

International District Energy Association Campus Energy Conference

District Energy
Alternate Pathways for LEED Credits
Leveraging PEER

USGBC DES Task Group

Purpose & Goals

- Outline and integrated approach to addressing DES in LEED and PEER
- Develop new DES guidance and credits for PEER
- Propose revision to DES credit pathways in LEED

Stakeholders

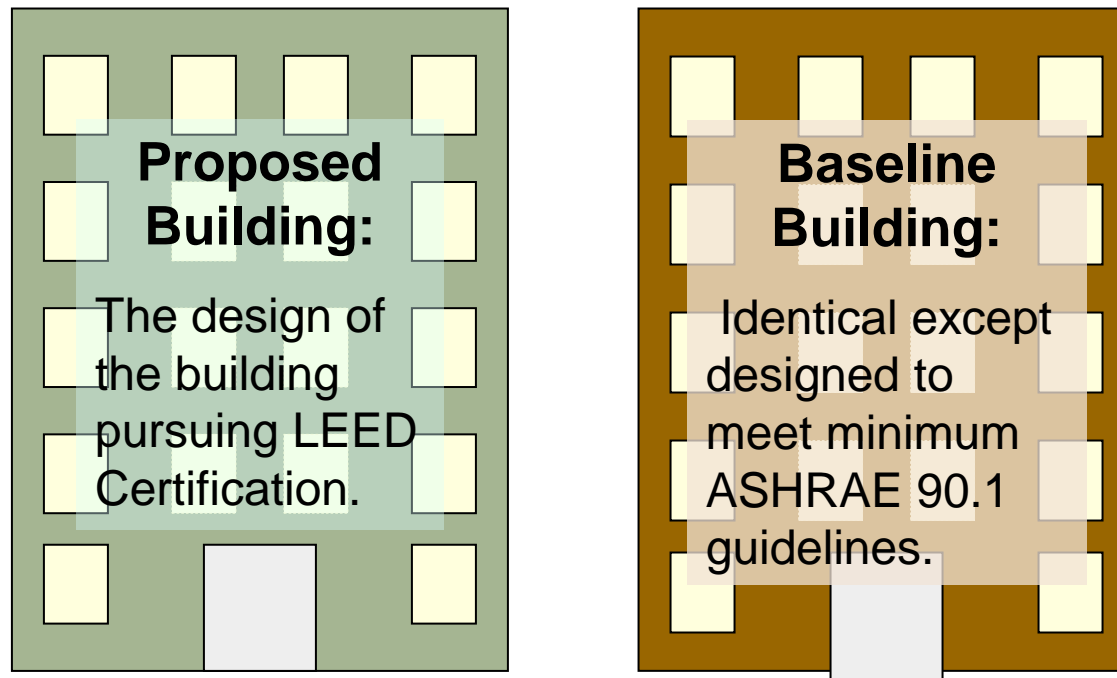
- Campuses
- Utilities
- Canadian USGBC
- China
- Europe

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LEED & District Energy

Leveraging DES to Achieve LEED Energy Credits (EAC)

