Missouri Statewide DSM Market Potential Assessment

Project Kickoff Meeting

August 4, 2010

Draft Agenda

- Introductions
- Review and approve agenda
- Review and accept project summary
- Introduction to potential analysis
- Finalize schedule, communication & reporting protocols
- Coordination with ACEEE
- Data sources
- Refine analytic approach & definitions
- Next steps

Project Summary

OBJECTIVE

- Develop estimates of the technical, economic, and achievable potential of electric and natural gas demand side management (“DSM”) for Missouri.

METHOD

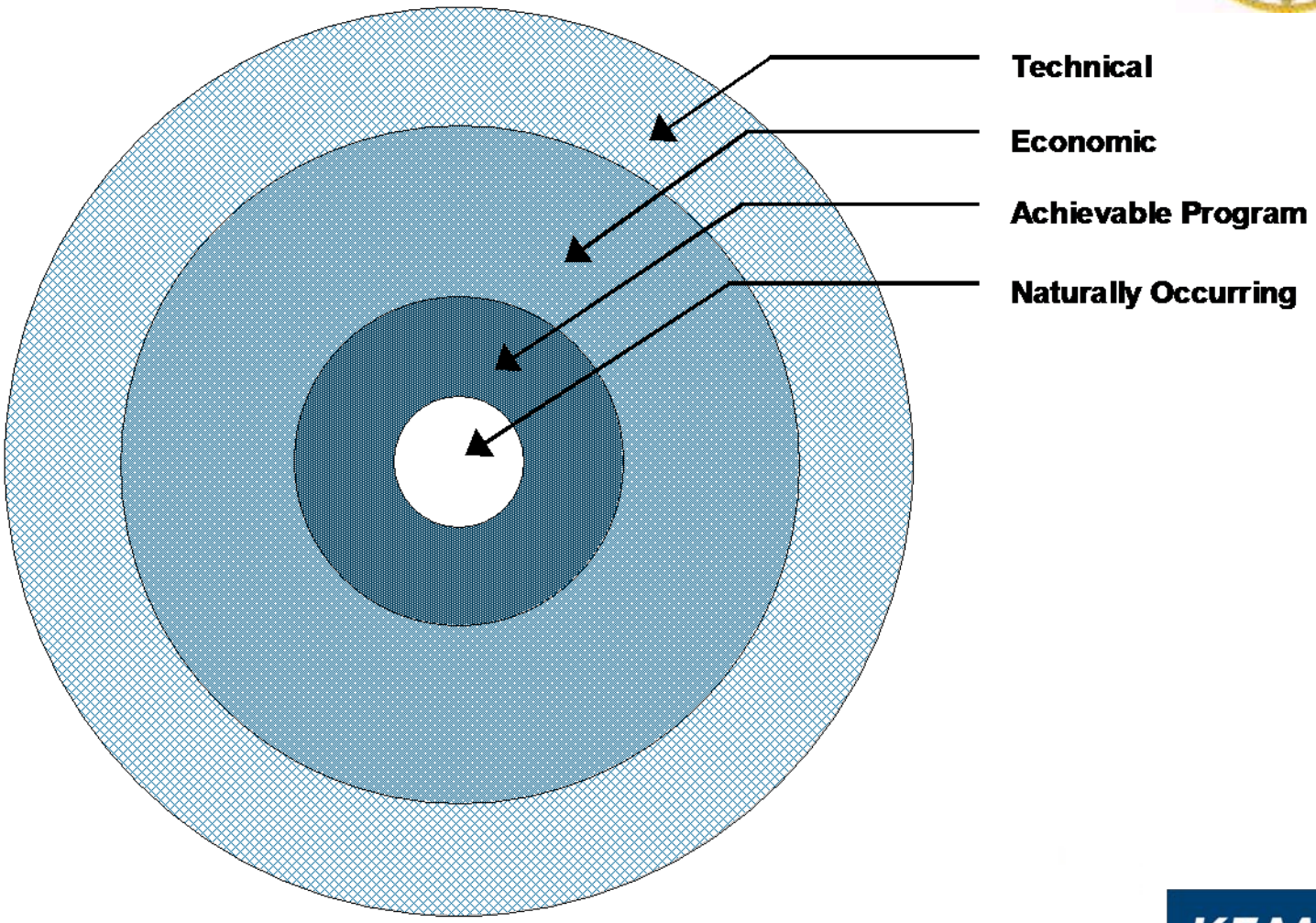
- Use KEMA’s DSM Assyst™ model to build estimates of Missouri’s DSM potential primarily from data acquired through secondary research.

