



2022-24 EEB THREE YEAR EVALUATION BUDGET & PLAN

December 15, 2021

APPROVED BY EVALUATION COMMITTEE 12/17/21

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Organization of the Report

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CT EEB 2022-24 THREE YEAR EVALUATION BUDGET AND PLAN – ABSTRACT

Abstract

As a result of an extensive project needs, development, and prioritization assessment, conducted with the input of all CT evaluation stakeholders, the Evaluation Administrator Team (EA Team) is pleased to submit this recommended budget and supporting Evaluation Projects for the 2022-24 Cycle. The projects were discussed with stakeholders in an open and collaborative manner, with multiple opportunities for input and feedback.

The recommended evaluation budget is \$14.775 million over the Three-Year period, which is 9% more than the budget included in the October 2021 C&LM Plan is \$13.5 million. The evaluation committee discussed specific projects, and made some modifications, but the list and associated budget included in this document was accepted by the Committee. The budgets for both the Evaluation Plan studies and the EA Oversight budget are shown in Figure A.1.

Figure A.1: Three-Year Evaluation Plan Budget

Budget Entry	Year 2022	Year 2023	Year 2024
Evaluation Plan / Studies	\$4,500K	\$4,500K	\$5,775K
EA Budget	\$444,110	\$444,110	\$531,155

The approved C&LM plan budget presented in Table E.1 over the period is \$706.6 million. The calculated percent allocated to EM&V totals 2.1% over the three years, ramping up from 1.8% in 2022. This represents a substantial increase over the Evaluation allocation over previous years. This was a deliberate change. Esource information indicates the national average for the percent of C&LM Plan budgets allocated to evaluation is between 2-2.5%, with even higher numbers generally associated with leading states. The percentage allocated to evaluation in Connecticut had declined from 2.1% in 2012/2013 to 1% in 2019-22.¹ This budget increase moves Connecticut back to values that are in line with other states.

The low evaluation budgets in Connecticut have led to very limited scopes and sample sizes, and also difficulties making the projects economically attractive to industry-leader contractors. The increased budget brings substantial advantages to the evaluation work in Connecticut in several ways, reflected in the enhanced scope of evaluation topics presented for this Three-Year Period:

- More projects, representing topics that meet the array of needs expressed by the stakeholders.
- Projects with more robust scopes and larger sample sizes, to allow greater granularity in results, and fewer limitations on drilling down on key subjects.
- The plan's budget and corresponding level of verification of programs and their savings represents a percentage that is more in line with industry standard for evaluation across the nation.

¹ This low value was partly influenced by the last year of effects from the budget sweep.

The annual phased dollars are presented in Figure A.1. The split by sector is shown in Figure A.2. Figure A.3 identifies the split of projects by evaluation category. The 45 individual recommended projects, budget totals, and budget phasing are presented in Figure A.4.

Figure A.2: Recommended Evaluation Plan Budget and Project Counts by Sector and Year

	Budget Year 1	Budget Year 2	Budget Year 3	Total 3-year Budget	Share of total budget	Number of Projects
Residential	\$1,595	\$1,169	\$2,226	\$4,990	34%	15
Commercial	\$1,330	\$1,180	\$1,400	\$3,910	26%	8
Cross-sector	\$1,575	\$2,151	\$2,149	\$5,875	40%	22
Total	\$4,500	\$4,500	\$5,775	\$14,775	100%	45
Share of Total	30.5%	30.5%	39%	100%		

Figure A.3: Evaluation Plan Project List by Evaluation Type

Evaluation Type	# of Studies	Budget	Share of Budget
Baseline	9	\$3,460	23%
Impact or Impact/Process**	10	\$3,850	26%
Process	5	\$1,275	9%
PSD	4	\$750	5%
Topics	17	\$5,440	37%
Total	45	\$14,775	100%

(**) Table Note: \$5.025* is the budget for impact if we include the 2nd half of two large C&I impact studies, which carry over to 2025, per FCM timing needs). That budget is not in this plan.

Next Steps: The remaining steps in the Plan Development / Approval process includes:

- The “Three Year Evaluation Budget and Plan”, including EA Budget, has been voted on and approved on December 17 by the Evaluation Committee.
- The Evaluation Plan is presented to the EEB in January and the EEB votes on the Plan budget.
- After vote, the EA Team finalizes the steps to issue the Evaluation Research Area RFP.

Figure A.4: Recommended Project List –Projects and Budgets
 (X-Cross-sector; C=Commercial; R=Residential)

EVALUATION PLAN PROJECT LIST				Total 3-Year Budget ==>	Year 2022	Year 2023	Year 2024	
ct Number	EA	Study Type	Short Title	Total Budget	Start Year	Timing - Pct in 2022	Timing - % in 2023	Timing - % in 2024
				\$14,775		\$4,500	\$4,500	\$5,775
C 2201	PJ	Baseline	C&I baseline large sample	\$925	2022	65%	35%	
R 2202	LAS	Baseline	Residential Appliance Saturation Survey & Baseline	\$700	2023		50%	50%
X 2203	DG	Baseline	Agricultural market and baseline assessment	\$400	2022	25%	75%	
X 2204	RP	Baseline	ISP Research	\$300	2022	40%	40%	20%
C 2205	PJ	Baseline	Refrigerated casework and desiccant AHU baseline	\$85	2022	100%		
R 2206	LAS	Baseline	Residential Lighting - Hard to Reach & DI-IE Update	\$175	2022	100%		
C 2207	PJ	Baseline	Advanced Lighting Controls Market study to examine potential, guide interventions	\$175	2022	75%	25%	
X 2208	DG	Baseline	Market effects pulse survey (residential and commercial)	\$500	2022		25%	75%
R 2209	RW	Baseline	Residential New Construction NTG and Code compliance Attribution	\$200	2022	100%		
C 2210	PJ	Impact	ECB impact evaluation (NOTE: 50% in 2024, 50% in next 3-year plan)**	\$1,250	2024			50%
C 2211	PJ	Impact	BES/O&M Impact and process	\$600	2022	20%	80%	
R 2212	LAS	Impact	Behavioral Program Impact Evaluation	\$100	2023		50%	50%
R 2213	LAS	Impact	Oil Savings Impacts - Methods, Attribution	\$125	2022	75%	25%	
X 2214	RW	Impact Baseline	Demand Response Studies	\$200	2022	38%	33%	29%
R 2215	RW	Impact Baseline	Residential New Construction Impact Evaluation and Code Compliance - PHASE 2	\$300	2023		20%	80%
C 2216	DG	Impact Process	EO impact and process evaluation (NOTE: 50% in 2024, 50% in next 3-year plan)**	\$1,100	2024			50%
C 2217	DG	Impact Process	SBEA impact and process evaluation	\$450	2022	65%	35%	
R 2218	RW	Impact Process	Process and Impact Evaluation of HES and HES-IE SF and MF	\$600	2022	10%		90%
R 2219	RW	Impact Process	HVAC & DHW (upstream) program Impact & Process evaluations	\$300	2024			100%
R 2220	LAS	Process	Behavioral Program Process Evaluation	\$175	2022	75%		25%
R 2221	LAS	Process	Concierge Programs - Opportunities, Performance, and Best Practices	\$125	2022	100%		
R 2222	RW	Process	Increasing Market for Renovation and Additions Projects	\$600	2022	50%		50%
X 2223	LAS	Process	Res & Commercial Financing - Process Evaluation	\$225	2022	20%	80%	
X 2224	RW	Process	Workforce process evaluation on updated initiative	\$150	2023		75%	25%
X 2225	RW	PSD	Infiltration Reduction in Multifamily Buildings	\$250	2022	26%	75%	
X 2226	LAS	PSD	EULs-Measure Lifetimes / AML Evaluation Study	\$250	2022	50%	50%	
X 2227	LAS	PSD	Potential "Next Measures" - Residential & Commercial	\$100	2022	100%		
X 2229	PJ	PSD	PSD updates, assorted	\$150	2022	50%	50%	
C 2230	RP	Topics	Commercial Heat Pump Study	\$500	2022	20%	35%	45%
X 2231	RP	Topics	Cross-Cutting Heat Pump Study	\$400	2022	40%	40%	20%
X 2232	LAS	Topics	Phase 1 - Data Quality and Process Improvements Options - Evaluation	\$250	2022	100%		
X 2233	LAS	Topics	Phase 2 - Data Quality and Process Improvements - Evaluation - Implementation	\$0	2023		25%	75%
X 2234	RP	Topics	Emerging Issues	\$500	2024			100%
X 2235	RW	Topics	Non-Participant Equity Assessment (Res and Small Business)	\$400	2023		33%	67%
R 2236	LAS	Topics	Program Targeting - Arrears / vulnerable customers	\$100	2022	50%	50%	
X 2237	LAS	Topics	NEIs - Utility, H&S, and Controls Measures	\$400	2022	40%	60%	
X 2238	LAS	Topics	Evaluability Study - Residential & Commercial	\$200	2022	100%		
X 2239	LAS	Topics	GHG / GWSA Compliance Avoided Cost Study	\$50	2022	50%	50%	
X 2240	DG	Topics	Potential for DR and EE measure interaction	\$200	2023			100%
X 2241	RP	Topics	EE/DR Potential Research	\$500	2023		25%	75%
R 2242	LAS	Topics	Residential Weatherization Barriers Study	\$300	2022	25%	75%	
X 2243	LAS	Topics	Effects of Discontinuing Gas Equipment incentives in R&C HVAC & DHW market	\$300	2023		35%	65%
X 2244	LAS	Topics	Review possible shift from EE to GHG policy integration goals and metrics at the State level	\$150	2022	50%	50%	
R 2245	RW	Topics	Residential New Construction Cost-Effectiveness	\$40	2022	100%		
R 2246	RP	Topics, Baselines	Residential Heat Pump Study	\$1,150	2022	30%	35%	35%