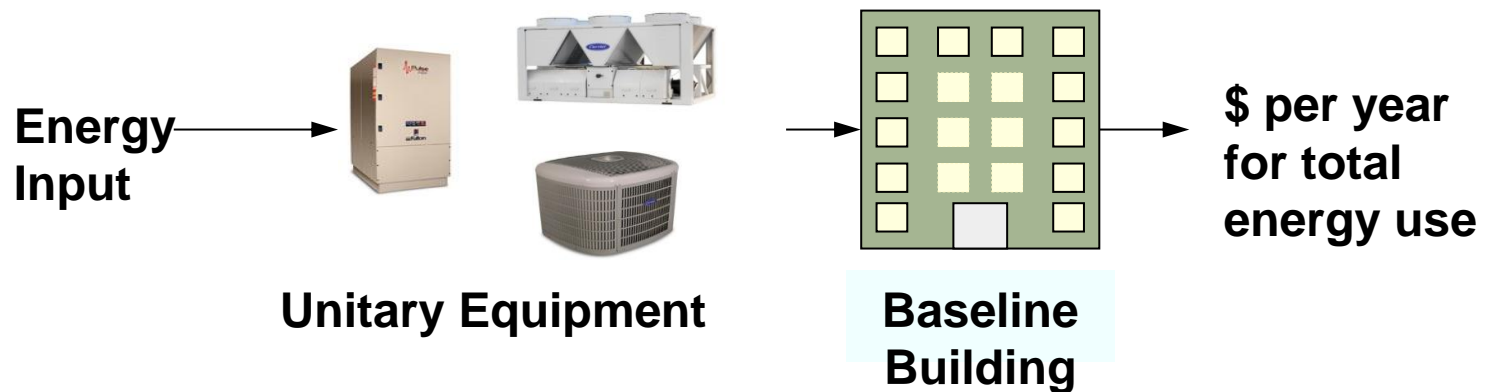
- LEED Energy Credits ~ 19 out of a possible 110 total points
- DES guidance provides methods for leveraging DES to achieve these points



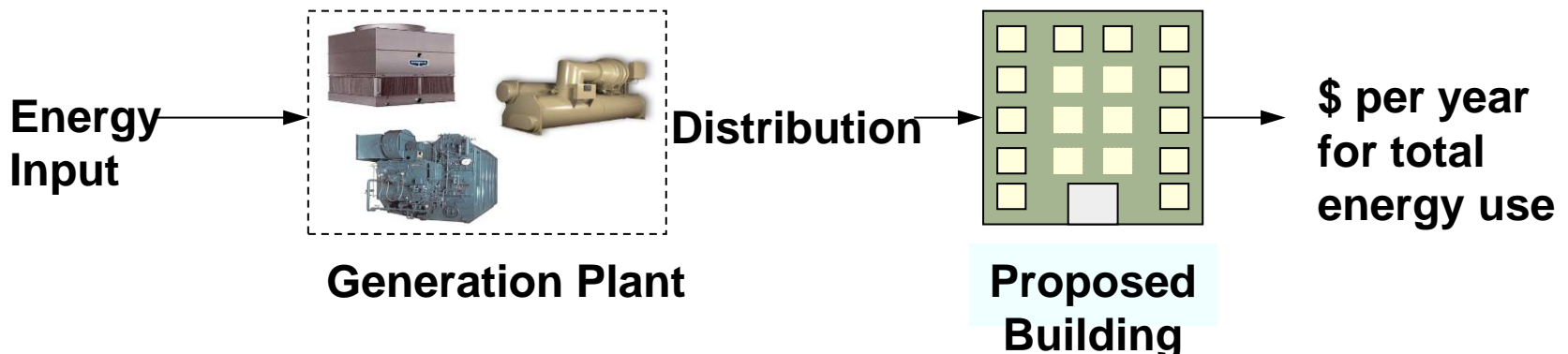
ENERGY USE IN DOLLARS

LEED DES CREDIT APPROACH

STEP 1: Model baseline conditions using ASHRAI 90.1 to determine energy use and costs



STEP 2: Model proposed building conditions with district energy to determine energy use and costs



Weaknesses of Current DES Approach

- Points awarded based on modeled cost improvements above baseline
- Modeling is very complex and time consuming for both the applicant and GBCI reviewer
- In some cases application of DES credit approach is a disincentive
- The current methodology is based solely on cost thereby avoiding other performance measures
 - Reliability & resiliency
 - Water use
 - Emissions
- Existing buildings cannot take credit for non-owned DEC
- Disconnect between proposed and actual performance

Pathways Forward (Courtney to modify)

- Alternative pathway to existing credit:
 - Utilize PEER to provide an alternate pathways to current LEED DES modeling approach
 - Could be incorporated as an addition to current pathway (i.e. modeling approach)
- Pilot Credits
 - This is a new credit, however, limited typically to only 1 point
- Revision to existing credit