FINAL DELIVERABLE

- A detailed report containing description of the project approach, estimates of the DSM potential by fuel and sector, and a comprehensive record of study inputs, sources and model outputs.

Introduction to DSM Potential

Types of Potential



DSM Assyst™ Overview

- Used to estimate energy efficiency potential
  - Technical and Economic
  - Achievable
- Achievable can be driven by a target or a budget
- Main steps in the process:
  - Data Collection
  - Calibration to actual usage
  - Developing Technical and Economic potential
  - Developing Achievable or Program potential

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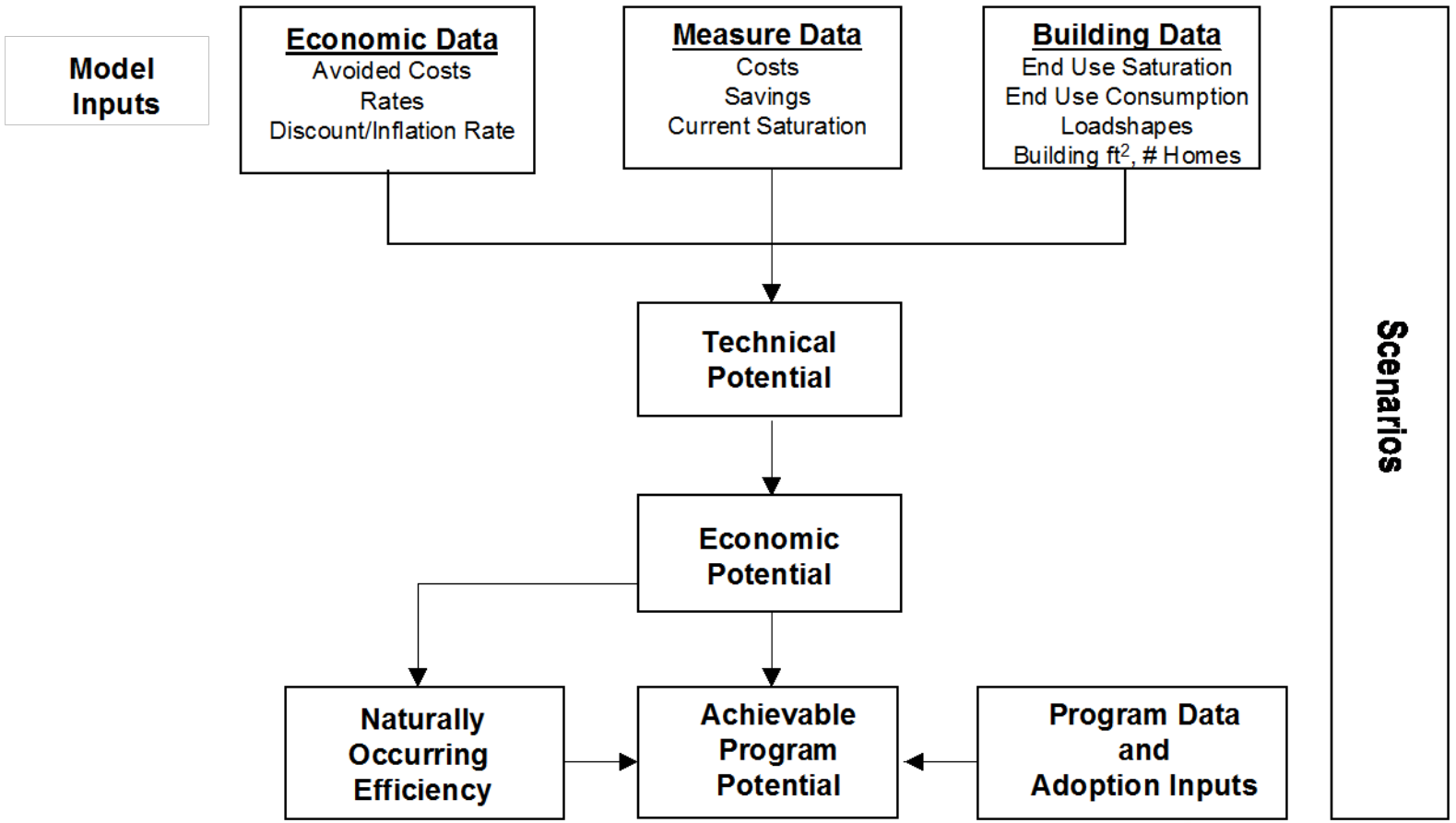
Estimating Energy Efficiency Potential



