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Capital Investment Planning and Climate Budgeting for Clean Energy and Low Carbon Infrastructure Projects

Prepared in collaboration with Montgomery County, Maryland

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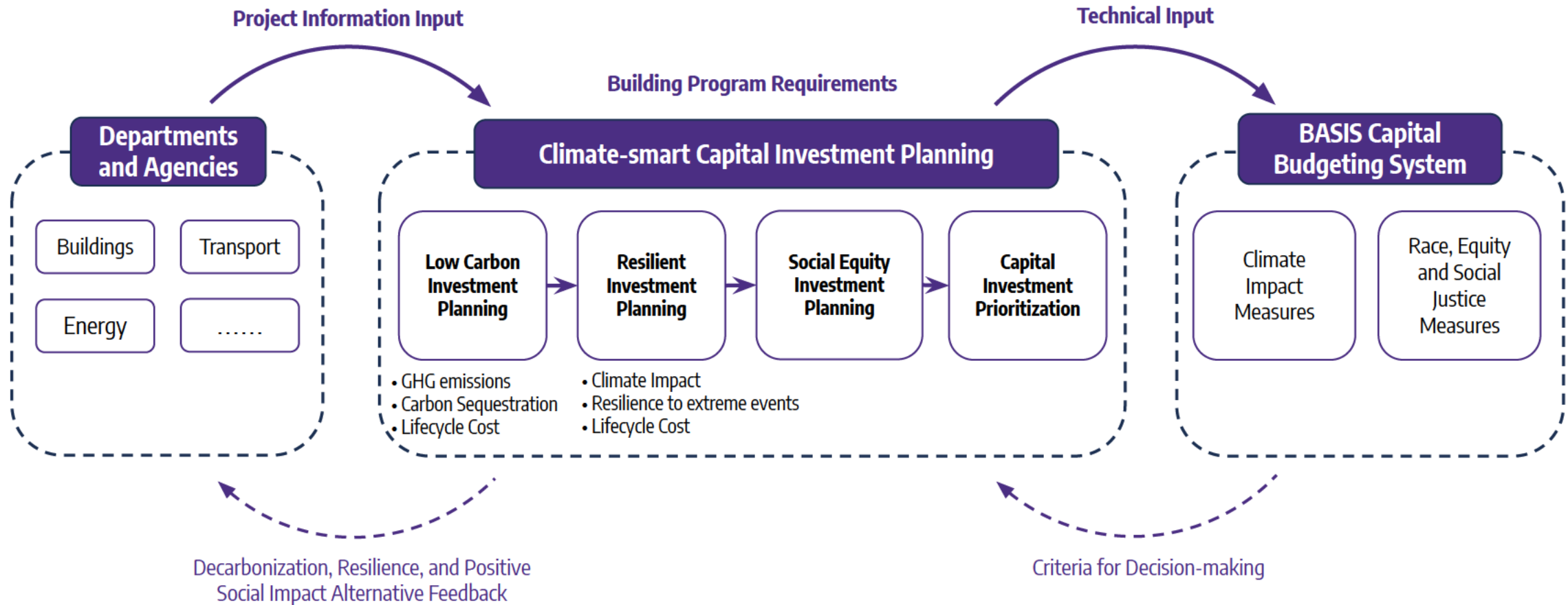
April 18, 2024



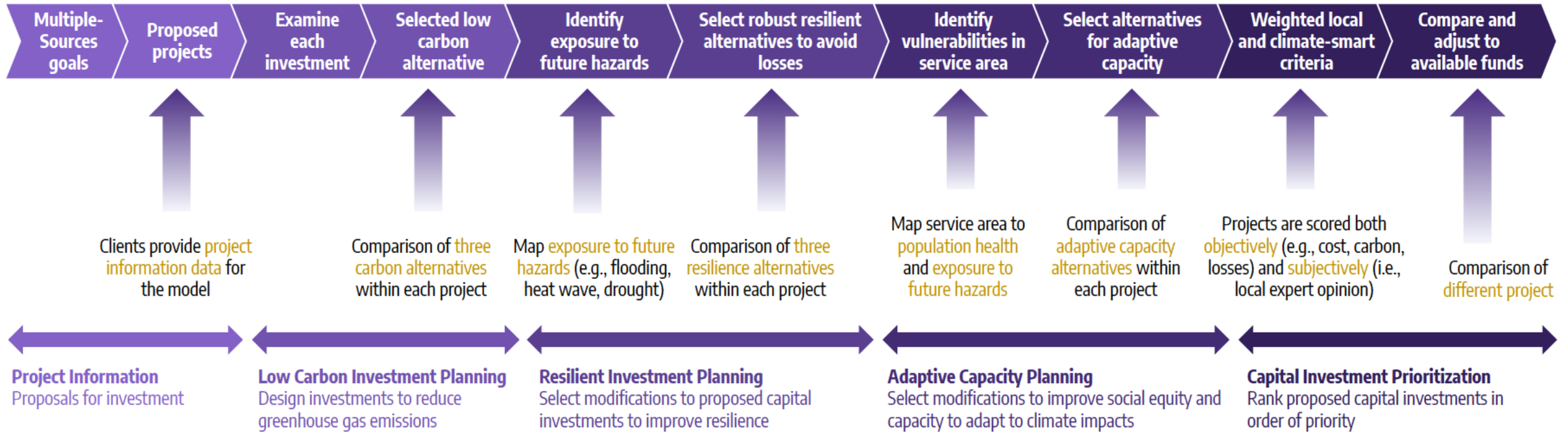
Outline

- 1. Climate-smart Capital Investment Planning**
- 2. Montgomery County, MD application of Climate-smart CIP** (XLS)
- 3. Measures and outputs**
 - Decarbonization
 - Resilience
 - Social Equity
- 4. Reporting at the project, program, and county level**
- 5. Climate bond certification**
- 6. Results from global field-tests of Climate-smart CIP**
- 7. Intro to Climate Solutions International** (XLS + online application)

Integrating Climate Measures with the Capital Investment Plan



The Process of Climate-Smart Capital Investment Planning



* We remove the **Capital Investment Funding Allocation** phase for the diagram

Quantitative Indicators

Decarbonization

Compare projects for:

Scale efficiencies

GHG intensity of energy sources

GHG emissions

Carbon Sequestration

Capital cost

Lifecycle cost

Resilience

Compare projects for:

Capital cost

Lifecycle cost

Vulnerability to extreme events

over the lifecycle:

Cost of extreme events

Cost of design strategies

Losses avoided

Suggested capital reserves

Resilience dividend

Social Impact

Forecast effects on:

Local Employment

Climate Science Categories

Exposure

Sensitivity

Adaptive capacity

May be categorized as:

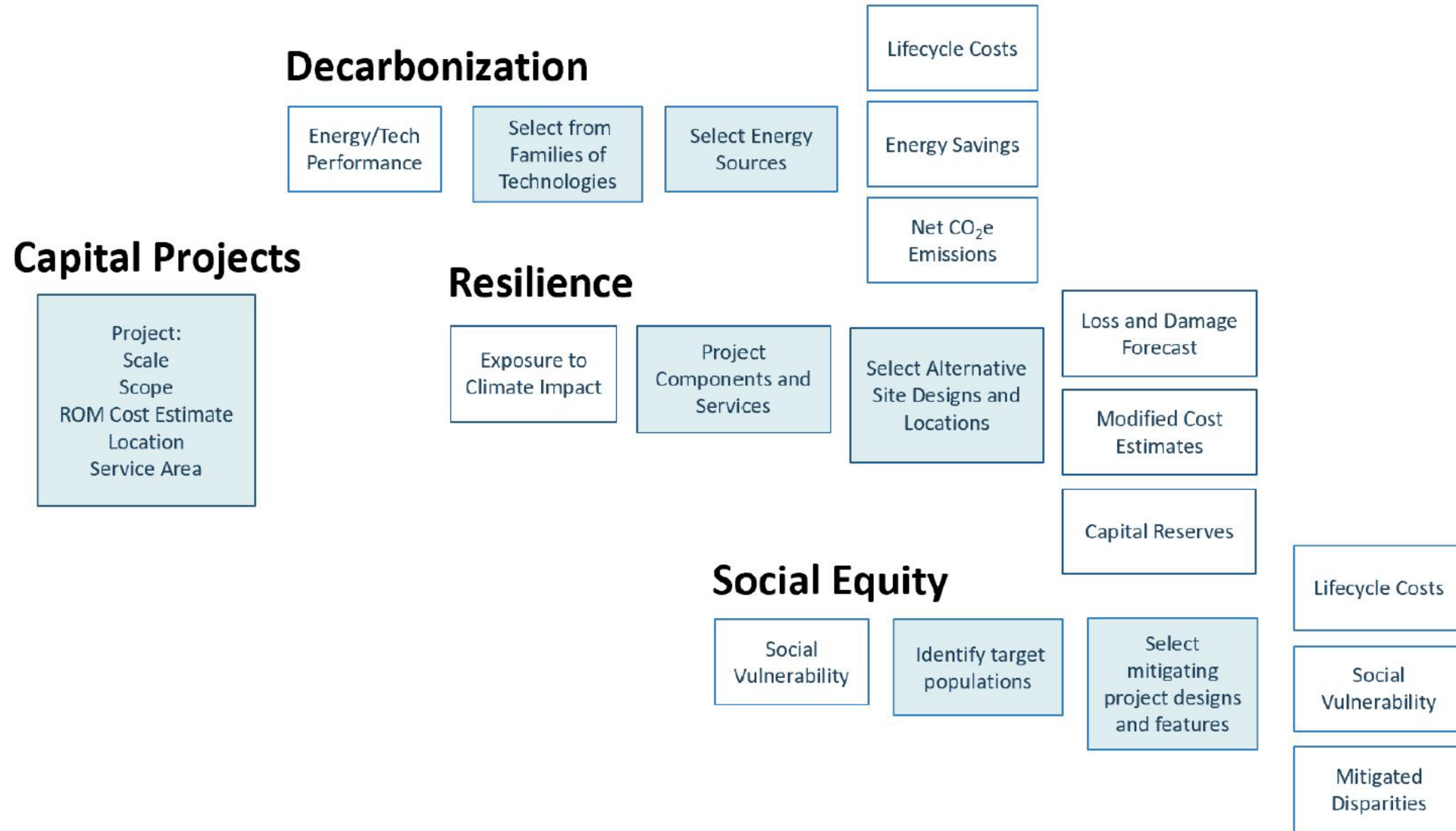
Level of service goals

Community benefits

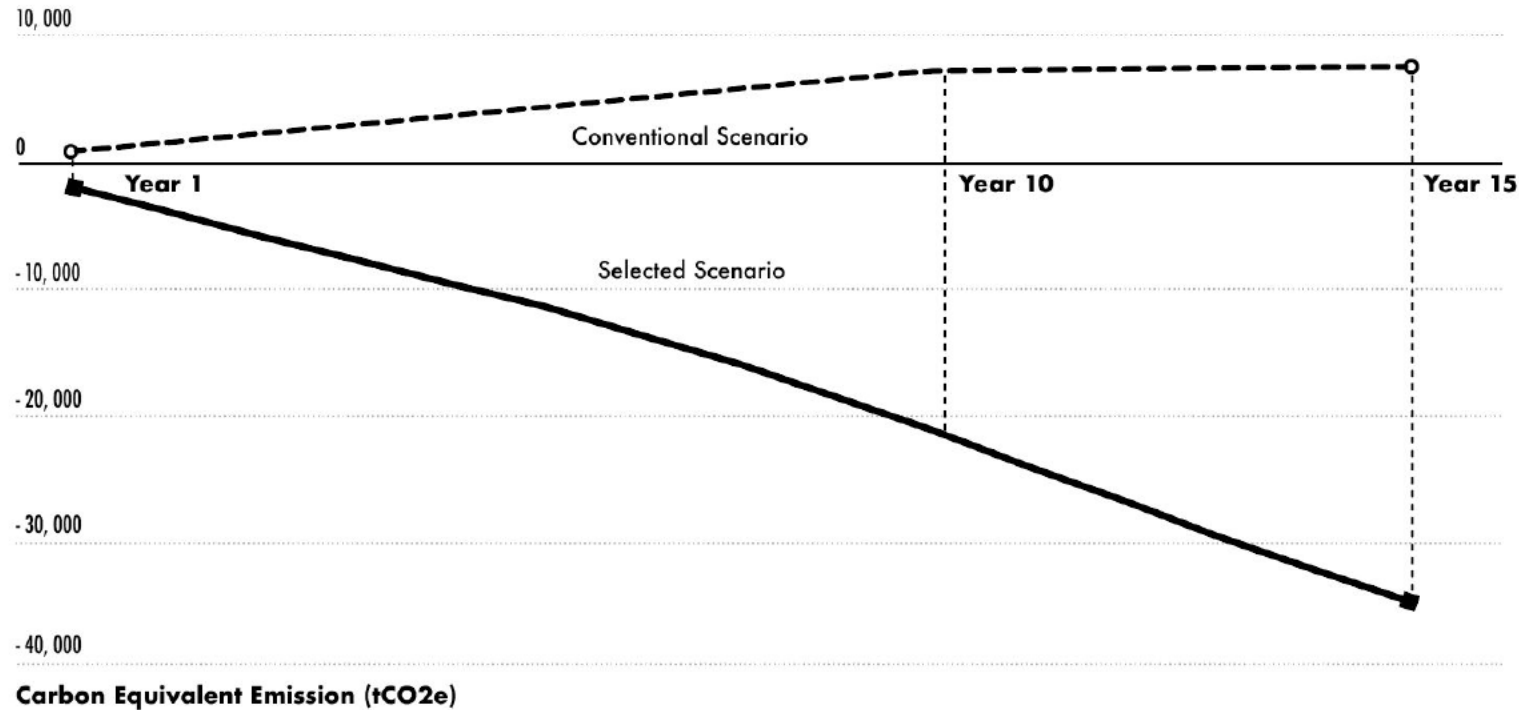
Environmental justice goals

Social equity goals

Workflow is a series of modules



Low Carbon - Impact of the Capital Budget on GHG Emissions



Cumulative GHG Emissions

One in a series of charts to show how Climate-smart selections contribute to the energy efficiency, getting to net zero greenhouse gas emissions, resilience to climate impacts, and equity in the capacity to adapt to climate change.

Example Figure - Cumulative Greenhouse Gas Emissions in the Capital Budget

Low Carbon - Project alternatives

Local engineers select alternative tech:

- Business as usual
- Low Carbon
- Carbon Zero

Pre-loaded with localized data

- Emissions
- Energy sources
- Energy demand
- Capital cost
- Operation and maintenance cost

			Project 1		
			Oceanside Plant Digester Gas Utilization Upgrade		
Criteria	Unit	Indicator	Conventional	Low Carbon	Carbon Zero
Scale	Percent	Proportion of conventional	1.00	1.00	1.00
	Percent	Percent scale of conventional	100%	100%	100%
	M2 or Count	Square meters of conditioned space or count	20	20	20
Energy Source	tCO ₂ e/MWh	Carbon intensity of energy sources	0.44	0.28	-
	Percent	Percent tCO ₂ e per MWh of conventional	100%	64%	0%
Energy Savings and Sequestration	MWh/year	Energy intensity	642	230	-
	Percent	Percent annual tCO ₂ e of conventional	100%	35%	0%
	Years	Period of lifecycle	20	20	20
	tCO ₂ e/lifecycle	Lifecycle emissions without sequestration	5,686	1,305	-
	tCO ₂ e/lifecycle	Life-cycle carbon sequestration (at plant maturity)	512	1,726	3,454
	tCO ₂ e/lifecycle	Net lifecycle carbon equivalent emissions	5,174	(421)	(3,454)
Capital Cost	Percent	Percent capital cost of conventional	100%	93%	98%
	Million	Capital Cost	15	14	14
Life-cycle Cost	Percent	Percent life-cycle cost of conventional	100%	73%	90%
	Years	Lifecycle (Years)	20	20	20
	Million/lifecycle	Lifecycle Operation and Maintenance Cost	17	16	16
	Million/lifecycle	Lifecycle Major Maintenance Cost	21	8	17
	Million/lifecycle	Lifecycle Cost	52	38	47

Low Carbon - Project alternatives

Local engineers select alternative tech and designs:

- Business as usual
- Low Carbon
- Carbon Zero

Pre-loaded with localized data

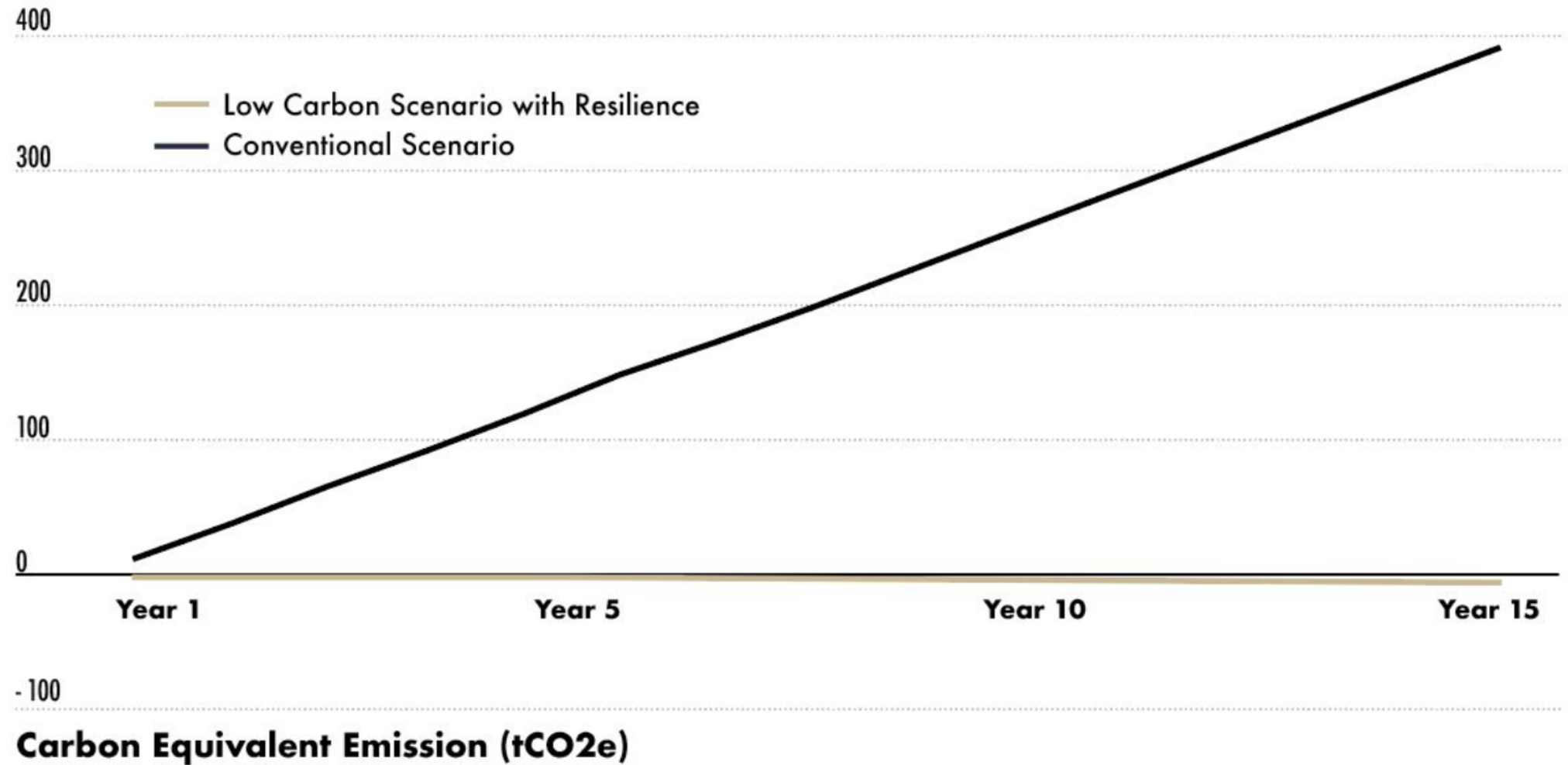
- Emissions
- Energy sources
- Energy demand
- Capital cost
- Operation and maintenance cost

Wastewater Treatment		Project 2		
		Upgradation & Rejuvenation of existing 10 MLD to 20 MLD STP to meet effluent parameters as per CPHEEO, MoHUA, MoEF, CPCB and NGT Guidelines (At RL Nagar)		
Scale	Units	Conventional	Low Carbon	Carbon Zero
Total Area	m2	13600	13600	13600
Percentage of Sewer System >20 Years Old (I/I)	Percentage	30	30	30
Wastewater Flow - Dry Season	MGD	4	4	4
Wastewater Flow - Wet Season	MGD	4.8	4.8	4.8
Percent of sludge produced per year as compared to conventional	Percent by dry weight	80%	80%	80%
Percent of sludge produced that's digested for energy	Percent by dry weight	80%	80%	80%
Conventional Treatment - Treatment for BOD Only (not for Nitrogen), & Biogas Production Treatment				
Tertiary Treatment - Cogeneration/Pipeline Injection				
Cogeneration Engine - Biogas Consumption (per 45,000 gpm capacity)	276 Total Number of units possible	1	1	1
	390 Selected Number of Units		0.0815	0.0815
	Total Carbon Emitted (tCO2e)	0	23	23
	Total Biogas Use (MWhe)	0	32	32
Cogeneration Engine - Natural Gas Consumption (per 45,000 gpm capacity)	276 Total Number of units possible	1	1	1
	390 Selected Number of Units	0.0815	0.0815	
	Total Carbon Emitted (tCO2e)	23	23	0
	Total Natural Gas Use (MWhe)	32	32	0
Cogeneration Engine - Energy Generation (per 45,000 gpm capacity)	634 Total Number of units possible	1	1	1
	-1170 Selected Number of Units		0.0815	0.0815
	Total Carbon Sequestered	0	52	52
	Total Biogas Produced (MWhe)	0	-95	-95
Biogas Flare - Biogas Consumption (per 45,000 gpm capacity)	354 Total Number of units possible	1	1	1
	500 Selected Number of Units	0.0815		
	Total Carbon Emitted (tCO2e)	29	0	0
	Total Biogas Use (MWhe)	41	0	0
Biogas Flare - Energy Generation (per 45,000 gpm capacity)	407 Total Number of units possible	1	1	1
	-500 Selected Number of Units		0.0815	0.0815
	Total Carbon Sequestered	0	33	33
	Total Biogas Produced (MWhe)	0	-41	-41
Subtotal Carbon Emitted (tCO2e)		51	45	23
Subtotal Carbon Sequestered (tCO2e)		0	85	85
Subtotal Natural Gas Use (MWhe)		32	32	0
Subtotal Biogas Use (MWhe)		41	32	32
Subtotal Biogas Produced (MWhe)		0	-136	-136

How it Works: Cost-effective designs to reduce GHG emissions

Climate-Smart Criteria for Selection of Low Carbon Alternatives		Indicator		Weight of Criteria	Project 1		
					Clarksburg Library No. 710500		
					Conventional score	Low Carbon score	Carbon Zero score
1	Project minimizes GHG emissions through scale/density.	Percent scale of conventional	x	20	20.0	20.0	20.0
2	Project reduces GHG emissions through energy sources.	Percent tCO2e per MWh of conventional	x	20	20.0	0.0	0.0
3	Project minimizes GHG emissions through energy saving and carbon sequestration.	Percent annual tCO2e of conventional	x	20	20.0	0.0	0.0
4	Project minimizes capital costs.	Percent capital cost of conventional	x	20	17.0	19.4	20.0
5	Project minimizes life-cycle costs.	Percent life-cycle cost of conventional	x	20	18.4	20.0	20.0
				100	95	59	60
				Selected Alternative	Low Carbon		

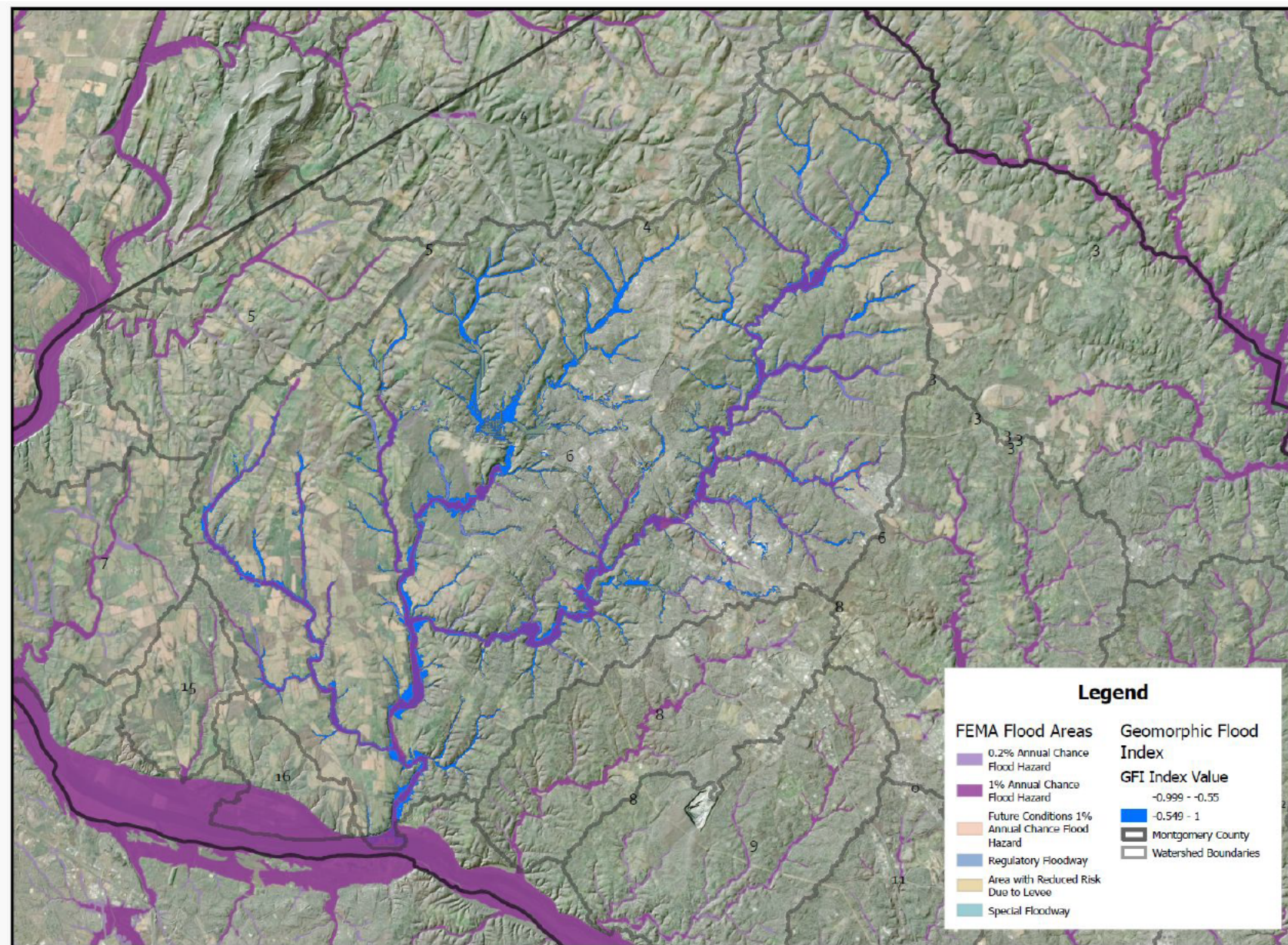
Low Carbon - Impact of the Capital Budget on GHG Emissions



Resilience - Countywide Analysis

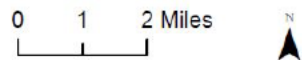
A technical report on the risk and resilience analysis of urban heat island, drought, flood, landslide, wildfire, severe storm and wind, earthquake, volcanic hazards, and more.

