



PRESENTED BY GDS ASSOCIATES, INC.

DEVELOPMENT & UTILIZATION OF MARKET POTENTIAL STUDIES

IRP Contemporary Issues Technical Conference #2

July 15, 2021

TOPIC OVERVIEW AND KEY QUESTIONS

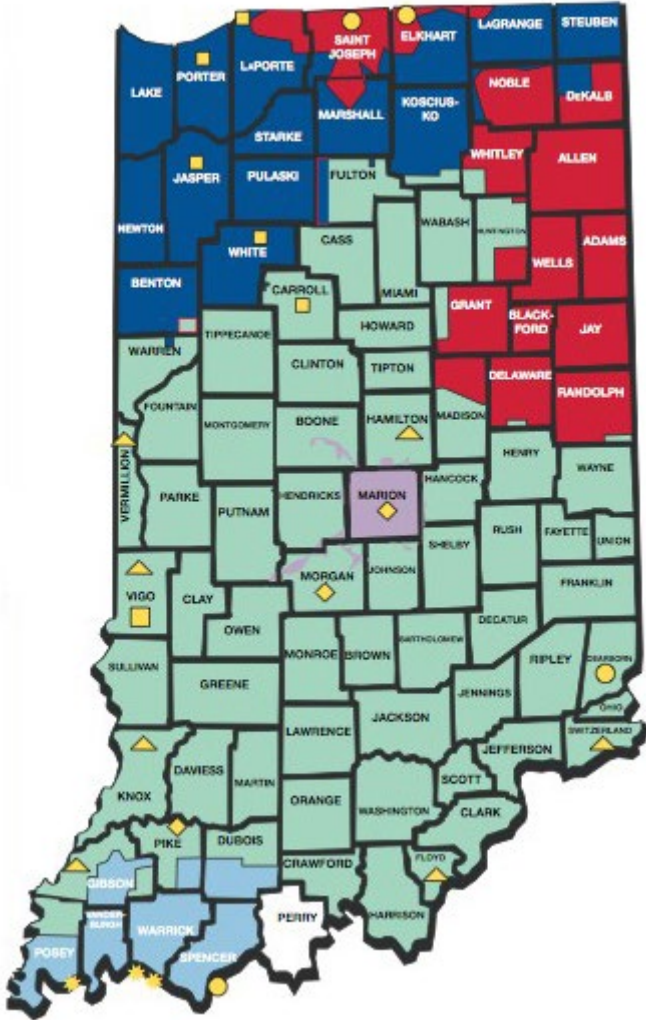
TOPIC OVERVIEW

- ❑ GDS Experience In Indiana
- ❑ General Approach to MPS
- ❑ Key Inputs/Considerations into MPS

KEY QUESTIONS

- ❑ Data Requirements and Potential Improvements that may affect future MPS
- ❑ How MPS is used in developing DSM programs
- ❑ Relationship between MPS and load forecasting

GDS MPS EXPERIENCE IN INDIANA



□ Vectren / CenterPoint

- Project Completed: 2018-2019
- MPS Years: 2020-2039
- EE/DR/CVR

□ Indianapolis Power and Light (IPL)

- Project Completed: 2018-2019
- MPS Years: 2021-2039
- EE/DR/End-Use Analysis

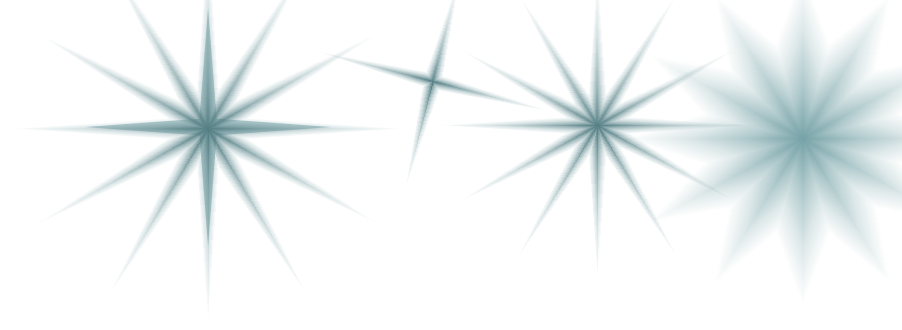
□ Northern Indiana Public Service Company (NIPSCO)