CT EEB 2022-24 THREE YEAR EVALUATION PLAN AND BUDGET

1. Introduction

This document provides the summary of the process and the results for the EA Team’s preparation of the CTEEB’s Three-Year Evaluation Budget and Plan for 2022-24. This document includes background information on the budget and projects for the Evaluation Committee. This document includes:

- Summary of the multi-step process used to develop projects and budgets
- Summary information on the budgets allocated by strata: sector, project types, and years.
- Listing of all projects, including titles and major project outcomes.
- Descriptions of all evaluation studies.

Summary of Process

This “2022-24 Three-year Recommended Evaluation Budget and Plan” document serves as the foundation of the plan for the Evaluation of the EEB portfolio of programs. These recommendations were prepared by the Evaluation Administrators (EA) in October, November, and December 2021.

The process for developing the plan was collaborative and multi-step. The steps included:

- Solicited project concepts and information needs from all stakeholders
- EA team assembled list
- EA team facilitated discussions during Evaluation Committee meetings, plus 4 dedicated discussions with stakeholders to clarify needs and priorities
- EA Team refined the list to emphasize the priorities, constructed logical projects, and prioritized and budgeted the projects
- EA Team circulated list in advance of meeting and discusses in Evaluation Committee Meeting
- EA Team revised according to discussion,² and distributed (in this memo).

A number of criteria were used to identify needed project concepts, and prioritize projects. Those included:

- Impact evaluation: these projects are rated highly
- Process evaluation: these projects are rated highly
- Project has not been evaluated recently, or is due for the next round
- High C&LM Plan savings (and / or budgets) associated with the relevant program
- Projects needed to meet needs of ISO / FCM score
- Projects that address important gaps, uncertainties, or aged numbers in PSD
- Projects that address important gaps / needs for program design
- Projects that follow another project, or are part of a series

² Note, the projects that were discussed in the Committee meeting had the following dispositions out of that meeting: Remained essentially the same: Studies R2220, X2224, X2233. Refocused study to controls: C2207. Renamed and some clarification of focus: X2208. Cut study: R2228 on power strips. Retained as priorities, clarified study will rely on adjustment of MA numbers: X2239. Moved to later year and reduced budget to allow more time for where the state will be on the issue: X2240.

- Projects that have the potential to be co-funded with other agencies or can be borrowed / adapted from elsewhere
- Other considerations, including needs identified by the stakeholders related to issues, markets, “next” programs, and other topics.
- Feasibility of conducting the work technically,
- Budgets

2. Summary of Recommendations – Overall Budget

This document includes summary tables and detailed project descriptions.

Budget Summary and Caveats

The requested evaluation budget is \$14.775 million over the Three-Year period. The approved C&LM plan budget presented in Table E.1 over the period is \$706.6 million. The calculated percent allocated to EM&V totals 2.1% over the three years, ramping up from 1.8% in 2022. This represents a substantial increase over the Evaluation allocation over previous years. This was a deliberate change. Esource information indicates the national average for the percent of C&LM Plan budgets allocated to evaluation is between 2-2.5%, with higher numbers generally associated with leading states. The percentage allocated to evaluation in Connecticut had declined from 2.1% in 2012/2013 to 1% in 2019-21.³ This budget increase moves Connecticut back to values that are in line with other states.

The low evaluation budgets in Connecticut have led to very limited scopes and sample sizes, and also difficulties making the projects economically attractive to industry-leader contractors. The increased budget brings substantial advantages to the evaluation work in Connecticut in several ways, reflected in the enhanced scope of evaluation topics presented for this Three-Year Period:

- More projects, representing topics that meet the array of needs expressed by the stakeholders.
- Projects with more robust scopes and larger sample sizes, to allow greater granularity in results, and fewer limitations on drilling down on key subjects.
- The plan’s budget and corresponding level of verification of programs and their savings represents a percentage that is more in line with industry standard for evaluation across the nation.

Figure 1: Three-Year Evaluation Plan Budget, in thousands

Year 2022	Year 2023	Year 2024	3 Year Total
\$4,500	\$4,500	\$5,775	\$14,775

Note that these budgets maintain a \$4.5 million dollar budget for the first two years, but the budget for Year 3 exceeds that amount. This extra amount is the result of including (vs. eliminating) projects specifically called out in the Evaluation Committee meeting held on 12/13/21. Without these projects, the budget is approximately

³ This low value was partly influenced by the last year of effects from the budget sweep.

\$13.5 million (\$4.5 million times 3 years). However, each of these Discussion projects was called out and discussed during the Committee meeting. Eight of the projects were retained, because the committee considered them priorities (and the budget was reduced for one of the projects). These eight projects represent approximately \$1.4 million dollars of the budget.⁴

With these projects, the total budget then exceeds the 3-year budget currently allocated in the C&LM Plan by \$1.275 million, or 9%. The levelized cost of the priority evaluation studies is \$4.9 million per year, rather than the \$4.5 million in the adopted C&LM Plan.

Moving to a Revised Budget-Setting Process: The Board has requested a revised process going forward, in which the Evaluation Committee develops an Evaluation Plan that identifies the budget needs for evaluation, which then is used to inform the numbers included in the C&LM Plan Budget tables. The Evaluation Administrators have committed to this improved process, and will move Evaluation Planning forward in the year to accomplish this in the future.

This year, there was a partial move toward that kind of process. The EA was invited to participate in early stages of the C&LM Committee, and provided advice regarding Connecticut's low share of evaluation budget compared to national numbers. The EA recommended an increase to a figure closer to 2%+ of the C&LM Plan. Based on rough calculations, a figure of \$4.5 million in the first year, with additional ramp up on an undetermined schedule, was generally put forward and supported. The EEB's adoption of the Three Year C&LM Plan included a static placeholder \$4.5 million budget for each of the three years of the plan. For the 2022-24 period, the Board has requested information on what evaluation work would be included in the Plan. The Evaluation Administrator committed to developing the Plan, and presenting the project list and budget to the EEB in January 2022.