Key Inputs

- Economic Data
  - Avoided costs, rates
  - Discount rates (utility/society, participant)
  - Inflation rate
- Measure Data
  - Costs, savings, applicability, saturation
- Building Data (Baseline)
  - Total units (ft^2, households, etc.) by segment
  - End-use data - (EUIs / UECs, saturations, load shapes

EUI – Energy Utilization Index :: UEC – Unit Energy Consumption

Developing a Baseline

- Calibrate model to base usage
  - Typically calibrate to utility energy sales (kWh, therms) and peak demand (MW, therms) for most recent year
    - Reflects current penetration of EE measures
    - Reflects current load shapes
    - Rate forecasts assume EE program funding
  - Base Year
    - First year of Avoided Cost data
    - Year to which all costs and benefits normalized

What is Technical Potential ?

- **Technical potential** refers to the amount of energy savings or peak demand reduction that would occur with the complete penetration of all measures analyzed in applications where they were deemed technically feasible from an engineering perspective

Steps to Develop Technical Potential

- Develop list of EE measure opportunities
- Develop technical data (costs and savings) on efficient measure opportunities
- Gather, analyze, and develop information on building characteristics: total square footage and households; energy consumption and intensity by end use; end-use consumption load patterns; market shares of key energy consuming equipment and EE technologies and practices.
- Match data on efficient measures to data on existing building characteristics to estimate technical potential

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Developing Technical Potential

- Technology-based factors include:
  - Base Technology Energy Use (EUI or UEC) – Annual energy consumption of each base technology (air conditioner, light bulb, refrigerator, etc.)
  - Applicability – % of floor space or units with end use
  - Feasibility – % of applicable floor space or units that could technically be converted
  - Incomplete – % of applicable floor space or units that have not been converted to a particular EE technology
  - Energy savings – estimated annual energy savings %

