

City of La Mesa

Climate Action Plan Benefit-Cost Analysis

Summary of Preliminary Results

City of La Mesa
Environmental Sustainability Commission Meeting
July 17, 2017



Evaluating GHG Reduction Measures

Considerations			
Authority/ Control	Data Availability/ Trackability	Feasible/ Implementable	Available Funding
Size of GHG Reduction	Benefits & Costs	Linkage to CEQA Checklist	Time to Implement
Public Support	Political Will	Co-Benefits	Policy Changes Required

Benefit-Cost Analysis Framework

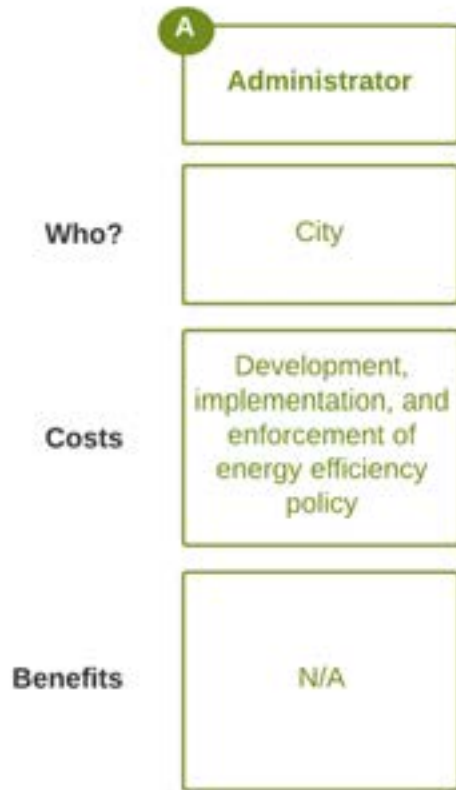
Benefit-Cost Analysis Framework

5 Perspectives (benefit/cost to whom?)

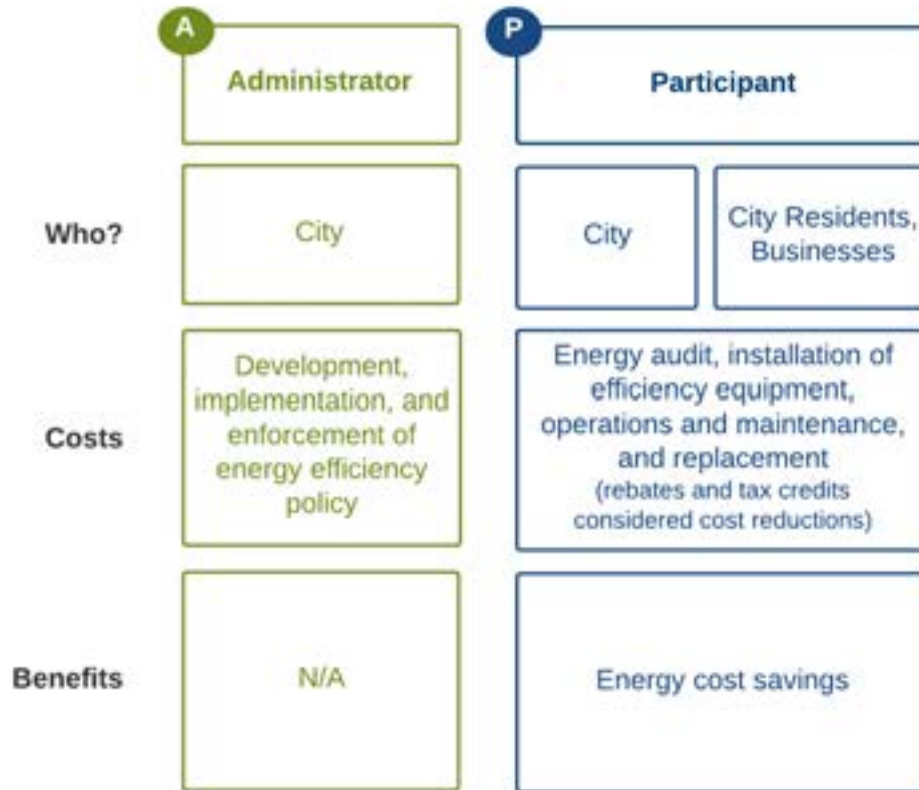
- Administrator
- Participant
- Non-Participant
- Total Measure
- Total Societal

