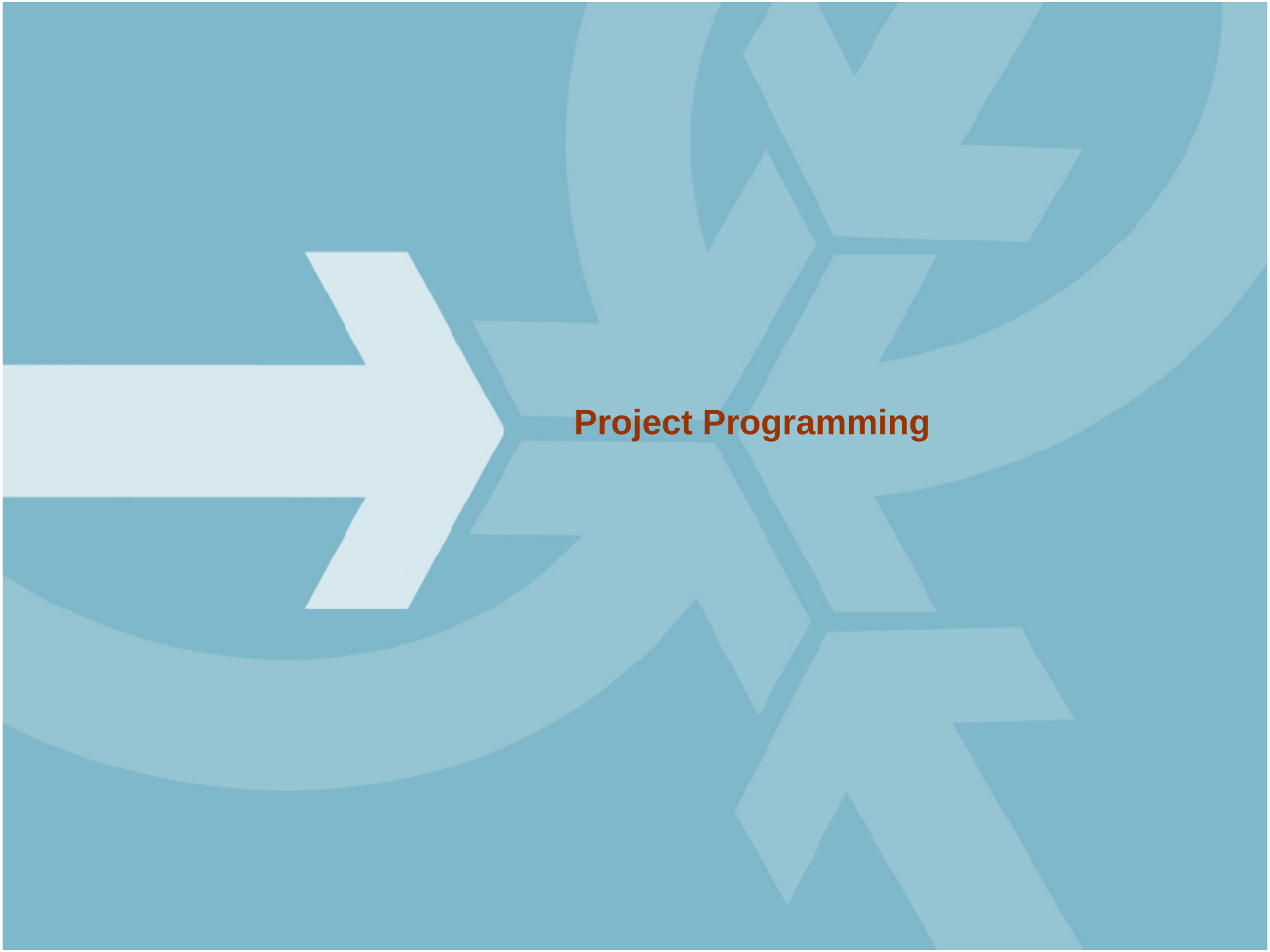
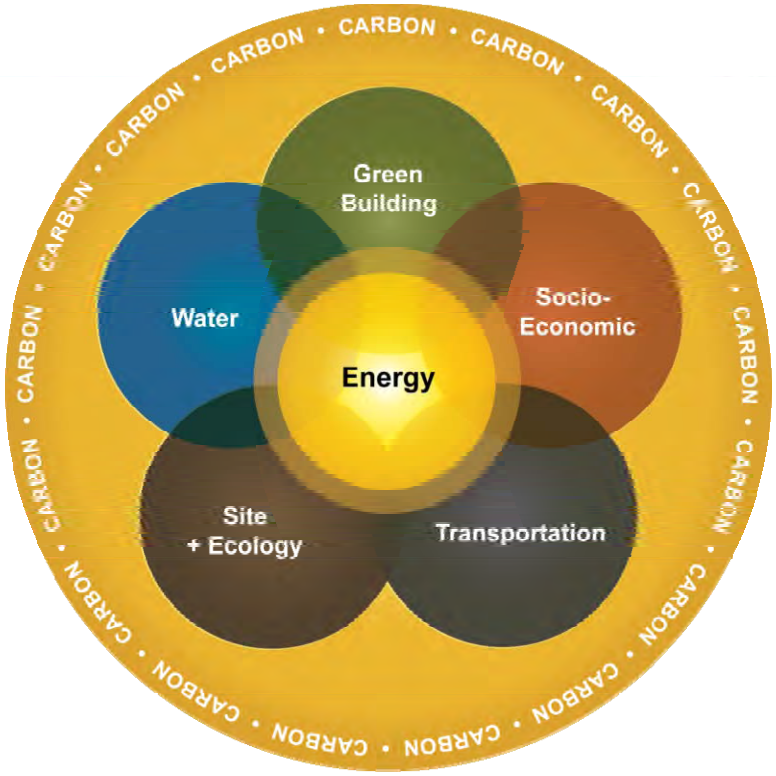