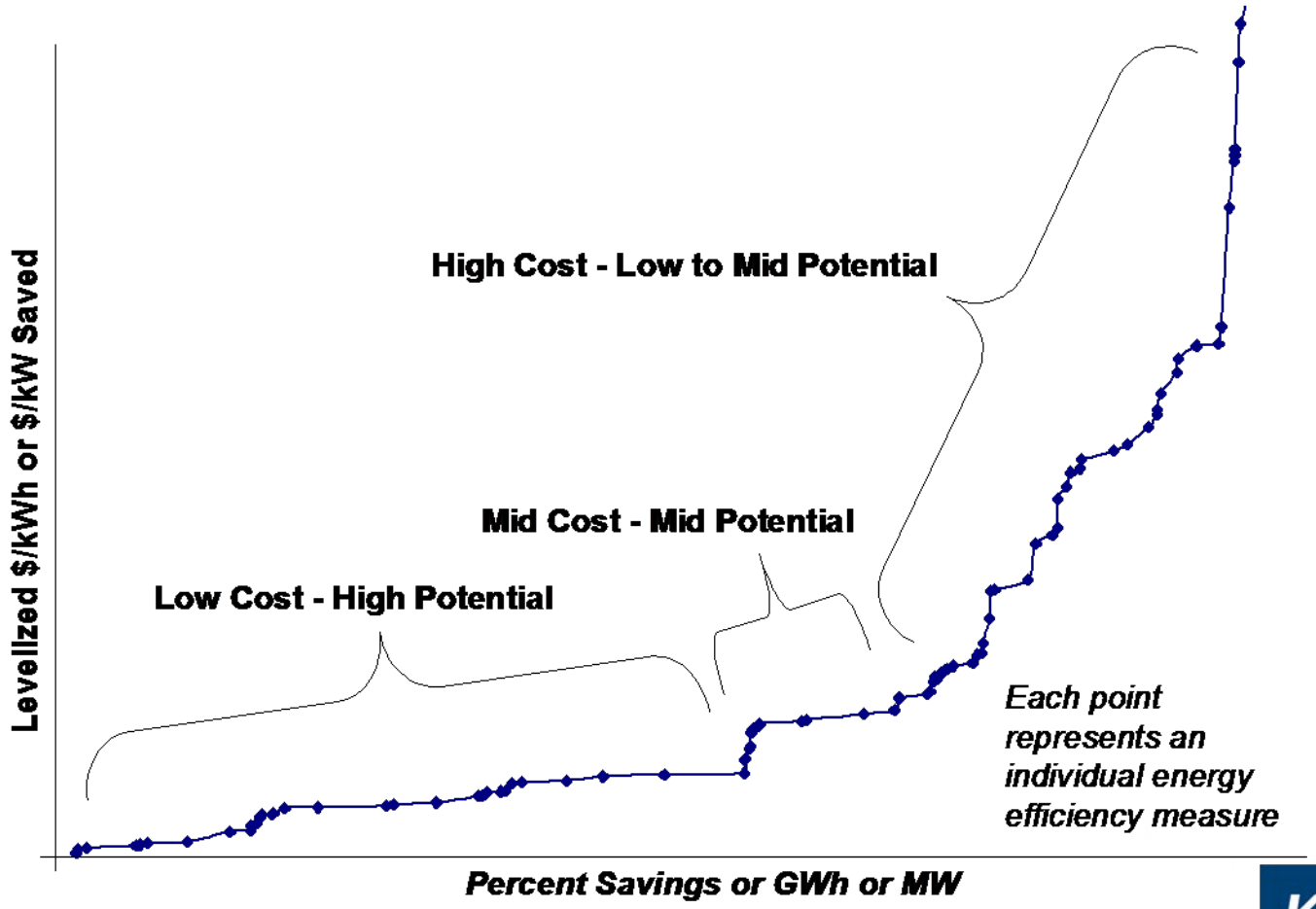
Technical Potential Example:

Replace Standard T-8 with HP T-8 in office segment

Technical Potential of Efficient Measure	=	Total square feet	X	Base Case UEC	X	Applicability Factor	X	Not Complete Factor	X	Feasibility Factor	X	Savings Factor
57 million kWh		195 million		5.74		0.34		0.95		1		0.16

Supply Curves

Eliminate double counting by sequential measure analysis



What is Economic Potential?

- Economic potential is typically used to refer to the technical potential of those energy conservation measures that are cost effective when compared to either supply-side alternatives or the price of energy
- Economic potential takes into account the fact that many EE measures cost more to purchase initially than do their standard-efficiency counterparts
- The incremental costs of each efficiency measure are compared to the savings delivered by the measure to produce estimates of energy savings per unit of additional cost

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Economic Potential

- Cost-effective Energy Efficiency
- Economic Potential = Technical Potential for Measures/Market Segments with a TRC ratio* $\geq$ 1.0

$$*TRC\ ratio = \frac{Present\ Value\,(avoided\ cost\ benefits)}{Present\ Value\,(incremental\ measure\ costs)}$$

Steps to Determine Economic Potential

- Gather economic input data
- Match and integrate measure and building data with economic assumptions to produce indicators of costs from different viewpoints (e.g., utility, societal, and consumer)
- Estimate total economic potential using supply curve approach

What is Achievable Potential?

