

Success and Limitations of EU & US Evaluated Energy Efficiency

*Robert Neumann, Randy Gunn & Karen Maoz
Navigant Consulting (A Guidehouse Company), Chicago, IL*

ABSTRACT

There has been significant progress in deploying energy efficiency (EE) measures and projects across the US and EU. This is due to strong policies, legislation and ongoing cooperation by governments and public utilities to reduce energy demand and greenhouse gas (GHG) emissions. US EE deployment is focused on energy-demand reduction, while the EU deploys EE mainly for GHG reduction. This paper will provide insights into rapidly changing EE policy and structure and the energy industry. This paper outlines EU and US state and national EE structures and policies, which EE structures are working and those that are being limited due to policy and political changes. Specific state and national detail are outlined for a robust analysis. This will consider various evaluation approaches and policies detailed across states and national levels, along with specific evaluation findings to provide a thorough analysis of how EE evaluation, measurement and verification (EM&V) is benefiting the energy transition and supports policy making and legislation in the US and the EU. Analysis includes EE evaluation of utility and state-run programs and discussion of leading legislation and efforts to expand EE deployments that drive the energy transition.

Energy Efficiency Structures and Policies

The global movement away from central generation and toward new energy industry business models is underway. A large part of this change is due to carbon produced by coal and natural gas plants. Many states and nations are looking to EE to reduce energy demand since EE is shown to be a least cost resource while also playing a key role in decarbonization. The US leverages EE mostly for energy savings reductions, reducing costs and power requirements. While in the EU, EE is deployed mainly to reduce greenhouse gas (GHG) and carbon.¹ Except for CA and the RGGI states (Regional Greenhouse Gas Initiative)², the US does not track or require GHG or carbon reduction. A key difference between the EU and US on EE policy is that there is an overall EU directive to reduce GHG by 20% by 2020 and 32.5% by 2030 – each nation chooses to adopt the EU EE directive or choose an alternative policy approach. The US has no national energy goals, no EE national goals and each city and state sets its own goals and standards. The following sections outline the regulatory and policy EE structures in the EU and US. (Molina & Relf, Cost of Saved Energy 2018)

EU EE Structures and Policies

The EU's deployment of EE is focused on decarbonization in the power, heating, and transport sectors. The EU emphasized that reaching climate and energy goals without EE is expensive and problematic since significant renewable supply would be required. EE is widely seen as a least cost resource. As of 2019, the EU will have to decrease energy use by approximately 17% by 2030 compared to 2015 levels. The building sector is identified as important to reaching this EE goal. It's also expected that after 2030, EE will also be required to reach future goals. In the EU, it's planned that energy use will have to continue to decrease by a one third or more by 2050 to achieve its decarbonization goals. (European Energy Transition 2030: The Big Picture, p. 28)

¹ The underlying legal basis for this is Article 194 of the Treaty on the Functioning of the European Union (TFEU).

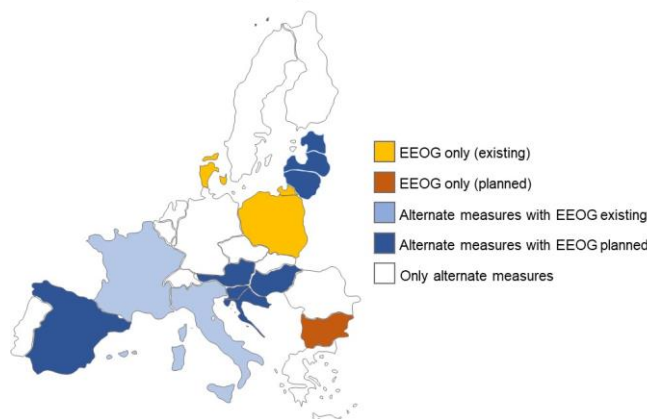
² RGGI states include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. RGGI detail can be found here: www.rggi.org

Similarly, EE is seen as a key strategy in ensuring the cost-effective decarbonization of the energy system, since electrification investment can only be limited by reducing overall energy demand in buildings, industrial and transport sectors and increasing efficiencies of appliances. In the European Commission’s modelling, final electricity demand and gross electricity generation only rise slightly (by 8.5% and 6.9%, respectively) between 2015 and 2030 due to efficiency measures in these sectors. Under deep decarbonization scenarios, electricity consumption increases by 50%, while electricity generation increases more than twofold compared to 2015 due to cleaner forms of generation (i.e., use of solar, hydrogen) (Id).

EE Established Across EU Nations Are Key to Delivering Most Savings

Energy Efficiency Obligation Schemes (EEOS) are central to the Energy Efficiency Directive (EED) given the results this instrument has achieved in the EU and overseas. The EED has led to increased EEOS across the EU member states (MS) – 17 MS plan to implement or have already implemented an obligation scheme and 40% of the proposed savings from Article 7 of the EED will be generated by EEOS, making EEOS by far the most important policy instrument in terms of energy savings. Four MS have notified EEOS as the only policy instrument for Article 7 (two MS have notified existing schemes: Denmark and Poland, and two MS have notified planned schemes: Bulgaria, Luxembourg). The map below illustrates the current status in 2020 of implementation of EEOS across the EU (excluding England). For some MS the details of the planned EEOS are still being developed. (Study Evaluating Nat’l Policy Measures & Methods to Implement Article 7, p. iii).