- Project Completed: 2019-2021
- MPS Years: 2024-2043
- EE/DR/CVR

□ Indiana Michigan Power (I&M)

- Project Completed*: 2021
- MPS Years: 2024-2043
- EE/DR/DER

MPS EXPERIENCE IN INDIANA



- **No two market potential studies are exactly alike**
 - *In some cases, this is driven by changing policy/regulatory needs*
 - *In other cases, differences might be due to data availability*
 - *Can make direct comparisons challenging*

- **Still, more similarities than differences in MPS methodologies**
 - *Differences in IRP bundling, however, are more significant*

MPS AND USES IN INDIANA



The **MPS** represents the starting point for developing inputs for the **IRP** modeling



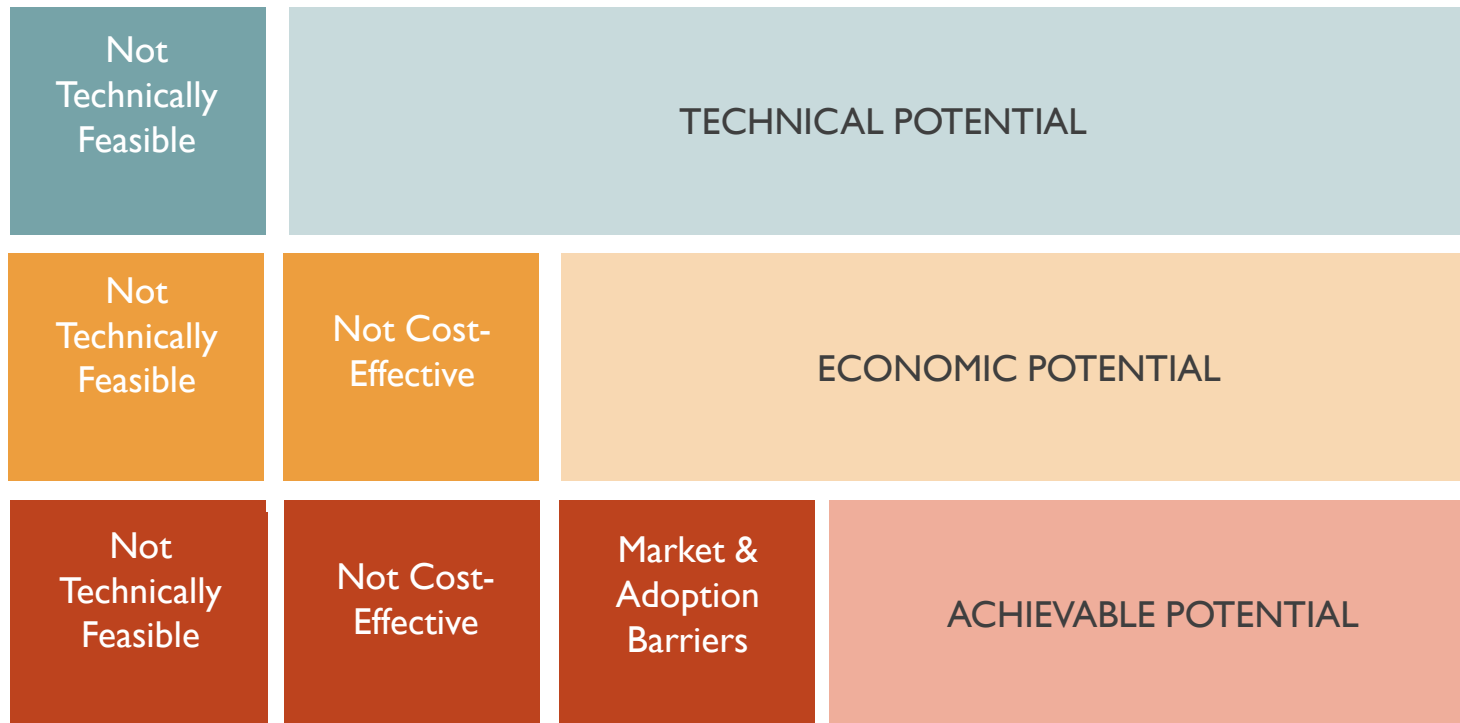
The savings potential from the **MPS** analysis are used to create **DSM** resources and levels to be modeled in the **IRP**