Adapted from CA Standard Practice Manual

Benefit-Cost Analysis Framework



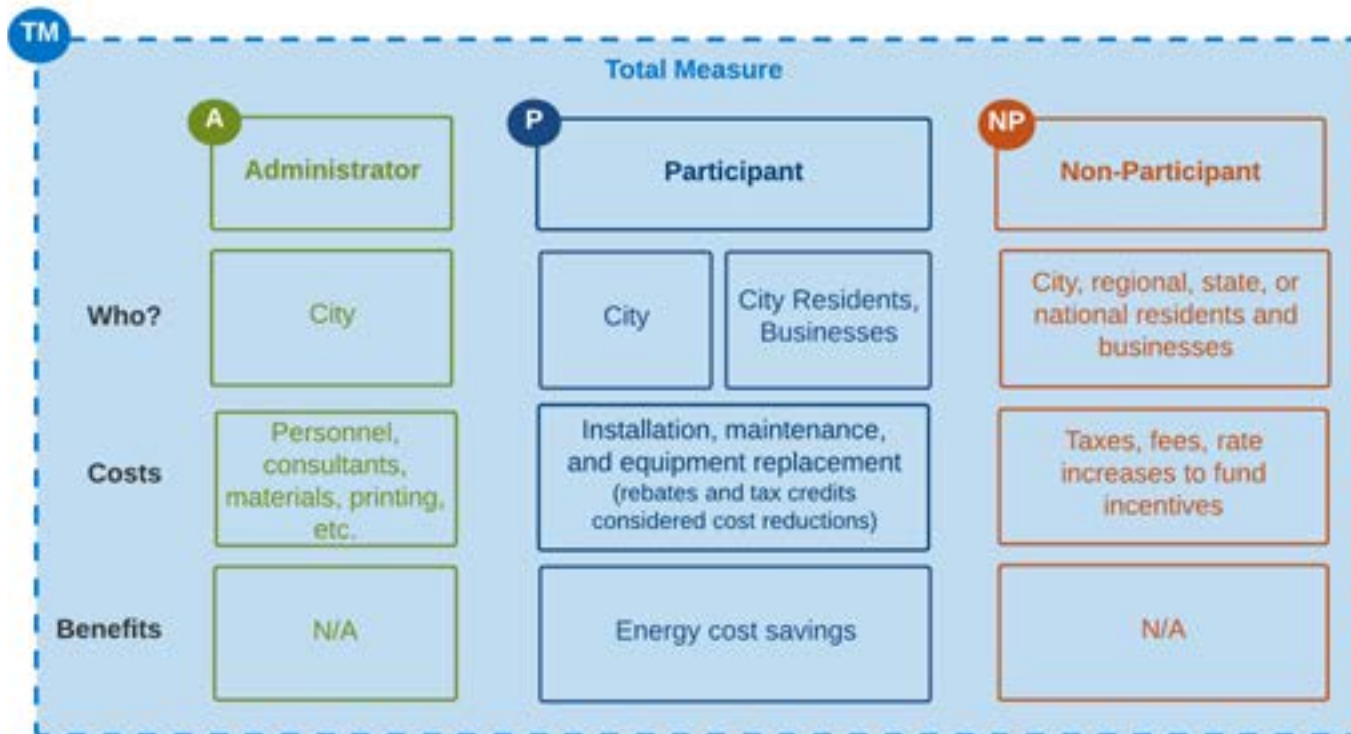
Benefit-Cost Analysis Framework



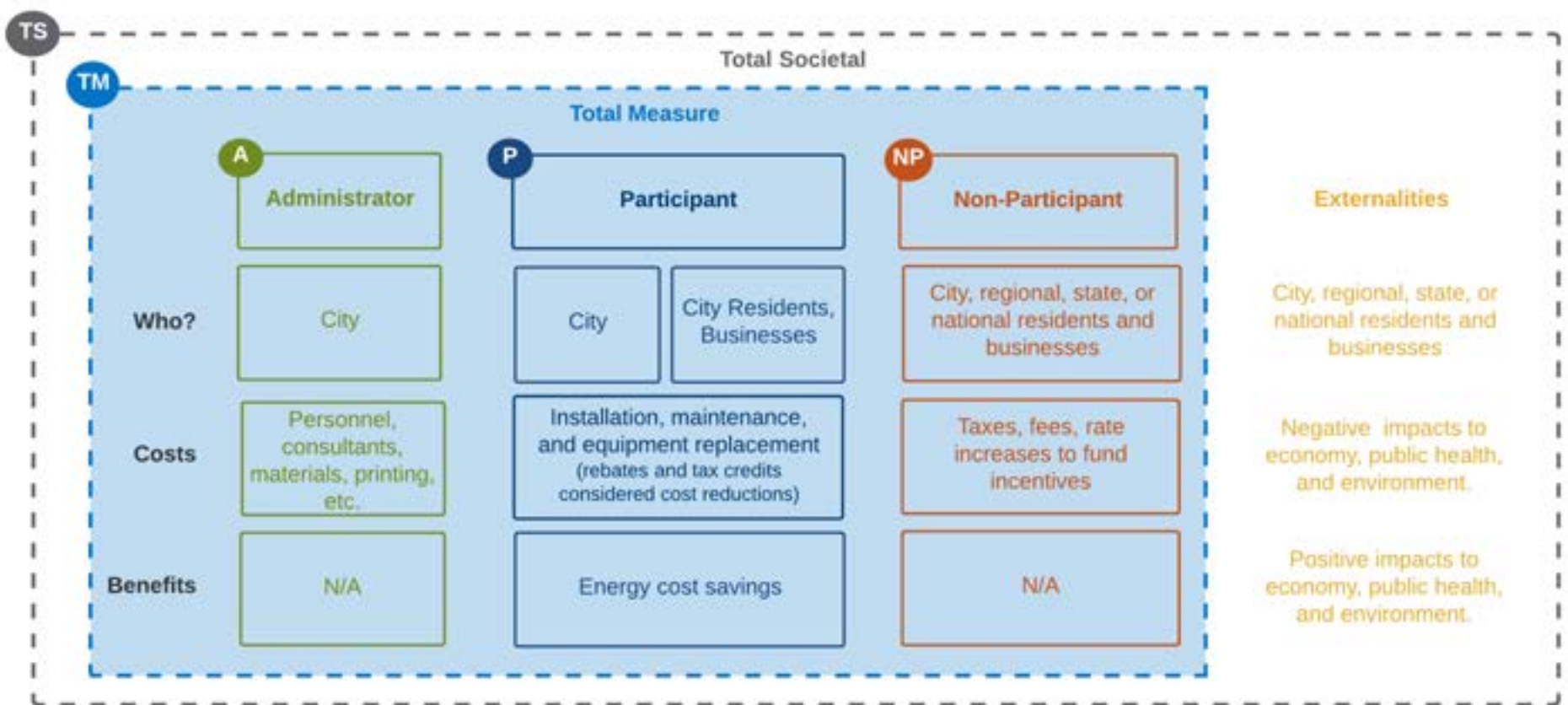
Benefit-Cost Analysis Framework

	A	P	NP
	Administrator	Participant	Non-Participant
Who?	City	City City Residents, Businesses	City, regional, state, or national residents and businesses
Costs	Development, implementation, and enforcement of energy efficiency policy	Energy audit, installation of efficiency equipment, operations and maintenance, and replacement (rebates and tax credits considered cost reductions)	Utility ratepayer funds from regional residents for rebates and incentives
Benefits	N/A	Energy cost savings	N/A