Figure 1: Map of MS with Existing and Planned EEOS



Source: Study Evaluating the National Policy Measures and Methodologies to Implement Article 7 of the EED at p. 16

This focus began in earnest in 2012 with the EED. The EU set a 20% energy savings target by 2020 (compared to projected energy use in 2020) through the EED. This means lowering the EU’s energy consumption to 1,086 million tons of oil equivalent (Mtoe) as well as energy consumption to 1,483 Mtoe. This is roughly equal to shutting down 400 power plants – plant shuttering is difficult and costly. To reach this goal, EU countries are required to (i) set their own indicative national energy efficiency targets, and (ii) publish 3-year national energy efficiency action plans (NEEAPs) (EU 2020 Target for EE, <https://ec.europa.eu/energy/en/topics/energy-efficiency/targets-directive-and-rules/eu-targets-energy-efficiency#20-energy-savings-by-2020>), annual progress reports. In December 2018, the EED was revised and establishes EU EE targets for 2030 of a minimum equal to no less than 32.5% energy savings target (compared to projections) – the EED also includes possible increased revisions by 2023. This revised 32.5 % savings target for 2030 translates to final energy consumption of 956 Mtoe and/or primary energy consumption of 1,273 Mtoe across the EU. (EU 2020 Target for EE,

<https://ec.europa.eu/energy/en/topics/energy-efficiency/targets-directive-and-rules/eu-targets-energy-efficiency#20-energy-savings-by-2020>).

Based on the EU Article 7 rules, each MS must create a 10-year integrated national energy and climate plan (NECP) for the 2021-2030 period. NECPs address how a MS plans to meet 2030 EE and renewable energy targets. NECPs were submitted in 2019 and the EU published assessments of the draft plans in June. Final MS NECPs were completed by the end of 2019. (European Commission, EU 2020 Target for EE).

Member States can adopt Article 7 or propose alternative approaches to meet the goal. Table 1 provides an overview of MS that implemented the Energy Efficiency Obligation Schemes (EEOS) approach and an alternative policy measure. EEOS are central energy savings measures – approximately 40% of expected cumulative savings are expected from EEOS, much more than any other type of policy measure. Realize that the EEOS approach is different than the US approach which is utility and program specific. Note that total energy savings may be lower than savings rates if MS use Article 7 exemption. Four different exemptions can be used from Article 7.2 with the possibility of using a combination of four of the exemptions. Exemption limitations are specified in Article 7.3. Maximum exemption thresholds cannot exceed 25% of the target based on a 1.5% per year saving rate. Exemptions include (i) phasing in of the energy savings (1% for 2014 and 2015; 1.25% for 2016 and 2017; and 1.5% for 2018, 2019 and 2020), (ii) exclude final energy use in the emission trading scheme, (iii) supply-side energy savings (efficient energy production and distribution) and (iv) early actions. Id.

EEOS are planned by 11 MS and have already been implemented by 6 MS. Of these 17 MS, the 11 MS that do not yet have implemented EEOS are Austria, Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Slovenia and Spain. (Study Evaluating the National Policy Measures and Methodologies to Implement Article 7 of the Energy Efficiency Directive, p. 14)

Table 1 – EU Member States EE Goals to meet Article 7 Goals as of 2019

Member State	Cumulative Energy Savings Target (ktoe)*	% of Exemptions Used (Article 7.2)
Austria	5,200	25%
Belgium	6,922	25%
Bulgaria	1,943	25%
Croatia	1,295	25%
Cyprus	242	25%
Czech Republic	4,581	25%
Denmark	4,130	3%
Estonia	611	25%
Finland	4,192	25%
France	30,570	25%
Germany	41,989	25%
Greece	3,301	25%
Hungary	3,614**	25%
Ireland	2,164	25%
Italy	25,502	25%
Latvia	851	25%
Lithuania	1,004	25%
Luxembourg	532	25%
Malta	56	25%
Netherlands	11,512	25%
Poland	14,818	25%
Portugal	3,376	0%
Romania***	10,000	Not Clear
Slovakia	2,284	25%
Slovenia	945	25%
Spain	15,979	25%
Sweden	9,114	21%
UK	27,859	25%
TOTAL	234,575	-

* ktoe = Kilotonne of oil equivalent, amount of energy released burning one ton of oil

** Calculated with transport excluded and with 25% exemptions

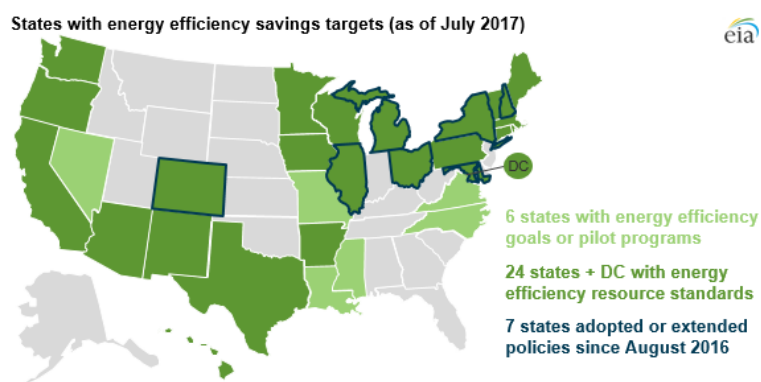
*** Target expressed in primary energy consumption, converted to final energy

Source: Study Evaluating National Policy Measures and Methodologies to Implement Article 7 at p. 11

US Energy Efficiency Structures and Policies

EE is implemented across many US states. The map below outlines states with EE goals and standards: six states have EE goals or pilot programs, 24 states and DC have legislated EE resource standards and 7 states have adopted or extended EE policies since 2016. No national US energy policy or legislation exists that is comparable to the broad EU Article 7 EE directives. US energy policy does have broad stroke national laws such as the Public Utility Holding Company Act of 1935 (facilitates regulation of electric utilities, by limiting their operations to a single state), the Energy Policy Act of 2005 (addresses energy production in the US), and the Federal Power Act of 1920 (national guidance on development of power), as well as various national laws that establish the Nuclear Regulatory Commission, Federal Energy Regulatory Commission and the Environmental Protection Agency, among others. But there is no overriding US federal law that guides energy use and conservation and no national laws that mandate meeting demand or GHG reduction by certain dates like those in the EU. This is especially true for EE national goals or standards. This is mainly the result of US states wanting to maintain their control of power production and distribution – energy policy has been codified as a state’s right issue, so states want to control how energy is produced and distributed. Thus, to assess EE across the US, a review of states is required and each state is different. A nationwide map of EE structures is illustrated below.