DSM selections from the **IRP** are used to create **DSM** plans

GENERAL APPROACH TO MPS

Types of Energy Efficiency Potential



TECHNICAL POTENTIAL

All technically feasible measures are incorporated to provide a theoretical maximum potential.

ECONOMIC POTENTIAL

All measures are screened for cost-effectiveness using the UCT Test. Only cost-effective measures are included.

ACHIEVABLE POTENTIAL

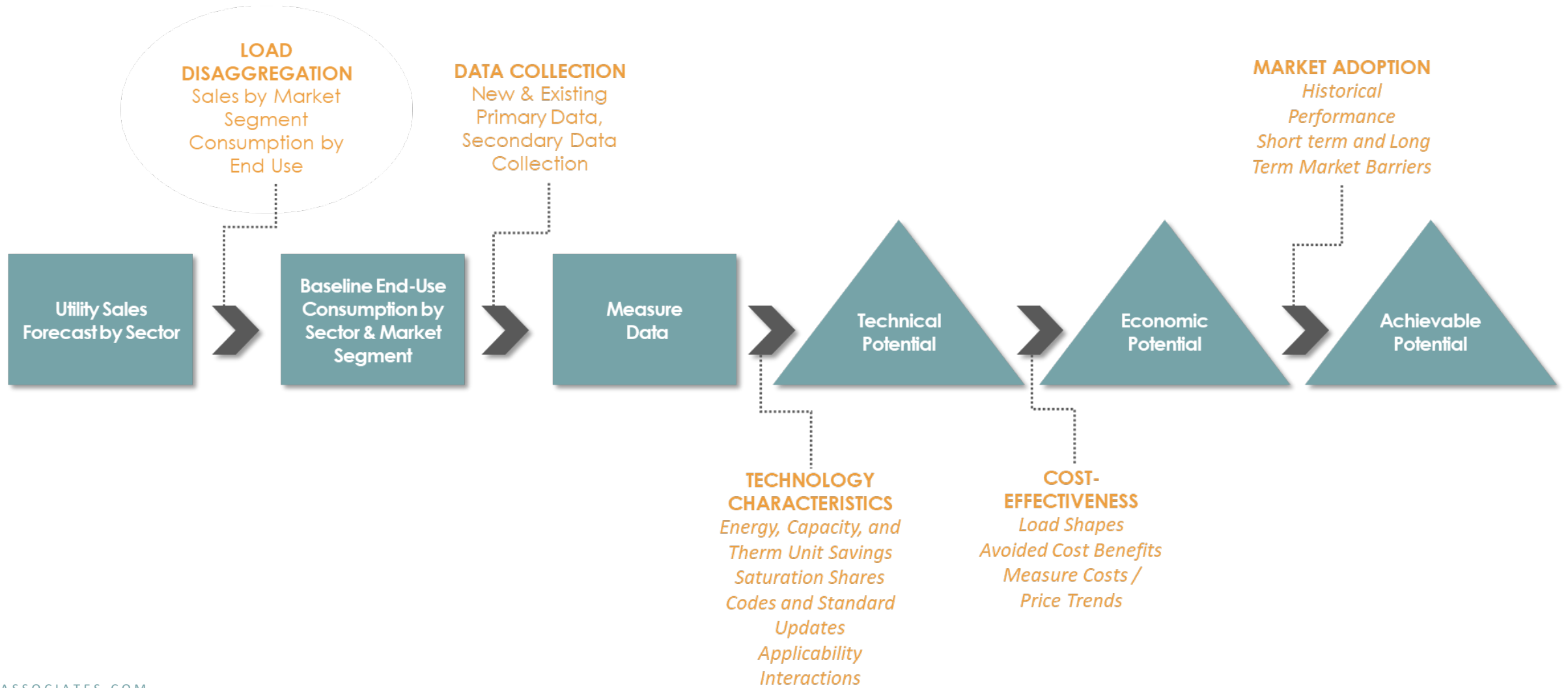
Cost-effective energy efficiency potential that can practically be attained in a real-world program delivery case, assuming that a certain level of market penetration can be attained.



