

Net Zero Cities: Food for Thought

Mayors Innovation Project

Summer 2017 Meeting

Burlington, VT



What is a “zero net city”?

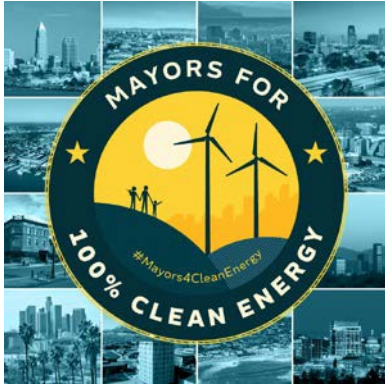
“A net zero-energy community is one that has greatly reduced energy needs through efficiency gains such that the balance of **energy for vehicles, thermal and electrical energy** within the community is met by renewable energy.”



Relies heavily on purchase of off-site RECs

Relies heavily on local renewable energy available within the community's built environment

Bold, aspirational goals are great...



What's your
BHAG?



Big. Hairy. Audacious. Goal.



Hollow promises...not so much

No, Cities Are Not Actually Leading on Climate. Enough With the Mindless Cheerleading

Sam Brooks, a former director for the D.C. government's energy division, examines the "cities are leading on climate" myth.

<https://www.greentechmedia.com/articles/read/hard-truths-about-city-failures-with-clean-energy>

"Fewer than a quarter of the mayors mentioned the environment or energy, and only 12% discussed climate change in any way. Those who did mention it often were based in cities where climate adaptation is already a necessity, not a choice."

- NLC 2017 State of the Cities Report

MONEYBOX

A BLOG ABOUT BUSINESS AND ECONOMICS.

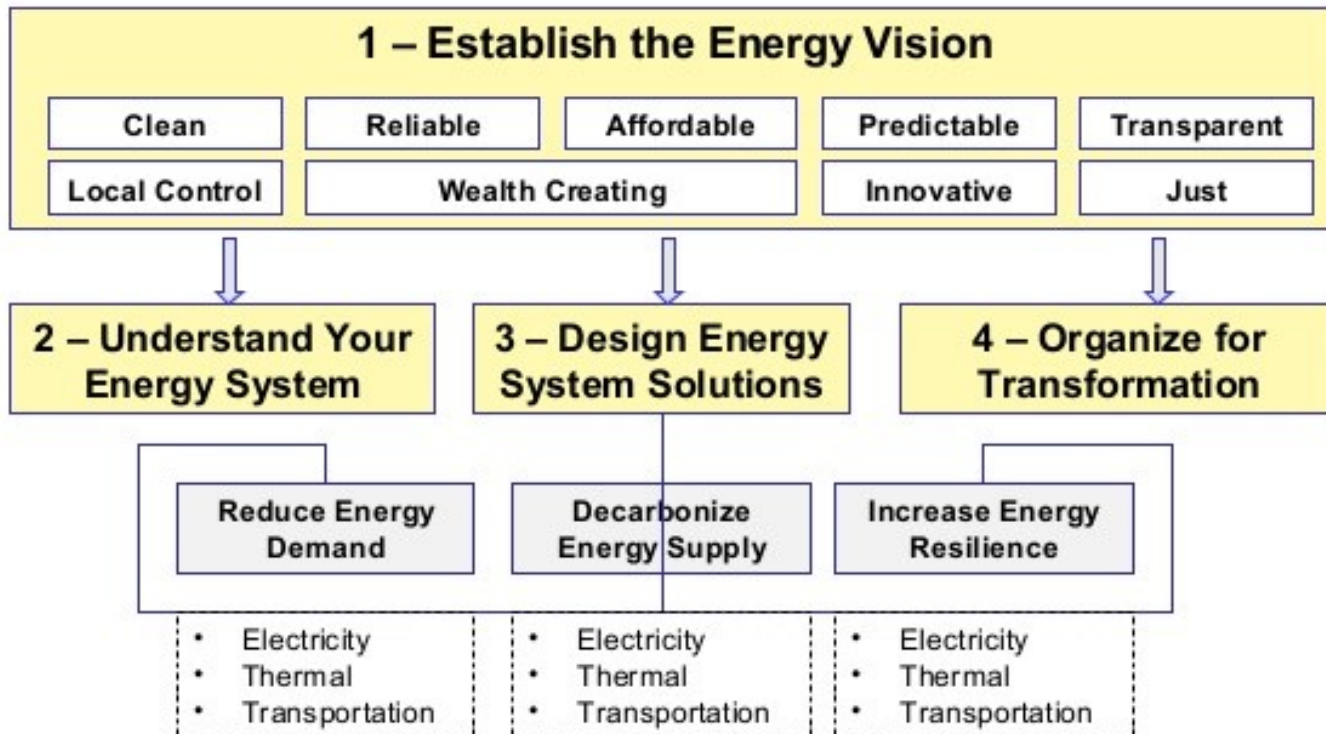
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Lefty Cities Say They Want to Fight Climate Change but Won't Take the Most Obvious Step to Do It

