San Luis Obispo Webinar on City-Led Clean Energy Innovation

February 21, 2018

Clean Energy Transition

Agenda

- Creating Energy Maps to Understand Sources and Uses
- Carbon Wedge Analyses to Determine Sectoral Targets
- Best Practices and Lessons Learned

Why City Climate & Clean Energy Action?

- Cities account for 70% of global emissions
- Half the world and 80% of Americans in cities
- Paris Agreement December 2015
- Federal inaction

Urban Clean Energy Program

Small- and medium-sized Northwest cities accelerating carbon emission reduction:

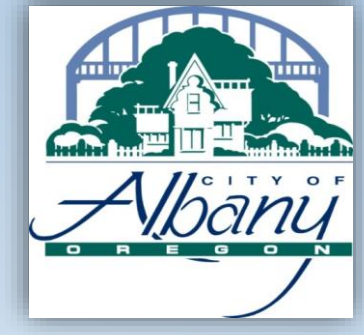
- ✓Ambitious goal-setting
- ✓Carbon math
- ✓Reduction strategies
- ✓Buildings, transportation, energy supply

2009-2017

JACKSON HOLE
ENERGY
SUSTAINABILITY
PROJECT

TOWN OF JACKSON
WYOMING

CITY OF
SPOKANE


CITY OF
Albany
OREGON

CITY OF Salem
AT YOUR SERVICE

SunValley

THURSTON
ENERGY
YOUR
PATHWAY
TO SAVINGS

CLARK COUNTY, WASHINGTON

VANCOUVER
WASHINGTON

CITY OF EDMONDS
INC. 1890

RE POWER
BAINBRIDGE

CITY OF
SHORELINE

City of
Wenatchee

CITY OF
ISSAQUAH

BOISE
CITY OF TREES

Beaverton
OREGON

CITY OF KIRKLAND
WASHINGTON

CITY OF HILLSBORO

SEAL OF TUKWILA WASHINGTON
1908

Olympia

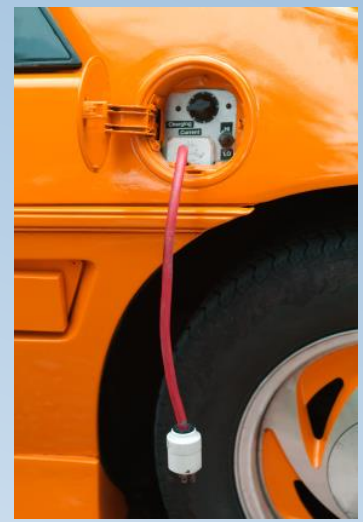
50 YEARS
1967 - 2017
THURSTON REGIONAL PLANNING COUNCIL • TRPC

EVERETT

KING COUNTY-Cities
CLIMATE COLLABORATION

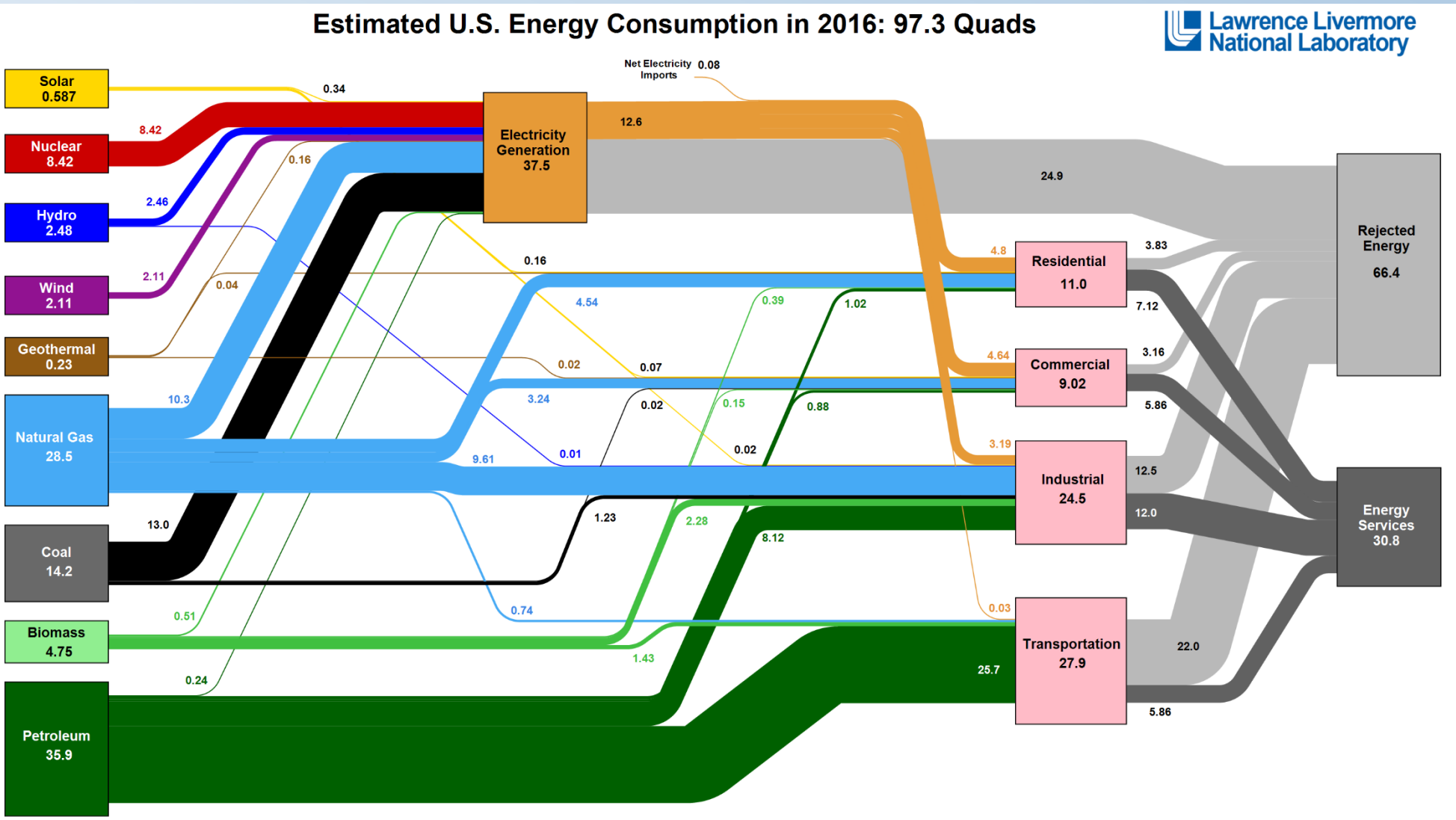
Urban Clean Energy Approach

1. Set aggressive, **attainable carbon reduction targets** over 15-30 year period
2. Align community energy efforts with **statewide energy policies**
3. Do **carbon math** to depict how community can reach targets
4. Assess **carbon reduction potential** of tactics for the built environment, transportation, and energy supply
5. Create **Sustainable Energy Strategies** that complement local comprehensive plans



Mapping Energy, Creating Carbon Wedges

What is an Energy Map?