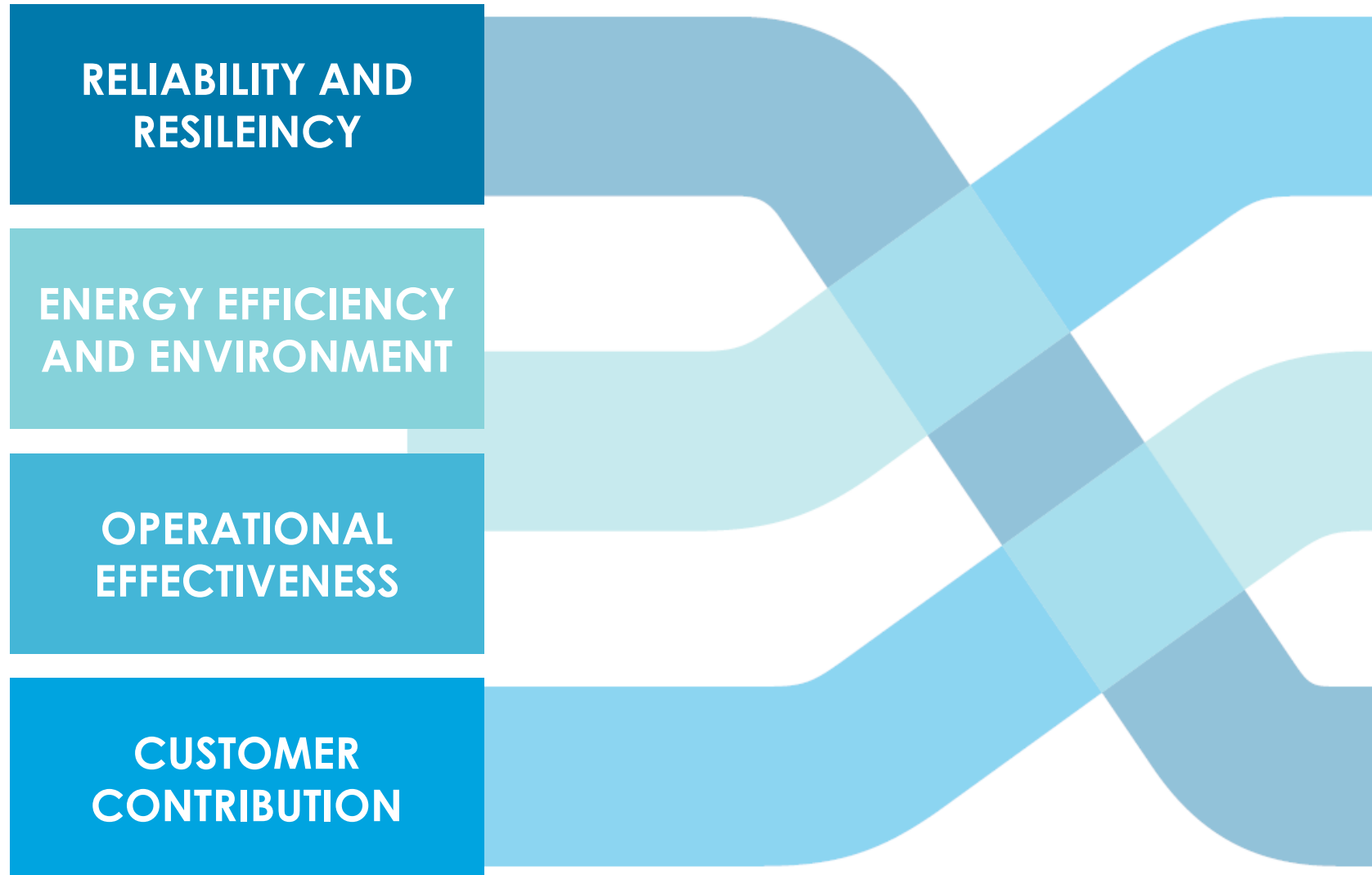
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PEER & District Energy

