AEG
APPLIED ENERGY GROUP

DSM Potential Study Stakeholder Workshop 1

Prepared for: evergy

Date: September 26, 2022

Safety Message

End of Summer Projects

- Before you use any power tool make sure the cord isn't frayed, that it is free of cuts, and appears to be in good condition.
- If you need an extension cord, be sure it is designed for outdoor use.
- Be sure that the extension cords amperage can handle the demand of the power tool you're using.
- Only use a ladder when there's someone else at home.
- If you're using a metal ladder, be careful that it doesn't contact with an electrical source.

Agenda

- EE potential analysis
  - Recap of analysis approach
  - RASS overview
  - Preliminary results
- Status update on DR/DSR analysis

EE Potential Analysis

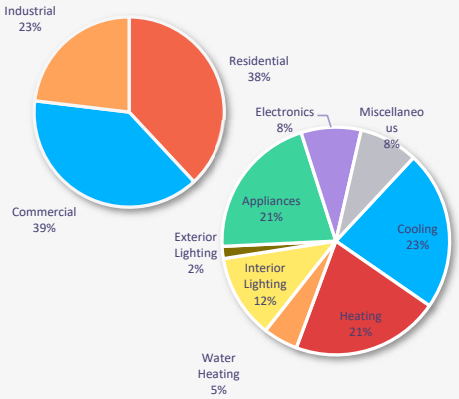
Energy Efficiency Potential Approach

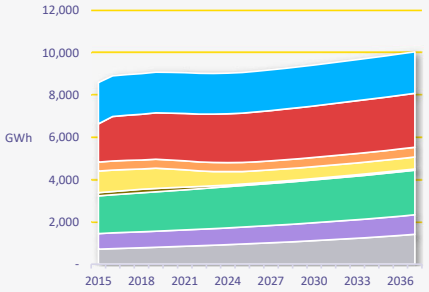
Market Characterization
- Customer segmentation
- Utility data
- Residential survey
- Secondary data

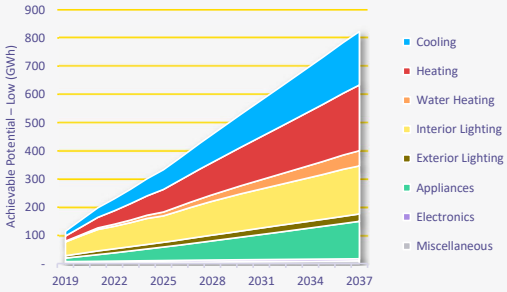
Identify and Characterize Measures
- Efficiency equipment
- Retrofit opportunities
- Emerging technologies

Baseline Projection
- Utility forecasts
- Stock turnover
- Codes and standards

Potential Estimation
- Technical, Economic, Achievable (MAP and RAP)
- Recent program history







Overview of RASS

Conducted separate surveys for

- Missouri West
- Missouri Metro
- Kansas Metro
- Kansas Central

Also stratified Evergy customers by

- Usage category within each service territory
- Net metering status

Oversampled customers with email addresses to reach targets within budget

- The initial sample consisted of 18,000 mail customers and 46,000 email customer.
- Due to low response rate, another 80,003 email customers were added to the sample

Survey invitations were (e)mailed

- Invitations included a URL/link and a unique password
- Reminders were sent 3 – 7 days later