Source: LLNL March, 2017. Data is based on DOE/EIA MER (2016). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. This chart was revised in 2017 to reflect changes made in mid-2016 to the Energy Information Administration's analysis methodology and reporting. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector, and 49% for the industrial sector which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Data Sources Energy Map & Carbon Wedge Analysis

Category	Measure/Assumption	Sources
Transportation	Vehicle miles traveled	Local Metropolitan Planning Organizations (e.g., PSRC; TRPC, etc.,)
Commercial, Residential, Industrial Buildings	Electricity consumption Natural gas consumption	Utilities (e.g., Seattle City Light Puget Sound Energy)
Population growth	Projected population growth	City/County/Regional Planning Departments

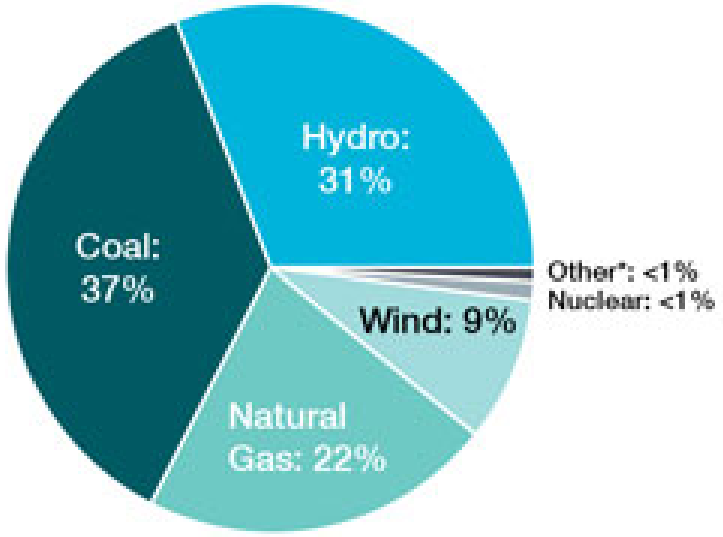
Puget Sound Energy Electricity Fuel Mix

2016 Electricity Fuel Mix

Diverse resources powering your home and business

The electricity generated for you uses a diverse mix of resources. The PSE fuel mix for electricity delivered to customers in 2016 is detailed in the chart and graph below.

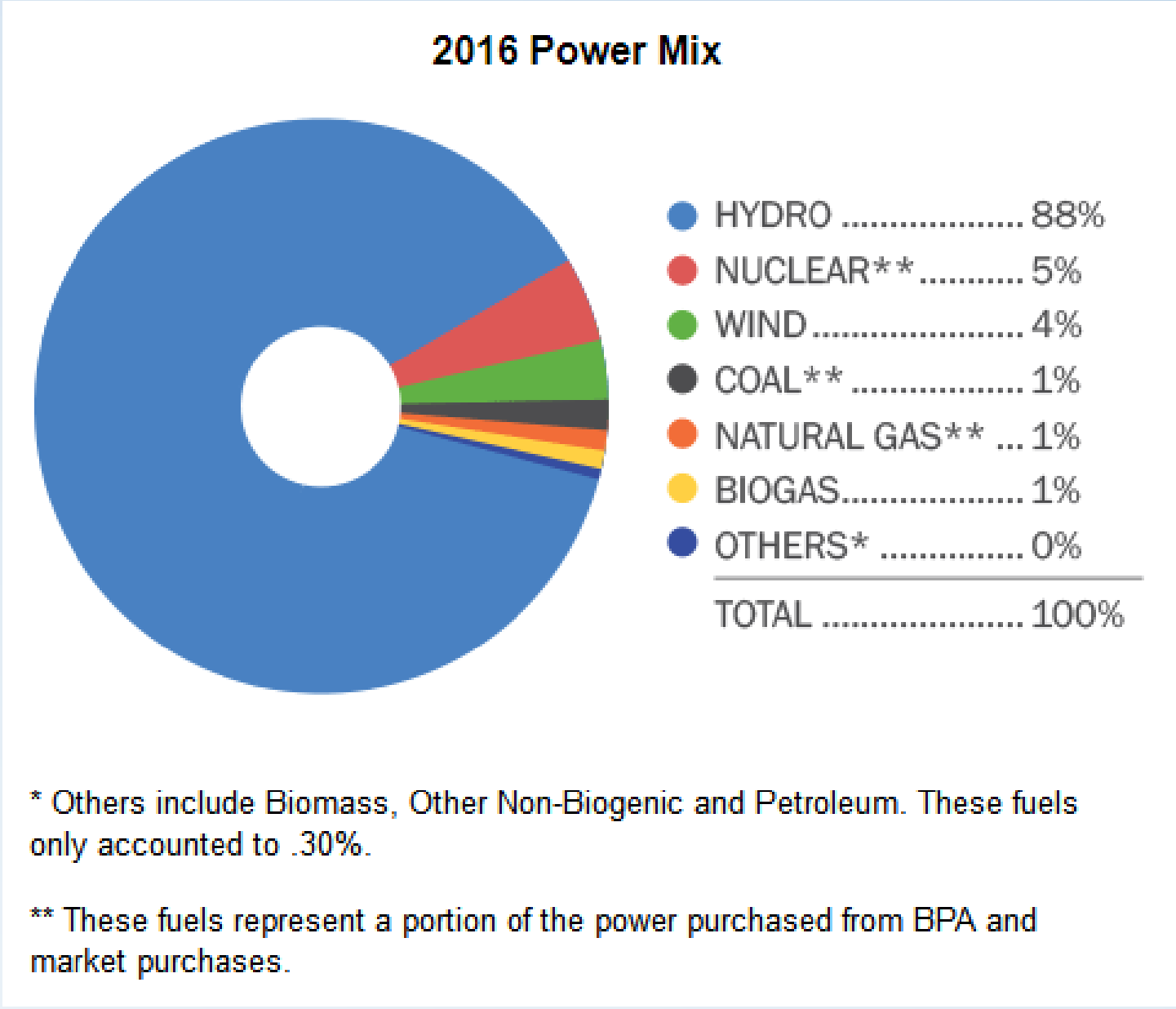
Fuel	Percentage
Coal	37%
Hydroelectric	31%
Natural Gas	22%
Nuclear	<1%
Other*	<1%
Wind	9%
Total	100



** Biomass, non-biogenic and petroleum.*

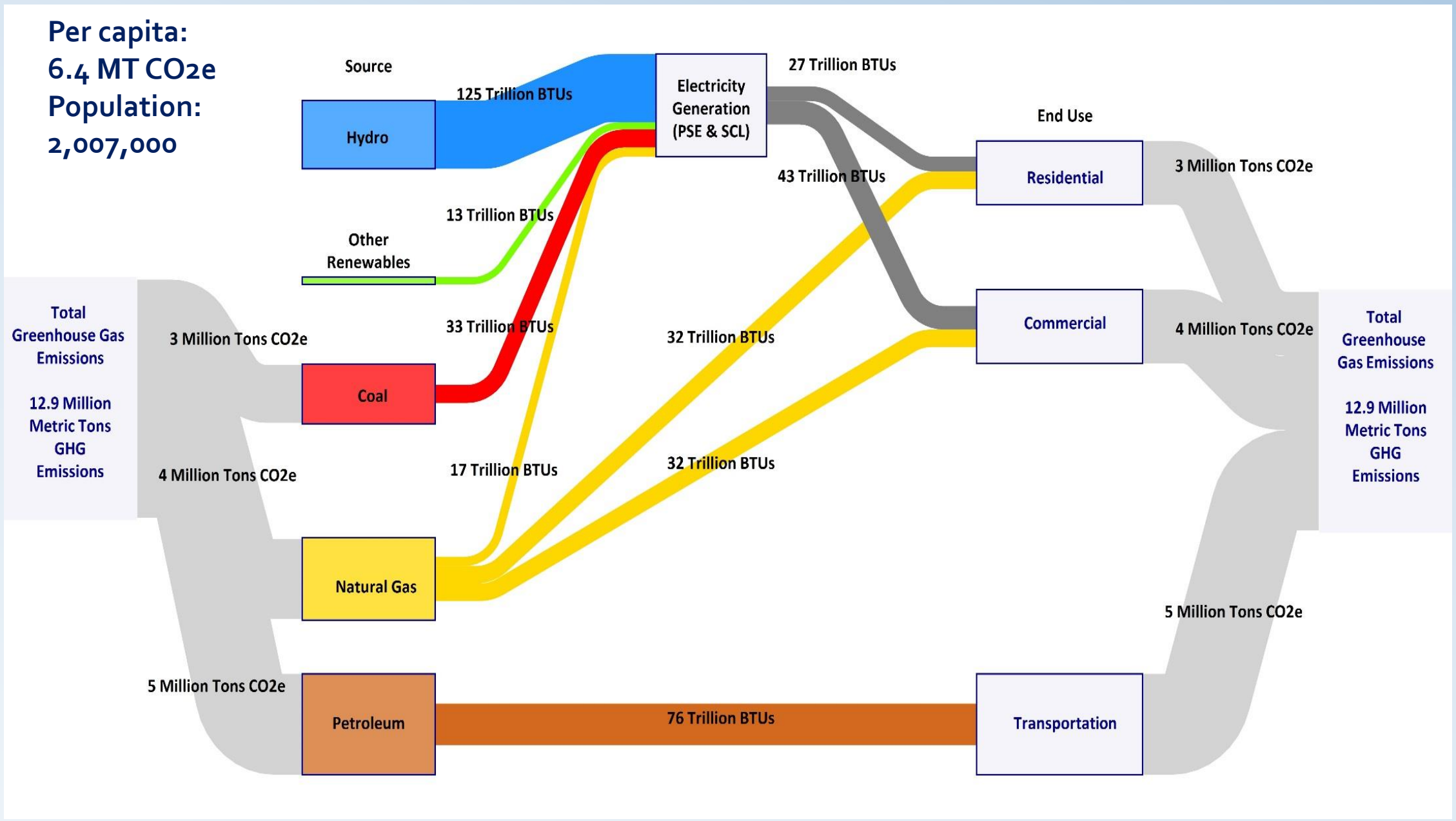
Source: Published by the Washington Department of Commerce, October 2017, with data reported by PSE in August 2017.