ACHIEVABLE POTENTIAL SCENARIOS

- **Conducted two achievable potential scenarios for each utility.**
- **Achievable potential scenarios included:**
 - *Maximum Achievable Potential (MAP): estimates achievable potential on paying incentives equal to 100% of measure incremental costs and aggressive adoption rates*
 - *Realistic Achievable Potential (RAP): estimates achievable potential with incentive levels closely calibrated to historical levels but not constrained by any previously determined spending levels*
- **Program potential:**
 - *Vectren/CenterPoint: Assessed through DSM Action Plan*
 - *I&M: Assessed as part of MPS*
 - *NIPSCO / IPL – net achievable potential used for IRP modeling*

STUDY APPROACH



KEY INPUTS/CONSIDERATIONS INTO MPS

**Electric Load
Forecast**

**Forecasts of
Avoided Costs &
Economic
Screening**

**Line Loss
Assumptions**

**Market
Characteristics
Data**

**Measure
Characteristics**

**Emerging
Technologies And
2nd Lifetimes**

**Measure :
Program
Mapping**

**IRP Bundles /
Program
Planning**

LOAD FORECAST CONSIDERATION

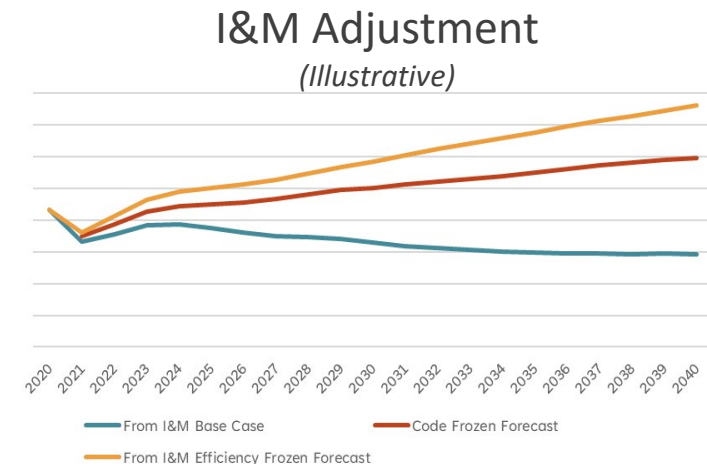
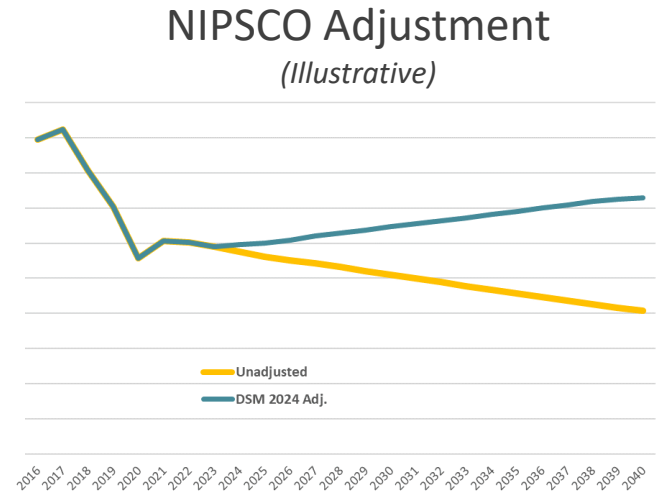
- **As part of our standard data request to utilities, GDS requests the utility sales forecast, excluding any future DSM impacts.**
 - *Want to avoid double-counting DSM impacts*
 - *Impacts of historical DSM are appropriate, but helpful to understand embedded assumptions surrounding measure decay*
 - *GDS has an internal load forecasting group that is familiar with load forecasting techniques (i.e. SAE forecasts)*
 - *Level of involvement has varied across Indiana utilities*