Figure 2: Map of US States with EE Goals or Standards



Source: EIA State Adoption of EE Policies - 2017

Each state establishes its own regulatory structure for implementing EE. Only 30 states have some type of established EE goals. Utilities in many other states offer EE programs, but they are not required by law or regulation. Provided in Attachment A - Table 2 is a sample of state-specific legislative and regulatory detail (Regulatory Regimes Across 25 States – Gunn & Neumann 2018). States have established various initiatives to promote the development of EE programs. Table 2 demonstrates that legislative and regulatory oversight varies greatly by state. Many states have degrees of EE legislative or regulatory policy activity. But the level of specific requirements, length of EE in each state and the types of incentives and penalties differ across states. EE regulatory financial paradigms are typically designed around cost recovery, lost margin recovery and performance incentives.³ Many initiatives focus on cost recovery and performance incentives. Others include adjustable rate mechanisms or specific cost recovery riders. Corresponding absence of such incentives is described as financial penalties (negative incentives), or disincentives to actively pursuing EE programs since utilities are concerned and focused on avoiding non-recovery of implementation costs.

³ Program Cost Recovery: Costs include those for program administration, implementation and evaluation. Because program costs reduce utility revenues on a dollar-for-dollar basis, reasonable recovery of these costs is a minimum requirement program implementation; Incentives: Financial incentives allowed in addition to cost-recovery if utilities meet EE goals.

Table 2 summarizes 25 state regulatory structures with high-level detail – this is intended as a detailed example of US states.

California, Illinois, Michigan, Massachusetts, Oregon and Vermont implement EE and evaluation, measurement and verification (EM&V) through legislated and commission policies. These states provide strong models to follow while also considering specific state utility and commission nuances and interactions. Each of these states have cost recovery and detailed EM&V policies and approaches. Many of the Table 2 states also have EE policies in place for many years. It should be noted that each state is different and the relationship between utilities, regulators and implementers also determines state model structure. Other states have varying degrees of policy oversight, for example:

- California, Illinois, Massachusetts, Minnesota, New Mexico and Wisconsin are strong EE states. Illinois continues to implement EM&V policy through various Stakeholder Advisory Group policies. Illinois has strong overall EE statewide focus, stakeholder group focus and enabling commission action.
- Connecticut, Pennsylvania, New York, Michigan, New Hampshire, Ohio, Maryland, Arizona and Arkansas are stable EE&V states given their established programs and EM&V approaches and policies and track record of implementing consistent evaluations over a period of years.
- Arkansas has established EM&V procedures and policies and a TRM that is the model for the southeast.
- Iowa, Indiana and Ohio have historically achieved EE savings based on performance against statewide goals, but as of 2014, Indiana and Ohio state legislatures reduced or eliminated EE resource standards - but utilities continue to implement and evaluate programs with commission oversight. Iowa's legislature started a roll back of EE in 2018. In 2018 Iowa allowed use of a no losers Ratepayer Impact Measure (RIM) cost-effectiveness test to show negative cost-benefit results and disallow programs – that made it challenging for EE programs to be judged successful.

Evaluation Approaches in the US and EU

Both the EU and US EE evaluation include approaches for EM&V and reported savings. Evaluation approaches are focused on ensuring cost-effective EE programs that meet regulatory requirements. Primary evaluation activities typically include the following:

- Verifying gross savings to be applied toward regulatory goals each program year using deemed savings values from technical resource manuals or other sources.
- Impact evaluation involving data collection, analysis and creating recommendations to help improve effectiveness of EE efforts and programs.
- Conducting technical reviews and gathering state-specific data to update various technical manuals and conducting research to update savings calculations.
- Process evaluations for programs or EE research efforts to improve EE programs.
- Evaluation work is guided by state or national regulatory requirements.

US evaluation is implemented at the state level with advances over the last 30 years. The US has more than three decades of EE programs implemented and delivered by utilities, funded with ratepayer dollars and have resulted in widespread implementation of EM&V, which has been developed locally, vetted nationally and implemented at the state and utility levels. There is a uniform approach to implementing EM&V protocols and methodologies set forth in the International Performance Measurement and Verification Protocol (IPMVP) which has become the de facto framework for M&V of EE programs. There has been convergence in EM&V practices, bolstered by initiatives such as the National Action Plan for EE, DOE's

Uniform Methods Project and work by the North American Energy Standards Board. (Energy Efficiency Evaluation, Measurement and Verification: A Regional Review of Practices in China, the EU, India and the US at p. vi).