USGBC Goals

- Leverage PEER to improve the existing LEED DES guidance for Energy Credits within LEED
- Explore additional ways to leverage DES for LEED credits
- Leverage PEER to encourage DES owners to improve their systems, improve the business case for investment, and recognize excellent performers

Four critical categories of Performance



PEER CREDIT TYPES

BEHAVIORS (Proven Programs and Processes)

Risk Mitigation or
FMEA

Renewable
Energy
Certificates

Failure Identify and
Elimination

Value/Gap Analysis

Real-time Data

Dynamic Pricing

DESIGN (Capabilities and Considerations)

Safety
Auto Switching
Dist. Redundancy
Island Capability

Undergrounding
District Energy
Cogeneration

Microgrid
Demand
Response
Capability

Energy
Management
Systems

PERFORMANCE (Metrics and Outcomes)

Availability or SAIDI
SAIFI and AIFI
Power Quality

Source Energy SEI,
CO₂, NO_x, SO₂
Water
Solid Waste

System Energy
Efficiency
Load Duration Curve

% Demand Response
% Local Renewable
% Local Clean Gen

Reliability and
Resiliency

Energy Efficiency
and Environment

Operational
Effectiveness

Customer
Contribution

DES IMPACT ON ENERGY COST (\$/MWh)

PEER Value/Gap Results

Description	NYC	Boston	DC	TX
Total	\$176	\$154	\$111	
Thermal Energy	8	8	8	
Supply	80	80	60	
Demand	71	46	13	
Capacity	NA	NA	13	
Distribution	17	20	17	
% Potential Reduction DES	44%	38%	50%	
½ Cost Reduction	40	30	25	
Recovered Space	14	8	12	
Capital Cost	10	10	10	
Total Reduction w/DES	\$64	\$48	\$47	