Preliminary Flood Hazard Analysis Montgomery County, MD



Preliminary Flood Hazard Areas - Montgomery County, MD

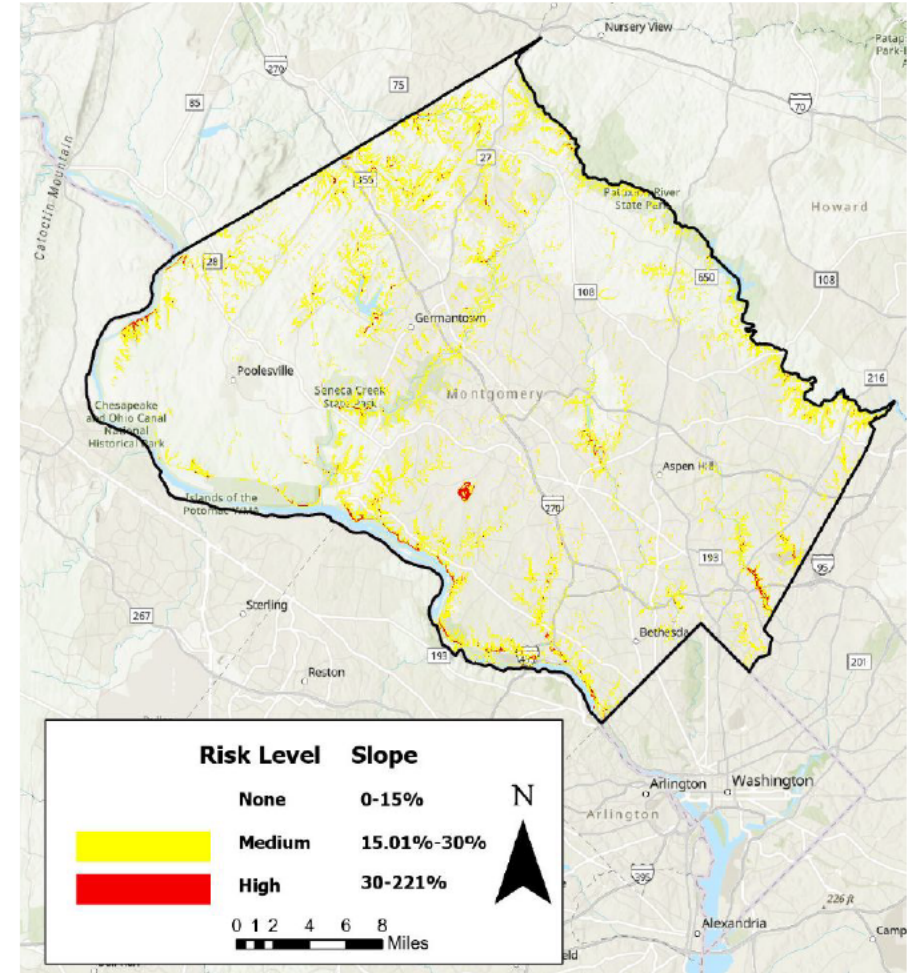
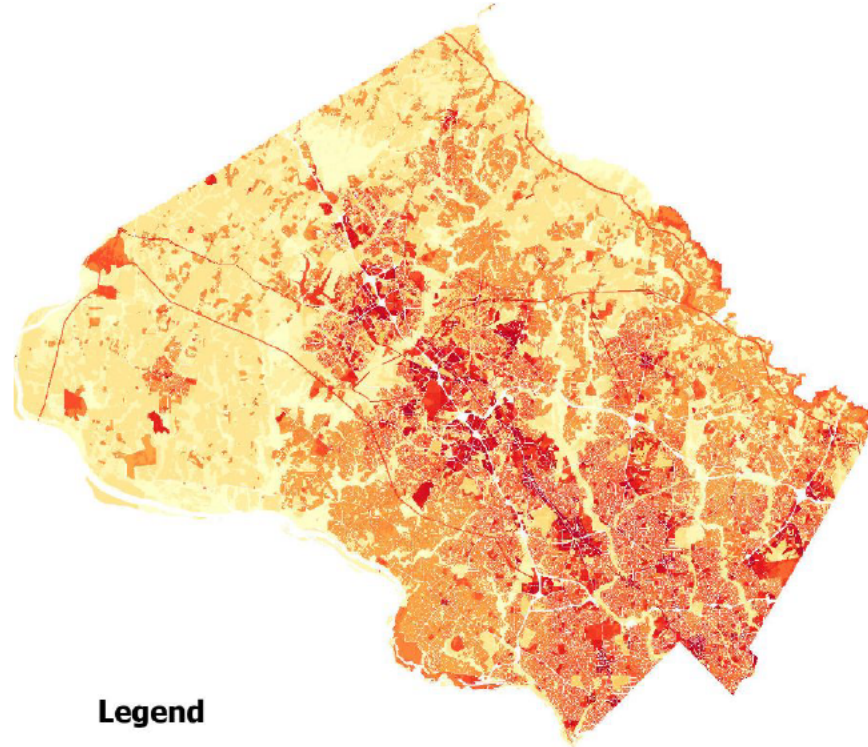
Geomorphic Flood Index calculation from 10m USGS DEM, Calibrated to FEMA 500-year Flood Hazards



Resilience - Countywide Analysis

Preliminary
Temperature Increase
and
Landslide
2100

Montgomery County, MD



Resilience - Project-level Analysis

Urban Heat
Library Project
Montgomery County, MD



0 0.13 0.25 0.5 Miles



Clarksburg Library
Temperature Increase
Degrees Fahrenheit
9.5
9.0

Clarksburg Library Urban Heat Hazard

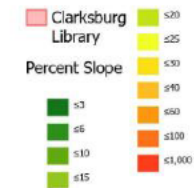
There is minimal urban heat hazard. Most temperature increases will come from warming temperatures as opposed to the urban heat island effect.

Resilience - Project-level Analysis

Landslide Hazard Analysis
Library Project
Montgomery County, MD



0 0.13 0.26 0.5 Miles



Clarksburg Library Landslide Hazard

There is no landslide hazard as the site will be graded

Resilience - Project alternatives

Local engineers select alternative designs:

- Business as usual
- Moderately resilient
- Robust to all hazards

Pre-loaded with localized data

- Exposure to climate impact
- Lifespan of the capital investment
- Forecast of capital loss and damage
- Mitigating effects of design + location
- Resilience dividend
- Capital cost
- Operation and maintenance cost

			1		
			Oceanside Plant Digestion Utilization Upgrade		
			Low Carbon Carbon Zero		
Category	Unit	Proportion of conventional	Resilient Convtl	Resilient Moderate	Resilient Robust
Capital Cost	mi llions	Capital cost including expenses for resilience	14	14	
	Proportion	Percent capital cost compared to conventional (cost of facility)	98%	98%	
Life-cycle Cost	mi llions	Percent lifecycle cost compared to conventional (lifecycle cost of facility)	90%	90%	
	Years	Lifecycle (Years)	20	20	
	Million/year	Annual Operation and Maintenance Cost (including expenses for resilience)	1	1	
	Million/lifecycle	Lifecycle cost (with low carbon and resilience modifications)	47	47	
Vulnerability to Extreme Events	As shown	All Plausible Extreme Events	5	5	
	Ratio	Rosenhead Robustness Factor	5	5	
			5	5	
	mi llions	Avoided cost from resilience (one occurrence of each extreme event)	-	-	
	Proportion	Percent cost from hazards compared to conventional (one occurrence)	100%	100%	
	mi llions	Total operation loss from hazards (one occurrence)	0	0	
	mi llions	Total capital loss from hazards (one occurrence)	17	17	
	mi llions	Capital reserves for CIP for resilience (one occurrence of each extreme event)	17	17	
Climate Informed Cost	Years	Frequency of occurrence in life-cycle (an illustration, not an estimate)	1	1	
	mi llions	Cost of hazards to conventional in life-cycle	17	17	
	mi llions	Cost of hazards to resilient alternative in life-cycle	17	17	
	mi llions	Avoided cost from resilience in life-cycle (all extreme events)	-	-	
	Proportion	Percent of life-cycle cost of hazards (all extreme events)	100%	100%	
	mi llions	Capital reserve to repair and continue operations (all extreme events)	17	17	
	mi llions	Lifecycle capital expenditure for resilience (all extreme events)	64	64	