EU evaluation is strong, but possibly not as rigorous as many US states that have implemented and evaluated EE over many years (See Figure 2). EM&V in the EU is driven mainly by requirements to estimate energy savings achieved by energy suppliers subject to EE MS obligations. Stringent EM&V is likely to increase as MS respond to the 2012 EE Article 7 EED requirements and implement EEOs or alternative EE plans that deliver 1.5% energy savings each year. It should be clear that EM&V methodologies are not uniform across the EU and MS are free to develop their own EM&V protocols, baselines, and methodologies for estimating energy savings. A lot of effort has gone into creating deemed energy savings values for numerous EE measures. Once deemed, deemed measure values are not updated regularly. Only the UK and Denmark estimate net energy savings across MS. Few process evaluations are done, while the majority of EM&V are impact evaluations which are done based upon EE obligation schemes. (Id at p. vi)

Which EE Structures are Working and Which are Being Limited due to Policy or Politics?

The US effectively deploys EE across numerous states, but not all states, and broad nationwide EE adoption is limited by each state's internal policies, local interest or lack of interest in reducing energy consumption. Many states have limited or no EE savings goals or standards (See Figure 2) which are focused on reducing energy demand and use, not carbon or GHG reduction. Even for the majority of 30 EE states, none of those energy savings are rolled-up at the national level and few states count EE savings toward carbon or GHG reduction. This is documented in Table 2 - Attachment A. Only California⁴ and RGGI states are tracking GHG reduction attributed to EE energy savings. EE focus in the US has been and continues to be energy demand reduction so that new generation supply is not required.

In comparison, the EU is focused on reducing energy use and waste, and reducing GHG and carbon levels - this is of growing importance in the EU. EU 2007 targets were set to cut annual energy consumption by 20% by 2020 - this was further expanded to 32.5% by 2030. These goals are mandated across all the EU states, there is a unified approach with rules that allow each MS to implement plans to reach individual MS goals. The goals appear to be working. EE measures are used to achieve energy supply needs, cut GHG, and promote EU economic competitiveness. (European Parliament: Fact Sheet on EE in the EU; <http://www.europarl.europa.eu/factsheets/en/sheet/69/energy-efficiency>).

. EE is positioned as a strategic imperative in the EU. Only a handful of the 30 US EE states view EE as an imperative resource, but that positioning is only among a minority of those states (e.g., CA, IL, MA, MI, MN, NH, NY, VT).

Use of Measure Lives in the EU (for GHG) and US (for Cost-Effectiveness)

An interesting example that highlights key differences between EU and US EE and EM&V structures is the use of EE measure lives. It became clear through our research that expected useful lives (EUL) are applied in the EU and US with great disparity. The US applies EULs mostly for EE planning and cost-effectiveness testing compared to the EU's use of EULs for GHG abatement tracking. This is understandable given the differing EE focus in the US compared to the EU. But it's interesting that there is a clear dichotomy in EUL application. Except for California and RGGI, there is virtually no focus on using EULs for emissions in the US. Also, EULs for EE cost-effectiveness testing is an afterthought in the EU. Beyond these uses, EULs should also be applied for counting energy savings across multiple years (cumulative years) and requiring multiple

⁴ California's annual statewide greenhouse gas (GHG) emission inventory is an important tool for establishing historical emission trends and tracking California's progress in reducing GHGs.

year saving goals. Cumulative total savings is now the law in Illinois. In the EU cumulative savings are tracked across the continent for GHG reduction. In comparison, the US has no national framework to measure GHG, and EULs are not used for cumulative GHG tracking like in the EU. California continues to expand GHG savings goals. The RGGI states are anticipated to add states as interest and demand to require and track GHG savings grows and matures in the US. One could easily imagine California serving as an anchor of western states to agree to regional GHG goals too. Accounting for carbon abatement does include abatement over a specified time period or over the lifetime of the measure. For examples, this is addressed in the California AB32 Scoping Plan and separately in the Alberta energy efficiency plan.

The EU actively defines application of EE EULs for GHG, but there is little in the way of applying EULs for EE cost-effectiveness testing. As noted, US states control the EE regulatory framework in which measures and portfolios are managed and assessed. US states with EE legislative and regulatory frameworks (See Table 2) typically have cost-effectiveness requirements where EULs are applied to programs and portfolios savings to assess cost-effectiveness over the life of program measures. Cost recovery for EE programs or portfolio that are not cost-effective may not be allowed. EULs are central to this analysis. As an additional EM&V layer, the EU could adopt cost benefit analysis on a broader basis so that EE measures are examined from a cost-effectiveness standpoint. Similarly, the US should consider using EULs for documenting GHG reduction potential and including the GHG reduction as a benefit stream in cost-effectiveness analysis.

In the US, there is no national body that sets guidelines for energy savings or lifetime savings or how to evaluate savings for multiple years. There is the Uniform Methods Project which provides guidance on different evaluation efforts including persistence. Measure lists with a lifetime value to date have leveraged very little primary data collection and mostly rely on circuitous references with minimal original source documentation and derivation. The EU establishes this detail, but it's not updated on a regular basis. While in the US, there are persistence and measure-level analysis being undertaken regularly, particularly in states that have an established Technical Resource Manual (TRM) that deems measure savings and other related values and measures.

As noted, EU member states provide calculations used to derive cumulative energy savings targets for a given period (e.g., 2014-2020). That cumulative savings calculation is based on a savings rate of 1.5% per year. If no exemptions are used, the cumulative energy savings over the period 2014-2020 should amount to 42% of the adjusted final energy sales as calculated in the baseline, see Table 3.