Project Programming

Programming

So which sustainable design measures are right for your project?

What level of performance should you target?



AECOM

Site Drivers

Programming role:

/ **Ecosystem capabilities**
  / Climate/Climate Change
  / Biodiversity
  / Physiography
  / Hydrology



/ **Land use capabilities**
  / What is business as usual?
  / Energy, water supply
  / Land use context



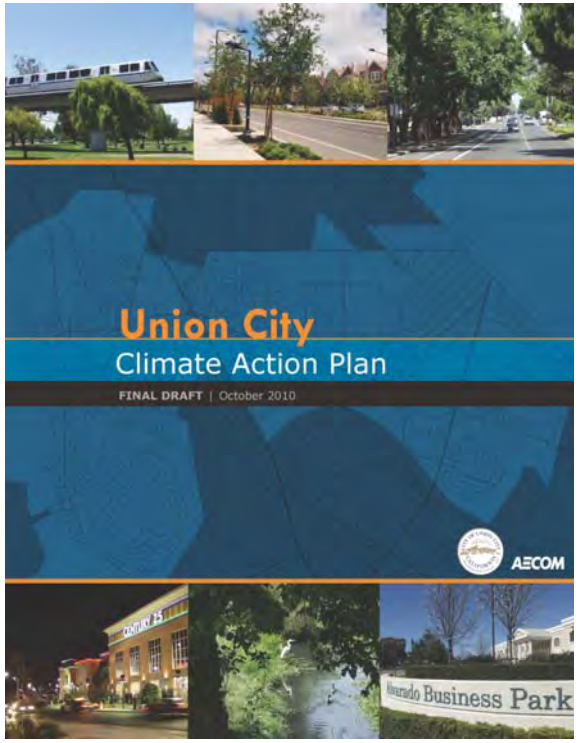
AECOM

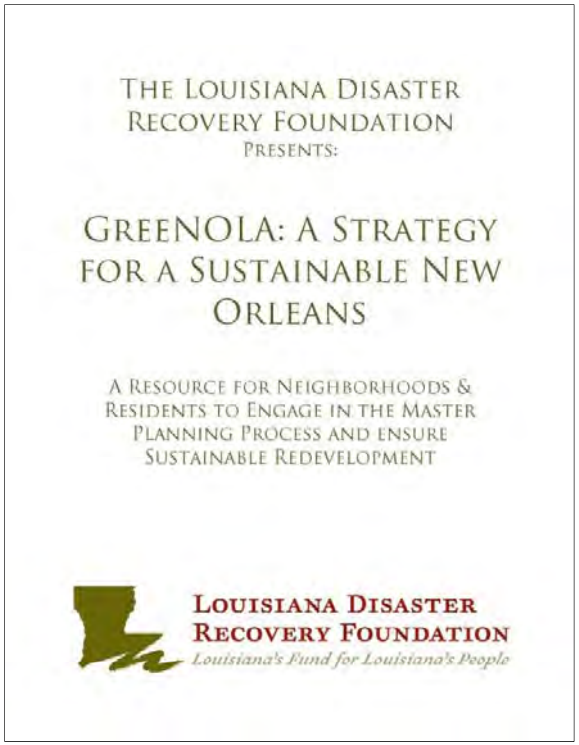
Policy Drivers

Programming role:

/ Establishes local targets, performance baselines, priorities

/ Incentives





AECOM

Best Practices & Analogs

Programming role:

/ Example of what works

/ Establish the bar

Case Studies

Carsten Crossings	65th St/University Transit Village	Upton, UK	Treasure Island	Dockside Green	Ladera (Terramor)
Part of the 1,200 acre Whitney Ranch near Rocklin, California	East Sacramento, California	Upton, Southwest district, Northampton, England	393 ac master plan development in San Francisco Bay Area, California	15 ac planned sustainable harbor front community in Victoria, BC	4000 ac (Terramor 644 ac) master planned community in Orange County, California
Client: Grupe Planner: Grupe	Client: City of Sacramento	Client: Northampton Borough Council Planner: EDAW	Client: Treasure Island Community Development Design Team: Arup, BKF, SOM	Client: Vancity Enterprises & Windmill Development	Client: DMB Ladera Planner: EDAW
Main design components: - All homes to be built to LEED Certified - highly-compact coastal cities - Walkable, transit-rich district with high density district core	Main design components: - Transit oriented development (TOD) - Improved pedestrian and bicycle circulation - Access to light rail	Main design components: - Higher density mixed-use district - Improved public transportation - Community focal point - Improved pedestrian & cycle - Innovative drainage techniques - The local center to be located along the main road	Main design components: - Dense, compact, walkable design with easy access to transit - Maximize access to a variety of open space and parks - Self sufficient community - Street and bldg orientation to maximaze the sun effect and minimize the wind impact	Main design components: - Socially diverse - Ecologically restaurative - Economically sound community for 2,500	Main design components: - None-gated community - Valley-like setting which suggest a general inward orientation - Mixed density neighborhoods with different characters
Main sustainable components: - All homes built to LEED Certified - 144 homes with solar panels - Exceeds Title 24 energy standards - High efficiency HVAC system - Enhanced insulation - Energy efficient windows - Tankless water heaters - Energy efficient lighting - 40 acre community park	Main sustainable components: - Walkable transit village - Mixed use - Open space, joint use detention basin/neighborhood park - Mix of housing types - Balance residential, retail, and employment opportunities - Plan to reduce operational emissions of ozone precursors by a minimum of 15 percent	Main sustainable components: - Sustainable drainage systems - Green tariff electricity supplies & common service corridor - Optimize passive solar gain and low CO emission - High efficiency fittings & rainwater harvesting technologies for water conservation - Using recycled or local, sustainable sourced materials	Main sustainable components: - Resources are used efficiently and replenished over time - Effectively using the sun, wind, climate and tree canopy - Walkable, bikeable streets - Thriving mixed-income, cross-generational community in a self-sufficient, urban setting - Sufficient on-site education, recreation & cultural opportunities	Main sustainable components: - 26 proposed LEED platinum buildings - On-site biomass energy cogeneration plant - 65% water reduction - Car sharing / mini transit system - Commitment of C $ 1 million to the City	Main sustainable components: - Biofiltration & water treatment system - Pedestrian friendly streets-capes w/ reduced street width - Enhanced energy conservation - New construction recycling - Diversed educational system - Residential green bldg program
Carbon:	Carbon:	Carbon:	Carbon: Working towards carbon neutrality	Carbon: Greenhouse Gas Neutral	Carbon:

INTERNATIONAL GREEN COMMUNITIES CASE STUDIES EDAW | AECOM

AECOM

Certification Systems

Programming role:

/ Established, comprehensive frameworks

/ Green premium, name recognition

/ Monitoring and verification

STAR COMMUNITY INDEX

CALIFORNIA green BUILDER
www.cagreenbuilder.com

CALIFORNIA Climate ACTION Registry

LEED FOR NEIGHBORHOOD DEVELOPMENT

Source: USGBC

Twinbrook Station: Transit-Focused Living

SPECS
1,595 multi-family residential units

325,000 sf of office space

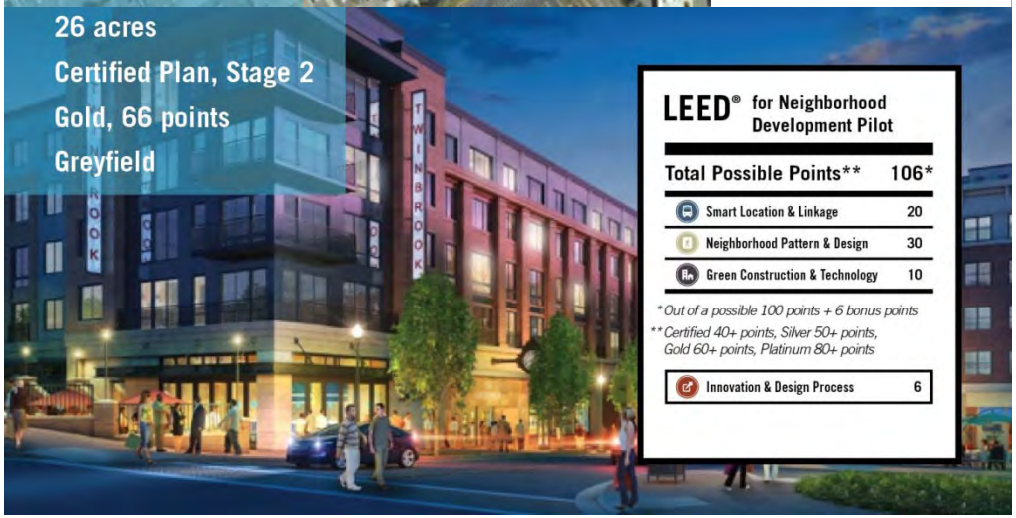
225,000 sf of street front retail

80% of buildings seeking LEED certification

1,028 daily transit trips

30% reduction in water usage (projected)

26 acres
Certified Plan, Stage 2
Gold, 66 points
Greyfield



Quantitative Modeling

Programming role:

- / Measurement of GHG & environmental benefits
- / Specific target compliance
- / Optimize project costs, paybacks
- / Solutions engineered for project context

Water Demand

659.6 MGY
1.81 MGD

26%

170 MGY
Nearly 1 Olympic swimming Pool/day

Power Demand

194.4 GWhr / Yr

30% +

58 GWhr/Yr
Power for 1,400 Homes

GHG Emissions

163,710
MTCo2eq/Yr

34%

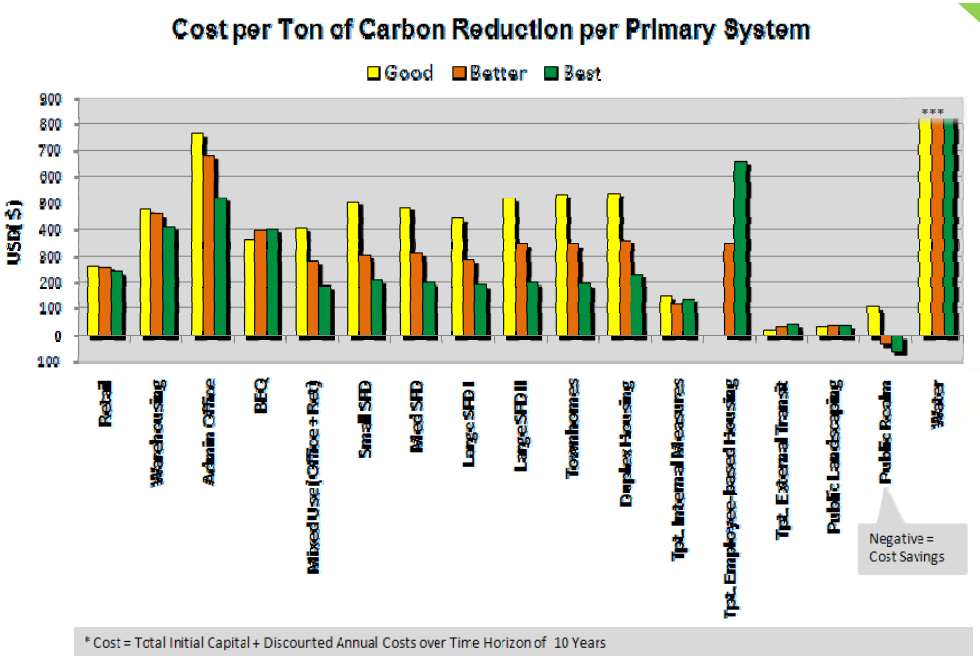
56,000
MTC02eq/Yr
10,000 cars off the road