As mentioned above, that stakeholder process and prioritization identified the studies included in this document. The Evaluation Plan list suggests that priority Evaluation needs are \$4.5 million in years 1 and 2, and \$5.8 million in Year 3.

The budgets presented in these tables are for this new set of 2022-24 Three-year plan projects. The budget does not address any projects that were part of the previous Plan, and particularly does not include projects that started in 2020 or 2021 but have work that may continue into 2022 or even 2023. All those projects were fully funded from 2019-21 dollars, and the accruals have been separately accounted for by the utilities. They do not spill over into 2022-24 evaluation plan dollars.

⁴ Note that the Phase 2 of the Data project is retained in the list, but at zero funding – with that budget, action steps, and source for the funding to be discussed in a later year / later Evaluation Plan Update.

Budget for the Three-Year Evaluation Budget and Plan

The tables below summarize the budget totals – by sector, by evaluation type, and by year.⁵

Figure 2.1: Recommended Evaluation Plan Budget and Project Counts by Sector and Year

Round totals to \$1.93 million, \$3 million, and \$3 million in 2019, 2020, and 2021, respectively

	Budget Year 1	Budget Year 2	Budget Year 3	Total 3-year Budget	Share of total budget	Number of Projects
Residential	\$1,595	\$1,169	\$2,226	\$4,990	34%	15
Commercial	\$1,330	\$1,180	\$1,400	\$3,910	26%	8
Cross-sector	\$1,575	\$2,151	\$2,149	\$5,875	40%	22
Total	\$4,500	\$4,500	\$5,775	\$14,775	100%	45
Share of Total	30.5%	30.5%	39%	100%		

Figure 2.2: Evaluation Plan Project List by Evaluation Type

Evaluation Type	# of Studies	Budget	Share of Budget
Baseline	9	\$3,460	23%
Impact or Impact/Process**	10	\$3,850	26%
Process	5	\$1,275	9%
PSD	4	\$750	5%
Topics	17	\$5,440	37%
Total	45	\$14,775	100%

(**) Table Note: \$5.025* is the budget for impact if we include the 2nd half of two large C&I impact studies, which carry over to 2025, per FCM timing needs). That budget is not in this plan.

3. Recommended Studies for the Three-Year Evaluation Plan

A summarized list of recommended projects (sectors, numbers, and titles) is shown below. The recommendations are designed to obtain greatest value from the projects and the allocated budget. The recommended project list, including commercial, cross-sector, and residential sectors, are provided in Figure 3.1 below. Descriptions of the projects are included in Section 4.

⁵ Contracted totals are developed after the RFPs are released, scored, and selected. We recognize the overall contract total must be no larger than the adopted plan total.

Figure 3.1: Recommended Project List –Projects, Outcomes, and Budgets

(X-Cross-sector; C=Commercial; R=Residential)

EVALUATION PLAN PROJECT LIST - DRAFT FINAL						Total 3-year Budget =>				
						\$14,775	\$4,500	\$4,500	\$5,775	
Project Number	EA	Study Type	Short Title	Key Outputs & Outcomes	Total Budget	Start Year	Timing - Pct in 2022	Timing - % in 2023	Timing - % in 2024	
C	2201	PJ	Baseline	C&I baseline large sample	Building characteristics by building type; HVAC system types by building type; fuel type by building type	\$925	2022	65%	35%	
R	2202	LAS	Baseline	Residential Appliance Saturation Survey & Baseline	Conduct updated RASS study addressing housing stock (and shell), equipment saturations (and fuel, efficiency) and baseline information. Include in-depth study of gas measures, saturation of wifi thermostats, factors affecting condensing equipment potential (and condensing equipment in place and in need of replacement) and other targets. Construct user-friendly database.	\$700	2023		50%	50%
X	2203	DG	Baseline	Agricultural market and baseline assessment	Characterize CT agriculture market (dairy/crop, indoor/outdoor, food/non-food; technology); forecast economic growth and energy requirements by market type and indoor/outdoor class; assess current EE participation and future potential.	\$400	2022	25%	75%	
X	2204	RP	Baseline	ISP Research	Recommended updates to baseline assumptions for lost opportunity measures; recommended updates to program design to reflect what is learned about market conditions.	\$300	2022	40%	40%	20%
C	2205	PJ	Baseline	Refrigerated casework and desiccant AHU baseline	Refrigerated casework baseline; desiccant AHU baseline	\$85	2022	100%		
R	2206	LAS	Baseline	Residential Lighting - Hard to Reach & DI-IE Update	Evaluate the status of transformation / remaining need for program interventions in the residential HTR and DI-IE markets.	\$175	2022	100%		
C	2207	PJ	Baseline	Advanced Lighting Controls Market study to examine potential, guide interventions	Lighting Market study focused on Advanced Lighting controls, looking at how they are used, potential, and advice on how best to intervene in the market successfully.	\$175	2022	75%	25%	
X	2208	DG	Baseline	Market effects pulse survey (residential and commercial)	Regular feedback that keeps track of fast-changing market changes including information on purchases, awareness / behaviors, barriers, and market trends for key products and practices, and fast-turnaround feedback on topics and issues. Expected to address both residential and commercial sectors.	\$500	2022		25%	75%
R	2209	RW	Baseline	Residential New Construction NTG and Code compliance Attribution	NTG for RNC, marker effects of code compliance activities.	\$200	2022	100%		
C	2210	PJ	Impact	ECB impact evaluation	Realization rates on kWh, peak kW and therm savings by measure group for the ECB program; true-up of winter and summer peak demand coincidence factors consistent with ISO-NE definition.	\$1,250	2024			50%
C	2211	PJ	Impact	BES/O&M Impact and process	kWh, kW and therm impacts; realization rates; barriers to participation; participation issues	\$600	2022	20%	80%	
R	2212	LAS	Impact	Behavioral Program Impact Evaluation	Impact evaluation savings for UI and ES behavioral programs.	\$100	2023		50%	50%
R	2213	LAS	Impact	Oil Savings Impacts - Methods, Attribution	Identify any changes in best practices / methods in estimating oil / delivered fuel savings since study R91. Examine estimates that can be attributable for Weatherization measures, estimates suitable for use with new vendor /audit tools, and for HP conversions.	\$125	2022	75%	25%	
X	2214	RW	Baseline	Demand Response Studies	Baselines and Impacts of DR initiatives	\$200	2022	38%	33%	29%
R	2215	RW	Baseline	Residential New Construction Impact Evaluation and Code Compliance - PHASE 2	User Defined Reference Home baseline, Code compliance baseline, gross savings	\$300	2023		20%	80%
C	2216	DG	Impact	EO impact and process evaluation	Ex post savings estimates for EO program and key measures; assessment of program efficiency and customer satisfaction.	\$1,100	2024			50%
C	2217	DG	Impact	SBEA impact and process evaluation	Process evaluation (assessment of program efficiency, customer satisfaction, gap analysis, equity); ex post savings estimates for SBEA program and its key measures;	\$450	2022	65%	35%	
R	2218	RW	Impact	Process and Impact Evaluation of HES and HES-IE SF and MF	Recommendations for program delivery and new areas to develop with loss of lighting.	\$600	2022	10%		90%
R	2219	RW	Impact	HVAC & DHW (upstream) program Impact & Process evaluations	Saving , NTG, and process recommendations	\$300	2024			100%
R	2220	LAS	Impact	Behavioral Program Process Evaluation	Process evaluation of early stages of recently-launched behavioral program to provide early feedback to refine program delivery, identify gaps and improvements. Use quarterly surveys of samples of participants to support early identification of issues.	\$175	2022	75%		25%
R	2221	LAS	Impact	Concierge Programs - Opportunities, Performance, and Best Practices	Identify best practices, effective delivery, program potential, and if possible, savings ranges for the planned "virtual web-based" concierge services enhancement to HES & IE core services program.	\$125	2022	100%		
R	2222	RW	Impact	Increasing Market for Renovation and Additions Projects	Recommendations for refining program and savings estimates, and promoting greater participation and savings per project	\$600	2022	50%		50%
X	2223	LAS	Impact	Res & Commercial Financing - Process Evaluation	Process evaluation of financing initiatives to identify barriers / improvements, and impacts / uptake by vulnerable vs. other customers (residential and commercial).	\$225	2022	20%	80%	
X	2224	RW	Impact	Workforce process evaluation on updated initiative	Process evaluation of selected revised workforce initiative(s) to assess effectiveness of delivery of the program.	\$150	2023		75%	25%