http://www.slate.com/blogs/moneybox/2017/06/14/cities_want_to_want_fight_climate_change_but_won_t_take_the_most_important.htm

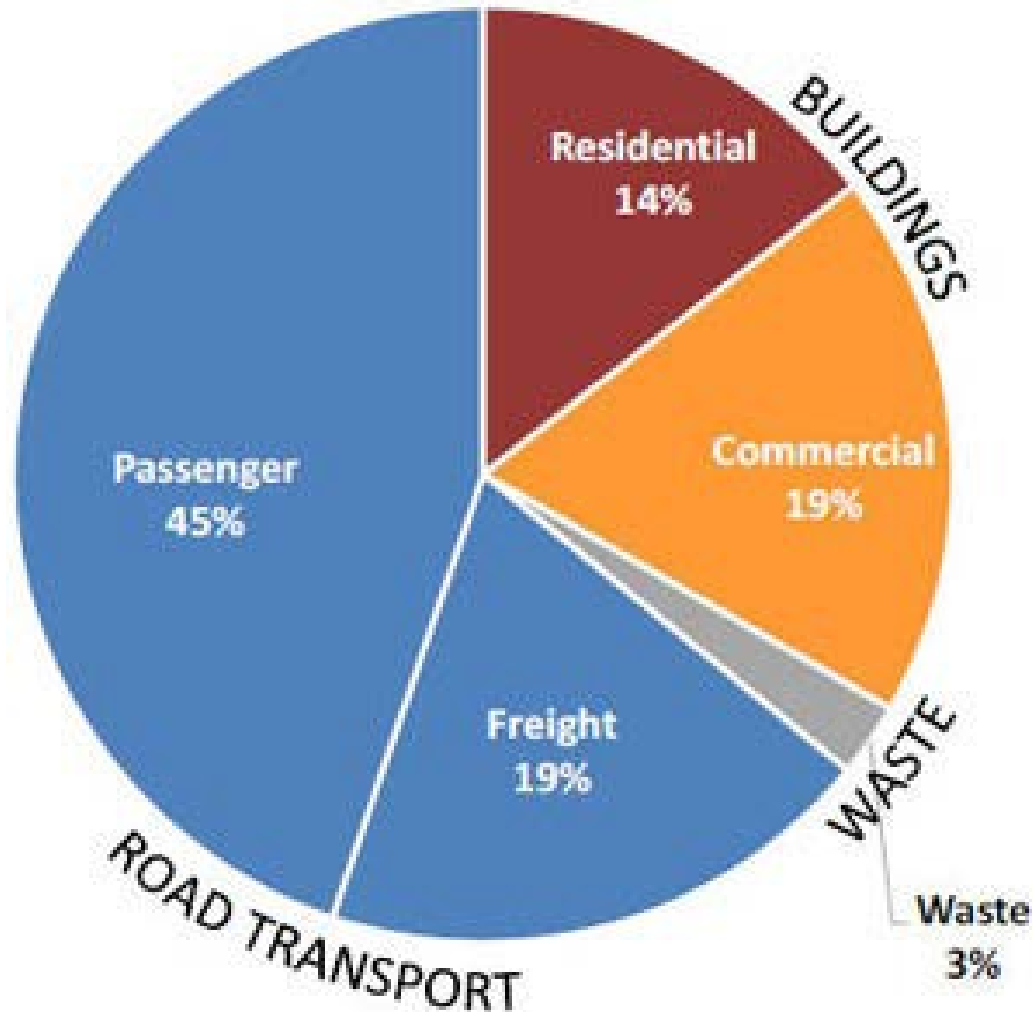
Useful Framework

Key Components of an Energy System Strategy



<https://www.slideshare.net/johncleveland/energy-systems-framework-final-december-2015>

Buildings and Transportation



Building Energy Strategies (1)

LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
<p>ENCOURAGE VOLUNTARY ACTION</p>	<ul style="list-style-type: none"> • <i>Encourage Improved Energy Efficiency Performance of Existing Buildings</i> • <i>Promote Energy Conservation Behaviors of Building Occupants & Tenants</i> 	<ul style="list-style-type: none"> • Best practice sharing between building owners • Building energy performance challenge programs • Building energy performance districts • Voluntary benchmarking programs
<p>SEND PRICE SIGNALS & PROVIDE SUBSIDIES</p>	<ul style="list-style-type: none"> • <i>Increase Access to Financing</i> • <i>Support/Provide Rewards for Performance</i> • <i>Subsidize Capacity Improvements for Building Management</i> 	<ul style="list-style-type: none"> • Building energy efficiency subsidies and incentives (e.g. ratepayer funds) • Access to specialized financing tools (e.g. Property Assessed Clean Energy (PACE); On-Bill Financing) • Support for building operator training • Market rewards for building certification performance (e.g. LEED) • Provide regulatory and zoning relief for buildings that meet high standards

Building Energy Strategies (2)

LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
<p>MAKE TARGETED PUBLIC INVESTMENTS</p>	<ul style="list-style-type: none"> • <i>Invest in Technology Development</i> • <i>Invest in Economic Development</i> • <i>Model the Behavior</i> 	<ul style="list-style-type: none"> • City piloting of new building technologies • Building technology “innovation hubs” • Building technology economic development clusters • Municipal Strategic Energy Management programs • Invest in Energy Efficiency Retrofitting of Government Buildings
<p>MANDATE BEHAVIORS & INVESTMENTS</p>	<ul style="list-style-type: none"> • <i>Mandate Reporting</i> • <i>Mandate No- to Low-Carbon Standards for New Construction</i> • <i>Mandate Performance Improvements of Existing Buildings</i> 	<ul style="list-style-type: none"> • Building Energy and Reporting Disclosure Ordinances • Mandatory energy audits; sub-metering; and building rating systems • Increased energy efficiency requirements in building codes • Net Zero building code requirements • Mandatory upgrade at point of sale • Mandatory building performance standards • Required certification of building operators

