduct*** a forward-looking, long-term analysis that captures incremental impacts of energy efficiency.
- 6. *Ensure transparency*** in presenting the analysis and the results.



ARKANSAS PROCESS OVERVIEW



Case Study Background

- ***November 2, 2017:*** the Arkansas Public Service Commission (APSC) directed APSC Staff that the Parties Working Collaboratively (PWC) collaborate with E4TheFuture to ***develop*** a National Standard Practice Manual (NSPM) Case Study in Arkansas (Docket No. 10-100-R, Order No. 27; Docket No. 13-002-U, Order No. 40) p. 1 of 3).
- Overall ***goal*** of this case study was to ***document*** Arkansas' progress in adhering to the six NSPM underlying principles.
- This case study ***provides*** a snapshot of current IOU operations during Program Year 2017-Program Year 2018.
- ***The case study was filed with the Commission in November 2018.***



Role of the PWC

CenterPoint
Attorney General's Office
HIMs discuss **Applied Energy Group**
AEEC/AGC *electric/gas* Clinton Climate Initiative Tetra Tech
AEO OG&E SWEPCO **SEEA** Black Hills Audubon Arkansas

Parties Working Collaboratively

Utilities... Stakeholders... Interested Parties... Intervenors

Empire Entergy AOG TRM Sierra Club MMP
weatherization financing AAEA CLEAResult
cooperate potential study ICFI Navigant
Frontier Arkansas Public Service Cadmus Wal-Mart
Commission Staff ACAAA
IEM

Three Key Research Undertakings

1. *Identify/Document current state policies* governing EE

- A core NSPM process recommendation
- Informs what categories of impacts should be included in a state's test (NSPM Principle #2)

2. *Document what utility system impacts* each IOU currently including in cost-effectiveness analyses

- Central to confirming treatment of EE as a resource (NSPM Principle #1)

3. *Document how utilities currently treat free rider costs*



Documentation of State Policies - Process

- Staff conducted a comprehensive review of the *current legislation* addressing energy efficiency policies in Arkansas.
- The PWC *convened a Working Group* to focus on the case study. This working group included utilities and stakeholders.
 - They also *developed a template* to identify the categories of impacts policy suggest may be important to include in cost-effectiveness analyses.

Documentation of State Policies - Excerpt

Energy Efficiency Policy/Source	Summary/Description	Legislative/Administrative Statement of Policy/Purpose	AR Policy Support for Impacts to Potentially Include in EE Cost/Benefit Analysis	AR Policy Relevance to Other NSPM & Cost-Effectiveness Issues
Energy Conservation Endorsement Act of 1977, Arkansas Code §23-3-401, et seq. [Enacted by Act 748 of 1977, effective 7/6/77 except as subsequently noted]	The primary source of statutory authority for energy efficiency policy for the State of Arkansas (the "Energy Conservation Act").	<p>§ 23-3-402 – The General Assembly recognizes that enormous amounts of energy are wasted by consumers of all classes and economic levels due to inadequate insulation of buildings and other inefficiencies in the use of energy. The overriding public interest in the conservation of natural gas and oil, as well as the use of alternative forms of energy, is indisputable.</p> <p>§ 23-3-404 – It shall be considered a proper and essential function of public utilities regulated by the Arkansas Public Service Commission to engage in energy conservation programs, projects, and practices which conserve, as well as distribute, electrical energy and supplies of natural gas, oil, and other fuels.</p>	<ul style="list-style-type: none"> Utility system impacts Other fuel impacts (maybe ???) participant impacts 	
Energy Conservation Act, § 23-3-405(a)(1)(A), effective 7/6/77	Gives extensive authority to the Commission to promote the development of utility energy efficiency programs.	<p>Section (a)(1)(A) – The General Assembly authorized the Arkansas Public Service Commission to propose, develop, solicit, approve, require, implement, and monitor measures by utility companies which cause the companies to incur costs of service and investments which conserve, as well as distribute, electrical energy and existing supplies of natural gas, oil, and other fuels.</p>	<ul style="list-style-type: none"> Utility system impacts Other fuel impacts 	
Energy Conservation Act, § 23-3-405(a)(1)(B), added by Act 1102 of 2017, effective 7/30/17	Authority to promote EE programs for utility customers sixty-five (65) years and older or low income eligible.	<p>Section (a)(1)(B) – The commission is authorized to order, require, promote, or engage in energy conservation programs and measures for the benefit of utility customers who are sixty-five (65) years of age or older or who meet the income eligibility qualifications for the Low Income Home Energy Assistance Program administered by the Department of Human Services.</p>	<ul style="list-style-type: none"> Low income impacts 	