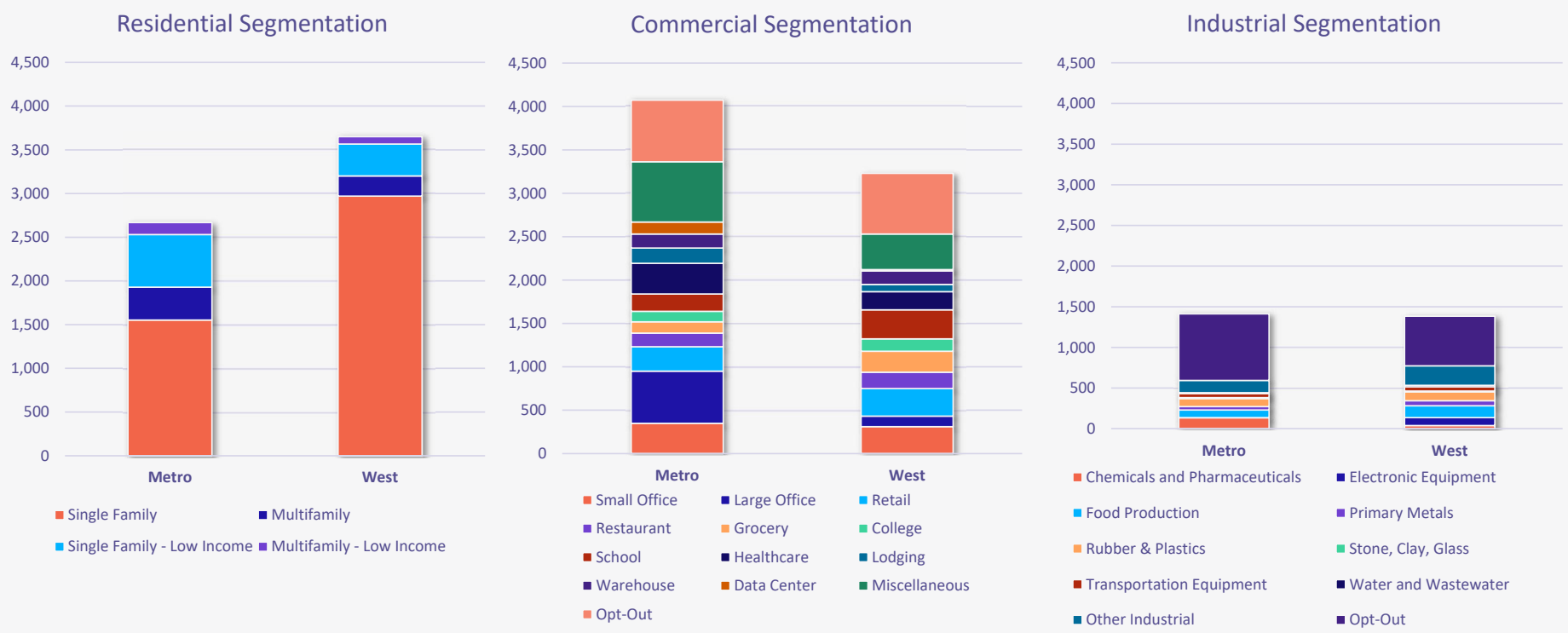
Service Territory	Completed Surveys
Missouri West	819
Kansas Metro	816
Missouri Metro	741
Kansas Central	821
Total	**3,197**

Results for MO were used to develop market profiles by region and segment for potential study, primarily:

- Use per household
- Appliance saturations

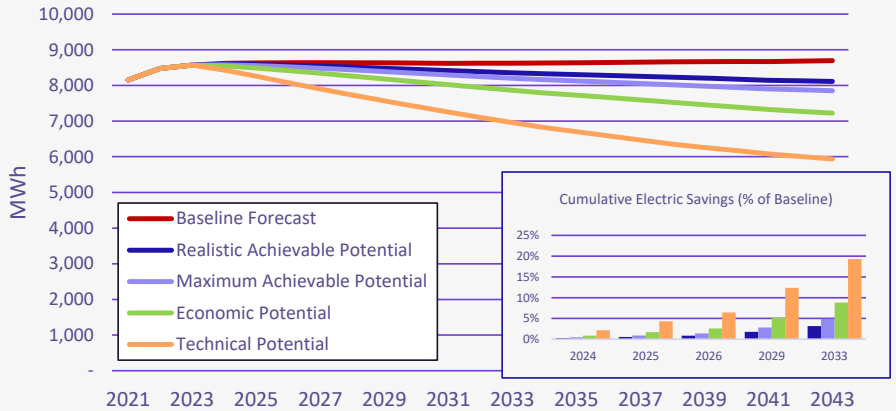
Base Year Market Characterization

By Territory, Sector, and Segment



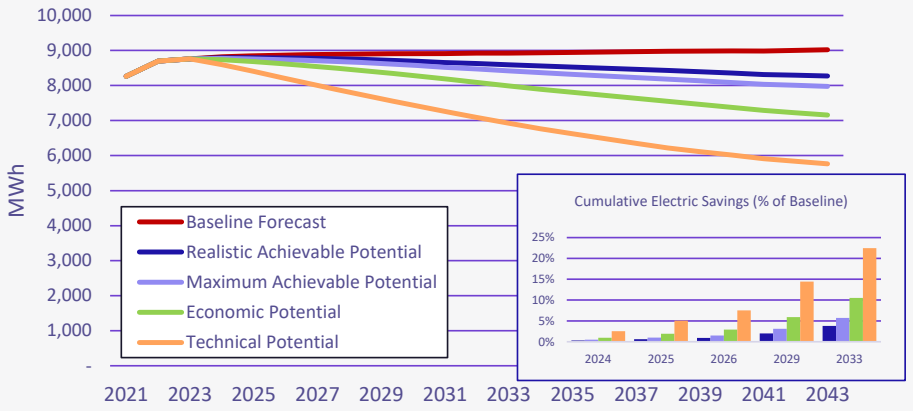
EE Potential Results - Summary

Metro



Cumulative GWh	2024	2025	2026	2029	2033
Realistic Achievable Potential					
Residential	2	4	6	13	20
Commercial	15	30	47	95	163
Industrial	6	12	19	44	88
Total	**23**	**47**	**72**	**151**	**271**
Maximum Achievable Potential					
Residential	3	6	8	17	26
Commercial	26	53	81	161	270
Industrial	9	19	29	65	125
Total	**38**	**77**	**118**	**243**	**421**

West



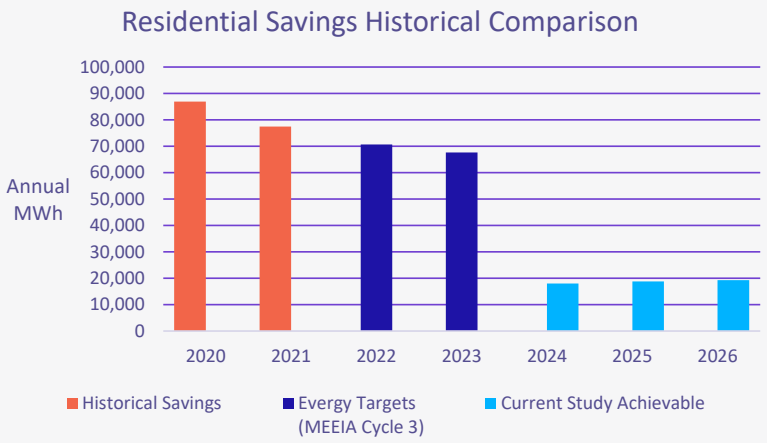
Cumulative GWh	2024	2025	2026	2029	2033
Realistic Achievable Potential					
Residential	2	5	7	15	24
Commercial	12	24	38	79	140
Industrial	12	24	37	81	173
Total	**26**	**53**	**82**	**176**	**337**
Maximum Achievable Potential					
Residential	3	7	10	21	32
Commercial	21	43	66	135	231
Industrial	19	37	56	121	247
Total	**43**	**87**	**132**	**277**	**511**