VMT

73.2 M miles/yr

30%

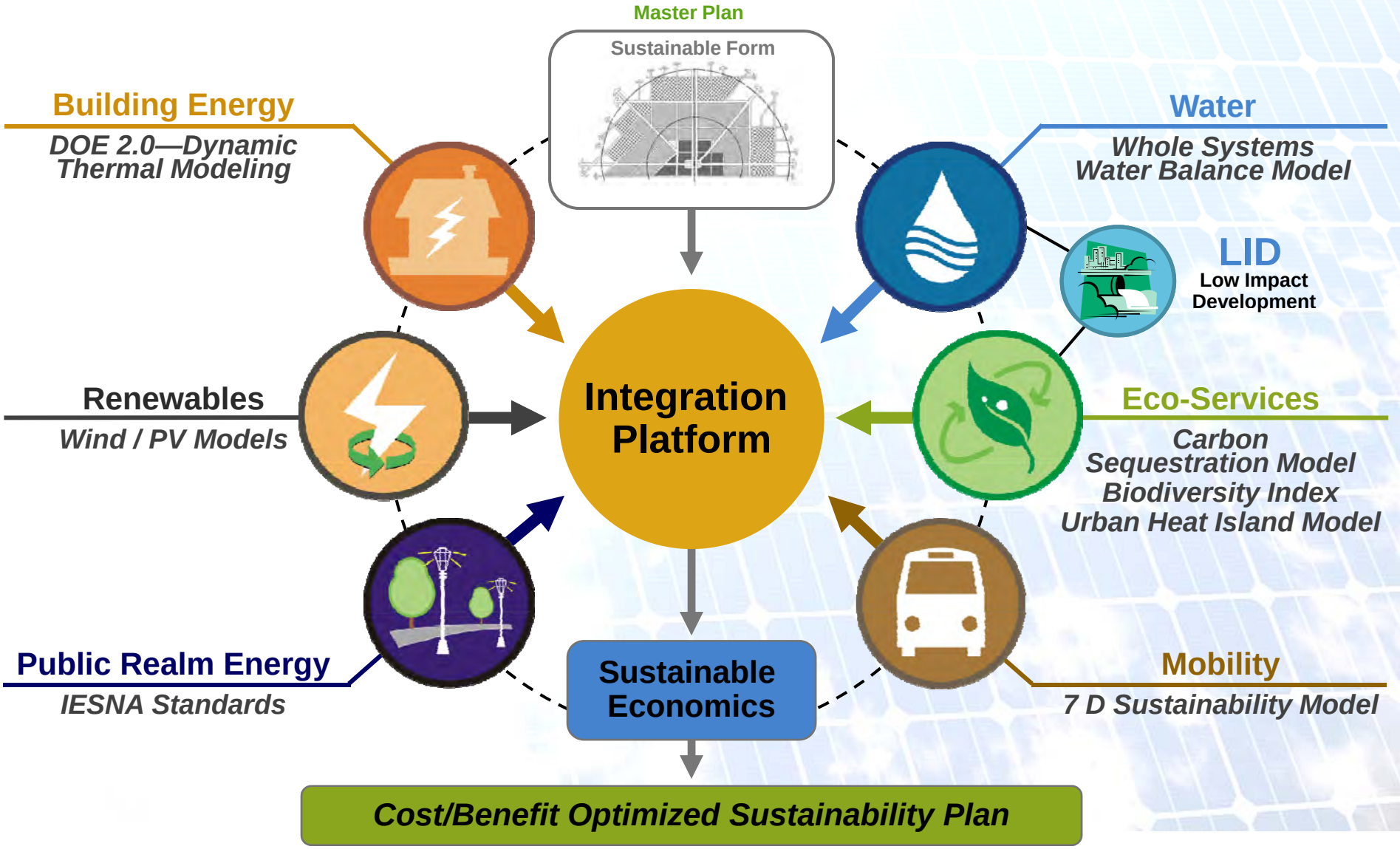
6 Million Vehicle Miles/Yr



Performance Assessment and Systems Integration

Site Specific Conditions and Priorities

Quantitative Modeling



Sustainability Options "Gaming"