Project Number	EA	Study Type	Short Title	Key Outputs & Outcomes	Total Budget	Start Year	Timing - Pct in 2022	Timing - % in 2023	Timing - % in 2024	
X	2225	RW	PSD	Infiltration Reduction in Multifamily Buildings	Estimation of potential savings from MF buildings. Methods and level of effort that are cost-effective to pursue.	\$250	2022	26%	75%	
X	2226	LAS	PSD	EULs-Measure Lifetimes / AML Evaluation Study	Develop EULs and adjusted Measure Lifetimes for additional priority measures not covered under X2001. Focus on measures affected by market condition (AMLs) and potentially small commercial measures.	\$250	2022	50%	50%	
X	2227	LAS	PSD	Potential "Next Measures" - Residential & Commercial	Conduct a study of "next measures" for in-depth review and consideration for programs (beyond HP, to replace lighting), including potential, performance elsewhere, suitability to CT. If possible, identify key TRM parameters.	\$100	2022	100%		
X	2229	PJ	PSD	PSD updates, assorted	Various PSD updates needed, related to updated values, new measures, and expansion of a set of measures to smaller businesses.	\$150	2022	50%	50%	
C	2230	RP	Topics	Commercial Heat Pump Study	Outputs focus on improvements to program design and savings estimation for commercial heat pumps and other C&I electrification measures.	\$500	2022	20%	35%	45%
X	2231	RP	Topics	Cross-Cutting Heat Pump Study	Outputs include recommendations regarding: (1) improvements to program design for electrification efforts in both the residential and C&I sectors; (2) electrification goals; and (3) policies pertaining to beneficial electrification.	\$400	2022	40%	40%	20%
X	2232	LAS	Topics	Phase 1 - Data Quality and Process Improvements Options - Evaluation	Development of recommendations for approaches to improve the quality, timeliness, and cost-effectiveness of data acquisition to support EM&V studies.	\$250	2022	100%		
X	2233	LAS	Topics	Phase 2 - Data Quality and Process Improvements - Evaluation - Implementation	Develop the plan for and/or implement recommendations from Phase 1 of the Data Quality Improvement Project, including the on-going source for the needed funds.	\$0	2023		25%	75%
X	2234	RP	Topics	Emerging Issues	Findings and recommendations regarding an emerging policy, program design or market assessment issue to be determined in late 2023.	\$500	2024			100%
X	2235	RW	Topics	Non-Participant Equity Assessment (Res and Small Business)	Identification of non-participants and their characteristics	\$400	2023		33%	67%
R	2236	LAS	Topics	Program Targeting - Arrears / vulnerable customers	Attributable arrearage reduction effect from targeting high-arrearage customers for participation in EE programs. Identify their associated housing characteristics, location in disadvantaged areas, etc.	\$100	2022	50%	50%	
X	2237	LAS	Topics	NEIs - Utility, H&S, and Controls Measures	Conduct 1-3 NEI studies, focused on: utility NEIs, which can be claimed in current C/E test; H&S NEIs especially related to new initiative to address barrier removal in HES & IE weatherization (IE portion can also be included in current C/E tests); and lighting control measures to use in marketing and outreach to increase uptake of these measures.	\$400	2022	40%	60%	
X	2238	LAS	Topics	Evaluability Study - Residential & Commercial	Conduct an evaluability study, with a special focus on mid- and up-stream programs, to identify evaluability, and work with utilities to refine data collected during implementation to address evaluability gaps identified in the study to assure all funded programs can be evaluated.	\$200	2022	100%		
X	2239	LAS	Topics	GHG / GWSA Compliance Avoided Cost Study	Study quantifies the avoided cost of complying with CT's Global Warming Solutions Act (GWSA) for updating the State's Cost-effectiveness test, adapting work from MA.	\$50	2022	50%	50%	
X	2240	DG	Topics	Potential for DR and EE measure interaction	Provide information on potential system savings due to better coordinated deployment of EE and DR measures. Assumes limited study, starting in 2024, if / as CT focus on PV, battery, and DER increases.	\$200	2023			100%
X	2241	RP	Topics	EE/DR Potential Research	Estimates of potential savings for energy efficiency and DR measures, both in total and by measure/market; recommendations regarding program design and resource allocation.	\$500	2023		25%	75%
R	2242	LAS	Topics	Residential Weatherization Barriers Study	Conduct early process and NEI study of weatherization barriers initiative being added to HES / IE. Use quarterly survey approach to address the approach and refine delivery. Examine differential effects on sensitive households. Focus NEI research on developing defensible health effects. Provide information to allow vendors to estimate health benefits associated with specific barriers (vermiculite vs. mold, etc.) going forward.	\$300	2022	25%	75%	
X	2243	LAS	Topics	Effects of Discontinuing Gas Equipment incentives in R&C HVAC & DHW market	Examine multiple effects associated with discontinuing gas equipment incentives in residential and commercial gas HVAC and DHW market for future planning, including specifically: stocking, sales, participation effects, and exploration of whether there is backsliding for sites with already-condensing equipment in place.	\$300	2023		35%	65%
X	2244	LAS	Topics	Review possible shift from EE to GHG policy integration goals and metrics at the State level.	Examine options, transition issues and best practices for possible strategic transition in CT from EE to GHG focus in program development / delivery / direction.	\$150	2022	50%	50%	
R	2245	RW	Topics	Residential New Construction Cost-Effectiveness	Adaptation of MA RNC Cost-effectiveness study to CT. Stretch code in first and lifetime costs	\$40	2022	100%		
R	2246	RP	Topics, Baselines	Residential Heat Pump Study	Outputs focus on improvements to program design and savings estimation for residential heat pumps.	\$1,150	2022	30%	35%	35%

4. Study Descriptions

The following section provides brief descriptions of the projects recommended for the Three-Year Plan.

4.1 Baseline Studies (2201-2209)

C2201 PJ Baseline C&I baseline large sample

Outputs: Building characteristics by building type; HVAC system types by building type; fuel type by building type

Description: Large sample of C&I customers to establish building characteristics needed to update building simulation models. Sample will need to be designed at the building type level to cover all the building types in the PSD. Study will include customer surveys and a subset of onsite surveys. Incorporates the requested examination of saturation of wifi thermostats and cooling options. The level of disaggregation by building type will be limited by sampling / budget.

Budget and Start Year: \$925 2022

R2202 LAS Baseline Residential Appliance Saturation Survey & Baseline

Outputs: Conduct updated RASS study addressing housing stock (and shell), equipment saturations (and fuel, efficiency) and baseline information. Include in-depth study of gas measures, saturation of wifi thermostats, factors affecting condensing equipment potential (and condensing equipment in place and in need of replacement) and other targets. Construct user-friendly database.