Benefit-Cost Analysis Framework



Benefit-Cost Analysis Framework



Administrator Cost

Administrator Cost Overview

Purpose

- **Estimate the cost to City of La Mesa**
 - CAP Implementation
 - CAP Administration
 - No capital costs included
- **Assist in budget forecasting**
 - Budget Year 1
 - Plan for Years 2-5

Administrator Cost Overview

Costs to City of La Mesa to Administer and Implement CAP Measures

- Assume only direct costs and no direct benefits

Incremental Costs

- Would the costs have occurred without the CAP?
 - If yes, the cost was excluded from the results

Staff Provided Estimated Level of Effort

- Based on expected tasks and activity

Broken out by Year 1 and Years 2-5

Administrator Cost Components

Personnel Cost and Effort

- Allocated to each CAP Action
 - Department/Division
 - Position
 - Measure
 - Activity Type

Consultant

- None included
 - Regional resources available
 - Shared Forrester and Ombudsman position being considered

Administrator Cost Components

Other Costs Not Allocated to CAP Measures and Actions

- Printing, materials, etc.
 - \$100,000
- CCA feasibility study considered separately
 - \$150,000 - \$250,000
- Not allocated to CAP Measures or Actions

Other

- All results in 2017 dollars
 - Not discounted to 2010 dollars

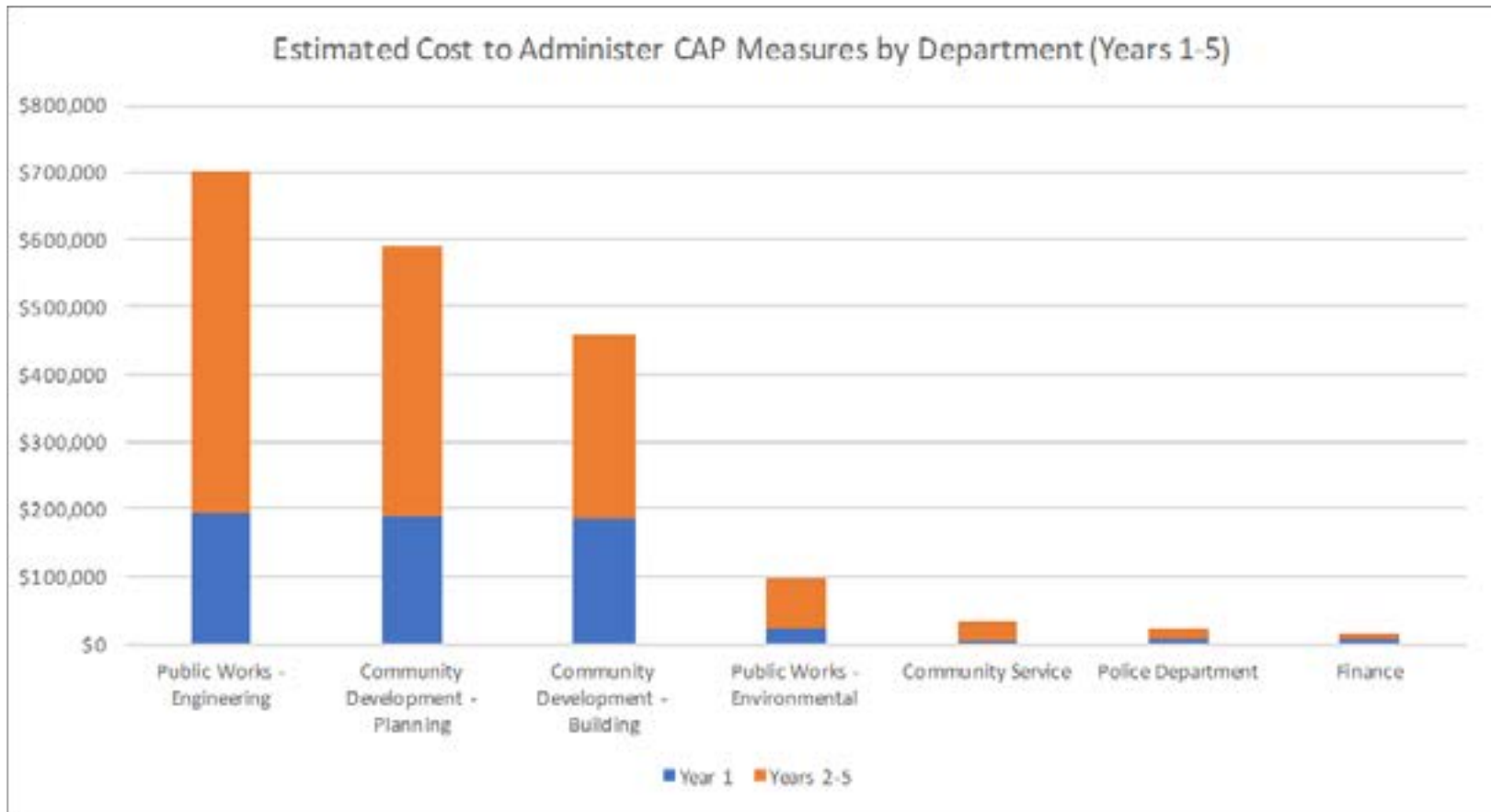
Total Personnel Costs and Effort

Cost and Effort Categories	Year 1	Years 2-5*	Total**
Effort (Hours)	4,641	9,723	14,364
Effort (FTE)	2.2	1.2	1.4
Effort as % of total	32%	68%	
Cost (\$)	614,998	1,306,678	1,921,676
Cost (\$) with 10% contingency	676,497	1,437,346	2,113,843
Cost as % of total	32%	68%	100%

*Years 2-5 FTE represents annual average over 4 years.