LOAD FORECAST CONSIDERATION

- **For Vectren/CenterPoint, GDS used a no future DSM forecast from 2016 IRP.**
 - *No additional adjustments were made*
- **For IPL, GDS conducted an end-use analysis where data from the market research was used to update equipment saturation inputs into the SAE modeling**
 - *Detailed review of IPL forecast inputs and coordination with changing inputs allowed for close alignment between forecast and MPS inputs*
 - *GDS forecasting group also reviewed and made an adjustment (add back) for previously included EE impacts*

LOAD FORECAST CONSIDERATION

- For NIPSCO, initial forecast was updated to remove future DSM impacts that were embedded in sales forecast as a result of regression off of historical impacts.
 - *Created an MPS-specific forecast ; NIPSCO IRP team also created an adjusted forecast and GDS/NIPSCO reviewed to ensure there was general consistency in overall impact*
- For I&M, GDS created an adjusted MPS-specific forecast from the base sales forecast
 - *For purposes of comparison, GDS used I&M’s base case and frozen efficiency forecast to create a “code-frozen” forecast to represent a no-future DSM case.*



— AVOIDED COSTS & ECONOMIC SCREENING

- **Utility Cost Test was the primary test used for economic screening**
- **Benefits typically included: avoided energy, avoided generation, avoided T&D**
 - *Not universal consensus across all parties on appropriate values for avoided generation, avoided T&D.*
 - *Granularity of avoided energy (monthly, seasonal, 8760)*
 - *Value of avoided T&D in IRP modeling also a consideration*

— AVOIDED COSTS & ECONOMIC SCREENING

- **For Economic Screening, cost reflected current utility incentive levels**
 - *Did not include non-incentive costs at measure-level economic screening*
- **Typically, did not re-screen measure-level cost-effectiveness when calculated Maximum Achievable Potential (MAP)**
 - *Increased incentives impacted adoption levels, but likely included measures that were not cost-effective at 100% incentives*
 - *Could lead to program/sector/portfolio results that are also not cost-effective (based on UCT)*
 - *For I&M, with recommendation of OSB, GDS did re-screen measure-level cost-effectiveness with increased incentives and allowed incentives lower than 100% (but not less than current levels).*

— LINE LOSS FACTORS

- **Line Loss Factors are used to adjust DSM savings from the meter/retail level to system/generation level for calculation of DSM benefits and for IRP inputs**
 - *Most utilities have average line losses (energy) and/or peak (demand) line losses*
 - *GDS is unaware of any in Indiana that have studied marginal line loss rates*
 - *Where peak loss factors were available, GDS and utilities agreed to use them for all line loss assumptions as a proxy.*

MARKET CHARACTERISTICS DATA

- **All utilities that engaged with GDS included some element of primary research to better understand key market segments**
 - *Vectren/CenterPoint: Onsite (comm); WTP data*
 - *IPL: Online/mail (res); onsite (res + comm); WTP data*
 - *NIPSCO: Online (res) ; onsite (res + comm) ; WTP data*
 - *I&M: Online only ; residential & commercial ; WTP data*
- **This research is highly valuable to support key input assumptions**