Description: Conduct a detailed RASS study, using surveys and photo data collection methods, and consider other data collection efforts like audit reports, sending staff on auditor visits, etc. Collect housing stock and shell information, equipment saturation, efficiency, and age information. Provide in-depth information on gas equipment, penetration of wifi thermostats, and condensing equipment, including existing condensing equipment and replacement needs, and conditions affecting full savings potential from placing condensing equipment in other homes. The study will also construct a user-friendly database for queries related to program planning, saturations, and potential estimates. The study incorporates the requested examination of saturation of wifi thermostats and cooling options.

Budget and Start Year: \$700 2023

X2203 DG Baseline Agricultural market and baseline assessment

Outputs: Characterize CT agriculture market (dairy/crop, indoor/outdoor, food/non-food; technology); forecast economic growth and energy requirements by market type and indoor/outdoor class; assess current EE participation and future potential.

Description: This project provides estimates of baseline and forecast economic size and energy needs for the major growth and market types operating in Connecticut. The market breakdown will stratify by indoor (nursery, vegetable, cannabis markets) and outdoor (crop, dairy animal, poultry). Indoor and outdoor technologies (vertical, horizontal, stacked, natural vs artificial light) and associated and forecast electric and natural gas energy requirements for each will be estimated. The study will include descriptions of the energy using equipment and technical requirements to achieve optimal production. Energy efficiency and demand reduction measures along with savings algorithms and data needs will be developed for CT using information from other jurisdictions. The study will include upstream interviews, interviews with customers / end-users, and will use the data to identify ISP and potential areas for intervention.

Budget and Start Year: \$400 2022

X2204 RP Baseline ISP Research

Outputs: Recommended updates to baseline assumptions for lost opportunity measures; recommended updates to program design to reflect what is learned about market conditions.

Description: This project will focus on characterizing what is getting sold or built in the overall markets for select technologies, with an eye toward both: (1) updating Industry Standard Practice (ISP) assumptions for lost opportunity measures; and (2) making recommendations for updates to program design to reflect what is learned about market conditions. The project will begin by assessing the transferability of ISP results from MA, which has had an ISP research program in place for a few years. Given the multitude of measure categories the programs target, the project will need to work with stakeholders to carefully prioritize the targets. It will then perform primary ISP research for 3-5 specific measure categories, using medium-rigor approaches.

Budget and Start Year: \$300 2022

C2205 PJ Baseline Refrigerated casework and desiccant AHU baseline

Outputs: Refrigerated casework baseline; desiccant AHU baseline

Description: This study will establish the standard practice baseline for two separate measures types: grocery store refrigerated casework and HVAC system air handlers with desiccant dehumidifiers. These equipment types are not covered by the CT energy code and represent good opportunities for energy efficiency improvements. Surveys of standard practices will be used to establish the baseline. The project will use a combination of subject matter expert interviews and interviews with distributors of refrigeration and HVAC equipment. The baseline will be used for custom project development and potential new measure additions to the PSD. Note that the availability of recently-constructed refrigeration system plans may constrain the sample size available for the baseline estimation work, and will be taken into account in study design.

Budget and Start Year: \$85 2022

R2206 LAS Baseline Residential Lighting - Hard to Reach & DI-IE Update

Outputs: Evaluate the status of transformation / remaining need for program interventions in the residential Hard-to-Reach (HTR) and DI-IE markets.

Description: Study uses sales and/or stocking study methods to identify if interventions in these remaining residential markets are still warranted. Estimate the remaining savings opportunities, status of the market, success and ability of HTR retailers to address needs in this market. Provide recommendation on whether evidence suggests the programs should exit these markets at end of 2022 as currently planned.

Budget and Start Year: \$175 2022

C2207 PJ Baseline Advanced Lighting Controls Market study to examine potential and guide interventions

Outputs: Lighting Market study focused on Advanced Lighting controls, looking at how they are used, potential, and advice on how best to intervene in the market successfully.

Description: Lighting market study focused on Advanced Lighting Controls. This study will focus on this important "next" lighting measure, providing information related to the measure itself (and the range of equipment), how (and where) they are used, and most importantly, how best to intervene in this market successfully. Uptake has been relatively slow for these measures, so information to understand how to be more effective in achieving savings through effective measure choice (accounting for current and future technology directions), cost and incentive levels, effective informational materials, and program design are important to get traction in this measure.

Budget: \$175K

X2208 DG Baseline Market effects pulse survey (residential and commercial)

Outputs: Regular feedback that keeps track of fast-changing market changes including information on purchases, awareness / behaviors, barriers, and market trends for key products and practices, and fast-turnaround feedback on topics and issues. Expected to address both residential and commercial sectors.

Description: This study will provide routine and fast-turnaround information on fast-changing markets, purchases, awareness/behaviors, barriers, market trends for key products and practices, and provide a readily-accessible source for feedback on hot topics and issues of concern. It is much easier to gather this information quickly if there is a regular framework in place. This periodic survey identifies and investigates market changes; for example, gas heating efficient market share, commercial lighting / controls, heat pump and HPWH sales and SEER levels, new construction insulation practices, decision-making factors, feedback on electrification or underserved communities, and other information. The study will investigate the advantages of panel vs. random design. The study will report trends in types, quantities, efficiency levels, barriers for the selected products. This information can be used to modify and target program incentives, develop current ISP baselines, measure market maturation. Timing was moved to later years, so the EA can assess the types of research and data collection that arise across multiple evaluation studies might more efficiently be collected through this aggregated survey effort. There is also interest in considering establishing a contractor panel.

Budget: \$500K

R2209 RW Baseline Residential New Construction NTG and Code compliance Attribution

Outputs: NTG for RNC, marker effects of code compliance activities.

Description: Update to NTG using Delphi panel process similar to what was done last time. Current NTG figure (~150%) is higher than surrounding areas (~30%). This information will need updating soon. The study will include market effects related to code compliance to the degree feasible.

Budget and Start Year: \$200 2022

4.2 Impact and Impact /Process Evaluations (2210-2219)

C2210 PJ Impact ECB impact evaluation

Outputs: Realization rates on kWh, peak kW and therm savings by measure group for the ECB program; true-up of winter and summer peak demand coincidence factors consistent with ISO-NE definition.

Description: Conduct a full impact evaluation of the Energy Conscious Blueprint (ECB) program. This is a periodic evaluation of a major CT C&I sector energy efficiency program. The evaluation will consist of site visits, on-site measurement and verification (M&V), and engineering analysis to support the development of realization rates for kWh, kW and therm savings by the measure groups established in the CT PSD. Monitored data will be used to revised peak demand coincidence factors consistent with the ISO-NE definition. Savings estimates for some measure groups will depend on sample size. This study can be started in the third year of the period, and finished in the beginning of the next three-year plan. The total budget is estimated as Budget and Start Year: \$1.25 million, with 50% in this period. The other half will need to be picked up as part of the 2025-27 plan.

Budget and Start Year: \$1,250 2024

C2211 PJ Impact BES/O&M Impact and process

Outputs: kWh, kW and therm impacts; realization rates; barriers to participation; participation issues

Description: BES offers a variety of operations and maintenance (O&M) and retro commissioning (RCx) program offerings, including Strategic Energy Management (SEM). SEM is currently the subject of a process and impact study (CT C1906). This study will address the other programs within the BES program umbrella. An impact and process evaluation will be conducted using customer interviews, program manager interviews, onsite surveys and M&V at a sample of sites. M&V may include a combination of billing analysis similar to the SEM program or equipment specific monitoring. This study's timing will be contingent on sufficient participation and customer access for onsite surveys and M&V.

Budget and Start Year: \$600 2022

R2212 LAS Impact Behavioral Program Impact Evaluation

Outputs: Impact evaluation savings for UI and ES behavioral programs.

Description: Pre/post/control group evaluation of the savings from ES and UI behavioral programs for PSD. Depending on the degree of work conducted in Massachusetts, and the degree of transferability assumed, this may include only UI estimates. Study timing will depend on program ramp up.