Seattle City Light Electricity Fuel Mix

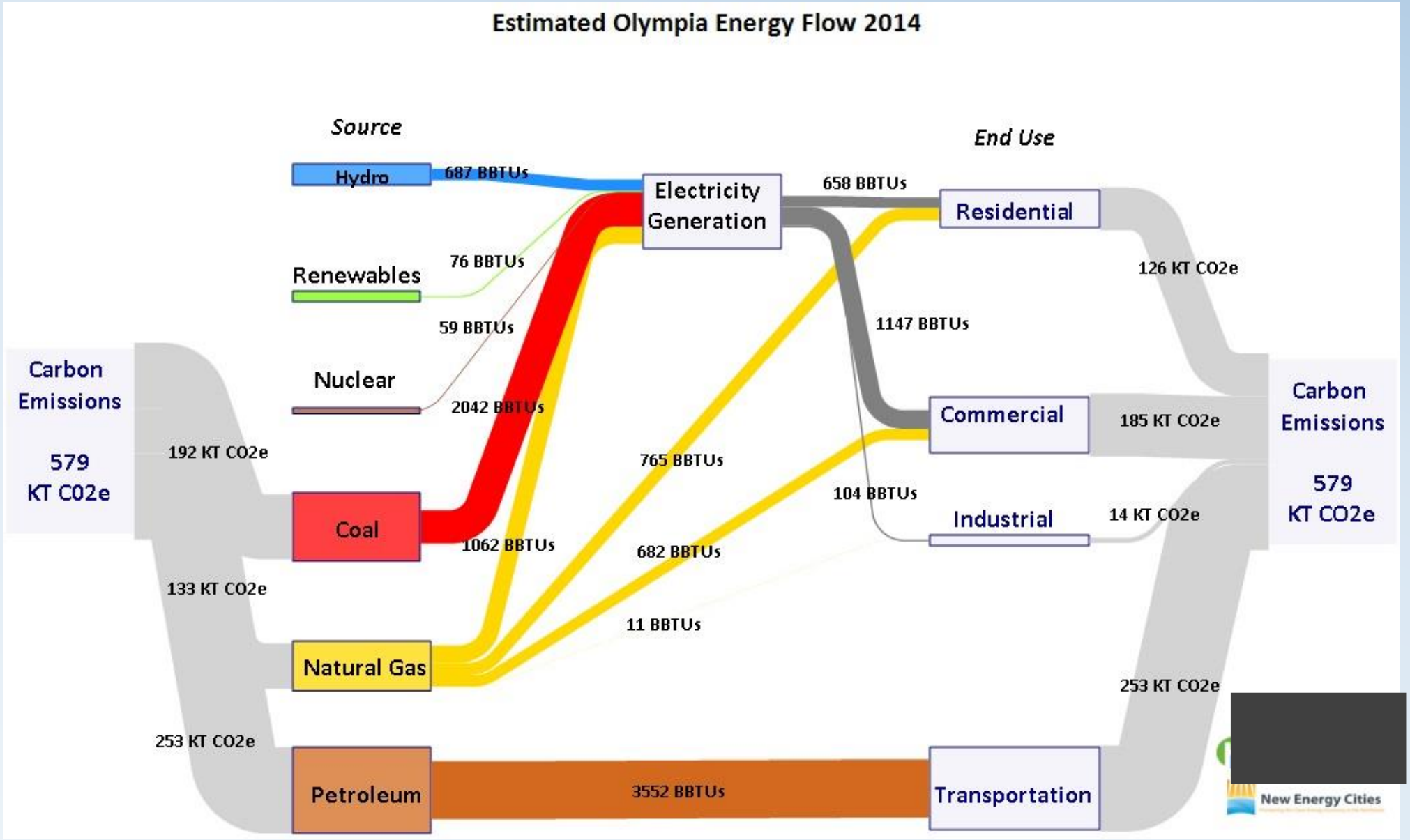


King County-Cities Climate Collaboration (K4C)