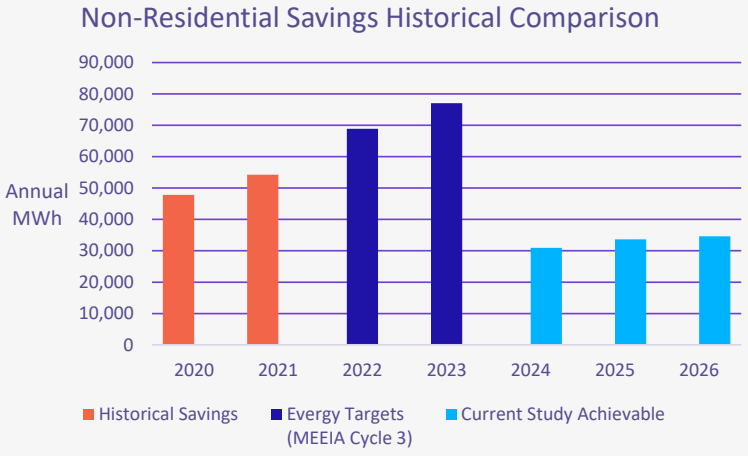
EE Potential Results – Top Measures

Rank	Measure Name	2026 Cumulative Savings (MWh)				
		Metro	West	Total	Metro Rank	West Rank
1	Commercial - Linear Lighting (LED 2020 (109 lm/W system) w/ Controls)	16,115	11,743	27,858	1	1
2	Residential - Central AC (SEER 16.0 (ENERGY STAR 6.1))	3,667	4,191	7,859	4	2
3	Commercial - RTU (IEER 18.0 - ENERGY STAR (4.0))	3,978	3,846	7,824	3	3
4	Commercial - Exempted Lighting (LED 2020 (95 lm/W))	4,264	2,790	7,054	2	9
5	Commercial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	3,176	2,729	5,905	5	10
6	Residential - Ducting - Repair and Sealing (Sealed)	2,069	3,820	5,888	10	4
7	Commercial - Ventilation - Demand Controlled (Outdoor air controlled based on occupancy to meet ASHRAE 62.1)	2,884	2,716	5,600	6	11
8	Residential - Connected Thermostat - ENERGY STAR (1.0) (Networked Thermostat Installed)	2,118	3,206	5,324	9	6
9	Residential - Furnace - Conversion to Air-Source Heat Pump (High efficiency air-source heat pump)	1,410	3,509	4,918	11	5
10	Industrial - High-Bay Lighting (LED 2020 (132 lm/W) w/ Controls)	2,130	2,513	4,643	8	12
11	Commercial - Server (ENERGY STAR (3.0))	2,636	1,384	4,020	7	18
12	Residential - Ducting - Repair and Sealing - Aerosol (G.17 Aerosol Duct Sealing)	1,276	2,492	3,768	14	13
13	Residential - Air-Source Heat Pump (SEER 16.0 / HSPF 9.2 (ENERGY STAR 6.1))	562	2,809	3,370	29	8
14	Residential - Insulation - Floor Upgrade (R-30)	0	3,130	3,130	157	7
15	Industrial - Linear Lighting (LED 2020 (109 lm/W system))	1,375	1,578	2,953	12	16
16	Residential - Central Heat Pump - Controls and Commissioning (Central Heat Pump with auxiliary heat control strategy, lockout settings, and other operational parameters)	388	1,960	2,348	37	14
17	Residential - Building Shell - Liquid-Applied Weather-Resistive Barrier (Liquid-Applied Weather-Resistant Barrier)	723	1,616	2,339	22	15
18	Commercial - Water-Cooled Chiller (COP 12.13 (0.29 kW/ton))	1,078	1,098	2,176	15	21
19	Commercial - Ventilation - Variable Speed Control (Variable speed drive on fan motor.)	1,289	845	2,133	13	24
20	Residential - Refrigerator (CEE Tier 3 (20% above standard))	915	1,026	1,941	19	22
	Total of Top 20 Measures	**52,054**	**59,000**	**111,054**		
	Total Savings - All Measures	**71,821**	**81,781**	**153,602**		