**Total FTE represents annual average across 5 years.

Personnel Cost by Department/Division

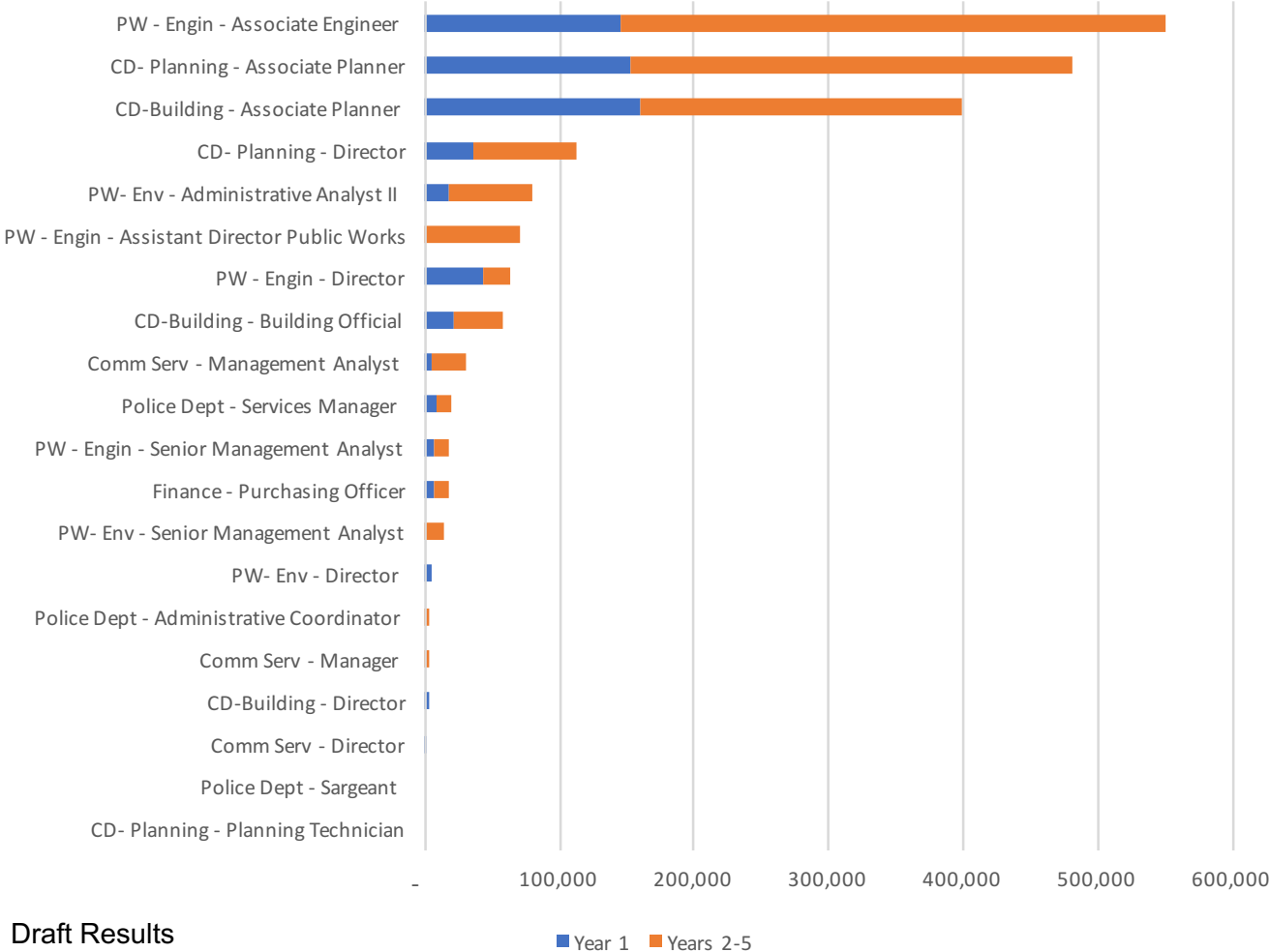


Effort by Department

	Year 1	Avg Annual Years 2-5	Avg Annual Years 1-5
Community Development - Building	0.7	0.2	0.3
Community Development - Planning	0.6	0.3	0.4
Community Service	0.0	0.0	0.0
Police Department	0.0	0.0	0.0
Public Works - Engineering	0.8	0.5	0.5
Public Works - Environmental	0.1	0.1	0.1
Finance	0.0	0.0	0.0
Total	2.2	1.2	1.4