Potential Policy Goals vs. Current Arkansas Test

Impact Categories	Policy References	Currently in TRC?	Notes
Utility System			
Utility System Impacts	9	Y	In utility EE portfolio costs & system avoided costs used by the utilities
Reliability Impacts	1	N	Not quantified in current tests
Participant			
Other Fuels	5	Y	Part of NEBs
Water Impacts	2	Y	Part of NEBs
Low-Income Impacts	2	TBD	Will be addressed in devt of Low-Income Pilot Program
Other Participant Impacts	4	Limited	Only reduced O&M costs
Society			
Equitable Access Impacts	2	N	Not quantified in current cost-effectiveness tests
Carbon Impacts	3	Partially, in some cases	Some utilities include value of avoided future carbon regulation costs (utility system impact); others don't include any carbon value.
Other Environment Impacts	1	N	Not quantified in current cost-effectiveness tests
Economic Devt Impacts	1	N	Not quantified in current cost-effectiveness tests
Energy Security Impacts	1	N	Not quantified in current cost-effectiveness tests

Utility System Impacts – Data Collection

Utility Name	XXX Electric or Gas Company				
Category of Utility System Impacts	Included in Cost-Effectiveness Analyses?	Values Used	Units	Source(s) of Values Used	Other Questions
Avoided Energy Costs	yes or no		specify	IRP modeling, EIA forecasts, MISO data, other	Differentiated by season, on/off peak?
Avoided Generating Capacity Costs	yes or no		specify	IRP modeling, EIA forecasts, MISO data, other	
Avoided T&D Capacity Costs	yes or no		specify	Internal study, benchmarking vs. other utilities	
Avoided T&D Line Losses					
energy kWh	yes or no		% loss rate	Internal study, system data, etc.	Based on avg or marginal loss rates?
peak kW	yes or no		% loss rate	Internal study, system data, etc.	Based on avg or marginal loss rates?
Avoided Ancillary Services	yes or no		specify	Internal study, MISO values, DSMore estimates	
Wholesale price suppression effects					
energy kWh	yes or no		specify	internal study, external study (specify)	
peak kW	yes or no		specify	internal study, external study (specify)	
Avoided carbon emission regulatory costs	yes or no		\$/ton CO2	internal study, external study (specify)	
Avoided other environmental regulatory costs	yes or no		specify	internal study, external study (specify)	
Avoided credit & collection costs	yes or no		specify	internal study, extrapolation from other studies	For which programs? Just low income?
Changes to Risk Profile (e.g. fuel diversity)	yes or no		specify	internal study, extrapolation from other studies	How are values applied?
Other impacts 1	yes or no		specify	specify	What are the other impacts?
Other impacts 2	yes or no		specify	specify	What are the other impacts?

Notes:

- 1 Avoided cost values (energy, capacity, T&D, ancillary services) can be provided on separate sheets.
- 2 If any requested values are proprietary, please note that they are included and explain why they are proprietary.

Other Cost-Effectiveness Screening Questions

Discount Rate	
What rate is used?	%
What is the basis for the rate used?	WACC, T-bill yields, other?
Is the rate "real" or "nominal"	specify
Analysis Period	
What years are covered by analyses?	specify start/end years or no. of years

Arkansas Case Study Timeline and Schedule

Activity	2018									
	March	April	May	June	July	August	September	October	November	December
Review NSPM Materials	Completed									
Review Policy Summary Arkansas	Completed	Completed								
Complete Cost-Benefit Checklist- Utilities			Completed							
Develop Case Study Materials				Completed	Completed					
Individual Utilities										
Summarize C/B information										
Review Symmetry Across						Completed				
Benefits & Costs										
Develop Draft Case Study Summarizing Findings							Completed	Completed		
Share Case Study with PWC									Draft- Mid Sept.	
Submit Final for Commission Filing										Final by Oct. 31