EE Key Takeaways

- EISA lighting standard has virtually eliminated general service lighting potential, particularly in residential
  - *Some* lighting potential remains in Exempt lighting fixtures and Commercial Linear fixture replacements that combine LEDs and embedded controls
- Cooling system upgrades are cost-effective in both Residential and Commercial, driven by the value of peak savings
- Converting Residential electric resistance heating to heat pumps is also a strong measure
- Residential ducting improvements (sealing and insulation) show strong savings, but most other building shell measures are not cost-effective





Deeper Dive into Potential Analysis

Analysis Results Available in Spreadsheet

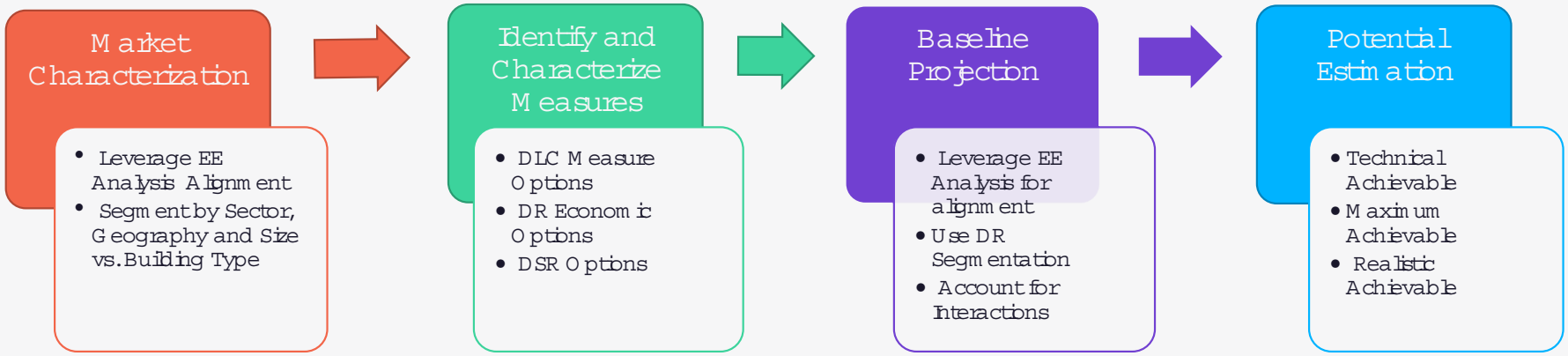
File: "Evergy 2022 DSM Potential Study DRAFT Results Viewer - All Sectors.xlsx"

- **Market Overview** shows how energy is allocated by sector and segment in the base year of the study (2021). A selector near the top allows you to view one territory at a time or the combined totals. (Initial view has both territories selected.)
- **Baseline Exhibits** shows AEG's modeled baseline projection at the sector and end use level, and compares to Evergy's official load forecasts to confirm alignment
- **Potential - All Sectors** shows the high-level overview of energy savings. Individual territories or sectors can be viewed using the selectors. This top-level view is repeated for Summer and Winter peak savings on the next two tabs.
- **Savings by Sector** shows the relative contribution of each sector to the MAP and RAP potential savings.
- **Potential by End Use** shows how different end uses contribute to savings in each sector over time and provides a snapshot pie chart for the composition of cumulative savings in 2026, the end of the next MEEIA cycle.
- **Top Measures** shows the highest savings measures for the MEEIA Cycle 3 period (2024-2026 cumulative RAP savings). It can be filtered to look at each sector individually or across all sectors.
- **Low Income** shows the potion of Residential savings that are in low-income segments compared to the overall sector savings.
- **Historical Comparison** puts the projected annual achievable savings for 2024-2026 in the context of historical accomplishments for 2020-2021 and filed plan targets for 2022-2023, with notes on key drivers of differences.