Table 3 – Ex. EU Cumulative Energy Savings 2014-2020 (% baseline sales)

Year	2014	2014	2014	2017	2018	2019	2020	SUM
2014	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	10.5%
2015		1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	9.0%
2016			1.5%	1.5%	1.5%	1.5%	1.5%	7.5%
2017				1.5%	1.5%	1.5%	1.5%	6.0%
2018					1.5%	1.5%	1.5%	4.5%
2019						1.5%	1.5%	3.0%
2020							1.5%	1.5%
TOTAL								42%

Source: Study Evaluating the National Policy Measures and Methodologies

Interestingly, this is a similar structure to the Cumulative Persistent Annual Savings (CPSAS) approach adopted in Illinois in 2016. Other US states are considering this approach, but have not implemented to date. In the State of Illinois, the General Assembly (legislature) passed the Future Energy Jobs Act, (“FEJA”

December 2016). This law took effect as of January 1, 2018, and requires reporting savings with Cumulative Persisting Annual Savings (CPAS) calculations. This requires counting measure savings over the life of the measure - it requires an accurate assessment of measure savings for each year of a measure's life. Qualification of lifetime savings and accuracy in values has become critical since required energy savings are increasing in Illinois. The first step of this work was to question the existing lifetime values used in the state. Many come from standard utility references with historic precedence of being considered strong sources.

Achieving greater savings through documenting cumulative savings over the life of a measure is done through implementing measures with longer savings lives. Overall savings must achieve enough savings each year to offset savings from measures that “die off” or don't continue in the following year – this becomes an EE portfolio management issue. To illustrate the importance of EULs for tracking cumulative savings over the life of a measure, Table 4, below, is useful – it shows percentages (savings as a percent of electric sales) as an example of a utility's annual savings goal and how lifetime savings can be tracked on a cumulative basis:

Table 4 - Example of Cumulative Savings in Illinois – Savings as a Percent of Annual Utility Sales

	2018	2019	2020	2021
Overall Utility Target	8.3%	9.1%	10.2%	10.9%
Prior savings persisting from 2012-2017	5.9%	5.4%	4.5%	3.9%
Savings persisting from 2018	2.4%	1.6%	1.3%	1.2%
Savings persisting from 2019		2.1%	1.8%	1.4%
Savings persisting from 2020			2.6%	2.2%
Savings persisting from 2021				2.1%
Total savings counted toward target	8.3%	9.1%	10.2%	10.9%

Source: Navigant Consulting and Illinois FEJA CPAS savings example

To help Illinois utilities comply with FEJA, the Guidehouse evaluation team undertook an effort to update Illinois EULs, and potentially update the Illinois Technical Resource Manual (TRM v 6 - 2018). The review team prioritized measure EUL review for those measures with the highest savings within the utility's portfolio. This assessment then identified if the EUL reference was from a quality source and the age of source. Many sources had limited justification since they have poor documentation or circuitous references that created the appearance of invalidity. Establishing a list of quality sources for high-impact measure review is important. This approach for TRM EUL values is comparable to the guidelines for the harmonization effort in the EU. But, again, this occurred in Illinois, not across the US.

Conclusion

In both the EU and the US, there is industry movement away from central station generation and toward EE and renewables. At the core of this industry shift are the dual goals of reducing energy demand and lowering carbon through GHG reduction. To achieve these goals, the EU and US are leveraging EE in different ways: (i) US leverages EE mostly for demand reduction through energy savings, and (ii) EU leverages deployed EE mainly to reduce GHG and carbon emissions. A key distinguishing factor between the EU and US is how EE is deployed – in the US it's mandated and evaluated state-by-state, while in the EU, Article 7 mandates an EU-wide savings goal. Both approaches have their merits. The US approach allows for states to control how energy is managed within its borders, while the EU Article 7 Directive mandates an EU goal and allows each nation to work within Article 7's parameters to reach their individual goal. The glaring absence of US national energy policy to reduce energy demand or GHG is a key difference between the continents. Conversely, the EU can learn quite a bit from the US's more stringent and established EM&V oversight – this will likely occur as MS Article 7 goals need to be measured over the next decade. In addition,

EULs should also be applied for counting EE savings across multiple years (cumulative years) and requiring multiple year saving goals.

Attachment A

Table 2. Detail on state EE legislation and regulation for Investor Owned Utilities (IOUs)