ARKANSAS CASE STUDY RESULTS



NSPM Principle #1 – Key Question

Principle #1: Treat Efficiency As a Resource

“Energy Efficiency (EE) is one of the resources that can be deployed to meet customers’ needs, and therefore should be compared with other energy resources (both supply-side and demand-side) in a consistent and comprehensive manner.” (NSPM 2017, p. 9)



Key Arkansas Case Study Questions:

1. Are all utility system impacts – costs and benefits – included in cost-effectiveness tests?

NSPM Principle #1 – Arkansas Conclusion

- PSC requires utilities to *include biggest categories* of utility system impacts
 - Avoided energy, capacity, T&D, marginal line losses
- But not all utilities *uniformly following* PSC guidance
 - Not all include avoided T&D
 - Most use average rather than marginal line loss rates
- Several utility system impacts *not currently included*
 - Avoided ancillary services costs, value of risk mitigation, reduced credit and collection costs

Note: The Arkansas case study addresses these issues in greatest detail in discussion of NSPM Principle #4 (symmetry) – all utility costs included, but some benefits omitted

NSPM Principle #2 – Key Questions

Principle #2: Policy Goals Should Dictate Impacts In Test

“A jurisdiction’s primary cost-effectiveness test should account for its energy and other applicable policy goals. These goals may be articulated in legislation, commission orders, regulations, advisory board decisions, guidelines, etc., and are often dynamic and evolving.” (NSPM 2017, p. 9)



Key Arkansas Case Study Questions:

1. What do the state’s policy goals suggest about the categories of non-utility system impacts that should be included in its cost-effectiveness test? Are all those categories of impacts included?
2. Is the discount rate consistent with policy objectives of the state?

NSPM Principle #2 – Arkansas Conclusions

Categories of Impacts in Test

- ***Most state policy goals currently*** reflect in Arkansas test
- But in some cases, ***less than full accounting*** of some impacts
 - E.g., participant NEBs (covered under NSPM Principle #3)
- ***Several societal impacts*** that some policy language suggests may be important, but not currently addressed
 - Environment, economic development, energy security
 - These societal objectives only mentioned once, in initial 2007 orders
 - PSC clarity on importance of these impacts needed

Discount Rate

- ***Current inconsistency*** across utilities
 - WACC, societal, hybrids all used
- Policy goals suggest ***range of impacts*** of interest
- Need ***PSC guidance***

NSPM Principle #3 – Key Questions

Principle #3: Should Account for Hard-to-Quantify Impacts

“Cost-effectiveness practices should account for all relevant, substantive impacts (as identified based on policy goals,) even those that are difficult to quantify and monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard- to-monetize impacts is preferable to assuming those costs and benefits do not exist or have no value.” (NSPM 2017, p. 9)



Key Arkansas Case Study Question:

1. Does the difficulty in quantifying some impacts prevent the state from including all relevant utility and non-utility impacts?

NSPM Principle #3 – Arkansas Conclusions

Participant NEBs

- Currently Arkansas test includes only other fuels, water, O&M benefits
 - Outcome of extensive recent PWC/Arkansas discussion of NEBs
 - Case study documents resulting asymmetrical consideration of participant impacts
 - Development of low income programs offer opportunity to consider low income NEBs

Carbon Impacts

- PSC order to consider NSPM included direction to assess carbon issue
- Current inconsistency across utilities
- NSPM doesn't provide guidance on how to develop carbon values

Other Hard-to-Quantify Impacts

- Case study documents several other impacts not currently addressed:
 - Other avoided future environmental regulation costs (except for EAI)
 - Energy security benefits
 - Economic development benefits

Note: The Arkansas case study addresses these issues again in discussion of NSPM Principle #4 (symmetry)

NSPM Principle #4 – Key Questions

Principle #4: Symmetry in treatment of costs and benefits

“Efficiency assessment practices should be symmetrical, for example by including both costs and benefits for each relevant type of impact.” (NSPM 2017, p. 9)



Key Arkansas Case Study Question:

1. Are all utility system impacts – costs and benefits - included?
2. Are all relevant non-utility system impacts – costs and benefits – included?