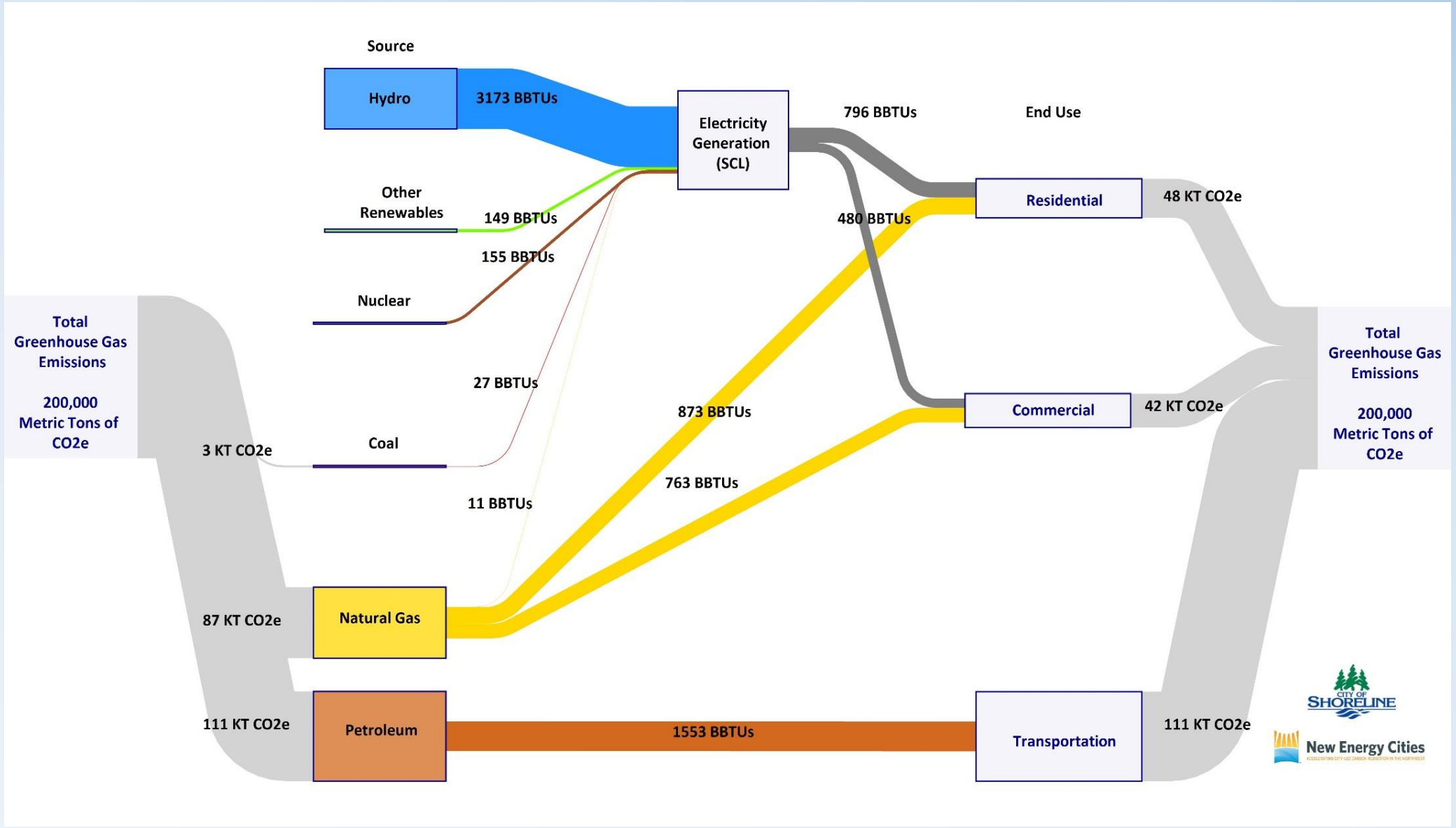
K4C Energy Map 2012



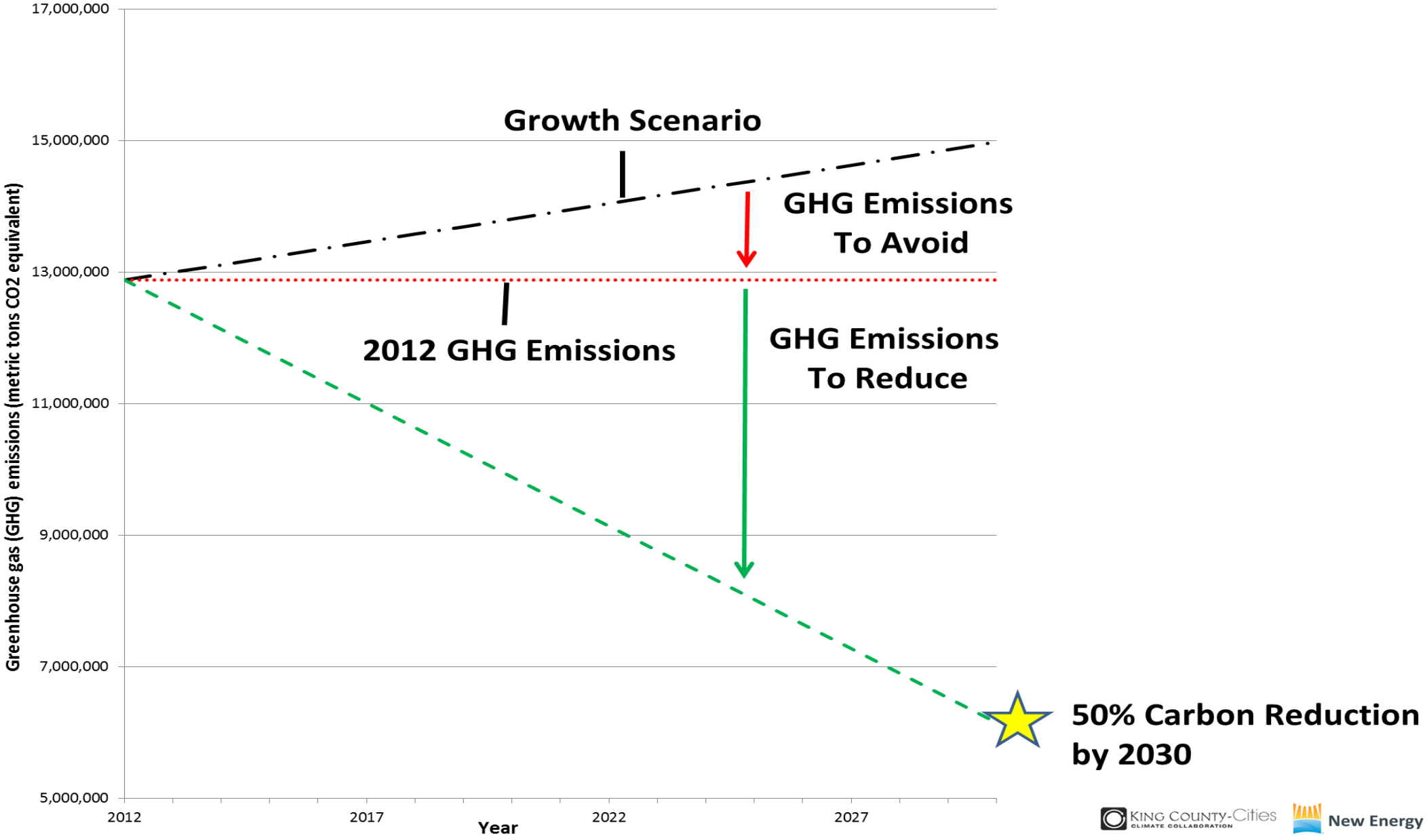
Olympia Energy Map 2014



Shoreline Energy Map 2012