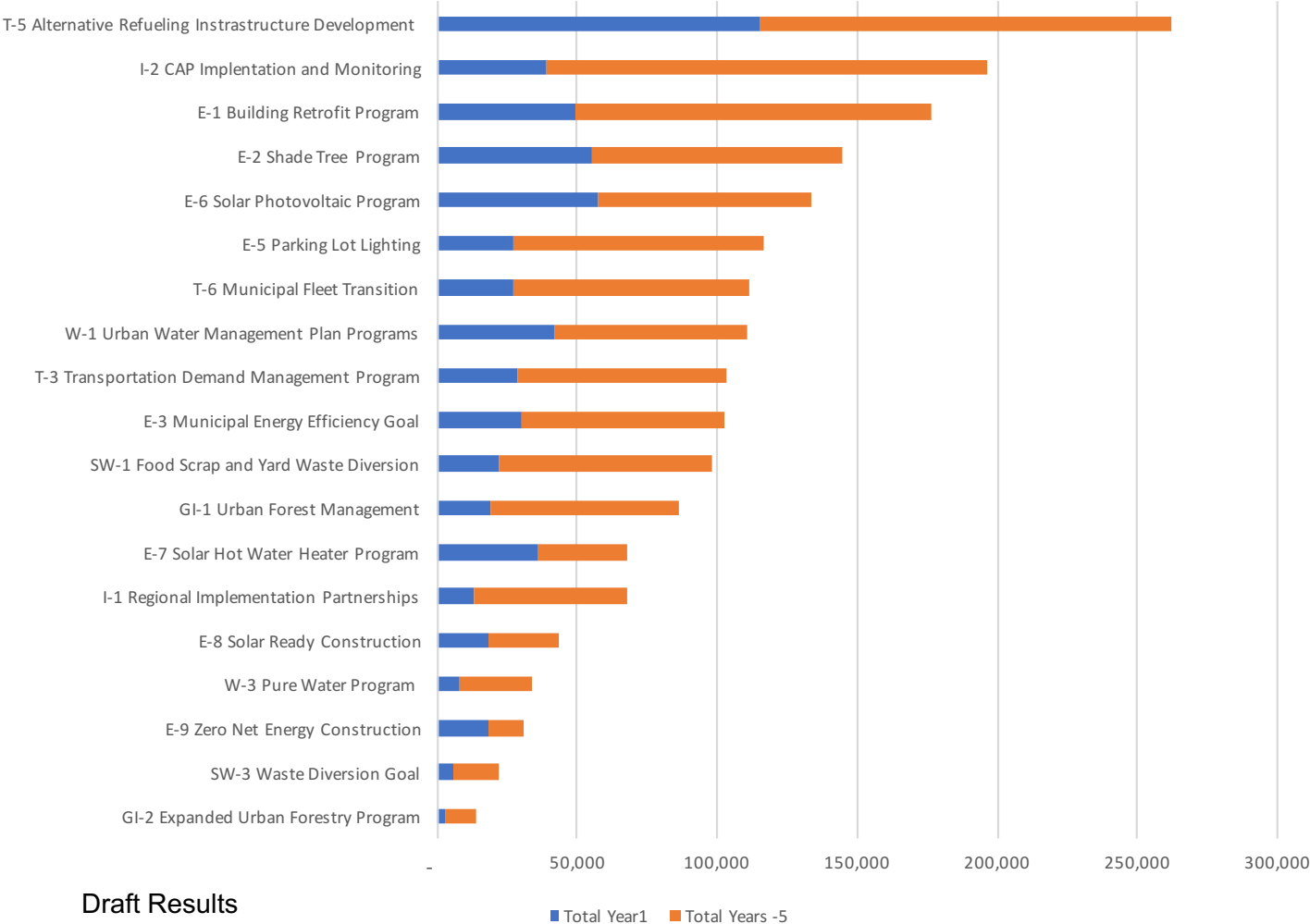
Personnel Cost by Position

Cost by Staff Position (Years 1-5)



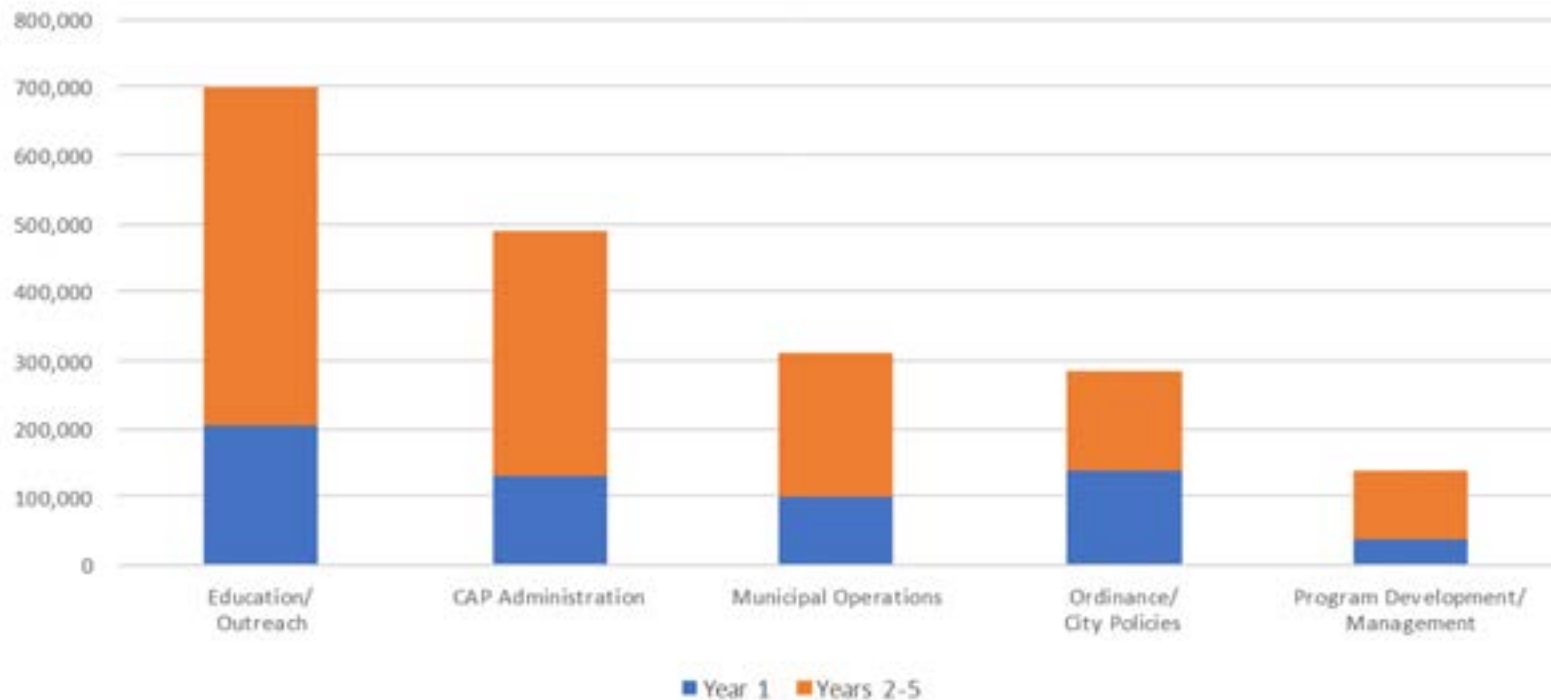
Personnel Cost by Measure

Cost by Measure (Years 1-5)