Resilience - Project-level Forecasts of Loss and Damage

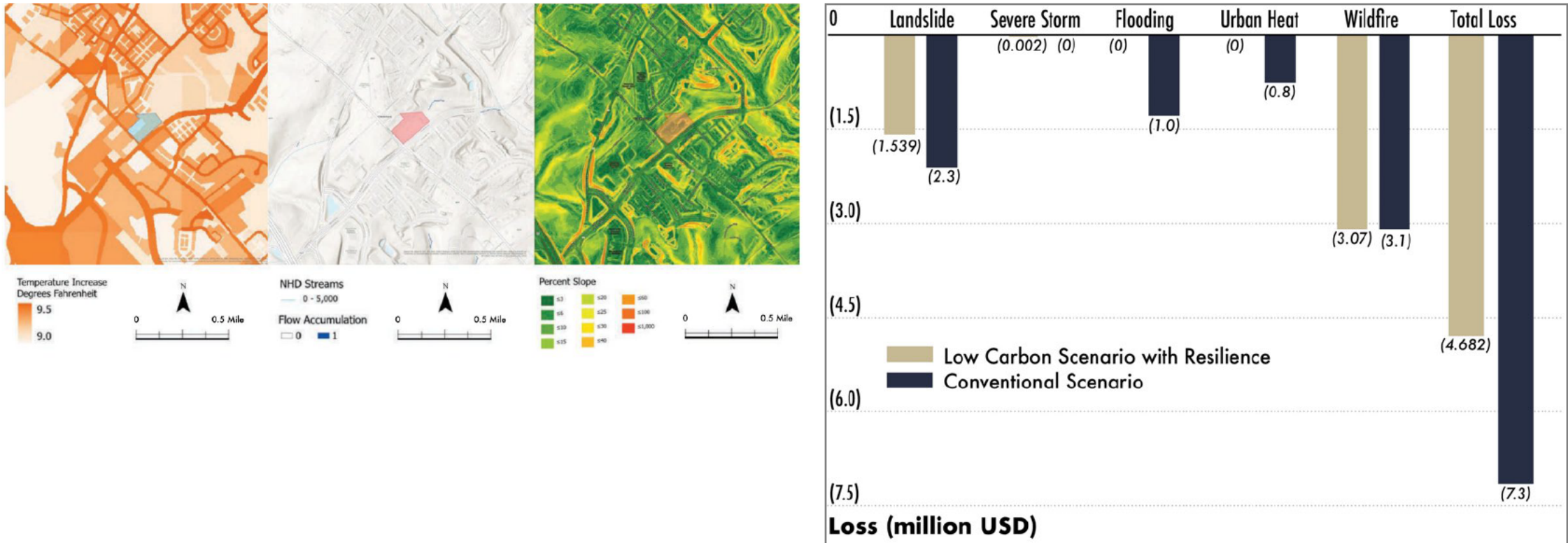


Figure: Value of Loss by Hazards for Clarksburg Library

Social Equity - CBET

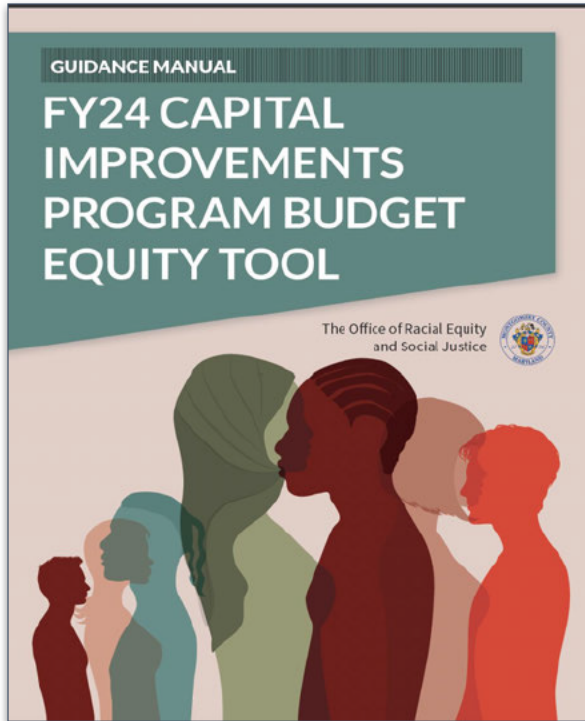
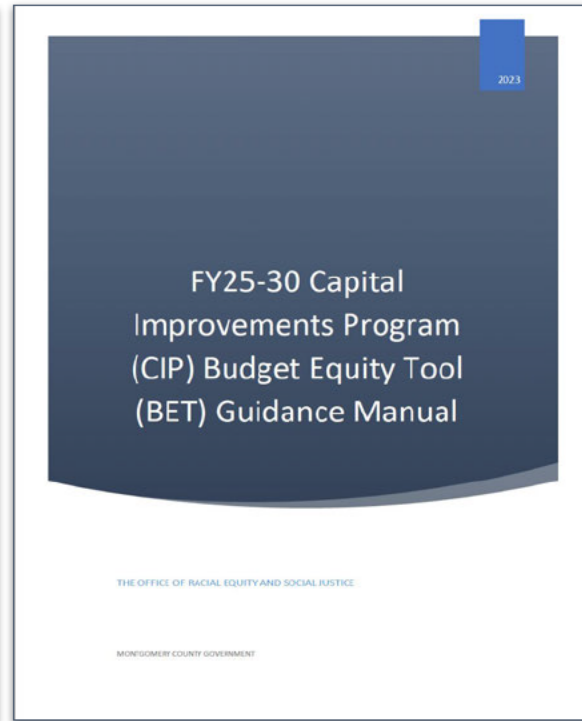


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Guidance Manual for FY24 Capital Improvements Program Budget Equity Tool | 1



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Introduction

In accordance with [§§ 11-20](#), The Office of Racial Equity and Social Justice (ORESJ) develops racial equity tools and processes to help county employees apply a racial equity lens to budget decisions. The FY25 Capital Improvements Budget Equity Tool (CBET) is designed to help departments and decisionmakers consider the racial equity and social justice impacts of their budget decisions.

1

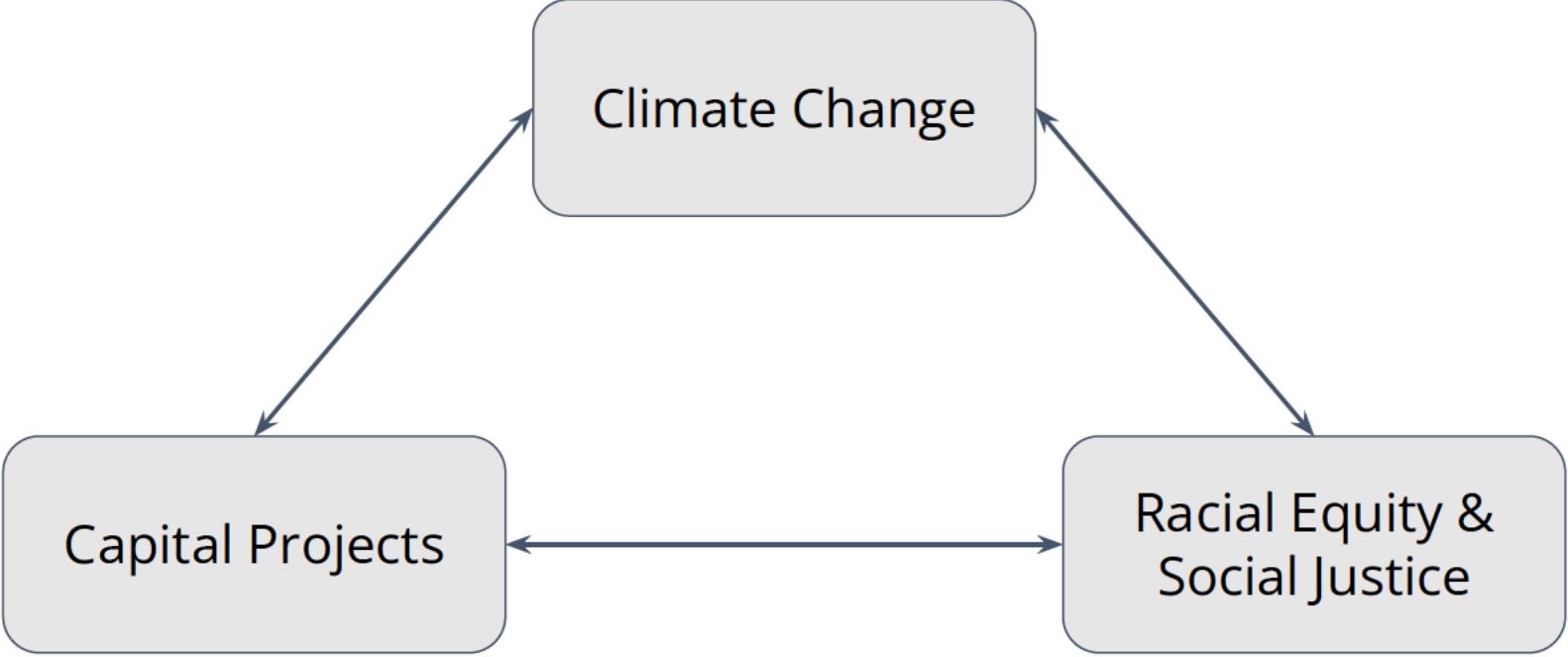
Social Equity - CBET Scoring Rubric

CIP BET Rating Rubric:

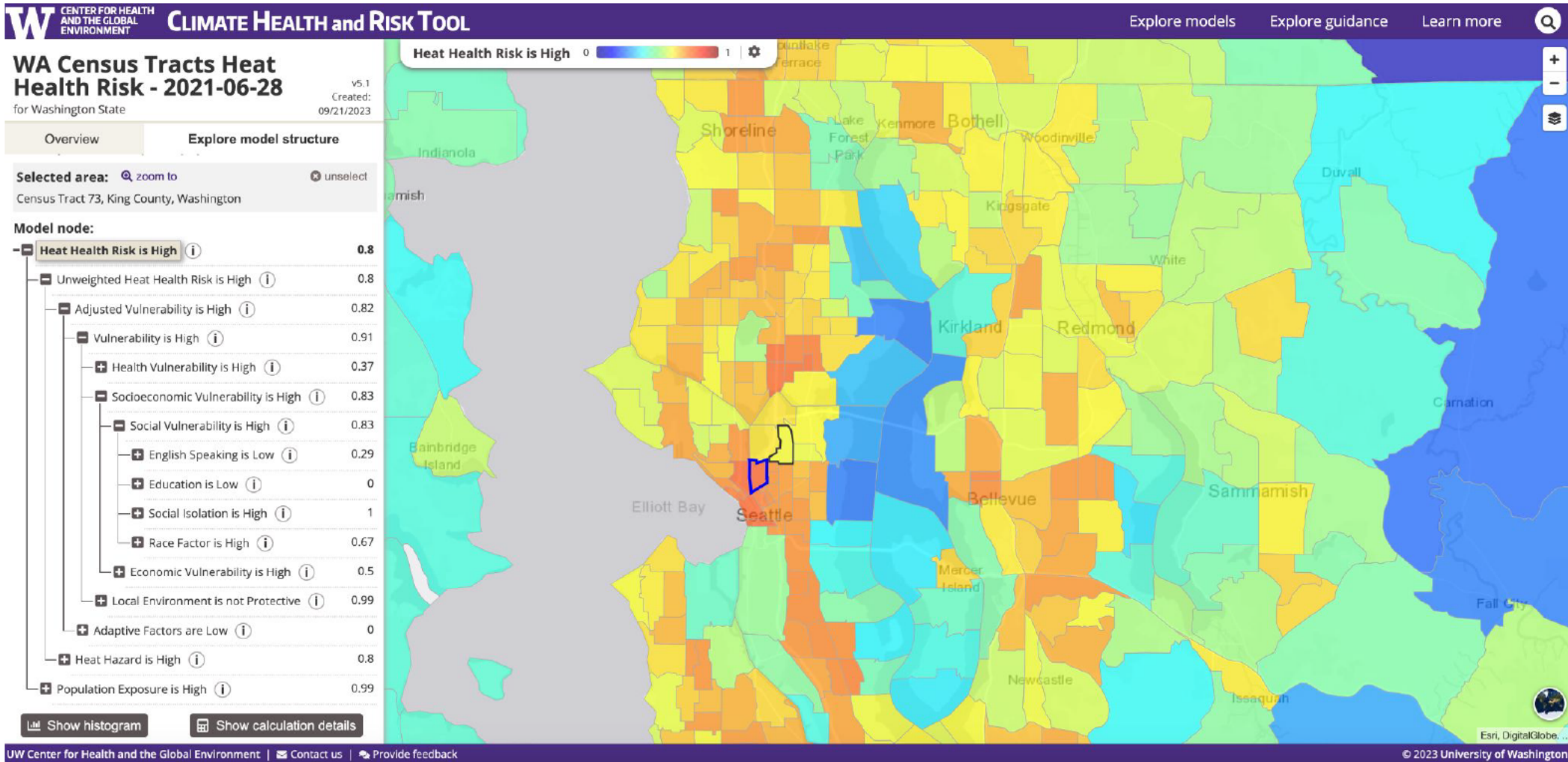
Rating Scale	Rating Explanation
<p>★★★★★</p> <p>Strongly Aligns with Montgomery County's policy to reduce and eliminate racial disparities and other inequities</p>	<p>The project strongly aligns with Montgomery County's policy to reduce and eliminate racial disparities and other inequities in that the response clearly demonstrates an ability to advance equitable outcomes for those identifying as BIPOC and/or low- income and includes at minimum all the following points as evidence to support this claim:</p> <ul style="list-style-type: none"> • Historical context • Current data • Community engagement strategy • Supplemental research • Consultation with those well-versed in topics of racial equity and social justice
<p>★★★★★</p> <p>Aligns with Montgomery County's policy to reduce and eliminate racial disparities and other inequities</p>	<p>The project aligns with Montgomery County's policy to reduce and eliminate racial disparities and other inequities in that the response demonstrates a clear correlation between racial inequities and the project's need, however it lacks a thorough analysis, potentially omitting at least one of the following points in its submission:</p> <ul style="list-style-type: none"> • Historical context • Current data • Community engagement strategy • Supplemental research • Consultation with those well-versed in topics of racial equity and social justice

<p>★★★★★</p> <p>Potential to Align with Montgomery County's policy to reduce and eliminate racial disparities and other inequities</p>	<p>The project has the potential to align with Montgomery County's policy to reduce and eliminate racial disparities and other inequities, however:</p> <ul style="list-style-type: none"> • Identified racial disparities or disproportionalities lack specific relevance to this project. • The response uses some evidence, but the data is not specific to this project justification. • The link between identified racial inequities and how the project will address them is weak.
<p>★★★★★</p> <p>Racial Equity Impacts are Acknowledged but are not sufficiently explained or addressed</p>	<p>Racial equity impacts are acknowledged in the project, however they are not clearly aligned with Montgomery County's policy to reduce and eliminate racial disparities and other inequities as the response does not:</p> <ul style="list-style-type: none"> • Identify specific racial disparities or disproportionalities. • Use data. • Demonstrate a link between racial disparities and how the project request will address them as it is incomplete or non-existent.
<p>★★★★★</p> <p>Does Not Align with Montgomery County's policy to reduce and eliminate racial disparities and other inequities</p>	<p>The project does not align with Montgomery County's policy to reduce and eliminate racial disparities and other inequities as the response did not identify any racial disparities or inequities or attempt to link them to the project in a way that justified its need. Simply, the project does not demonstrate the ability to advance equitable outcomes for residents as it was not considered in the response. More so, the project has the potential to cause undue burden or harm on low-income communities or those who identify as BIPOC.</p>
<p>★★★★★</p> <p>An Equity Analysis is Not Applicable to this Project</p>	<p>While it is the perspective of ORESJ that no county policy, program, or project is race neutral³ and therefore will have some impact – be it benefit or burden – on those who are low-income and/or identify as BIPOC, for the purposes of this evaluation, an analysis with the explicit focus on racial equity was not applicable</p>

Social Equity



Social Equity in CS-CIP model - Example of a tool showing Vulnerability



Project Report - Current Quantitative Measures



Clarksburg Library (P710500)

Category	Culture and Recreation	Date Last Modified	01/10/ 24
SubCategory	Libraries	Administering Agency	General Services
Planning Area	Clarksburg and Vicinity	Status	Planning Stage

EXPENDITURE SCHEDULE (\$000s)

Cost Elements	Total	Thru FY23	Est FY24	Total 6 Years	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30	Beyond 6 Years
Planning, Design and Supervision	4,937	8	569	4,360	1,052	1,275	1,202	831	-	-	-
Site Improvements and Utilities	5,656	-	3,500	2,156	-	980	1,176	-	-	-	-
Construction	20,172	-	-	20,172	-	9,169	11,003	-	-	-	-
Other	2,975	-	-	2,975	-	1,352	1,623	-	-	-	-
TOTAL EXPENDITURES	33,740	8	4,069	29,663	1,052	12,776	15,004	831	-	-	-

FUNDING SCHEDULE (\$000s)

Funding Source	Total	Thru FY23	Est FY24	Total 6 Years	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30	Beyond 6 Years
G.O. Bonds	33,740	8	4,069	29,663	1,052	12,776	15,004	831	-	-	-
TOTAL FUNDING SOURCES	33,740	8	4,069	29,663	1,052	12,776	15,004	831	-	-	-

OPERATING BUDGET IMPACT (\$000s)

Impact Type	Total 6 Years	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Maintenance	285	-	-	-	95	95	95
Energy	168	-	-	-	56	56	56
Program-Staff	3,807	-	-	-	1,269	1,269	1,269
Program-Other	1,806	-	-	-	1,202	302	302
NET IMPACT	6,066	-	-	-	2,622	1,722	1,722
FULL TIME EQUIVALENT (FTE)		-	-	-	15	15	15

APPROPRIATION AND EXPENDITURE DATA (\$000s)

Appropriation FY 25 Request	2,781	Year First Appropriation	FY23
Appropriation FY 26 Request	23,476	Last FY's Cost Estimate	15,363
Cumulative Appropriation	7,283		
Expenditure / Encumbrances	8		
Unencumbered Balance	7,275		

Project Report - Possible Addition of Climate Measures

PROJECT DESCRIPTION

This project provides for the design and construction of a library located in Clarksburg, as outlined in the Clarksburg Master Plan, and appropriate to the needs of the community.