Status of DR/DSR Potential

DR and DSR Potential Approach - Recap

- General methodology for estimating DR and DSR potential is similar to energy efficiency
- Our approach accounts for two key differences:
  - Neither exist outside of a programmatic structure ie., there is no naturally occurring DR
  - Focus on Technical Achievable, Maximum Achievable, Realistic Achievable



Program Options and Characterization

DR Options	DSR Options
DLC – End Use • Smart Thermostats (heating/cooling) – Res and C&I • Switches (heating/cooling) • Smart Appliances • Electric Vehicles • Water Heating • Pumps • Grid Interactive Water Heat • Battery Storage • Thermal Energy Storage **Economic – Whole Facility** • Firm Curtailment/Tariff • Non-Firm Curtailment • Capacity Building – C&I • Behavioral Demand Response	**Rate-Based** • Time-of-Use Rates • Critical Peak Pricing • Peak Time Rebate • Real Time Pricing • Demand Charges • EV Specific rates

- Participation rates
  - Define eligible customers for each given option and reflect appliance saturation rates, customer segmentation, and the hierarchy
- Customer impacts
  - Percentages or kW values that reflect the total load reduction during an event
- Participant/program costs
  - Incentives and enabling technology costs, program development and administration costs, marketing and recruitment costs, O&M costs

Per customer coincident peak load × % impact × # of eligible customers = MW Impact

DR and DSR Potential

Technical Achievable Potential

- Does not consider cost effectiveness
- Higher cost, higher participation
- Independent estimates for each option without consideration of dual participation

Economic Screen

Maximum Achievable Potential

- Higher cost, higher participation
- Includes only cost-effective options
- Integrated estimates reflect dual participation and eliminates double counting

Realistic Achievable Potential

- Lower cost, lower participation
- Includes only cost-effective options
- Integrated estimates reflect dual participation and eliminates double counting

Analysis To Date

Completed

- Develop program options list
- Segmentation of customers and peak demand
  - Used billing data to segment C&I customers into size bins
- Forecast baseline peak demand
  - Initially provided by Evergy
  - Updated to incorporate equipment turnover and EE adoption (by using the peak demand forecast from the EE study for the RAP scenario)

In-Progress/Ongoing

- Characterized DR programs and DSRs
- Modeled standalone potential
  - Potential is not yet "stackable" across programs
- Calibrated existing/planned resources in base year
  - ie., align modeled base-year participation and impacts with program achievements
  - Adjust model inputs as needed