Program Alternatives

Comparing packages of sustainability measures for a project

Core Systems

Package Selection

Real-time Readout of Primary Performance Indicators

Real-time Readout of Primary Cost Indicators

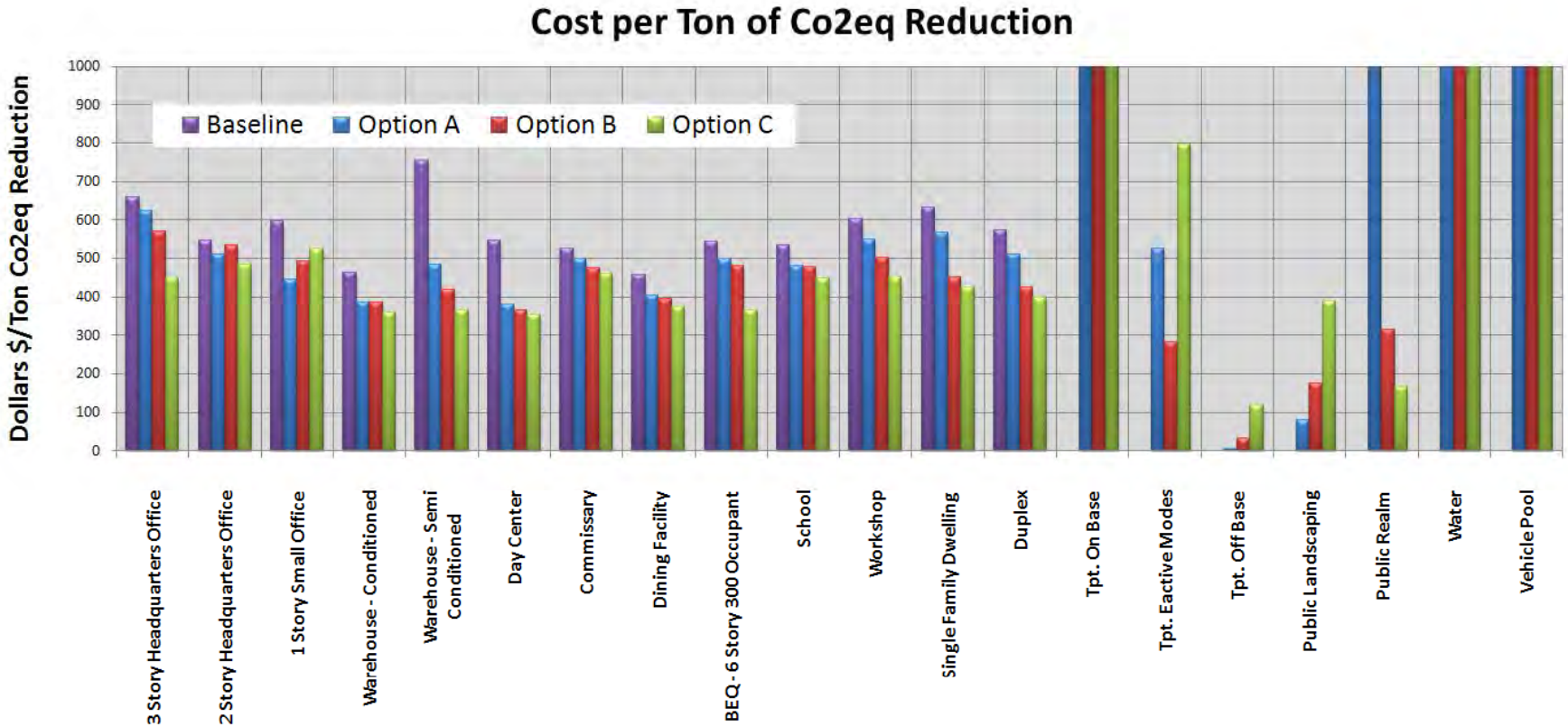
STAGE III PROGRAM SELECTION GAMEBOARD

Themes	Selected Packages for Programs		
	S1	S2	S3
Residential : Small SFD	Good	Better	Better
Residential : Med SFD	Good	Better	Better
Residential : Large SFD I	Good	Better	Best
Residential : Large SFD II	Good	Better	Best
Residential : Townhomes	Good	Best	Best
Residential : Duplex Housing	Good	Best	Best
Green Building - Residential	Good	Good	Better
Non-Residential : Retail	Baseline	Baseline	Baseline
Non-Residential : Warehousing	Baseline	Good	Good
Non-Residential : Admin Office	Good	Good	Good
Non-Residential : BEQ	Good	Good	Good
Non-Residential : Mixed Use (Office + Ret)	Good	Better	Better
Green Building Non-Residential	Good	Good	Good
District Heating / Cooling	Baseline	Baseline	Baseline
Water	Good	Good	Good
Sequestration - Public Landscaping	Better	Better	Baseline
Sequestration - Forestry	Baseline	Baseline	Baseline
Ecology - Farming	Good	Better	Good
Ecology - Biohabitat	Baseline	Baseline	Baseline
Urban Heat Island Mitigation	Baseline	Baseline	Baseline
Public Realm Energy	Better	Better	Best
Public Renewable Energy	Baseline	Baseline	Baseline
Transportation - Urban Form (4D) Measures	Baseline	Baseline	Baseline
Transportation - Internal Measures	Good	Better	Best
Transportation - Employee Based Housing	Better	Better	Better
Transportation - External Transit	Good	Baseline	Baseline
Renewable Energy - With Transportation	No Renewables		
Renewable Energy - Without Transportation	No Renewables		
PERFORMANCE INDICATORS			
Total Carbon Emission Reduction (%)	25.8%	32.6%	33.6%
Total Building Energy Reduction (% Reduction)	13.2%	23.7%	24.5%