ARKANSAS	
Regulations	Goals
<ul style="list-style-type: none"> PSC approved Rules for Conservation and Energy Efficiency Programs (2007) requiring electric and gas utilities to administer EE programs (Docket No. 06-004-R) Utility PSC requirements established through PSC order 	<ul style="list-style-type: none"> EE savings targets of 0.9% for 2015-2018 and 1.0% in 2019 PSC in 2013 issued an order setting an electricity savings target of 0.9% for 2015 - targets have been extended through 2016 Customers with 1 MW or greater monthly demand can opt-out
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost recovery is permitted through individual cases; TRC, UCT, PCT, RIM tests allowed; Decoupling is case-by-case; Incentives allowed 	<ul style="list-style-type: none"> Possible non-recovery of costs or incentives for utilities not meeting EE goals
ARIZONA	
Regulations	Goals
<ul style="list-style-type: none"> Administrative codes require electric and gas utilities to administer EE programs to meet goals set by state standard AZ Corporation Commission approves funding and spending - Dockets RE-00000C-09-0427 	<ul style="list-style-type: none"> Cumulative annual electricity savings for each utility of 22% of retail sales by 2020; natural gas saving of 6% in 2020 Targets of 1.25%/yr. of sales, ramped to 2% in 2018 Coops must propose savings goals too (75% of this standard)
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Full revenue decoupling and incentives available Lost revenue adjustments; max incentive is 8% of net benefits 	<ul style="list-style-type: none"> Cost and incentive disallowance
CALIFORNIA	
Regulations	Goals
<ul style="list-style-type: none"> CA Legislature, AB 2021, 2006; EE in place for more than 2 decades The CPUC formalized goals of an integrated policy report in Decision 04-09-060 in September 2004 In 2015, SB350 requires state agencies and utilities to work together to double cumulative EE savings by 2030 – this doubled state EE goals 	<ul style="list-style-type: none"> Electric utilities goal of 1.15% of retail sales through 2024, Gas utilities goal of incremental savings target of 0.56% through 2024 Goals called for electricity use reductions in 2013 of 23 billion kWh and peak demand reductions of 4.9 million kW Goal of 10% reduction in forecasted electricity use in 10 years
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> TRC and UCT tests; All major IOUs are decoupled Established a public goods charge from IOUs to provide baseline funding extended by CPUC 	<ul style="list-style-type: none"> Risk/Reward Incentive Mechanism (RRIM) allows CPUC to charge fee dependent on performance Cost and incentive disallowance
CONNECTICUT	
Regulations	Goals
<ul style="list-style-type: none"> In 2007, legislature enacted PA 07-242 creates regulatory requirements for electric utilities to procure EE as a priority resource Electric and gas utilities and municipal electric utilities required to provide conservation and load management programs 	<ul style="list-style-type: none"> Requirement to acquire cost-effective resources equal to annual savings targets of 1.5% for electric and 0.61% for gas through 2018
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost recovery allowed; Decoupling allowed 	<ul style="list-style-type: none"> Possible non-recovery of costs through rates
FLORIDA	
Regulations	Goals
<ul style="list-style-type: none"> In 1980, FL passed the FL EE and Conservation Act (FEECA) Utilities with >2,000 GWh are required to adhere to FL EE law and implement cost-effective EE programs Utilities implement cost-effective programs, limited % requirements 	<ul style="list-style-type: none"> No specific targets, PSC has authority to set targets and set them for 2015-2024 State must conduct EE potential studies No integrated resource planning; requirement for long-term planning
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> No decoupling Cost-effectiveness tests: TRC, PCT and RIM 	<ul style="list-style-type: none"> Possible non-recovery of costs through rates
ILLINOIS	
Regulations	Goals
<ul style="list-style-type: none"> December 2016 state legislature passed the Future Energy Jobs Act (FEJA – SB 1592) which created increased electric EE requirements based upon annual sales Demand-side management has been required since 1986 	<ul style="list-style-type: none"> Requirement of cumulative persisting annual savings starting in 2018 – targets set by electric utility as % of annual sales

- Illinois Legislation 2016 (SB2814; Public Act 99-0906); Illinois Public Utilities Act (220 ILCS 5/20-135)

- Utility EE goals require ComEd (21.5%) and Ameren (16%) to achieve cumulative reductions in energy use by 2030
- Gas companies remain on an annual EE savings basis
- Savings not counted by gas utilities can be converted to kWh

Cost Recovery, Decoupling and Incentives

- Rate of return earned on savings goals based on specific factors – EE assessed as an asset for rate base purposes
- Cost recovery of EE can be recovered through an automatic adjustment clause tariff (approved by the Commission)

Penalties

- Non-recovery of utility-proposed throughput incentive
- Possible non-recovery of costs upon annual review proceeding
- Failure to meet the goals includes penalties which is potential non-cost recovery and smaller returns if goals aren't met

INDIANA

Regulations

- Regulation established by the state utility commission (IUC)
- In 2014, Indiana legislature passed law eliminating the EE resource standard (EERS) and mandatory ratepayer funded EE programs
- Utilities continue to implement EE on a utility-level basis with commission approval - existing mechanisms remain in place

Goals

- **EE resource standard was repealed in 2014**
- Previous annual energy savings goal of 2% were to be achieved by electric utilities within 10 years, with interim savings goals established, starting with 0.3% of baseline sales for 2010 – although these requirements are eliminated, utilities have filed annual plans to continue implementing differing levels of EE

Cost Recovery, Decoupling and Incentives

- Cost-effectiveness testing: SCT, UCT, PCT, RIM
- Cost recovery and lost revenue by commission approval
- Utility can earn a performance incentive based on goals

Penalties

- Possible non-recovery of costs or incentives through rates
- RIM test used to disallow cost recovery

IOWA

Regulations

- As of 2018, IA's governor signed a bill that severely weakened IA EE programs, eliminating utility requirement to offer EE, imposes a spending cap and includes an all-customer opt-out provision.

Goals

- Goals established per individual utility plans

Cost Recovery, Decoupling and Incentives

- Automatic rate pass through reconciled annually
- Cost-effectiveness testing: SCT, UCT, PCT, RIM
- Incentives allowed on case-by-case basis

Penalties

- Failure to meet positive benefit-cost test results in non-recovery
- RIM test used to disallow cost recovery
- Failure to meet utility goals can include penalties

KANSAS

Regulations

- No legislation – state commission is moving toward treating EE as an energy resource
- Commission sets standards: KSA 66-1239(c)(2); KCC, Dkt No. 08-GIMX-442-GIV; Dkt No. 07-GIMX-247- GIV, Oct. 2007

Goals

- EE programs are established by individual utilities with Commission oversight
- Kansas has no goals required by laws or regulatory rules that require energy efficiency programs

Cost Recovery, Decoupling and Incentives

- Cost recovery rider mechanisms
- Decoupling considered on a case-by-case basis
- Commission may grant 0.5-2% increased Return on Equity

Penalties

- Non-recovery of costs

MAINE

Regulations

- Efficiency Maine runs the EE programs in the state
- Triennial plans are approved by the Maine PUC
- 10 and 20-year EE targets are set by statute and drafted into the Efficiency Maine triennial plans

Goals

- Electric and gas savings of 20% by 2020 with annual savings targets of approximately 1.6% for electric and 0.2% for gas