EXISTING PEER PERFORMANCE METRICS

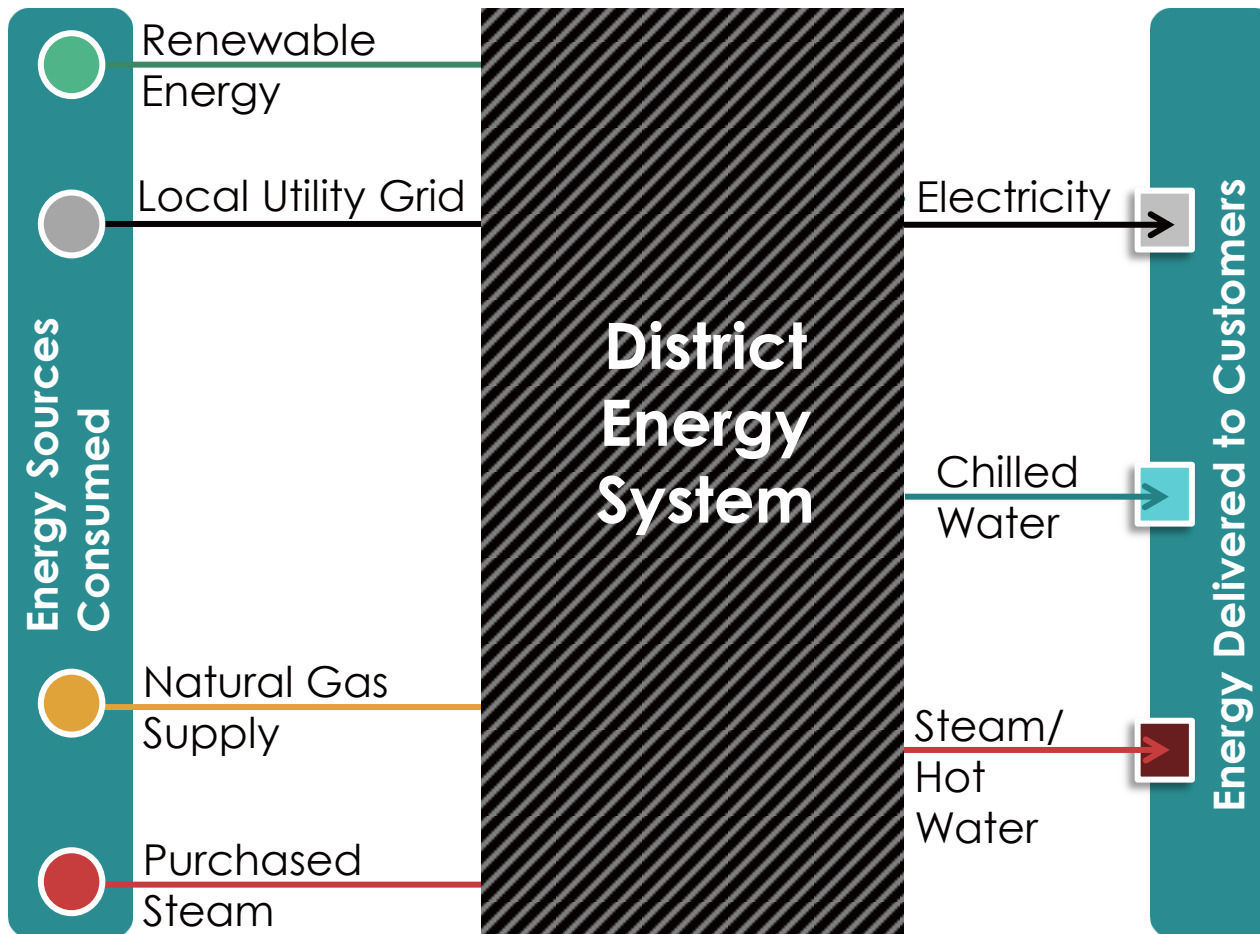
Applicable to District Energy

System Metrics	Requirements
System Energy Efficiency	SEE Index ($\text{MMBtu}_{\text{Out}}/\text{MMBtu}_{\text{In}}$)
Source Energy Intensity	SEE Index ($\text{MMBtu}_{\text{In}}/\text{MWh}$)
Water	Water Consumption in gal/MWh
Emissions	CO ₂ , NO _X , SO ₂ in lbs./MWh
Energy Resiliency	Protected, Cyber Security, redundancy, auto restoration
Demand Response	Ability to instantaneously reduce demand

System Energy Efficiency

CRITERIA DEFINITION

The ratio of energy delivered to customers over the fossil fuel energy delivered to the project



SYSTEM ENERGY EFFICIENCY (SEE)

Performance Metric	Building	Building w/Cogen	District Energy
Cogeneration Eff.	NA	48%	62%
Electricity SEI, MMBtu/MWh	10.7	8.8	7.9
Cooling, kW/ton	1.2	1.2	0.9
Boiler Eff.	80%	80%	90%
SEE %	54%	60%	74%

SYSTEM ENERGY EFFICIENCY (SEE)

Regional Sensitivity and Normalization

Performance Metric	SW	NE
% Cooling Load	51%	28%
% Heating Load	25%	44%
% Electric Load	24%	28%
SEE %	87%	65%
SEE Benchmark*	62%	44%
Method 1 – SEE change	25	21
Method 2 – SEE % change	40%	47%

- Benchmark (SEI = 10.7 , Boiler Eff. = 80%, kW/ton = 1.2)
- DES Task group still evaluating methods for setting benchmark (e.g. ASHRAE 90.1 Baseline)

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Summary

Pathways Forward (Courtney to modify)

- Alternative pathway for LEED EAC credit (19 points)
 - Utilize PEER to provide an alternate pathways to current LEED DES modeling approach
 - Expand definition of cost to include demand, capacity, capital, etc...
- Explore using PEER for other LEED credits
 - Renewable, carbon offsets, water
 - New resiliency LEED pilot credit
- Integrate DES Performance Criteria into PEER