NSPM Principle #4 – Arkansas Conclusions (A)

Utility System Impacts

- All utility system costs, but not all benefits are included – asymmetry
- Inconsistency across utilities on some key impacts
 - Avoided T&D, line loss rates, carbon, other avoided environmental regulatory costs
- Several categories of utility system impacts omitted by all utilities
 - Risk, ancillary services, credit and collection costs

Category of Utility System Impacts	Electric Utilities			Gas Utilities		
	EAI	SWEPCO	OG&E	AOG	BHEA	CNP
Avoided Energy Costs	Yes	Yes	Yes	Yes	Yes	Yes
Avoided Generating Capacity Costs	Yes	Yes	Yes	N/A	N/A	N/A
Avoided T&D Capacity Costs	Yes	No	No	N/A	N/A	N/A
Avoided T&D Line Losses						
energy kWh	Yes (Marginal)	Yes (Average)	Yes (Average)	Yes	Yes	Yes
peak kW	Yes (Marginal)	No	Yes (Average)	N/A	N/A	N/A
Avoided Ancillary Services	No	No	No	N/A	N/A	N/A
Wholesale price suppression effects						
energy kWh	Yes	No	No	N/A	N/A	N/A
peak kW	Yes	No	No	N/A	N/A	N/A
Avoided carbon emission regulatory costs	Yes	Yes	No	No	No	No
Avoided other environmental regulatory costs	Yes	No	No	No	No	No
Avoided credit & collection costs	No	No	No	No	No	No
Changes to Risk Profile (e.g. fuel diversity)	No	No	No	N/A	N/A	N/A

NSPM Principle #4 – Arkansas Conclusions (B)

Participant Impacts

- All participant costs, only some participant NEBs included
- Issue discussed in more detail under NSPM Principle #3

NSPM Principle #5 – Key Questions

Principle #5: Forward-Looking, Relative to Baseline w/o EE

“Analysis of the impacts of efficiency investments should be forward-looking, capturing the difference between costs and benefits that would occur over the life of efficiency measures and those that would occur absent the efficiency investment.” (NSPM 2017, p. 9)



Key Arkansas Case Study Questions:

1. Does analysis include only *future* costs & benefits (i.e. exclude sunk costs)?
2. Does analysis cover a period long enough to capture all EE impacts?
3. Does analysis treat free rider costs as “*baseline*” (and therefore *not* an incremental cost) if it include participant impacts?
4. Does analysis value *marginal* utility system impacts?

NSPM Principle #5 – Arkansas Conclusions

- Arkansas includes only future costs and benefits (no sunk costs)
- Arkansas analysis periods cover EE's full lifecycle costs and benefits
- Inconsistent utility treatment of free riders
 - Most do not treat free rider rebates as costs (consistent w/NSPM)
 - EAI treats free rider rebates as costs (inconsistent w/NSPM)
 - Based on EAI's interpretation of PSC past guidance regarding CA SPM
- Inconsistent utility treatment of line losses
 - Some use average, some marginal, some a mix
 - Both NSPM and PSC guidance is to use marginal

NSPM Principle #6 – Key Questions

Principle #6: Transparency

“Efficiency assessment practices should be completely transparent and should fully document all relevant inputs, assumptions, methodologies, and results.” (NSPM 2017, p. 9)



Key AR Case Study Questions:

1. Is the rationale for what impacts are included in AR test clear?
2. Is it clear what impacts the AR utilities are included in their tests?
3. Is the methodology used to estimate values for efficiency costs and benefits clear and publicly reviewable (except where confidentiality is absolutely necessary?)