Total VMT (% Reduction)	34.0%	35.0%	39.0%
Total Water Use (% Reduction)	38.8%	38.8%	38.8%
Total Cost (% Increase)	2.5%	3.4%	3.5%
Total Master Developer Cost (% Increase)	-3.3%	-2.7%	1.1%
Total Annual Cost (% Reduction)	16.5%	23.5%	23.8%
Total Cost Buildings (% Increase)	0.4%	1.6%	1.6%
Residential Building Cost (% Increase)	2.7%	4.4%	4.4%
Non-Residential Building Cost (% Increase)	2.7%	3.3%	3.3%
Status of Res Building Cost Inc (by Target)	Bldgs OK	Bldgs OK	Bldgs OK
Status of Non-Res Building Cost Inc (by Target)	Bldgs OK	Bldgs OK	Bldgs OK

SSIM

Select Preferred Program

Evaluating the "Biggest Bang for the Buck"



SSIM Projects Results

Case Study:	Transportation: [2]	Water:	Residential Energy:	Non-Residential Energy:	Carbon Emissions (GHG):[3]	% of Total Cost:[4]
Case Study #1: Northern CA (San Benito, CA)	13%	66%	55%	36%	30%	5.0% savings
Case Study #2: Salt Lake City, UT	18%	45%	50%	30%	28%	4.7%
Case Study #3: Charleston, SC	35%	39%	29%	14%	35%	2.9%
Case Study #4: Near Bejing, China (Tangu)	50%	40%	56%	51%	36%	4.6%
Case Study #5: Melbourn, Australia	17%	40%	60%	42%	43%	6.5%
Case Study #6: Stockton, California	23%	64%	44%	25%	30%	4.2%
Case Study #7: Guam Joint Military Base	34%	47%	43%	41%	40%	2.0% savings

1. Reduction from Baseline: local code or Business as Usual
2. VMT (Vehicle Miles Traveled) Reduction
3. GHG Emissions Reduction
4. Cost % of Total Project Cost

AECOM

Sustainable Community Design Summary

Whole Systems	**Interconnected live/work, built/natural, urban/exurban environments**
Optimization	**There are numerous sustainable design choices – and fewer right choices**
Quantification	**You can't manage what you can't measure**
Sustainable Economics	**Sustainable design CAN reduce cost of ownership**
Long Term Management	**Sustaining performance depends on monitoring, verification, and adaptive management.**

AECOM