MEASURE CHARACTERISTICS DATA

- **Measure Lists**
 - *Variety of sources including Indiana and Illinois TRMs, MEMD, current program offerings*
- **Emerging Technologies**
 - *Variety of smart technologies and other emerging measures included*
- **Assumptions and Sources**
 - *Measure savings, costs, measure life assumptions primarily based on TRMs and evaluated savings estimates*
 - *Indiana TRM becoming stale in certain areas*
- **Treatment of Codes and Standards**
 - *On the books changes to codes and standards included*
- **NTG**
 - *Measure-level screening uses gross savings; program potential factors in NTG*

EMERGING TECHNOLOGIES & SECOND LIFETIMES

- **Market Potential Studies**, when performed in conjunction with IRPs, are typically performed for a period of 20-years
- **Long-term studies can lead to questions related to:**
 - *Emerging Technologies*
 - *Measure re-upping and second lifetimes*
- **Emerging Technologies**
 - *GDS included if technologies are known and quantifiable.*
 - *Some emerging technologies may have been present in the market for some time but still have limited market acceptance*
 - *GDS did not include any placeholder or percent-adder to potential savings to account for future technologies*



EMERGING TECHNOLOGIES & SECOND LIFETIMES

□ Second Lifetimes

- *Most measures have an EUL less than the MPS analysis time-frame*
- *GDS typically allowed measures to “re-up” in the potential study in order maintain savings over the full 20-year timeframe. Implicit in this assumption is that continued savings will be possible at similar savings/costs as the original installation.*
- *This is a simplifying assumption that may not always be consistent with load forecast issues or programmatic assumptions (i.e., can lighting savings be replicated if the market is transformed?)*

MEASURE TO PROGRAM MAPPING

- **GDS “mapped” MPS measures/permutations to existing utility offerings**
- **Mapping allowed GDS to:**
 - *Calibrate near-term impacts to recent experience*
 - *Transition from achievable to program potential*
 - *Assign non-incentive costs to measures*
- **In practice, select measures tend to show up across multiple programs and delivery channels making mapping difficult**
- **Unmapped measures tend to represent a mix of viable program measures as well as measures not well-suited for utility delivered programs**

IRP BUNDLES AND PROGRAM PLANNING

- **MPS provides program planning insight on remaining potential, and which programs might be reaching an inflection point.**
- **Important for “Program Potential” to not be overly prescriptive**
 - *Program administrators and implementors should have additional input on program strategies and focus areas*
 - *Potential studies are the initial roadmap*
 - *MPS informs IRP inputs and IRP results inform future program plans*
- **Indiana utilities model energy efficiency as a selectable resource in their IRP**
 - *Do not hardcode pre-determined levels of energy efficiency*
 - *Amount of DSM modeled is closely aligned with MPS results, but modeling approach varies across the utilities*

IRP BUNDLES AND PROGRAM PLANNING

□ Similarities

- *Primary adjustment to reflect net savings (instead of gross)**
- *Force selection of IQW at a pre-selected level*
- *Within bundles, variation in savings by end-use impact the 8760 hourly shape provided to IRP modeling team to allow time differentiated savings to be reflected*

□ Vectren/CenterPoint & IPL

- *Modeled DSM in bundles equal to 0.25% of sales*
- *Bundles were based on a supply curve, with each bundle having a higher cost per lifetime kWh than the prior bundle*
- *Bundles included a mixture of residential and nonresidential measures*

Concerns: Discourages diverse portfolios, no sector differentiation, bundles modeled independently.

** I&M bundles for IRP are based on gross given use of code-frozen forecast.*

IRP BUNDLES AND PROGRAM PLANNING

□ NIPSCO

- *Initial intention to model sector-level bundles: residential and nonresidential*
- *Added an additional breakout in the residential sector to create a “high-cost” bundle*

□ I&M

- *Approach currently in progress*
- *Investigated both sector-level bundles as well as value-based bundles (by sector)*
- *Value-based bundles are not equivalent in size. Typically, one or two large bundles and then several smaller bundles.*

TOPIC OVERVIEW / KEY QUESTIONS REVISTED

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