Personnel Cost by Activity Type

Personnel Cost by CAP Activity Type (Years 1-5)



Note: Municipal Operations represent personnel costs associated with CAP measures that relate to municipal operations. No capital costs are included here.

Next Steps & Recommendations

Existing vs. New Staff Capacity

- Results here represent total costs/effort
- Determine potential need for new staff capacity

Consultant and Other Costs

- Refine estimate for consultant and other costs

Consider a CAP Administrator Role

- Actions I-1 and I-2 represent CAP Administration
- Other coordinating effort also likely required

The background is a solid dark blue color. On the right side, there are several overlapping, curved, lighter blue lines that sweep across the page, creating a sense of motion or a stylized graphic element.

Benefit-Cost Analysis of CAP Measures

Measure Benefit-Cost Analysis Overview

Purpose

- **Compare benefits & costs across measures**
 - **Metric:** \$/MT CO₂e reduced
 - Considers all benefits and costs over life of project(s)
 - Normalized to 2010 \$
 - Future dollars are discounted to present value
- **Analyze impacts by perspective**
 - Administrator
 - Participants
 - Non-participants
 - Total Measure
 - Total to Society

Measure Benefit-Cost Analysis Overview

Measures Included in Analysis

- **Subset of local measures**
 - Measures with quantified GHG reductions for 2020
 - Measures with quantified GHG reductions for 2035 only are brought forward for comparison
- **No state or federal measures are included**
- **No Community Choice Aggregation (CCA)**
 - Higher penetration renewables would reduce the total GHG associated with energy-related measures

Benefit-Cost Analysis – General Methods

Net Present Value (NPV) General Method



Benefit-Cost Analysis – General Methods

Net Present Value (NPV) General Method



Total Benefits & Costs – Single Measure

E-6 Solar Photovoltaic Program

2020 Expected Values - Solar Photovoltaics, All customer types

	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (all customer types)	Societal Benefits & Costs (all customer types)
<i>Present Value Benefits</i>	-	\$1,125,197	-	\$1,125,197	\$1,266,220
<i>Present Value Costs</i>	\$7,125	\$890,430	\$174,981	\$1,072,535	\$1,072,535
<i>Net Present Value</i>	\$7,125	\$234,767	\$174,981	\$52,662	\$193,685
<i>GHGs (MT CO_{2e})</i>	2,725	2,725	2,725	2,725	2,725
<i>\$/MT CO_{2e}</i>	\$3	\$86	\$64	\$19	\$71
<i>BCR</i>	-	-	-	1.05	1.18

*All dollar values are in 2010 \$

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Total Benefits & Costs – Single Measure

E-6 Solar Photovoltaic Program

2020 Expected Values - Solar Photovoltaics, Existing residential

	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (existing residential)	Societal Benefits & Costs (existing residential)
<i>Present Value Benefits</i>	-	\$843,734	-	\$843,734	\$946,874
<i>Present Value Costs</i>	\$5,211	\$697,024	\$51,455	\$753,689	\$753,689
<i>Net Present Value</i>	\$5,211	\$146,710	\$51,455	\$90,044	\$193,185
<i>GHGs (MT CO_{2e})</i>	1,993	1,993	1,993	1,993	1,993
<i>\$/MT CO_{2e}</i>	\$3	\$74	\$26	\$45	\$97
<i>BCR</i>	-	-	-	1.12	1.26

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Energy Policy Initiatives Center, USD 2017

Total Benefits & Costs – Single Measure

E-6 Solar Photovoltaic Program

2020 Expected Values - Solar Photovoltaics, New residential

	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (new residential)	Societal Benefits & Costs (new residential)
<i>Present Value Benefits</i>	-	\$44,452	-	\$44,452	\$49,886
<i>Present Value Costs</i>	\$275	\$28,243	\$9,156	\$37,673	\$37,673
<i>Net Present Value</i>	\$275	\$16,208	\$9,156	\$6,778	\$12,212
<i>GHGs (MT CO_{2e})</i>	105	105	105	105	105
<i>\$/MT CO_{2e}</i>	\$3	\$154	\$87	\$65	\$116
<i>BCR</i>	-	-	-	1.18	1.32

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Total Benefits & Costs – Single Measure