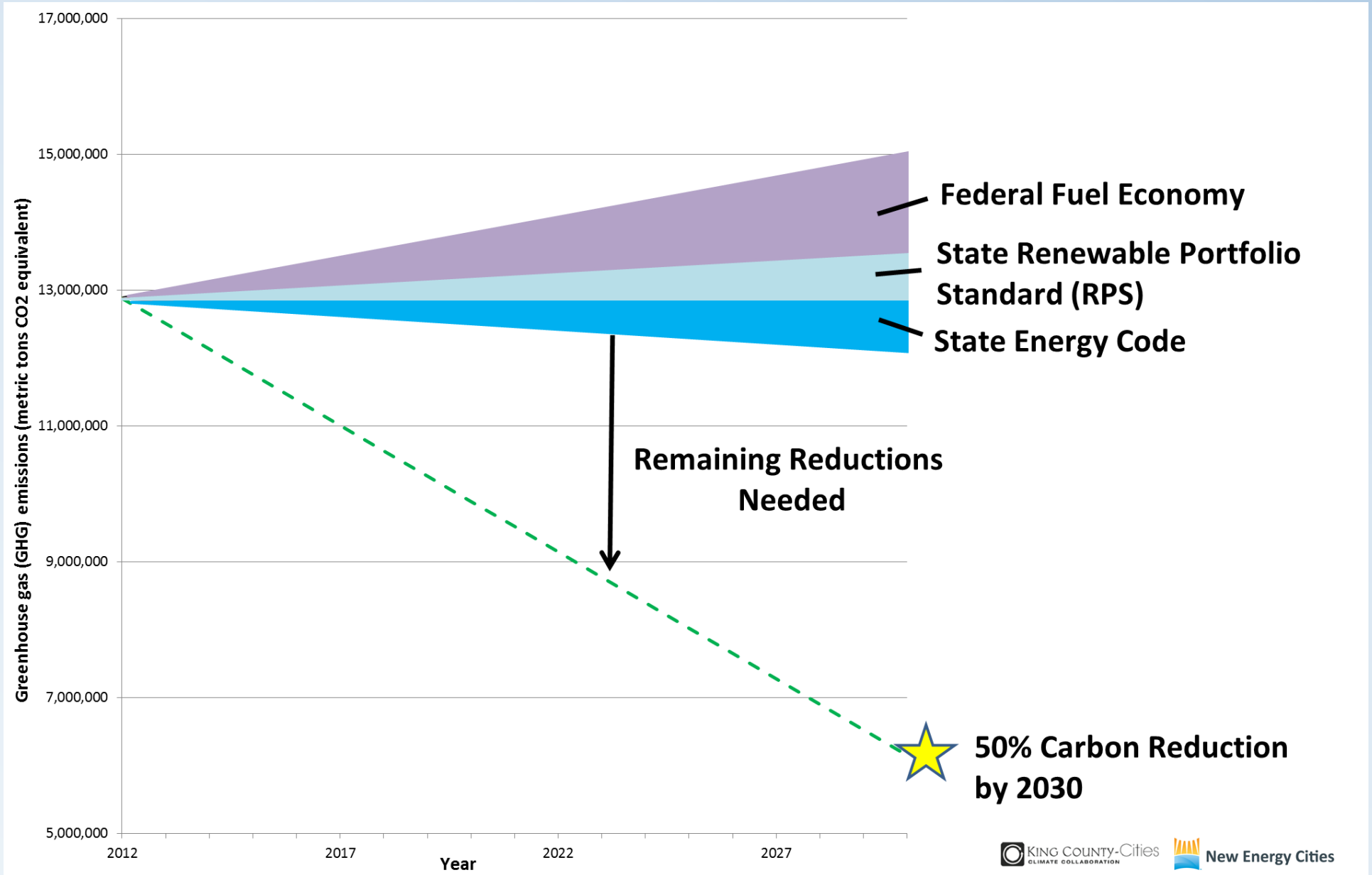
King County Carbon Wedge Analysis



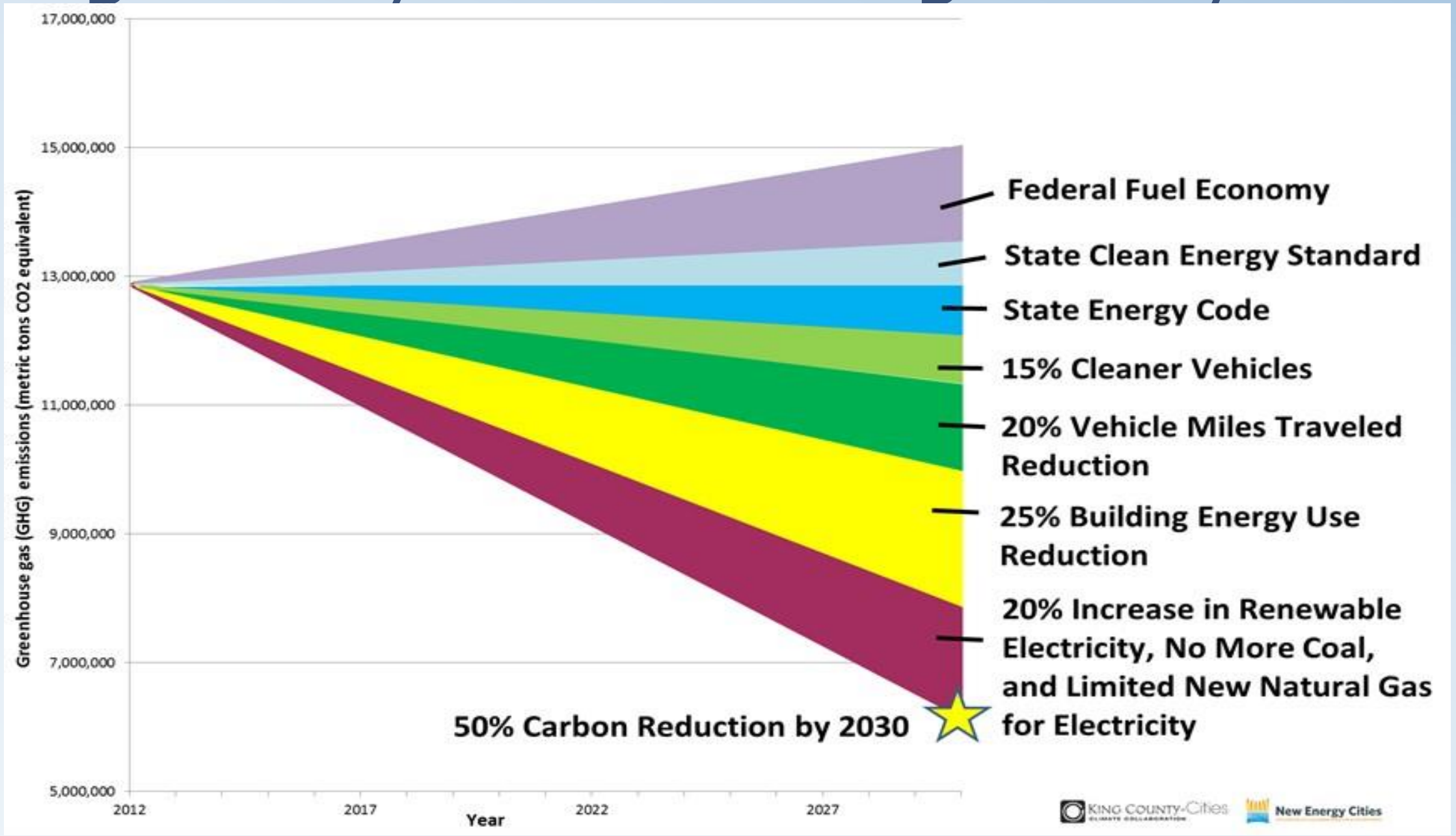
KING COUNTY-Cities CLIMATE COLLABORATION