LOCATION

To be determined. The following Clarksburg locations are being considered: Clarksburg Square Road and Public House Road, and MD 355 and Stringtown Road.

ESTIMATED SCHEDULE

Design development will begin in FY24, and construction will start in FY26.

CLIMATE REVIEW

- Energy Efficiency
- Greenhouse Gas Emissions
- Carbon Sequestration
 - Selected: Low Carbon
- Resilience
 - Selected: Robust
- Social Equity

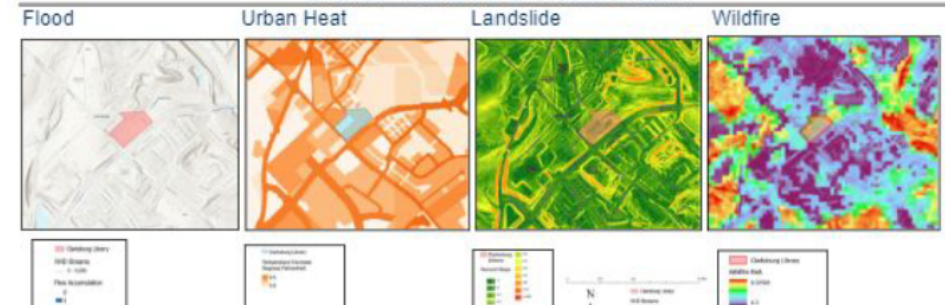


CLIMATE MEASURES

Indicator	Unit	Conventional	GHG Emissions: Low Carbon	Resiliency: Robust
Energy Intensity	MWh/year	77	62	62
Annual Greenhouse Gas Emissions	tCO2e/year	26	0	0
Net Annual Greenhouse Gas Emissions	tCO2e/year	26	(0.0)	(0.0)
Lifecycle Net Greenhouse Gas Emissions	tCO2e/20 years	528	(0.3)	(2.7)
Percent annual tCO2e compared	Percent	100%	0%	0%
Cost to Improve Resilience	\$000s	-	-	63
Loss Avoided due to Resilience*	\$000s	-	-	10,770
Percent loss from hazards compared	Percent	100%	100%	0%
Adjusted Capital Cost	\$000s	33,740	37,391	37,454
Adjusted Annual O&M Cost	\$000s/year	604	577	577
Adjusted Lifecycle Cost (Capital, O&M, Major Maintenance)	\$000s/20 years	46,878	40,972	51,417
Percent life-cycle cost compared	Percent	94%	100%	100%

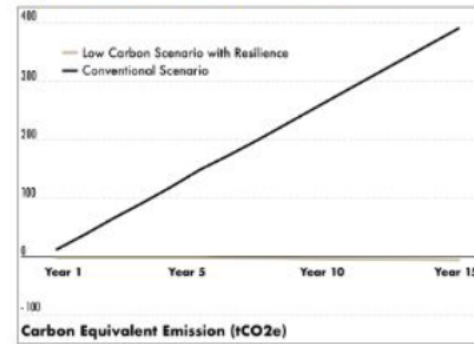
*One occurrence of each extreme event

SITE EXPOSURE TO EXTREME EVENTS

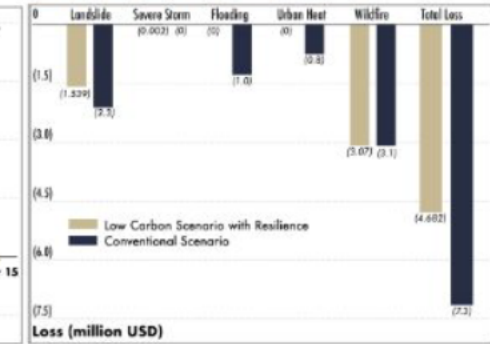


Project Report - Possible Addition of Climate Measures

NET GHG EMISSIONS OVER TIME



LOSS DUE TO EXTREME EVENTS



RACIAL EQUITY AND SOCIAL JUSTICE (IN PROGRESS)

[Place text here]

PROJECT JUSTIFICATION

The Department's Strategic Facilities Plan (1998 - 2003) recognized the need for library services in the Clarksburg area, including a needs assessment completed in 2001. The Department confirms that the Clarksburg area continues to meet the criteria for a new facility, as outlined in the Department's Facilities Plan 2013-2016. The Clarksburg population is expected to increase from 13,766 in 2010 to almost 40,000 by 2025. The closest library is the Germantown branch, which opened in 2007. The library will serve as the community connection hub to ideas, learning, and the exchange of information. It will improve the community through facilitating knowledge creation, informing the community, and inspiring lifelong learning and collaboration.

FISCAL NOTE

Dedication of a 1.1 acre site was approved by the Montgomery County Planning Board on July 23, 2015 as part of the developer Third Try LLC's design for the site plan for the unbuilt portions of the Town Center on the east and west sides of the development. Pending evaluation of a Program of Requirements, a more refined cost estimate will be provided. Associated parking will be provided by the developer.

COORDINATION

Maryland-National Capital Park and Planning Commission, Department of General Services, Department of Technology and Enterprise Business Solutions, Department of Permitting Services, Washington Suburban Sanitary Commission, Clarksburg Town Center Development District, Department of Public Libraries, Upcounty Regional Service Center.

New Appendices - Summary Report by Project and Department (Sector)

	Energy Intensity (MWh/year)		Net lifecycle carbon equivalent emissions (tCO2e/lifecycle)		Total capital cost		Lifecycle cost		Avoided cost from climate investment	
	Conventional	Selected	Conventional	Selected	Conventional	Selected	Conventional	Selected	Conventional	Selected
GENERAL GOVERNMENT										
County Offices and Other Improvements										
Project 1										
Project 2										
Project 3										
.....										
TRANSPORTATION										
Bridge										
Project 4										
Project 5										
Project 6										
Mass Transit										
Project 7										
Project 8										
.....										
RECYCLING AND RESOURCE MANAGEMENT										
Project 9										
Project 10										
Project 11										
.....										
Total	Energy intensity (MWh/year)		Net lifecycle carbon equivalent emissions (tCO2e/lifecycle)		Total capital cost		Lifecycle cost		Avoided cost from climate investment	
	Conventional	Selected	Conventional	Selected	Conventional	Selected	Conventional	Selected	Conventional	Selected

Key indicators show how projects move from conventional to selected performance outcomes (and associated designs)