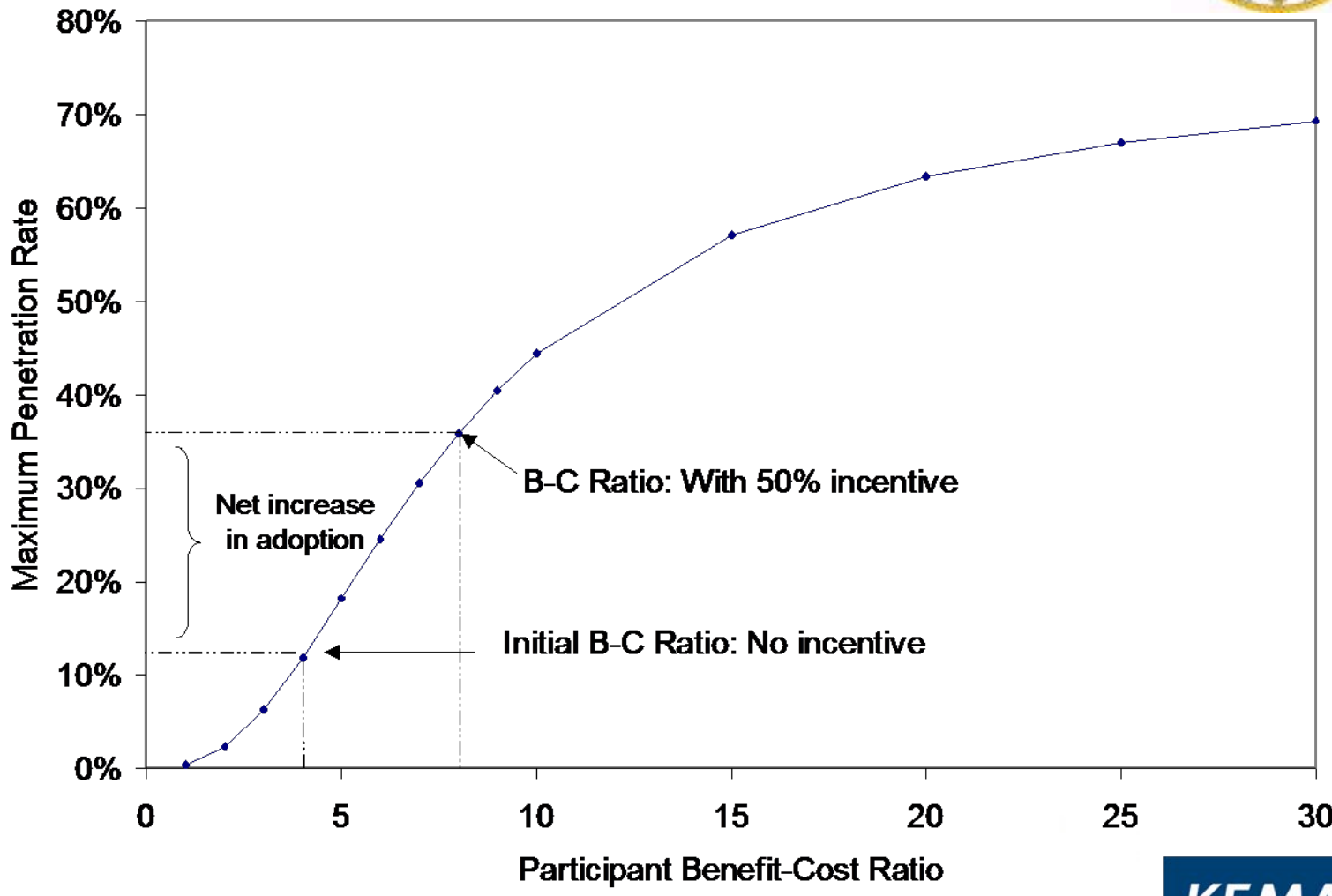
- Achievable Program Potential refers to the portion of the economic potential that is likely to be captured through program intervention at specific level.

- It takes into account the fact that individuals, for a variety of reasons, do not always make optimal economic choices.

Achievable Program Potential is modeled as a function of:

- Availability
  - Equipment turnover rates
- Awareness
  - Measure economics
  - Market barriers
  - Initial awareness level and decay
  - Program marketing expenditures and effectiveness
- Adoption
  - Measure economics
  - Market barriers
  - Incentive levels and budgets

One example: Incentive Modeling



Demand Response

Basic DR Approach

- Review impacts from FERC's *2009 National Assessment of Demand Response Potential* as it applies to the State of Missouri
- Adjust as necessary, using data developed during the data collection phase of the project
  - Some key data elements to look at:
    - Number of customer accounts by rate class
    - Electricity sales by rate class
    - System peak load forecast
    - Average peak load per customer by rate class
    - Growth rate in per customer peak load
    - Central Air Conditioning (CAC) market saturation data
- Model used for FERC assessment is publically available and KEMA has worked with it.

FERC National DR Study

- Bottom up approach using 4 customer segments: residential, small, medium, and large nonresidential
- Five DR program types
  - Direct load control,
  - Interruptible rates,
  - Dynamic pricing with enabling technologies,
  - Dynamic pricing without enabling technologies, and
  - Other DR programs (such as demand bidding).