New Energy Cities

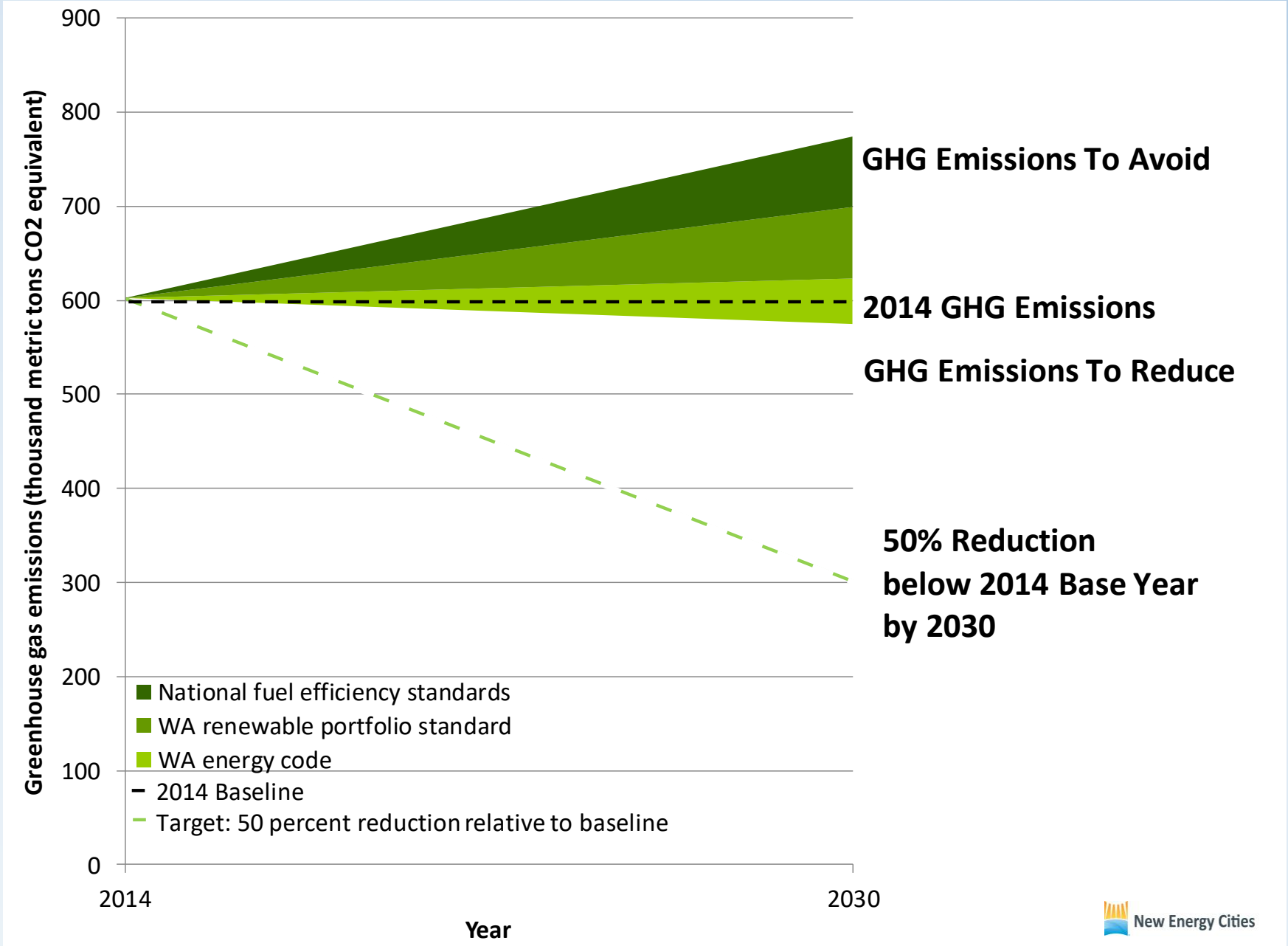
Existing Federal & State Laws



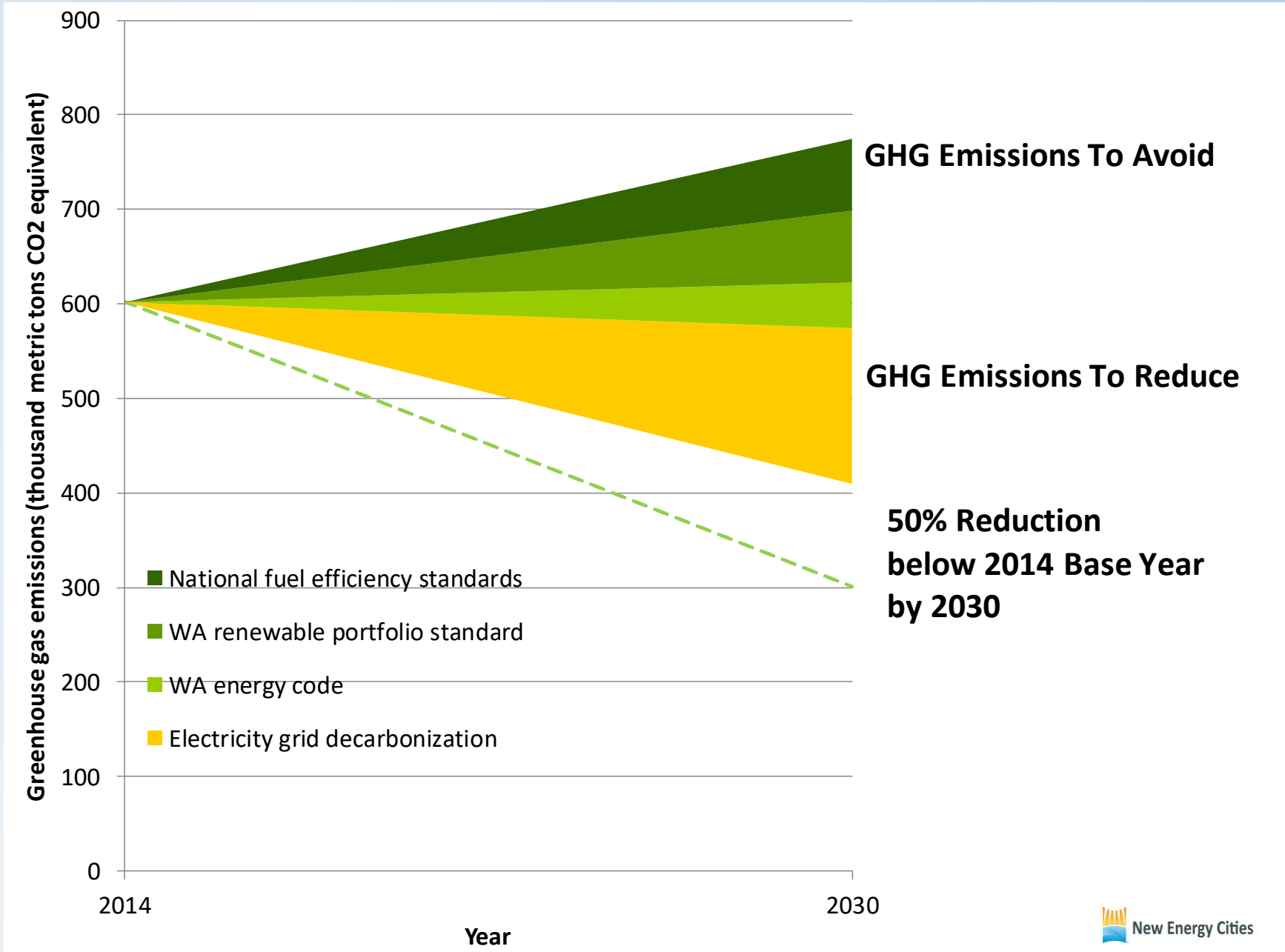
King County Carbon Wedge Analysis



Olympia Impact of Federal and State Policies

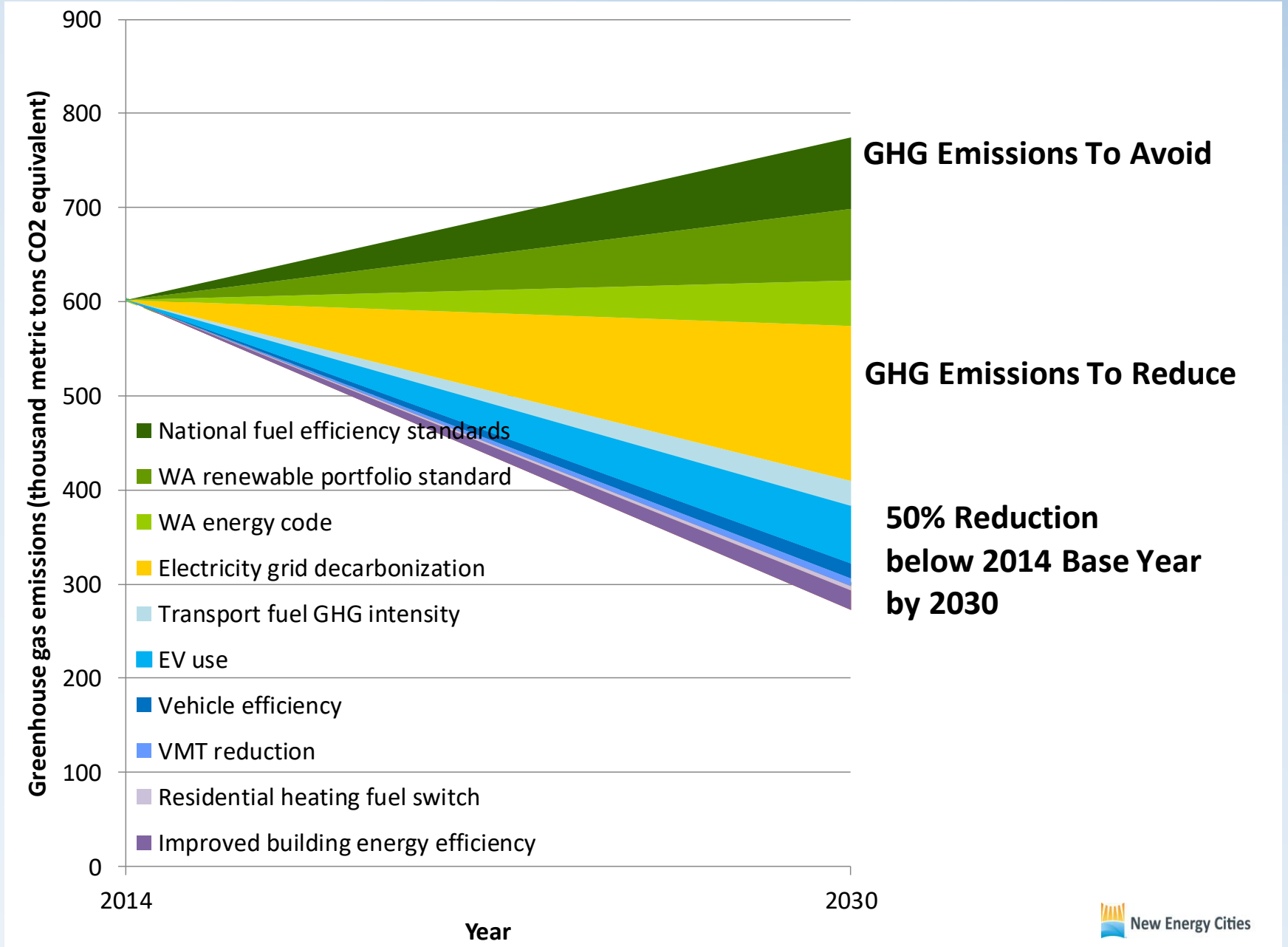


Olympia Decarbonizing Electricity



New Energy Cities

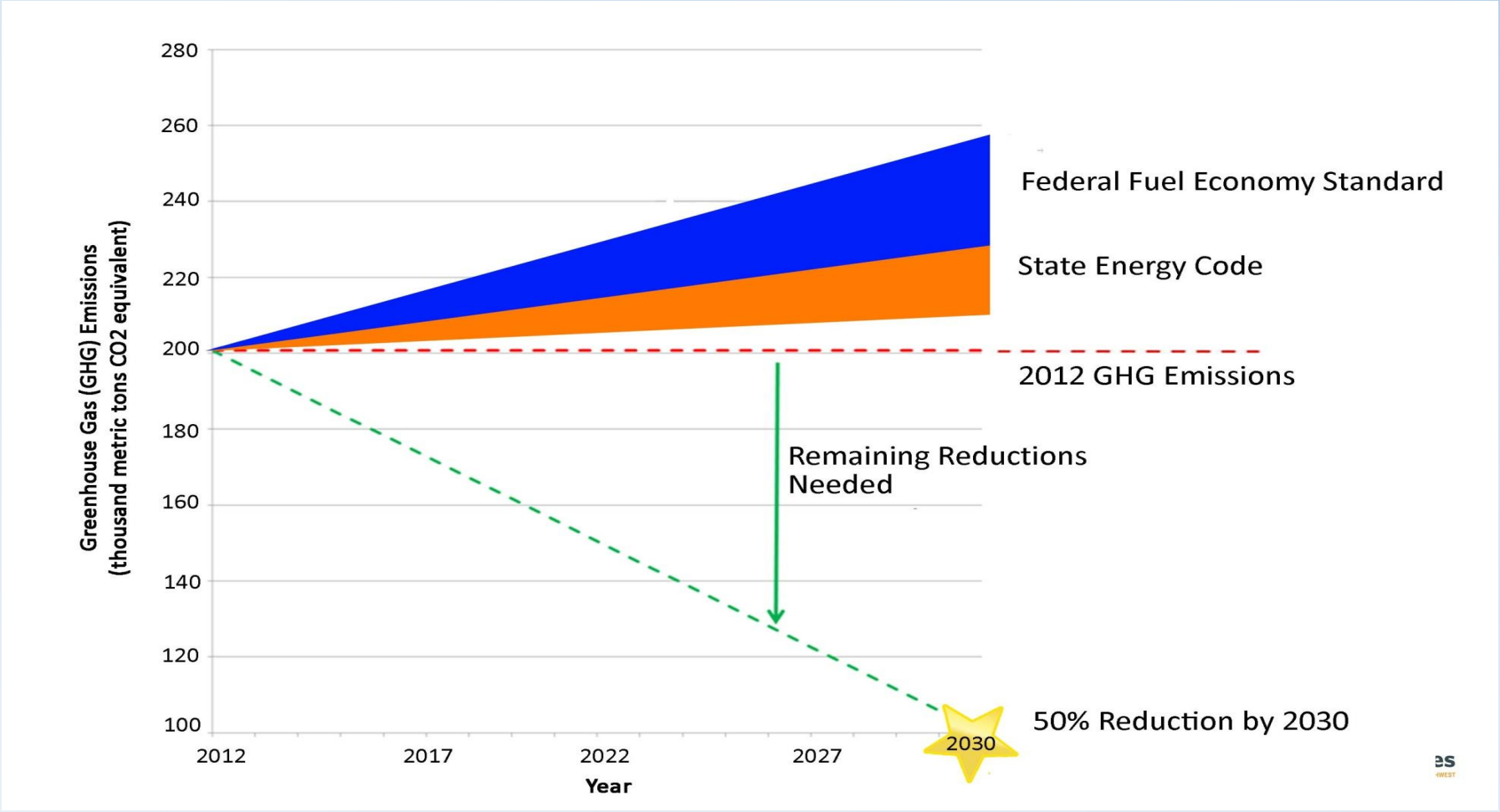
Olympia 50% Reduction 1990 by 2030



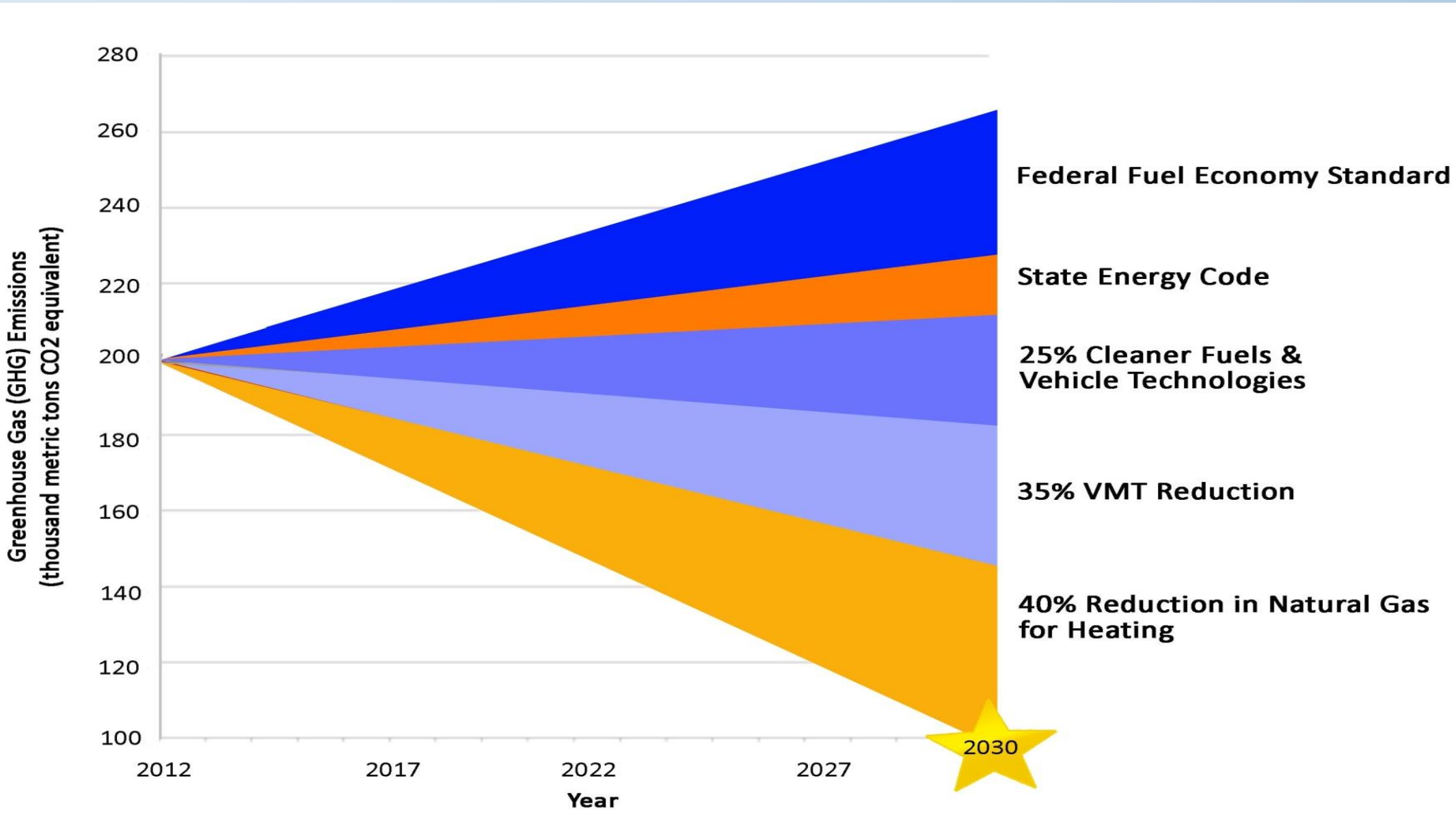
Olympia Local Strategy Assumptions

- Electricity decarbonization
  - ✓ Shift from 27% (baseline projection) to 2% of electricity demand met by coal in 2030
  - ✓ Renewables substitute for reduced coal generation
- Transport emissions reduction mechanisms
  - ✓ 10% reduction in transport fuel GHG intensity
  - ✓ 30% of all vehicles in Olympia are electric by 2030
  - ✓ Gas-powered cars are 10% more fuel efficient in 2030 than CAFE standards
  - ✓ 5% reduction in vehicle miles traveled in 2030 relative to baseline projections
- Building emissions reduction mechanisms
  - ✓ 20% of residential buildings with natural gas heat switch to high-efficiency electric heat pumps
  - ✓ 25% reduction in building energy use beyond 2030 state energy code