Example of Transparency

Commission Checklist Factor	Criteria
Factor One: Adequate Education, Training and Marketing	Whether the programs or portfolio provide, directly or through identification and coordination, the education, training, marketing, or outreach needed to address market barriers to the adoption of cost-effective energy-efficiency measures.
Factor Two: Adequate Budget, Management, and Program Delivery Resources	Whether the program and/or portfolio have adequate budget, management, and program delivery resources to plan, design, implement, oversee, and evaluate energy-efficiency programs.
Factor Three: Reasonably Addresses All Major End-Uses	Whether the programs and/or portfolio reasonably address all major end-uses of electricity or natural gas, or electricity and natural gas, as appropriate.
Factor Four: Addresses the Needs of Customers Comprehensively	Whether the programs and/or portfolio, to the maximum extent reasonable, comprehensively address the needs of customers at one time, in order to avoid cream-skimming and lost opportunities.
Factor Five: Addresses Comprehensive Needs of Targeted Customer Sectors	Whether such programs take advantage of opportunities to address the comprehensive needs of targeted customer sectors or to leverage non-utility program resources.
Factor Six: Enables the Delivery of All Achievable, Cost-Effective Energy Efficiency	Whether the programs and/or portfolio enable the delivery of all achievable, cost-effective energy efficiency within a reasonable period of time and maximize net benefits to customers and the utility system.
Factor Seven: Evaluation, Measurement, and Verification	Whether the programs and/or portfolio have EM&V procedures adequate to support program management and improvement, calculation of energy, demand, and revenue impacts, and resource planning decisions.

NSPM Principle #6 – Arkansas Conclusions

- The state has long history of efforts to ensure transparency in EM&V and related areas (e.g. TRM)
- This case study created cost-effectiveness transparency
 - One of the key benefits of the study
 - Identified several areas where utility assumptions do not follow current PSC guidance
 - Identified areas where further PSC guidance would be helpful

SUMMARY AND NEXT STEPS



Arkansas NSPM “Scorecard”

Utility Status	NSPM Principles					
	#1: Treat Efficiency as a Resource	# 2: Policy Goals	#3: Hard-to-Quantify Impacts	# 4: Symmetry	#5: Forward-Looking Analysis	# 6: Transparency
Overall Portfolio	●	●	○	○	●	●
AOG	●	●	○	○	●	●
BHEA	●	●	○	○	●	●
CenterPoint	●	●	○	○	●	●
EAI	●	●	○	○	○	○
OG&E	●	●	○	○	●	●
SWEPCO	●	●	○	○	●	●
Fully Met = ● Mostly Met = ●○ Partially Met = ○ Did Not Meet = ○						

© Johnson Consulting Group

Case Study Conclusions

- Many aspects of Arkansas' current approach that Arkansas ***consistent with NSPM principles***
 - ***Addresses*** biggest utility system impacts
 - ***Addresses*** most key state policy objectives
 - ***Forward-looking*** with sufficiency long analysis periods
 - Case study has ***enhanced transparency***
- But some areas where ***refinement*** may be warranted.
 - Addressed in recommendations (see following slides)



Recommendations for PSC (1)

- ***Consider*** previously stated policy interest in the environmental, energy security and economic development
 - Does policy interest warrant future inclusion of these impacts in the state's cost-effectiveness test?
- ***Consider*** providing clarity on areas of current utility inconsistency
 - Avoided T&D costs
 - Use of marginal line loss rates
 - Discount rates
 - Handling of incentives to free riders
 - Valuing carbon emission reductions



Recommendations for PSC (2)

- ***Consider*** adding low income NEBs
- ***Consider*** support for quantifying some additional NEBs to help mitigate current asymmetry
- ***Consider*** requiring Arkansas utilities to better document utility system & non-utility impacts included in tests, e.g.:
 - Wholesale price suppression effects
 - Other avoided regulatory costs



Questions?



Contact Details

- Julie Michals, E4theFuture, E4thefuture.org
- Chris Neme, Energy Futures Group, cneme@energyfuturesgroup.com
- Robert Booth, APSC Staff, rbooth@psc.state.ar.us
- Katherine Johnson, IEM, kjohnson@johnsonconsults.com
- To learn more about the NESP, please visit our website: <https://nationalefficiencyscreening.org/national-standard-practice-manual/>