Budget and Start Year: \$100 2023

R2213 LAS Impact Oil Savings Impacts - Methods, Attribution

Outputs: Identify any changes in best practices / methods in estimating oil / delivered fuel savings since study R91. Examine estimates that can be attributable for Weatherization measures, estimates suitable for use with new vendor /audit tools, and for HP conversions.

Description: Conduct a detailed literature review and SME interviews to identify the best practices for estimating attributable energy savings for oil and delivered fuels, which have high penetration in CT, and are important for fully assessing savings in CT. Consider special approaches that may be necessary for different measures, including HP and other residential and commercial measures. Conduct a threshold analysis of the degree to which changes or more sophisticated practices would change the savings estimates developed using current CT practices for these savings, and confirm and lay out the best practices for impact evaluation for these fuels that should be implemented for all relevant residential and commercial impact studies going forward in CT. Provide recommendations for estimates that can be attributable for Weatherization measures (and methods going forward), and provide best estimates suitable for use with new residential and commercial vendor /audit tools. Also develop specific recommendations for HP conversions.

Budget and Start Year: \$125 2022

X2214 RW Impact Baseline Demand Response Studies

Outputs: Baselines and Impacts of DR initiatives

Description: This study will continue to evaluate the DR initiatives offered by the utilities. Where appropriate, this study assumes potential cooperation with MA.

Budget and Start Year: \$200 2022

R2215 RW Impact Baseline Residential New Construction Impact Evaluation and Code Compliance - PHASE 2

Outputs: User Defined Reference Home baseline, Code compliance baseline, gross savings

Description: Regular cadence study of RNC with onsite and code office data collection to compare features of program and non-program homes. Calculation of User Defined Reference Home. Needs to wait until 6-months after new code. The study does not specifically parse out the contribution of code training or enhanced enforcement, as this is a very expensive and involved. Other states have used other processes to assign these shares.

Budget and Start Year: \$300 2023

C2216 DG Impact Process EO impact and process evaluation

Outputs: Ex post savings estimates for EO program and key measures; assessment of program efficiency and customer satisfaction.

Description: This is a periodic study to update the EO RR and NTG values last estimated for PY 2016-17. Key measure RRs and NTG will be estimated depending on data availability. While the program's impacts are the primary focus, processes including investigation of select/topical issues surrounding customer satisfaction, equity, program efficiency, progress towards goals, and coordination with other C&I programs will also be investigated. The data for the study will come from onsite visits, surveys, and interviews. Metering of new or changing measures such as lighting controls, heat pumps will be considered. To meet ISO, the study will start in the 3rd year of the period, and complete in the first year of the next Plan. Only half the Budget and Start Year: \$1.1 million budget is included in this period, with the rest being incorporated into the 2025-27 Evaluation Plan.

Budget and Start Year: \$1,100 2024

C2217 DG Impact Process SBEA impact and process evaluation

Outputs: Process evaluation (assessment of program efficiency, customer satisfaction, gap analysis, equity); ex post savings estimates for SBEA program and its key measures;

Description: This is a periodic study to update the SBEA RR and NTG values last estimated for PY 2013-15. Key measure RRs and NTG will be estimated depending on data availability. Program processes including investigation of select/topical issues surrounding customer satisfaction, equity, program efficiency, progress towards goals, and coordination with other C&I programs will also be investigated. Data collection activities include on-site visits, surveys, interviews. Any metering will be limited to select new or changing measures such as lighting controls or heat pump installations.

Budget and Start Year: \$450 2022

R2218 RW Impact Process Process and Impact Evaluation of HES and HES-IE SF and MF

Outputs: Recommendations for program delivery and new areas to develop with loss of lighting.

Description: Impact evaluations of MF and SF programs were just completed or are just being completed. The results will help focus process investigations on deeper dives into specific impact inquiries. If current report does not specifically look at regressions aimed at separating out savings from air sealing vs duct sealing; then this should be done as a follow up study. Similarly, if current report does not include vendor specific Process studies should include program delivery and issues identified in forthcoming HES impact study. There are clear links to other studies including: weatherization barriers, equity studies, MF air infiltration.

Budget and Start Year: \$600 2022

R2219 RW Impact Process HVAC & DHW (upstream) program Impact & Process evaluations

Outputs: Saving, NTG, and process recommendations

Description: This includes process and NTG study of upstream programs. Process component will assess if mid-upstream approach is a good fit for these measures. Will also cover any impact of program components. Much of this work may overlap with HP studies and emphasis may shift to non-HP measures if there are any, or not be necessary.

Budget and Start Year: \$300 2024

[4.3 Process Evaluations \(2220-2224\)](#)

R2220 LAS Process Behavioral Program Process Evaluation

Outputs: Process evaluation of early stages of recently-launched behavioral program to provide early feedback to refine program delivery, identify gaps and improvements.

Description: Use quarterly surveys of samples of participants to support early identification of issues. Process evaluation involving interviews with staff, participant surveys, and review of materials / data. Process evaluation of the program helps identify early-stage corrections, improvements, barriers to improve program delivery and effectiveness. Program covers both gas and electric customers (22K gas, 130K electric at ES when launched 1/21). Recommending possibly quarterly survey approach to allow continuous improvement in early stages. Assumes effort in 2022 (1 year after program launch) and smaller effort 2 years later to review performance after program refinements.

Budget: \$175K

R2221 LAS Process Concierge Programs - Opportunities, Performance, and Best Practices

Outputs: Identify best practices, effective delivery, program potential, and if possible, savings ranges for the planned "virtual web-based" concierge services enhancement to HES & IE core services program.

Description: Identify best practices, effective delivery, program potential, and if possible, savings ranges for the planned "virtual web-based" concierge services enhancement to HES & IE that follows-up on core services program participants to encourage installation of recommended insulation and HVAC measures. Study should provide advice on best and most effective delivery approaches to encourage installation of deeper measures, and leave fewer recommendations "on the table". Study should review barriers analysis and other findings from HES / HES-IE and weatherization barriers studies, in addition to the in-depth analyses of existing programs in other states.

Budget and Start Year: \$125 2022

R2222 RW Process Increasing Market for Renovation and Additions Projects

Outputs: Recommendations for refining program and savings estimates, and promoting greater participation and savings per project

Description: The recent study indicated that there is a large technical potential for savings in the R&A market. The project will review baseline and other data to refine baselines and estimates of actual potential in the current market. This project will also explore market to determine strategies that can be used to increase program interest and to increase level of savings in each project. This involves study at both ends of current marketplace, both projects pushing deep retrofits, and the much more common projects where there is little or no focus on energy savings. This should include analysis of cost-effectiveness of paying incremental cost of triple-paned or other advanced window measures. Given the market potential and the possible market effects that the program could generate, the study includes additional market/process study components that will establish a market baseline in year 1 and conduct a follow-up market assessment in year 3.

Budget and Start Year: \$600 2022

X2223 LAS Process Res & Commercial Financing - Process Evaluation

Outputs: Process evaluation of financing initiatives to identify barriers / improvements, and impacts / uptake by vulnerable vs. other customers (residential and commercial).

Description: Process evaluation of financing initiatives using customer surveys and review of initiatives in other states. Interview other states / utilities for latest thinking on financing initiatives. Conduct surveys with participants using - and not using -- financing options available for residential and commercial financing options - and identify potential for uptake of any new initiatives identified in SME interviews. Identify patterns of impacts on vulnerable / sensitive customers relative to others. Identify barriers, recommended refinements or revamping of these options.

Budget and Start Year: \$225 2022

X2224 RW LASProcess Workforce process evaluation on updated initiative

Outputs: Process evaluation of selected revised workforce initiative(s) to assess effectiveness of delivery of the program.