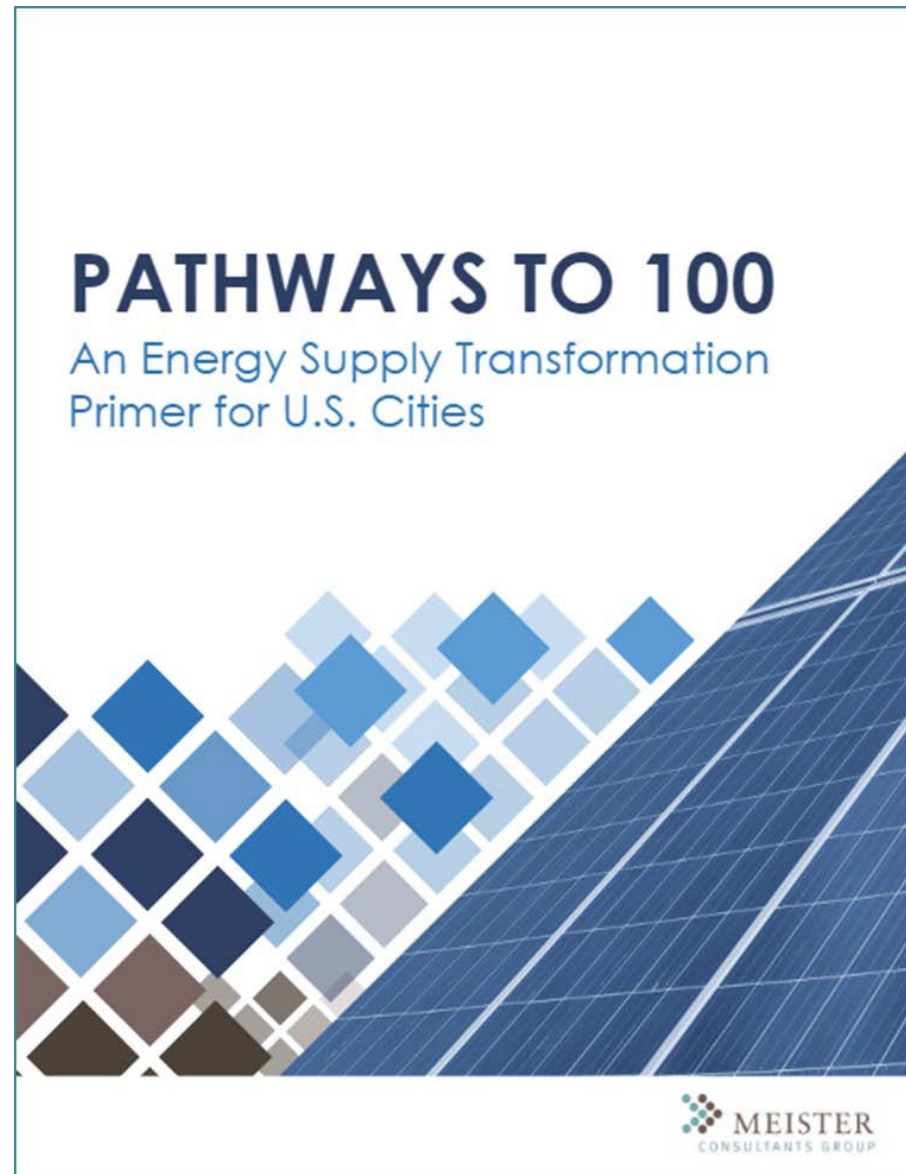
Transportation Energy Strategies (1)

LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
ENCOURAGE VOLUNTARY ACTION	<ul style="list-style-type: none"> • <i>Promote Non-Vehicle Modes of Transportation</i> • <i>Promote New Mobility Technologies and Business Models</i> 	<ul style="list-style-type: none"> • Promote the recreational and health benefits of bicycling and walking • Promote tele-working • Promote car pooling and High Occupancy Vehicle lanes • Partner with employers to encourage employee commuting using public transit, biking, or walking • Support pilots and address regulatory barriers for on-demand busing, shared use mobility, driverless vehicles, etc. • Encourage private investment in street cars, highways, shared use systems
SEND PRICE SIGNALS & PROVIDE SUBSIDIES	<ul style="list-style-type: none"> • <i>Increase the Cost of Using Fossil Fuel Vehicles</i> • <i>Reduce the Cost of Carbon-Free Vehicles</i> • <i>Increase the Cost of Driving in Certain Places</i> 	<ul style="list-style-type: none"> • Establish congestion/climate taxes on fossil fuel vehicles in designated areas • Establish taxes/fees on fossil fuel vehicles and fuels • Subsidize fossil-fuel free vehicles • Institute new parking pricing models • Establish regional road pricing • Promote “pay as you drive” insurance • Tax off-street parking

Transportation Energy Strategies (2)

LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
<p>MAKE TARGETED PUBLIC INVESTMENTS</p>	<ul style="list-style-type: none"> • <i>Invest in De-Carbonizing Public Transit</i> • <i>Invest in Increasing Non-Vehicle Share of Mobility</i> • <i>Invest in Redesigned Urban Form to Promote Less Vehicle Use</i> 	<ul style="list-style-type: none"> • Convert public transit, gov't fleets and taxi fleets to low-carbon fuels • Invest in public transit • Implement Bus Rapid Transit • Invest in bicycle infrastructure and bike sharing • Invest in fuel infrastructure for low-carbon vehicles (electric, hydrogen) • Support commercial freight shift to rail and ship • Implement "Complete Streets" • Prioritize Transit-Oriented Development Planning • Develop an integrated multi-modal mobility system at the regional level • Redesign goods movement in the city to increase efficiency
<p>MANDATE BEHAVIORS & INVESTMENTS</p>	<ul style="list-style-type: none"> • <i>Mandate Vehicle Fuel Efficiency</i> 	<ul style="list-style-type: none"> • Establish reduced idling ordinances • Establish car-free zones • Increase fuel efficiency targets for vehicle producers

To the heart of the matter...



Energy Supply Strategies (1)

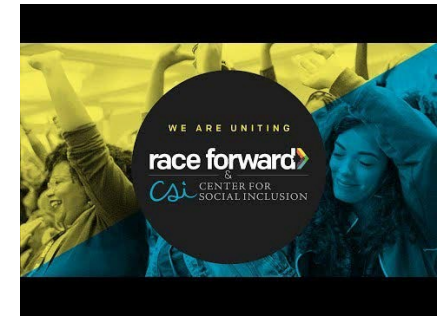
LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
ENCOURAGE VOLUNTARY ACTION	<ul style="list-style-type: none"> • <i>Enable Consumers to Purchase and/or Produce Renewable Energy</i> 	<ul style="list-style-type: none"> • Provide clean power purchasing options (e.g., allow consumers to participate in wholesale market, Community Choice Aggregation) • Assist large enterprises in implementing clean energy purchasing through Power Purchase Agreements (PPAs) and other arrangements • Ease permitting/land use regulation for on-site renewables (e.g., rooftop solar)
SEND PRICE SIGNALS & PROVIDE SUBSIDIES	<ul style="list-style-type: none"> • <i>Reduce Cost of Renewables</i> • <i>Ease Regulatory Compliance</i> 	<ul style="list-style-type: none"> • Provide financial incentives for on-site and off-site renewable generation (e.g., property tax breaks) • Provide feed-in tariffs and/or net metering incentives for excess distributed renewable generation • Reduce regulatory barriers to Combined Heat and Power, microgrids, district energy, Tri-generation

Energy Supply Strategies (2)

LEVER	TYPICAL STRATEGIES	TYPICAL ACTIONS
<p style="text-align: center;">MAKE TARGETED PUBLIC INVESTMENT S</p>	<ul style="list-style-type: none"> • <i>Invest in Renewable Supply</i> • <i>Model the Behavior – Purchase and Produce Renewable Energy</i> 	<ul style="list-style-type: none"> • Invest in large- and medium-scale distributed generation (district energy for heating and cooling, micro-grids, CHP, Tri-generation District), or in public-private partnerships • Invest in converting city-owned fossil-fuel power generating facilities • Invest in large-scale renewable production (wind, solar) facilities • Invest in “community solar” projects • Invest in new municipal utilities • Install distributed renewable energy generation on city facilities • Purchase clean energy
<p style="text-align: center;">MANDATE BEHAVIORS & INVESTMENT S</p>	<ul style="list-style-type: none"> • <i>Mandate Decarbonization of Central Supply</i> • <i>Mandate Increased Energy Efficiency and Conservation</i> 	<ul style="list-style-type: none"> • Increase Renewable Portfolio Standards for utilities • Force retirement/conversion of fossil-fuel plants • Implement an emissions “cap and trade” market • Require the phasing out/conversion of buildings’ fossil-fuel heating • Increase efficiency and emissions requirements for fossil-fuel plants • Implement mandates to reduce energy consumption in buildings and transportation systems

Three other things to consider

- EZNCs: equitable zero net cities
- Fear not your CBOs: valuable partner vs. Pandora's box
- Regional collaboration: hard, but potentially worth the effort.





INSTITUTE FOR
**Sustainable
Communities**
what's possible

Thank you!

Steve Nicholas



snicholas@iscvt.org



802-229-2907