FERC National DR Study

- Results developed for four different DR scenarios:
  - Business-as-usual (BAU): current programs and tariffs are held constant;.
  - Expanded BAU (EBAU): BAU program participation rates are increased to equal the 75th percentile of ranked participation rates of similar programs.
  - Achievable Participation (AP): further assumes advanced metering infrastructure (AMI) is universally deployed, and dynamic pricing is the opt-out default tariff.
  - Full Participation (FP): similar to the AP scenario, except that dynamic pricing and the acceptance of enabling technology is mandatory. This scenario quantifies the maximum cost-effective DR potential, absent any regulatory and market barriers.

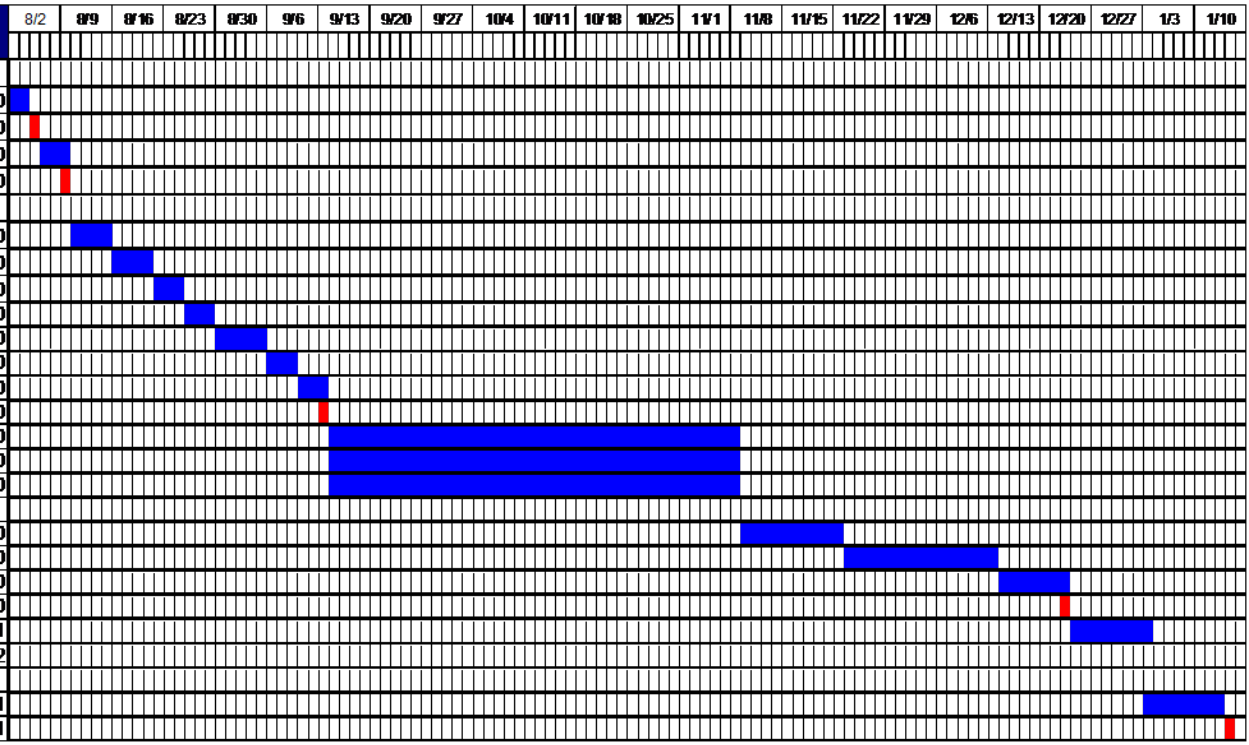
Ready for a Break?