New Appendices - Green and Climate Finance Indicators

Borrower	Project name	Description	Project period (est.)	Criterion met	Total disbursed (1000 NOK)	Green loan outstanding (1000 NOK)	Total cost (1000 NOK)	KBN share of financing	Heated area (m²)	Estimated impact (KBN share)		
										Energy produced (kWh annually)	Energy avoided (kWh annually)	Corresponds to avoided GHG (tonnes CO ₂ e annually)
Malvik municipality	Vikhammer lower secondary school	A new lower secondary school for approximately 450 pupils featuring a cultural centre, a youth centre and an arts school. The building will have a low energy demand and approximately 1,900 m² of solar panels, and the construction site and bulk transportation vehicles will be fossil-free. The sports pitch will have environmentally friendly artificial grass, and the building will be heated from a local district heating facility. A grant was received from Klimasats for the pre-engineering phase.	2021-2023	1.2.1 New low-energy buildings	325 640	319 127	407 350	78%	7 367	202 942	200 847	4.4
Malvik municipality	Vikhammer nursery	A new nursery with a low energy demand featuring extensive use of mass timber. The requirements set for the building are a combination of the criteria for nZEBs in the Norwegian Agency for Public and Financial Management's Criteria Wizard for Sustainable Public Procurement and in the Futurebuilt programme. Energy will be produced from solar panels and a ground source heat pump.	2022-2023	1.2.1 New low-energy buildings and 1.2.2 New buildings with climate-friendly materials	107 360	105 213	134 200	78%	1 368	43 299	66 817	1.2
Trondheim municipality	Risvollan nursery	The ambition for the new Risvollan nursery in Trondheim is for it to be the municipality's first energy-plus nursery. The building will be certified as BREEAM-NOR 'Very Good', and solar panels are planned for its roof.	2022-2023	1.2.1 New low-energy buildings	39 500	39 500	119 000	33%	2 033	-	44 268	0.5
Sykkylven municipality	New Sykkylven school	A new school and sports hall will be constructed in Bakkeøyane, northeast of central Sykkylven. Extensive use will be made of mass timber and glulam, and the school building and sports hall will also be built as a single building with a shared energy centre, using heat from geothermal wells.	2022-2023	1.2.2 New buildings with climate-friendly materials	198 350	198 350	363 000	55%	7 535	136 605	56 407	2.1
Skaun municipality	New fire station	The fire station in Skaun is being moved to central Børsla, and will be built in climate-friendly materials, using mass timber to support the roof and in the columns of the outer walls.	2021-2022	1.2.2 New buildings with climate-friendly materials	33 000	32 585	49 500	66%	1 315	-	12 119	0.1
Flakstad municipality	New Flakstad school	Flakstad school will be built using mass timber for the load-bearing system, floors and walls. The building will be heated using energy wells, and solar panels will be installed to produce energy locally.	2021-2022	1.2.2 New buildings with climate-friendly materials and 1.2.4 Buildings with locally produced energy	96 000	96 000	124 500	77%	1 685	160 916	8 315	1.9

Climate-smart CIP - Early support and field tests

2013 World Bank President's Initiative

to reach 300 cities in developing countries over 4 years to help them plan for a low-carbon future and get the needed financing flowing

Task force to Catalyze Climate Action

Low Carbon Livable Cities & Resilient Cities Initiatives

World Bank City Creditworthiness Initiative

World Bank City Resilience Program

Partnerships and funding sources

World Bank, PPIAF, Rockefeller Foundation, Global Environment Facility, C40 Cities Network, UN-Habitat, Korean Green Growth Fund, African Development Bank, UNIDO,...

Workshops and technical assistance programs

700+ municipal directors of finance & planning in 30+ countries, including C40 cities, Rockefeller's 100 Resilient Cities

Country-wide workshops in Colombia, Jordan, Palestine, India, Uganda, Rwanda, Tanzania, Ethiopia, Kenya, Indonesia

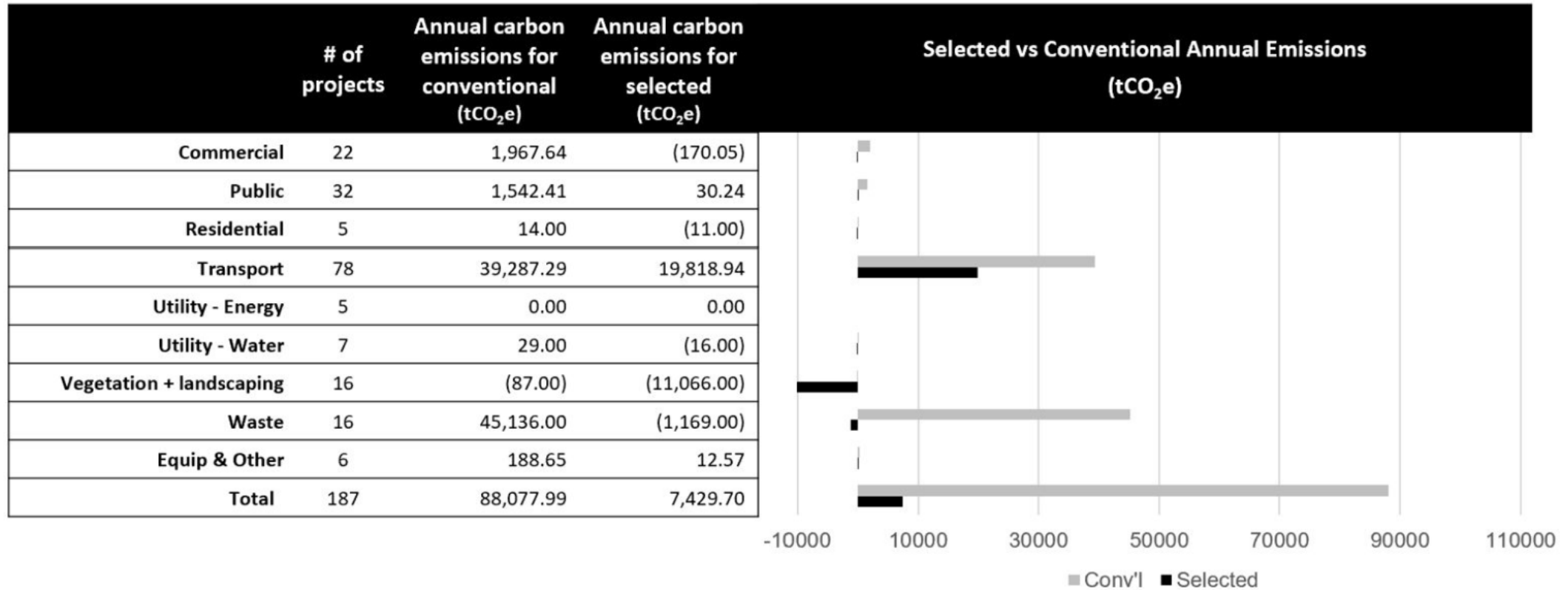
Regional workshops, East Asia (12 nations), Washington DC (18 nations)

Technical Assistance Programs in India, Turkey, Ethiopia, Uganda, Tanzania

San Francisco Public Utilities Commission

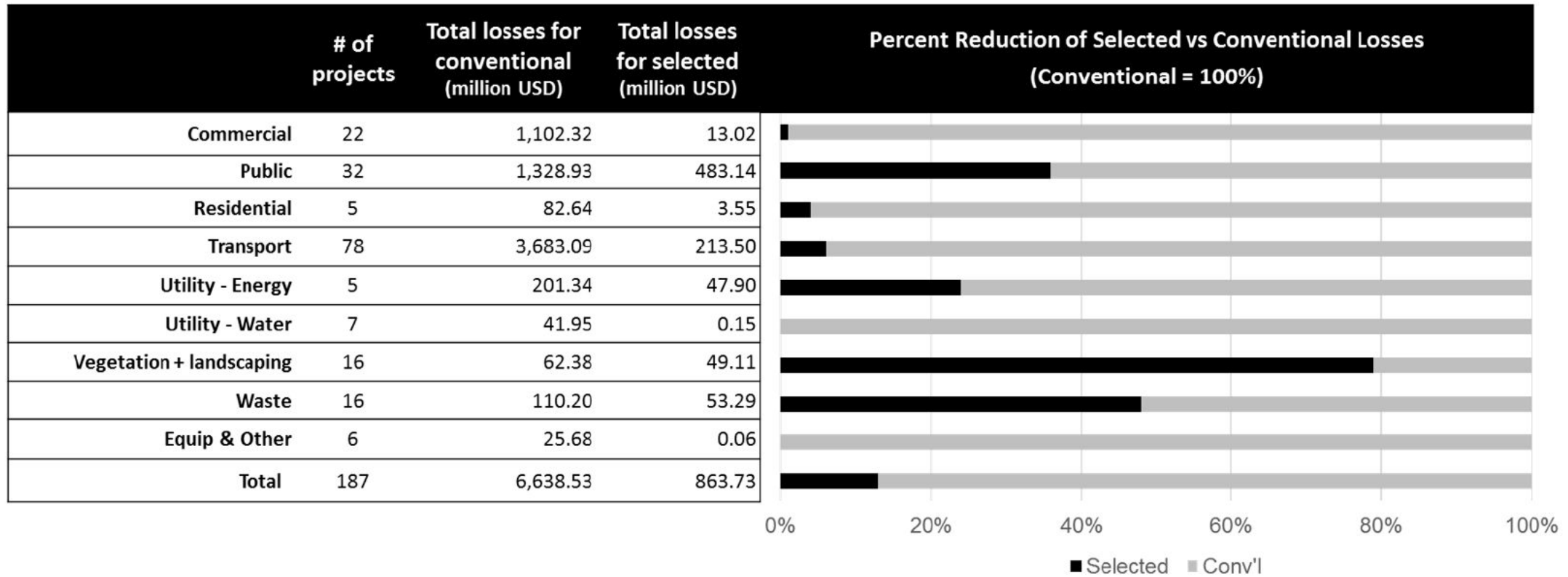
Field Test: Eliminating GHG Emissions through the Climate-smart CIP

Sample of 8 cities and 187 projects (\$2.5B capital investment)



Field Test: Improving Resilience through the Climate-smart CIP

Sample of 8 cities and 187 projects (\$2.5B capital investment)





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Enabling Cities to Fund Sustainable Infrastructure



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Capital Investment Planning and Climate Budgeting for Clean Energy and Low Carbon Infrastructure Projects

Prepared in collaboration with **Montgomery County, Maryland**

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April 18, 2024