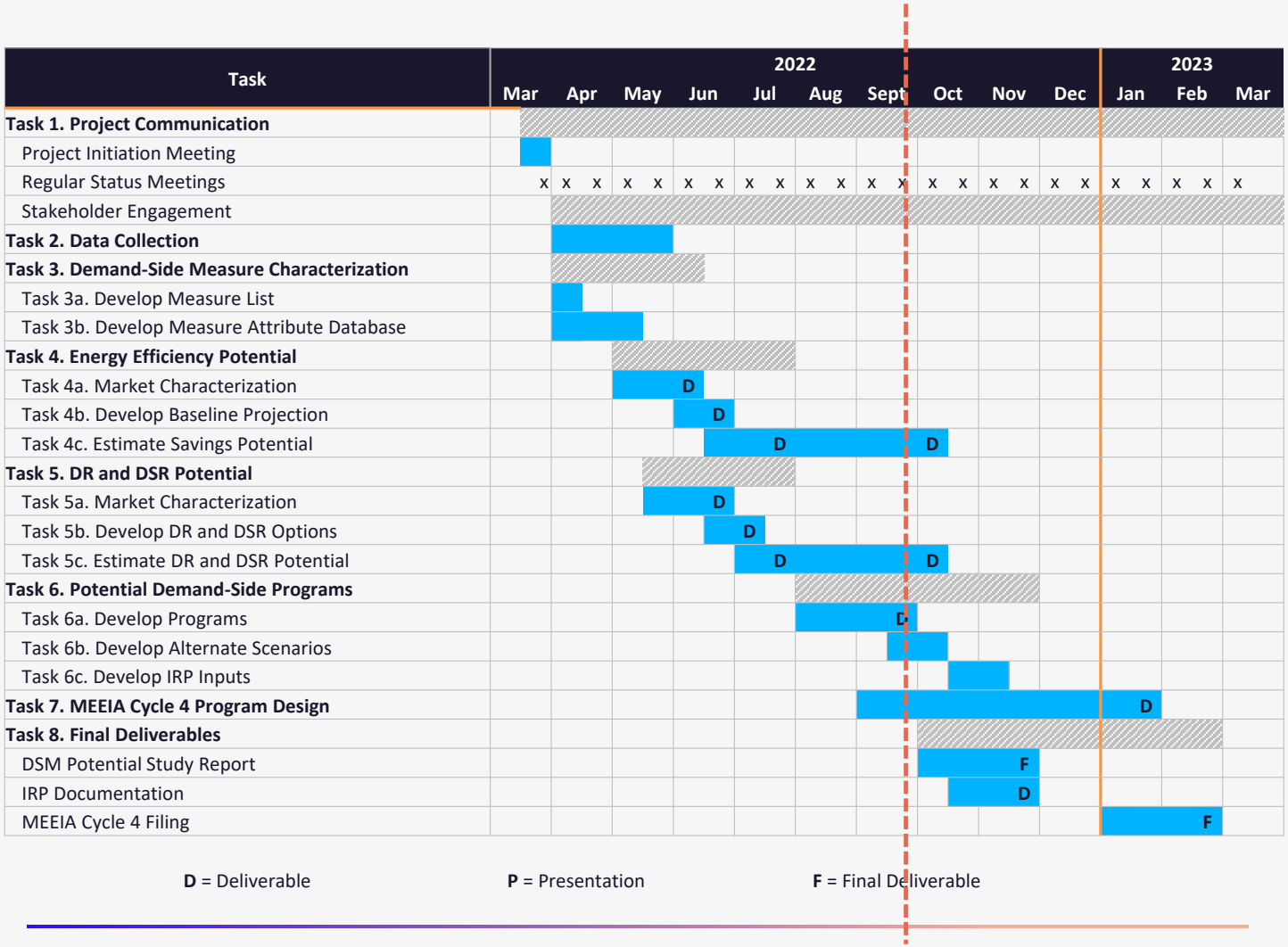
Up Next

- Develop program hierarchy for integrated potential model
  - Decide which competing resources will be offered first
  - Adjust the eligible customer population for subsequently-offered programs
- Model integrated potential
  - Use the hierarchy to get a "stackable" view of potential across programs

Stakeholder Engagement Plan

Meeting	Stakeholder Kickoff Meeting and Strategic Issues Forum	Draft DSM Potential Results Workshop	Refined Draft DSM Potential Results Workshop	MEEIA Cycle 4 Stakeholder Kickoff Meeting
Timing	May 2022	September 2022	October 2022	November 2022
Purpose	• Provide an overview of the DSM Potential Study, including analytic approach and key milestones. • Identify stakeholder positions on key issues for the DSM Potential Study and MEEIA Cycle 4 plan filing	• Review draft results of the DSM Potential Study • Gather initial feedback from stakeholders on the results of the study	• Review refined results of the DSM Potential Study • Gather stakeholder feedback on results	• Evergy presents initial program ideas on MEEIA Cycle • Revisit stakeholder positions on key issues specifically related to the MEEIA Cycle 4 plan filing

Project Timeline



Next Steps

Please submit your feedback by October 3.

Meeting on DR/DSR planned for week of October 10.

- Please look out for a meeting poll.

Workshop 2 is scheduled for Thursday, October 27 at 1:30pm Central.

Thank You.

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