Let’s Take 10 Minutes

Schedule, communication &reporting

Schedule per Scope of Work

Task#	Task	Start Date	End Date
001	Task 1 - Initiation Meeting		
A	Prep Work	8/2/10	8/3/10
B	Kickoff meeting	8/4/10	8/4/10
C	Prepare Initiation Meeting Memo	8/5/10	8/9/10
D	Submit Memo	8/9/10	8/9/10
002	Task2 - Work Plan		
A	Draft work plan	8/10/10	8/14/10
B	Comments from MO PSC	8/15/10	8/19/10
C	Revised draft	8/20/10	8/24/10
D	Comments from MO PSC	8/25/10	8/29/10
E	Revised final draft	8/30/10	9/3/10
F	Comments from MO PSC	9/4/10	9/8/10
G	Prepare Final Work Plan	9/9/10	9/13/10
H	Final Work Plan Accepted by PSC	9/13/10	9/13/10
003	Task 3 - Baseline Data Development	9/14/10	11/8/10
004	Task 4 - Measure Data Development	9/14/10	11/8/10
005	Task 5 - Additional Data Development	9/14/10	11/8/10
006	Task 6 - Potential Assessment		
A	Tech and Economic Assessment	11/9/10	11/22/10
B	Achievable Assessment	11/23/10	12/13/10
C	Draft report	12/14/10	12/22/10
D	Deliver draft report	12/22/10	12/22/10
E	Comments from MO PSC	12/23/10	1/3/11
F	Comments recieved	1/3/11	1/3/02
007	Task 7 - Final Report		
A	Prepare final report	1/3/11	1/12/11
B	Submit final report	1/13/11	1/13/11



Notes:

1) Schedule is driven by 120 calendar-day time frame.

2) Schedule presumes work initiation on work plan approval

Communication Protocols: Proposal

- KEMA has designated the project manager as the single point of contact for the PSC.
- KEMA requests that the PSC designate a single point (PSC project manager), and that issues related to project scope, timing, and budget be transmitted by e-mail between these two parties.
- Other KEMA, PSC staff, and their designees may communicate as necessary to acquire data or as required in the performance of their duties.

Reporting Protocols: Proposal

- The KEMA project manager will transmit monthly status updates to the PSC project manager on or about the 5th of the month with the monthly invoice, including:
  - Summary of activities since the last report
  - Progress toward task completion
  - Anticipated progress before the next report
  - Any variances/problems and proposal for resolution.
- The KEMA project manager will confer with the PSC project manager weekly or bi-weekly as requested.

Coordination with ACEEE

Purpose – To ratify KEMA's understanding of outcome of 7/20 call

- The KEMA project manager may communicate directly and informally with ACEEE representatives on matters relating to data acquisition and methodology.
- The KEMA project manager will submit draft reports, findings, and other work products to the PSC project manager and request explicit approval for transmitting to ACEEE.

Data Sources

Building or Baseline Data

Defining what's here now

- Total of energy consuming units, by sector and building type
- Energy consumption by end use and fuel
- End use load shapes and peak demand
- Saturation of end uses
- Market shares of standard and efficient equipment

Baseline sources

- Existing databases
  - U.S. Dept of Energy, e.g. Commercial Building Energy Consumption Survey
  - U.S. Census and Economic Census Data
  - Dunn and Bradstreet
- Previous studies from other jurisdictions, scaled to Missouri
- Past KEMA studies for Missouri and region
- AmerenUE study
- Utility operations data

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Known Issues - Baseline

- Utility data availability – time frame and format
- AmerenUE Study
  - Availability and format of data and instruments
  - Methodological consistency with PSC approach
  - Scalability to the entire state

Discussion

Measure Data

- Developed from extensive existing resources including:
  - Recent potential studies
  - AmerenUE study
  - Current Missouri programs
  - Lawrence Berkeley National Laboratory industrial sector measure list
  - Databases such as California's *Database for Energy-Efficient Resources*

Additional Data

- Economic
  - Avoided cost forecasts
  - Rate forecasts
  - Discount rate assumptions
  - Inflation rate assumptions
- Current Missouri program data

Data acquisition responsibility
Proposal

- KEMA will acquire data from public databases and its own sources.
- KEMA will develop a data request to entities within the PSC's jurisdiction for PSC transmission.
- KEMA, as directed by the PSC, will work directly with these entities to acquire the data in an appropriate format.

Analytic Approach & Definitions: Comments and Suggestions for the KEMA Team?

Next Steps

- KEMA will prepare a memorandum of summarizing discussion and outcomes of the meeting.
- KEMA will prepare a draft work plan based on today's discussion to submit to the PSC by August 13th per the proposal scope of work or by some other mutually acceptable date.
- KEMA will prepare a draft data request for PSC review to submit to the PSC on or about August 27th.

Thank you for your participation.

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