Cost Recovery, Decoupling and Incentives

- All programs must pass TRC cost-effectiveness test
- Decoupling is allowed via statute (35-A MRSA, Sec. 3195)

Penalties

- Possibility of no cost-recovery

MARYLAND

Regulations

- EmPower Maryland EE Act 2008 created statewide goal to reduce electricity by 15% by 2015
- PSC requires utilities 0.2% per year to reach 2% incremental savings through 2023

Goals

- 15% goal to reduce per-capita electricity use by 2015 (2007 baseline)
- By 2016, utilities must ramp up programs by 0.2% per year, reaching 2% incremental savings by 2020

Cost Recovery, Decoupling and Incentives

- Decoupling allowed
- No shareholder incentives - cost-recovery allowed can be amortized with a return

Penalties

- Case-by-case cost recovery (potential cost disallowance)

MASSACHUSETTS

Regulations

Goals

- In 2008, Chapter 169 of the Acts of 2008 enacted (Green Communities) - law requires utility EE plan approval every three years - 25 M.G.L. § 21
- Resource needs to be first met by EE and demand reduction
- Electric utilities must acquire all cost-effective EE less than the cost of supply

- Annual electric savings targets ramping-up to 2.94% by 2016
- Natural gas ramping-up to 1.24% by 2016.
- The state's third three-year plan require savings to increase to 2.95% of annual sales in 2018
- The energy efficiency investments in 2016-2018 are expected to save 4,118 annual GWh of electricity by 2018

Cost Recovery, Decoupling and Incentives

- Cost recovery permitted through system benefits charge - funded through forward capacity market revenue, Regional Greenhouse Gas Initiative and other outside funds
- Decoupling allowed and statewide utility incentive mechanisms

Penalties

- Threat of non-recovery of costs or incentives

MICHIGAN

Regulations

- Legislation passed in October 2008, Public Act 295, reestablished utility EE programs in Michigan. The state's previous programs had been discontinued in 1996
- PA 341 and PA 342, passed in December 2016 extended EE through 2021

Goals

- Utilities must offer programs to customers in all sectors
- 2016 extension from 1% electric and 0.75% natural gas efficiency targets through 2021
- 2016 extension removes a cap on spending and allows higher financial incentives for exceeding mandated 1% targets

Cost Recovery, Decoupling and Incentives

- Commission allows capitalized costs and rate of return
- Performance incentives allowed - cannot exceed 15% of the total cost of the EE programs

Penalties

- Threat of non-recovery of costs or incentives
- Threat of non-capitalization and lack of earning fair rate of return on investment; possibly limit or eliminate incentives

MINNESOTA

Regulations

- EE goals established by statute and implemented by the commission - EE has been in place for more than 2 decades
- Minn. Next Generation Energy Act of 2007 (Minn. Stat. 2008 § 216B.241); MPUC Docket No. 08-132

Goals

- Minnesota Next Generation Energy Act of 2007 sets energy savings goals for both natural gas and electric utilities of 1% to 1.5% of retail sales starting in 2010

Cost Recovery, Decoupling and Incentives

- Recovery of cost-effective program costs is allowed
- Performance incentives in place for an extended period⁵
- Efforts to incorporate decoupling efforts have begun

Penalties

- Costs not deemed appropriate or not cost-effective could be denied
- Failure to meet the state mandates can result in penalties

MISSOURI

Regulations

- The 2009 Missouri EE Investment Act establishes an EE program structure - limited EE program prior to ~2012
- Missouri Rules CSR 240-22.010(2)(A); MO Revised Statutes 25 MRS 393.1075.3; 25 MSR 393.1075.4

Goals

- Goals set by each utility and approved by the MO PSC
- Investor-owned electric utilities to capture all cost-effective EE opportunities
- EE goals are voluntary with specific targets set forth in SB 376

Cost Recovery, Decoupling and Incentives

- Recovery of reasonable and prudent costs - cost tests include: TRC, PCT, SCT and RIM
- Commission allowed to develop recovery mechanisms

Penalties

- Expenses not deemed appropriate or not cost-effective could be denied
- Adoption and development of recovery mechanisms still ongoing

NEW HAMPSHIRE

Regulations

- NH restructured electric markets and maintained support for EE; in Order No. 23,574 (2000)
- NH PUC Order No. 23,982 established statewide electric EE utility programs (NHSaves)
- NH PUC approved a revised EERS to help the state achieve the objectives set out in its 10-year State Energy Strategy

Goals

- NH PUC in 2016 established a statewide EERS targeting 2020 cumulative electric savings of 3.1% and 2.25% of gas sales
- Incremental electric savings of 0.8% by 2018 which increase to 1.0% by 2019 and 1.3% by 2020
- Natural gas savings of 0.7% by 2018, 0.75% in 2019, and 0.8% by 2020

Cost Recovery, Decoupling and Incentives

- Cost-effectiveness test is the TRC
- Utilities can earn performance incentive of 8-12% of total program budgets for meeting cost-effectiveness and goals

Penalties

- Lack of a specific performance incentive creates a penalty for well-managed EE programs and portfolios
- Costs not deemed appropriate could be denied

⁵ State utilities have performance incentives that are also meant to obviate the need for lost revenue recovery.