E-6 Solar Photovoltaic Program

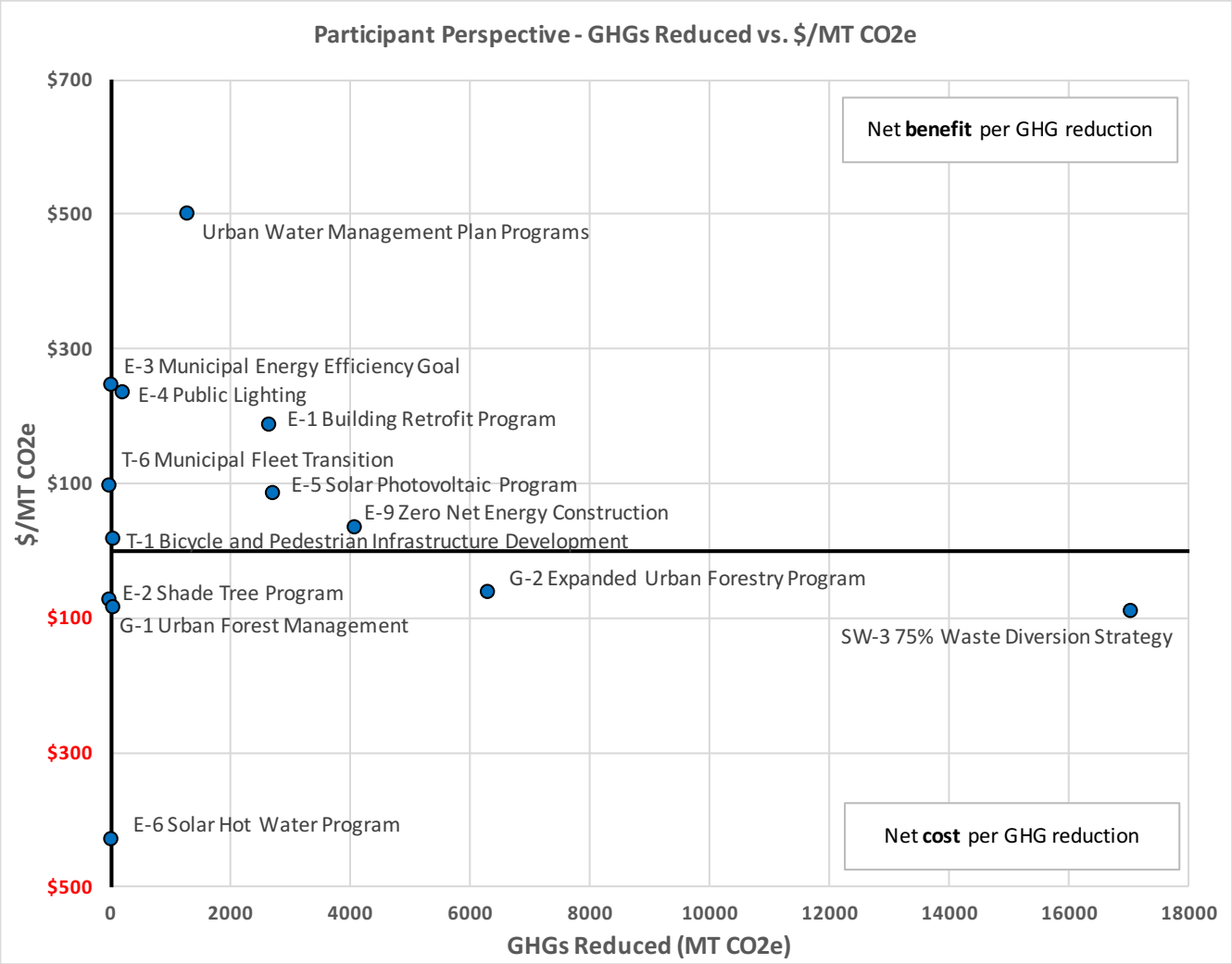
2020 Expected Values - Solar Photovoltaics, Commercial

	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (commercial)	Societal Benefits & Costs (commercial)
<i>Present Value Benefits</i>	-	\$237,012	-	\$237,012	\$269,460
<i>Present Value Costs</i>	\$1,639	\$165,162	\$114,371	\$281,172	\$281,172
<i>Net Present Value</i>	\$1,639	\$71,849	\$114,371	\$44,161	\$11,712
<i>GHGs (MT CO_{2e})</i>	627	627	627	627	627
<i>\$/MT CO_{2e}</i>	\$3	\$115	\$182	\$70	\$19
<i>BCR</i>	-	-	-	0.84	0.96

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Participant Perspective



Total Benefits & Costs – CAP Measure Perspective

All measures:

2020 Expected Values		\$/MT CO ₂ e			
CAP Measure		Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (all customer types)
E-1	Building Retrofit Program	\$5	\$187	\$289	\$107
E-2	Shade Tree Program	\$179	\$73	\$24	\$276
E-3	Municipal Energy Efficiency Goal	\$224	\$246	\$16	\$6
E-4	Public Lighting	\$9	\$234	\$0	\$225
E-6	Solar Photovoltaic Program	\$3	\$86	\$64	\$19
E-7	Solar Hot Water Program	\$135	\$428	\$143	\$706
E-9	Zero Net Energy Construction ¹	\$0	\$35	\$57	\$22
T-1	Bicycle and Pedestrian Infrastructure Development	\$22	\$17	\$0	\$5
T-6	Municipal Fleet Transition	\$678	\$97	\$0	\$581
W-1	Urban Water Management Plan Programs	\$11	\$501	\$64	\$426
SW-3	75% Waste Diversion Strategy ¹	\$0	\$89	\$0	\$89
G-1	Urban Forest Management	\$45	\$84	\$0	\$129
G-2	Expanded Urban Forestry Program ¹	\$0	\$62	\$0	\$62

*All dollar values are in 2010 \$

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¹ GHGs quantified for 2035 only

Total Benefits & Costs – CAP Measure Perspective

All measures:

2020 Expected Values		\$/MT CO2e				Total GHGs Reduced in 2020 (MT CO2e)	Total CAP Measure Benefits & Costs in 2020
CAP Measure	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (all customer types)			
E-1	Building Retrofit Program	\$5	\$187	\$289	\$107	2,660	\$283,596
E-2	Shade Tree Program	\$179	\$73	\$24	\$276	5	\$1,380
E-3	Municipal Energy Efficiency Goal	\$224	\$246	\$16	\$6	40	\$234
E-4	Public Lighting	\$9	\$234	-	\$225	205	\$46,133
E-6	Solar Photovoltaic Program	\$3	\$86	\$64	\$19	2,725	\$52,662
E-7	Solar Hot Water Program	\$135	\$428	\$143	\$706	25	\$17,647
E-9	Zero Net Energy Construction ¹	\$0	\$35	\$57	\$22	4,075	\$90,208
T-1	Bicycle and Pedestrian Infrastructure Development	\$22	\$17	-	\$5	50	\$263
T-6	Municipal Fleet Transition	\$678	\$97	-	\$581	5	\$2,905
W-1	Urban Water Management Plan Programs	\$11	\$501	\$64	\$426	1,300	\$553,422
SW-3	75% Waste Diversion Strategy ¹	\$0	\$89	-	\$89	17,050	\$1,515,597
G-1	Urban Forest Management	\$45	\$84	-	\$129	45	\$5,801
G-2	Expanded Urban Forestry Program ¹	\$0	\$62	-	\$62	6,300	\$390,075

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¹ GHGs quantified for 2035 only

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Total Benefits & Costs – Societal Perspective

All measures:

2020 Expected Values		\$/MT CO ₂ e			
CAP Measure		CAP Measure Benefits & Costs (all customer types)	Societal Benefits & Costs (all customer types)	Total GHGs Reduced in 2020 (MT CO ₂ e)	Societal Benefits & Costs in 2020
E-1	Building Retrofit Program	\$107	\$56	2,660	\$150,051
E-2	Shade Tree Program	\$276	\$215	5	\$1,074
E-3	Municipal Energy Efficiency Goal	\$6	\$58	40	\$2,331
E-4	Public Lighting	\$225	\$271	205	\$55,525
E-6	Solar Photovoltaic Program	\$19	\$71	2,725	\$193,685
E-7	Solar Hot Water Program	\$706	\$653	25	\$16,332
E-9	Zero Net Energy Construction ¹	\$22	\$6	4,075	\$24,525
T-1	Bicycle and Pedestrian Infrastructure Development	\$5	\$52	50	\$2,597
T-6	Municipal Fleet Transition	\$581	\$531	5	\$2,653
W-1	Urban Water Management Plan Programs	\$426	\$472	1,300	\$613,144
SW-3	75% Waste Diversion Strategy ¹	\$89	\$45	17,050	\$768,056
G-1	Urban Forest Management	\$129	\$68	45	\$3,053
G-2	Expanded Urban Forestry Program ¹	\$62	\$0	6,300	\$241

*All dollar values are in 2010 \$

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Total Benefits & Costs – All Perspectives

For all measures included in analysis with 2020 GHG reduction estimates:

2020 Expected Values

	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs (all customer types)	Societal Benefits & Costs (all customer types)
<i>Present Value Benefits</i>	-	\$3,744,173	-	\$3,744,173	\$4,097,434
<i>Present Value Costs</i>	\$56,149	\$2,316,498	\$1,030,668	\$3,403,315	\$3,403,315
<i>Net Present Value</i>	\$56,149	\$1,427,675	\$1,030,668	\$340,858	\$694,119
<i>GHGs (MT CO_{2e})</i>	7,060	7,060	7,060	7,060	7,060
<i>\$/MT CO_{2e}</i>	\$8	\$202	\$146	\$48	\$98
<i>BCR</i>	-	-	-	1.10	1.20

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Total Benefits & Costs – All Perspectives

For all measures included in analysis with 2020 GHG reduction estimates:

2020 Expected Values

Perspective	Total Benefits & Costs in 2020
Administrator	\$56,149
Participant	\$1,427,675
Non-Participant	\$1,030,668
Total CAP Measure	\$340,858
Externalities	\$353,261
Total to Society	\$694,119

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Total Benefits & Costs – All Perspectives

For all measures included in analysis with 2020 GHG reduction estimates:

2020 Expected Values, \$/MT CO_{2e}

Discount Rate	Administrator Costs (city staff hours)	Participant Benefits & Costs (residents/businesses)	Non-Participant Costs (subsidies)	CAP Measure Benefits & Costs	Societal Benefits & Costs
3%	\$9	\$312	\$158	\$145	\$195
5%	\$8	\$202	\$146	\$48	\$98
7%	\$7	\$125	\$135	\$18	\$32

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Energy Policy Initiatives Center, USD 2017

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Total Benefits and Costs to City of La Mesa

Total Benefits & Costs By Measure to City of La Mesa

2020 Expected Values		\$/MT CO ₂ e		Total GHGs Reduced in 2020 (MT CO ₂ e)	Total City Benefits & Costs in 2020
		Administrator Costs (city staff hours)	City As Participant		
E-1	Building Retrofit Program	\$5	-	2,660	\$12,747
E-2	Shade Tree Program	\$179	-	5	\$894
E-3	Municipal Energy Efficiency Goal	\$224	\$246	40	\$890
E-4	Public Lighting	\$9	\$234	205	\$46,133
E-6	Solar Photovoltaic Program	\$3	-	2,725	\$7,125
E-7	Solar Hot Water Program	\$135	-	25	\$3,374
E-9	Zero Net Energy Construction ¹	\$0	-	4,075	\$374
T-1	Bicycle and Pedestrian Infrastructure Development	\$22	\$106	50	\$6,403
T-6	Municipal Fleet Transition	\$678	\$97	5	\$2,905
W-1	Urban Water Management Plan Programs	\$11	-	1,300	\$14,645
SW-3	75% Waste Diversion Strategy ¹	\$0	-	17,050	\$2,665
G-1	Urban Forest Management	\$45	\$84	45	\$5,801
G-2	Expanded Urban Forestry Program ¹	\$0	\$62	6,300	\$390,075

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Thank You!

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