Description: Process evaluation of a targeted, revised workforce (or engagement) program to determine if updated design is delivering an improved experience and if the metrics for performance represent improvements and a strong program. Include recommendations for continued improvements.

Budget and Start Year: \$150 2023

[4.4 PSD Studies \(2225-2229\)](#)

X2225 RW PSD Infiltration Reduction in Multifamily Buildings

Outputs: Estimation of potential savings from MF buildings. Methods and level of effort that are cost-effective to pursue.

Description: This is one of the largest opportunities remaining in the MF sector, however, there is little consistency across contractors in effort level, methods employed or in calculating savings. Through ride-alongs, evaluators will examine closely activities that are included in existing infiltration projects to determine the types of activities included in a MF air sealing job. Project will compile tables of typical activities with recommendations for energy savings for both in unit and common areas, including basements and attic spaces. The report will work with contractors and program implementers to provide recommendations on tests to be done in each building, level of effort to be performed at each building, and energy savings associated with each project. This project is a strong candidate for a regional study, and the budget and timing are based on a joint study with MA or regionally, to control costs and provide the strongest results.

Budget and Start Year: \$250 2022

X2226 LAS PSD EULs-Measure Lifetimes / AML Evaluation Study

Outputs: Develop EULs and adjusted Measure Lifetimes for additional priority measures not covered under X2001. Focus on measures affected by market condition (AMLs) and potentially small commercial measures.

Description: Conduct primary research to update TRM EUL values, with a focus on priority small commercial measures and on developing AMLs for key residential and commercial measures affected by market conditions / mature markets to assure the values in the TRM reflect appropriate lifetimes. Confirm best practices for estimating EULs and recommended update practices / cadence.

Budget and Start Year: \$250 2022

X2227 LAS PSD Potential "Next Measures" - Residential & Commercial

Outputs: Conduct a study of "next measures" for in-depth review and consideration for programs (beyond HP, to replace lighting), including potential, performance elsewhere, suitability to CT. If possible, identify key TRM parameters.

Description: Conduct an in-depth review of "emerging" residential and commercial measures, from programs elsewhere, technology review, and other sources. Review the quality of information available on savings potential, level of savings delivered in potential studies conducted in other areas, suitability to CT, and other factors affecting consideration for inclusion in CT programs and TRM.

Budget and Start Year: \$100 2022

X2229 PJ PSD PSD updates, assorted

Outputs: Various PSD updates needed, related to updated values, new measures, and expansion of a set of measures to smaller businesses.

Description: Various PSD updates needed, related to: controls, cooling / chillers and lighting retrofits; expansion of appropriate custom measures to medium-sized firms; and a variety of new measures (fault detectors, data centers)

Budget and Start Year: \$150 2022

4.5 Topic Studies (2230-2246)

C2230 RP Topics Commercial Heat Pump Study

Outputs: Outputs focus on improvements to program design and savings estimation for commercial heat pumps and other C&I electrification measures.

Description: This study will address the following research objectives pertaining to heat pumps and electrification in the commercial sector: (1) Identify pathways for all electric new construction commercial buildings; (2) help to refine savings estimation methods for commercial heat pumps, including addressing issues such as partial vs full displacement and the effect of manual vs integrated controls; (3) analyze attribution and baseline issues for commercial heat pumps; and (4) provide EM&V support for a commercial heat pump pilot approved by DEEP in its 2021 C&LM plan approval. Methods may include field monitoring, participant surveys, and modeling. The rollout of this study will be affected by the pace of commercial heat pump activity in CT.

Budget and Start Year: \$500 2022

X2231 RP Topics Cross-Cutting Heat Pump Study

Outputs: Outputs include recommendations regarding: (1) improvements to program design for electrification efforts in both the residential and C&I sectors; (2) electrification goals; and (3) policies pertaining to beneficial electrification.

Description: This study will address the following research objectives pertaining to heat pumps and electrification in both the residential and the commercial sectors: (1) illuminate best practices regarding fossil fuel to electric conversion efforts; (2) identify and characterize new target measures to help support electrification efforts; and (3) analyze the technical, economic and market potential for beneficial electrification in CT. Methods may include literature review, expert and upstream interviews, customer surveys, and modeling. The pace of this study may be limited by the pace of both policy developments regarding electrification and (in some cases) heat pump program activity.

Budget and Start Year: \$400 2022

X2232 LAS RP Topics Phase 1 - Data Quality and Process Improvements Options - Evaluation

Outputs: Development of recommendations for approaches to improve the quality, timeliness, and cost-effectiveness of data acquisition to support EM&V studies.

Description: This Phase 1 study is focused on analyzing the challenges CT has faced in generating and maintaining the datasets needed to perform effective EM&V studies, consider and assess a variety of possible options for remedying the data content and delivery issues, and make recommendations for changes to data processes. The level of recommendations may be modest or may be very extensive. The work will involve interviews with utility data staff and with evaluation contractors and EA, review of databases and typical data needs for different types of evaluation projects, interviews with other states regarding their processes, and other research.

Budget and Start Year: \$250 2022

X2233 LAS RP Topics Phase 2 - Data Quality and Process Improvements - Evaluation – Implementation

Outputs: Develop the plan for and/or implement recommendations from Phase 1 of the Data Quality Improvement Project, including the on-going source for the needed funds.

Description: Using the results of the Phase 1 data quality / improvement study, this Phase 2 work will develop the plan for and/or implement recommendations from Phase 1 of the Data Quality Improvement Project, including the on-going source for the needed funds.

Budget and Start Year: \$0 2023

X2234 RP Topics Emerging Issues

Outputs: Findings and recommendations regarding an emerging policy, program design or market assessment issue to be determined in late 2023.

Description: This project reserves some funding to address one emerging policy, program design or market assessment issue in 2024, with the specific focus to be determined in consultation with the EC in late 2023. This reflects the fact that it is generally not possible to anticipate everything stakeholders want to know as far out as three years in advance, and thus it is desirable to retain some flexibility for the out years.

Budget and Start Year: \$500 2024

X2235 RW Topics Non-Participant Equity Assessment (Res and Small Business)

Outputs: Identification of non-participants and their characteristics

Description: This study conducts an assessment of all residential and small business accounts and locations that have never participated in a program. Analysis will match this data to Census and other third-party data to determine probable characteristics and determine if there are types of customers who are more likely to have not participated. The analysis will provide recommendations on strategies to increase participation of these customer types. The residential studies will be conducted at the census block-group level and not by individual accounts. The small business study will be at the account level, with data linked to location and other factors, where meaningful. The study budget is not able to support in-depth customer interviews to drill down on why these customers are not participating.

Budget and Start Year: \$400 2023

R2236 LAS Topics Program Targeting - Arrears / vulnerable customers

Outputs: Attributable arrearage reduction effect from targeting high-arrearage customers for participation in EE programs. Identify their associated housing characteristics, location in disadvantaged areas, etc.

Description: This study conducts and/or reviews analyses of the attributable impacts that an initiative to target and/or direct vulnerable customers (especially high-arrearage customers) into EE (or EE and DR) programs would have on: energy savings and reductions in arrearages. The study will assess whether these households are overrepresented in lower quality housing stock, distressed neighborhoods, or if the program can provide additional equity benefits. The study will review programs elsewhere to identify feasible approaches for "vulnerable" customers used at other utilities to assess other strong approaches to consider in CT. Additional topics will be identified based on the degree and focus of utility efforts.

Budget and Start Year: \$100 2022

X2237 LAS Topics NEIs - Utility, H&S, and Controls Measures

Outputs: Conduct 1-3 NEI studies, focused on: utility NEIs, which can be claimed in current C/E test; H&S NEIs especially related to new initiative to address barrier removal in HES & IE weatherization (IE portion can also be included in current C/E tests); and lighting control measures to use in marketing and outreach to increase uptake of these measures.