NEW MEXICO	
Regulations	Goals
<ul style="list-style-type: none"> Efficient Use of Energy Act (2005) requires electric and gas utilities to implement cost-effective EE programs Overseen by NM Public Regulation Commission 	<ul style="list-style-type: none"> Electric companies must spend 3% of customer bills Gas companies can spend no greater than 3% of total revenues Electric and gas utilities achieve 8% savings of kWh and therms by 2020
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost-effectiveness testing Incentives for meeting goals is allowed recovery 	<ul style="list-style-type: none"> Expenses not deemed appropriate or not cost-effective could be denied - possibility of not earning an incentive
NEW YORK	
Regulations	Goals
<ul style="list-style-type: none"> NY established Reforming the Energy Vision (REV) in 2015 directing NY commission to implement market design changes and incorporate EE and clean energy options 	<ul style="list-style-type: none"> NY has established EE as a high priority, 15% reduction in total state energy use by the year 2015 NY has 3-year savings targets - reduce NY energy consumption 15%
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Scaled incentives for achieving more than 80% of reduction targets - EE costs are recovered through a bill charge Decoupling is allowed 	<ul style="list-style-type: none"> Negative/positive incentive depending on achievement level Cost and incentive disallowance
NORTH CAROLINA	
Regulations	Goals
<ul style="list-style-type: none"> Limited state legislation, EE levels agreed to through utility negotiation EE goals from Duke Energy Progress (merger) – 1% retail sales savings target started in 2015, 7% cumulative target 	<ul style="list-style-type: none"> Renewable and EEPs joint goal: 12.5% by 2021 and beyond EE is capped at 25% of 2012-2018 targets and 40% of 2021 target
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost-effectiveness tests: TRC, UCT, PCT, RIM Decoupling allowed (only gas today) 	<ul style="list-style-type: none"> Case-by-case cost recovery (potential cost disallowance) Cost and incentive disallowance
OHIO	
Regulations	Goals
<ul style="list-style-type: none"> Legislature froze EE programs – utilities that achieved 4.2% cumulative savings can reduce or eliminate EE programs 2019 legislature determined EE should not be “mandated” 	<ul style="list-style-type: none"> Legislature “froze” EE allowing utilities that achieve 4.2% cumulative savings to reduce or eliminate EE programs Goals are on hold
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost recovery through rate adjustment mechanisms T&D costs for improved efficiencies can be recovered 	<ul style="list-style-type: none"> Recovery of lost revenues are allowed on a case-by-case basis Failure to meet mandates results in penalties
OREGON	
Regulations	Goals
<ul style="list-style-type: none"> EE programs are administered through the Energy Trust of Oregon created by the state PUC in 2002 EE offered to customer in 1981 Oregon Commission oversees EE and integrated planning 	<ul style="list-style-type: none"> 1.4% of electric sales through 2019 0.7% of gas sales through 2019 Savings goals for the years 2015 through 2019 of 240 average megawatts (2,102 GWh) and 24 million annual gas therms
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost-effectiveness testing is required - TRC and UCT tests Decoupling allowed by PUC on a case-by-case basis 	<ul style="list-style-type: none"> Possible failure to recover costs
PENNSYLVANIA	
Regulations	Goals
<ul style="list-style-type: none"> Statutory and utility commission requirements established PA Code Title 52, Chapter 57; PA Legislative Act 129 	<ul style="list-style-type: none"> Requires utilities to achieve cumulative savings of 1% by 5/31/11 and 3% by 5/31/13; peak load must also be reduced
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Cost recovery up to 2% through rate cases as prudent costs TRC test is used for cost-effectiveness testing 	<ul style="list-style-type: none"> Possible failure to recover costs through rate case No recovery for spending beyond 2% cap unless approved
VERMONT	
Regulations	Goals
<ul style="list-style-type: none"> Legislation and regulatory orders - VT has a statewide EE utility (EEU) to deliver programs – Efficiency Vermont EEU serves most of the state through state commission “Orders of Appointment” VT requires EEU to set budgets to realize cost-effective EE 	<ul style="list-style-type: none"> Average yearly incremental electricity savings of approximately 2.3% (2015-2017) increasing to 2.32% by 2017 Efficiency Vermont 2012-2014 budget set to achieve 2% annual savings (Public Service Docket EEU-2010-06) – 2015-107 savings set target savings to equal approximately 2.1% ea. year
Cost Recovery, Decoupling and Incentives	Penalties
<ul style="list-style-type: none"> Performance incentives allowed - decoupling allowed through alternative regulation 	<ul style="list-style-type: none"> Potential disallowance of cost recovery or no incentives

WASHINGTON

Regulations

- In 2006, Washington implemented the Voter Initiative 937 "Energy Independence Act" to set EE requirements
- Requires utilities to pursue all reasonable, cost-effective EE
- Utilities must comply with Northwest Power and Conservation Council's approach to achieve 10-year cost-effective potential

Goals

- Utilities use biennial targets to set and achieve cost-effective EE
- Targets of approximately 1.4% incremental electricity savings each year
- EE programs have been offered for many years

Cost Recovery, Decoupling and Incentives

- Decoupling allowed - performance incentives allowed
- Cost-effectiveness tests: TRC and UCT

Penalties

- Potential disallowance of cost recovery or no incentive earned

WISCONSIN

Regulations

- WI EE programs established in 1980s with integrated resource planning
- Statutory and regulatory rules established in 2005 - statewide oversight WI 2005 Act 141; WI Statute §1.12(4), §1.12(5)(a)

Goals

- Electric savings goal of 0.77% in 2015-2018, natural gas goals of 0.6% of sales between 2015-2018
- Statewide cumulative net first-year electricity savings of 2,137,142,988 kWh, gas savings of 76,911,727 therms

Cost Recovery, Decoupling and Incentives

- Cost recovery and incentives via rate cases
- Cost-effectiveness tests: TRC, UCT, RIM

Penalties

- Failure to meet state-mandated goals could bar cost recovery or incentives allowance

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