Description: Conduct 1-3 focused NEI studies. Utility NEIs are allowable in the current C/E test, but little research has focused on NEIs from reliability, resiliency, and other NEIs that provide benefit to the system. Conduct a literature review including review of avoided cost studies elsewhere and research that may be ongoing in other states to examine these issues and provide recommended values or ranges - or primary research that should be conducted on specific NEIs that show high potential value. Conduct research that is feasible within budget. Conduct a study of H&S NEIs especially related to barrier removal (mold, vermiculite, etc.) and IAQ effects in (HES &) HES-IE. These H&S effects from HES-IE can be included in the C/E test. Conduct a study of NEIs from lighting and integrated controls. These measures remain one of the few updates to lighting that may still have savings, but uptake is relatively low, partly because energy savings may not be the main benefit and the other NEIs are not yet well-quantified. Providing credible estimates of these other (home or) building savings may help potential participants better appreciate the overall ROI and increase uptake of these lighting measures within CT programs.

Budget and Start Year: \$400 2022

X2238 LAS Topics Evaluability Study - Residential & Commercial

Outputs: Conduct an evaluability study, with a special focus on mid- and up-stream programs, to identify evaluability, and work with utilities to refine data collected during implementation to address evaluability gaps identified in the study to assure all funded programs can be evaluated.

Description: Conduct an evaluability study, with a special focus on mid- and up-stream programs. For mid-stream and up-stream programs, conduct a review of needed vs. available data for impact evaluations and identify gaps.

Review processes and options used at other utilities. Work with the utilities and implementation contractors to identify refinements to delivery or data collection for programs with evaluability problems (identifying universal changes, or periodic "post card" or other options) that will make it possible to credibly / defensibly evaluate program initiatives that have not been well-evaluated in the past, to assure all funded programs can be evaluated.

Budget and Start Year: \$200 2022

X2239 LAS Topics GHG / GWSA Compliance Avoided Cost Study

Outputs: Study quantifies the avoided cost of complying with CT's Global Warming Solutions Act (GWSA) for updating the State's Cost-effectiveness test, adapting work from MA.

Description: Study quantifies the avoided cost of complying with CT's Global Warming Solutions Act (GWSA). This study is needed for future updates to the C/E test, and is needed as part of embedding GHG emissions into the test. It will be similar to the MA AESC Supplemental study, and will focus on adapting the MA work to the CT situation.

Budget: \$50K

X2240 DG Topics Potential for DR and EE measure interaction

Outputs: Provide information on potential system savings due to better coordinated deployment of EE and DR measures. Assumes limited study, starting in 2024, if / as CT focus on PV, battery, and DER increases.

Description: This study will be considered / reconsidered in later years of the 3-year plan and may carry over to next period if undertaken. This limited-scope project identifies measure bundles and the potential the bundles will both reduce system demand and provide demand response opportunities. The LBNL conceptual EE/DR framework (Satchwell et al, 2020) is the most likely tool to be used. Outcomes can help optimize program design to manage capacity requirements in the face of volatile distributed energy resources, primarily photovoltaics, and demand response resources.

Budget: \$200K

X2241 RP Topics EE/DR Potential Research

Outputs: Estimates of potential savings for energy efficiency and DR measures, both in total and by measure/market; recommendations regarding program design and resource allocation.

Description: This project will provide estimates of technical, economic and market potential, both in total and by measure/market. An important issue that will need to be resolved before project initiation is whether to go broad

(a global potential study looking at the entire portfolio) or deep (a set of studies targeted at specific markets, program types, or measure categories). The project should be timed to feed into the next three-year plan beginning in 2025, as potential estimates are a key long-term planning input. Note that, because there is particular interest in the issue of electrification potential, that issue is called out for definite action under a different study, and is thus not included here.

Budget and Start Year: \$500 2023

R2242 LAS Topics Residential Weatherization Barriers Study

Outputs: Conduct early process and NEI study of weatherization barriers initiative being added to HES / IE. Use quarterly survey approach to address the approach and refine delivery. Examine differential effects on sensitive households. Focus NEI research on developing defensible health effects. Provide information to allow vendors to estimate health benefits associated with specific barriers (vermiculite vs. mold, etc.) going forward.

Description: Use quarterly surveys of participants to conduct a process (and potentially NEI) study of the new weatherization barriers initiative being added to HES / IE. program. Address key issues related to program delivery and focus and refine in real time. Use these quarterly surveys and follow-up surveys to identify NEIs associated with these H&S and IAQ initiatives, and estimate the NEIs using survey and literature sources. Provide information to allow vendors to estimate health benefits associated with specific barriers (vermiculite vs. mold, etc.) going forward. If possible, specifically examine differential effects on sensitive households, for program effects (initial savings capture estimate) and from NEIs.

Budget and Start Year: \$300 2022

X2243 LAS Topics Effects of Discontinuing Gas Equipment incentives in R&C HVAC & DHW market

Outputs: Examine multiple effects associated with discontinuing gas equipment incentives in residential and commercial gas HVAC and DHW market for future planning, including specifically: stocking, sales, participation effects, and exploration of whether there is backsliding for sites with already-condensing equipment in place.

Description: The focus of this study is exploring an array of effects from potentially discontinuing gas equipment incentives in residential and gas HVAC and DHW market. The key effects of interest include participation / installation of efficient gas equipment and code compliant equipment in total stocking and sales values. Additionally, the study is interested in examining whether those with condensing equipment backslide or not. The analysis is needed to support program / policy design. These incentives have not yet been discontinued in CT, but MA has done so. If CT has near-term plans to consider a similar policy, it makes sense to undertake a study, but it may need to rely on secondary analysis of what happened in MA. If the policy change is not imminent, a more expedient design is to delay slightly and then undertake a joint study with MA. The study will be hampered a bit because Hardi data collection is suspended, so it may be especially expedient to wait a little; however, the proposers of the study expressed an urgency for the information. These factors will be considered in study design.

Budget and Start Year: \$300 2023

X2244 LAS Topics Review possible shift from EE to GHG policy integration goals and metrics at the State level.

Outputs: Examine options, transition issues and best practices for possible strategic transition in CT from EE to GHG focus in program development / delivery / direction. Address roles, priorities and implications for existing EE programs / shift goals and metrics to GHG.

Description: Review work in MA and other states and more broadly to provide information to support possible transition from EE to GHG metrics and program shifts. Provide advantages / disadvantages, transitions, issues of disruption and implementation, etc. Include effects on programs, workforce, customers, stakeholders.

Budget and Start Year: \$150 2022

R2245 RW Topics Residential New Construction Cost-Effectiveness

Outputs: Adaptation of MA RNC Cost-effectiveness study to CT. Stretch code in first and lifetime costs

Description: This study is focused on providing very fast turnaround results, adjusting the MA results on this topic to fit CT conditions.

Budget and Start Year: \$40 2022

R2246 RP Topics, Baselines Residential Heat Pump Study

Outputs: Outputs focus on improvements to program design and savings estimation for residential heat pumps.

Description: This study will address the following research objectives pertaining to heat pumps and electrification in the residential sector: (1) perform field monitoring to assess the actual performance of the latest generation of residential heat pumps being supported by the programs, potentially including field monitoring of baseline technologies; (2) analyze baseline and attribution issues for residential heat pumps; and (3) provide periodic technical review of an evaluation being performed for Eversource of its 100 heat pump residential pilot. As Massachusetts is also considering doing a residential heat pump field monitoring study similar project, there may be an opportunity for a joint two-state effort for that component. Likely methods for this study include field monitoring, participant surveys, upstream interviews, and modeling. The study will need to incorporate a thoughtful research design and prioritization efforts to target field monitoring efforts efficiently, given the variety of residential HP configurations (fossil fuels, technologies, baseline scenarios).

Budget and Start Year: \$1,150 2022