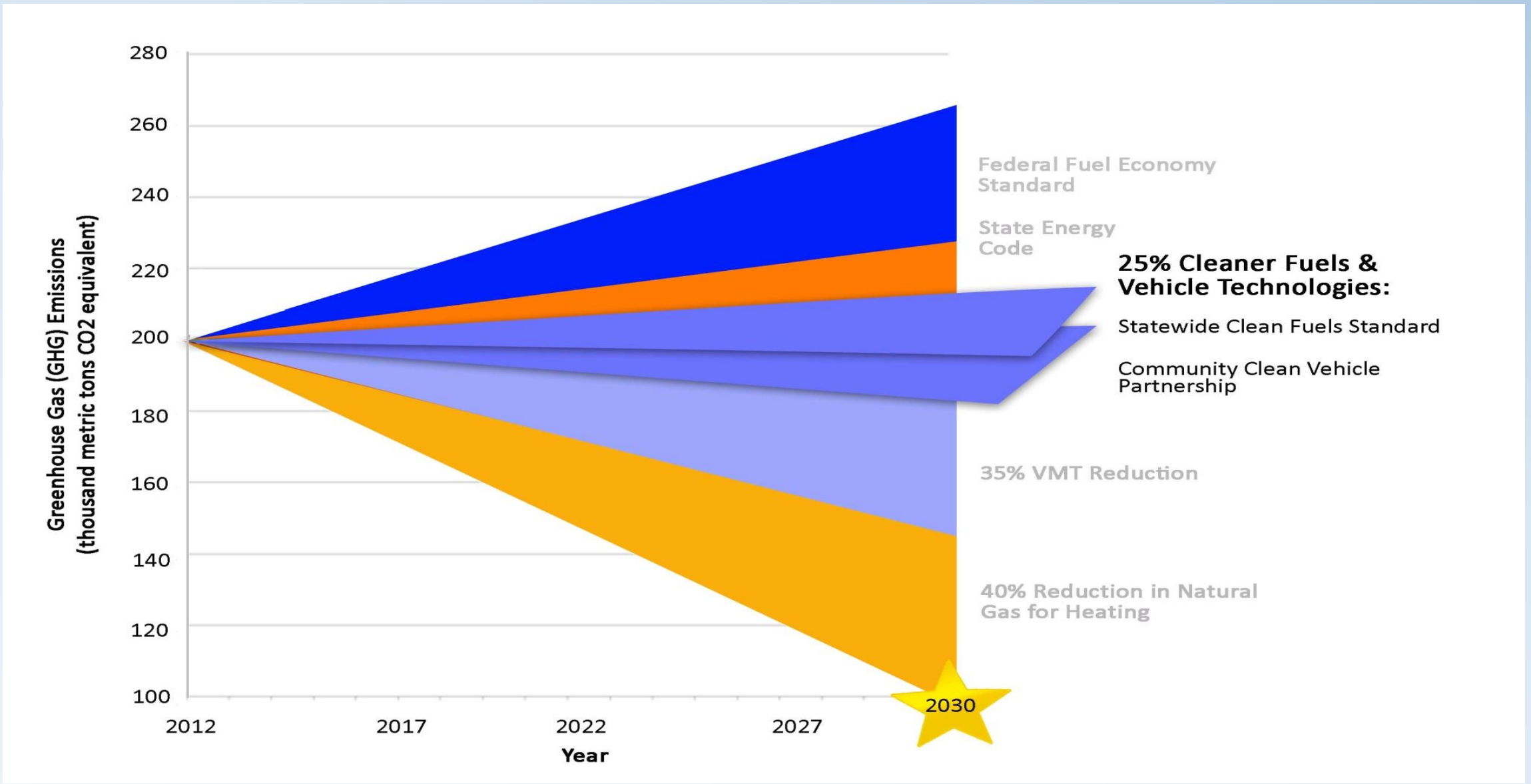
Shoreline Reductions Existing Federal & State Laws



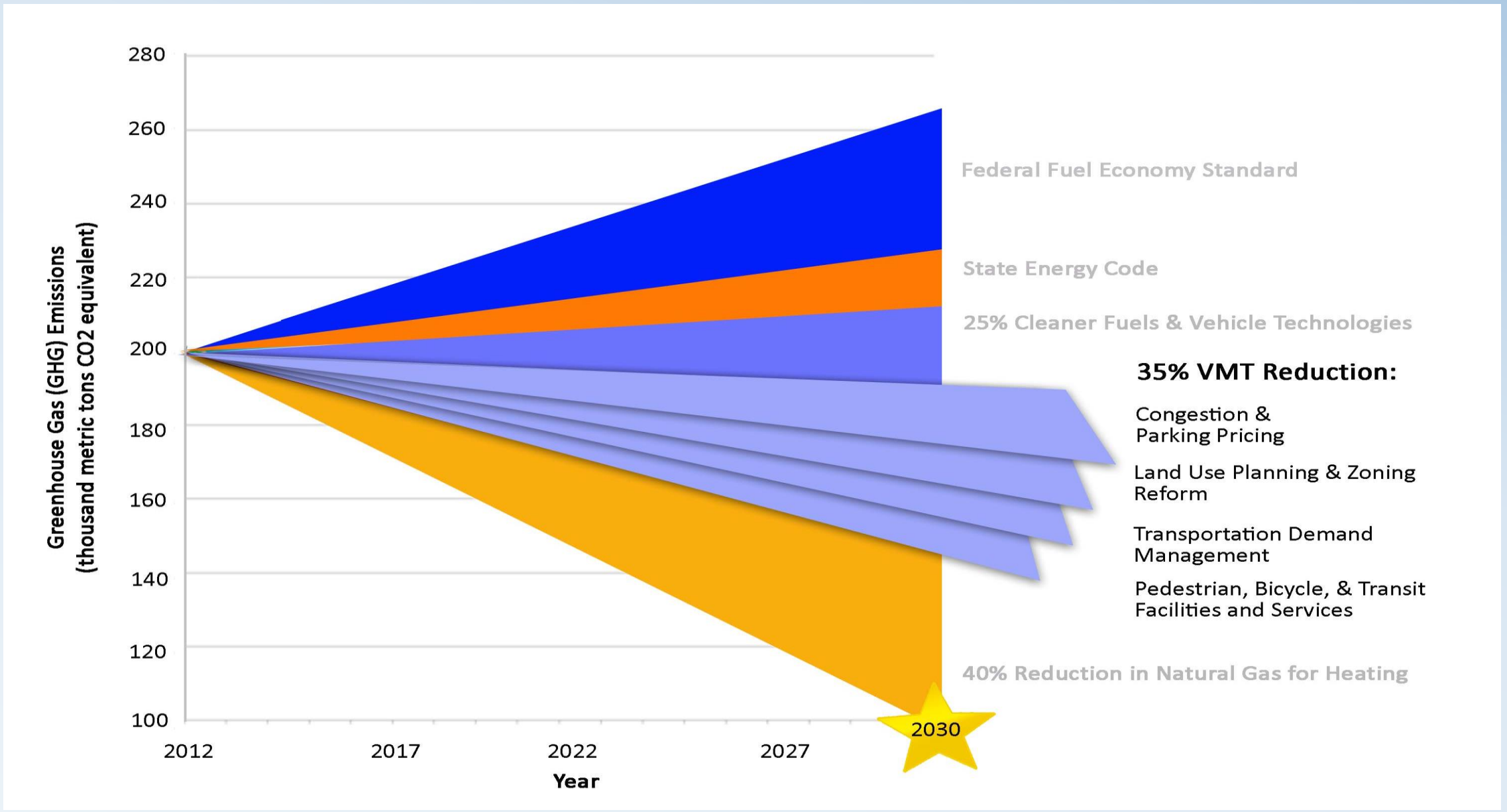
Shoreline Carbon Wedge Analysis



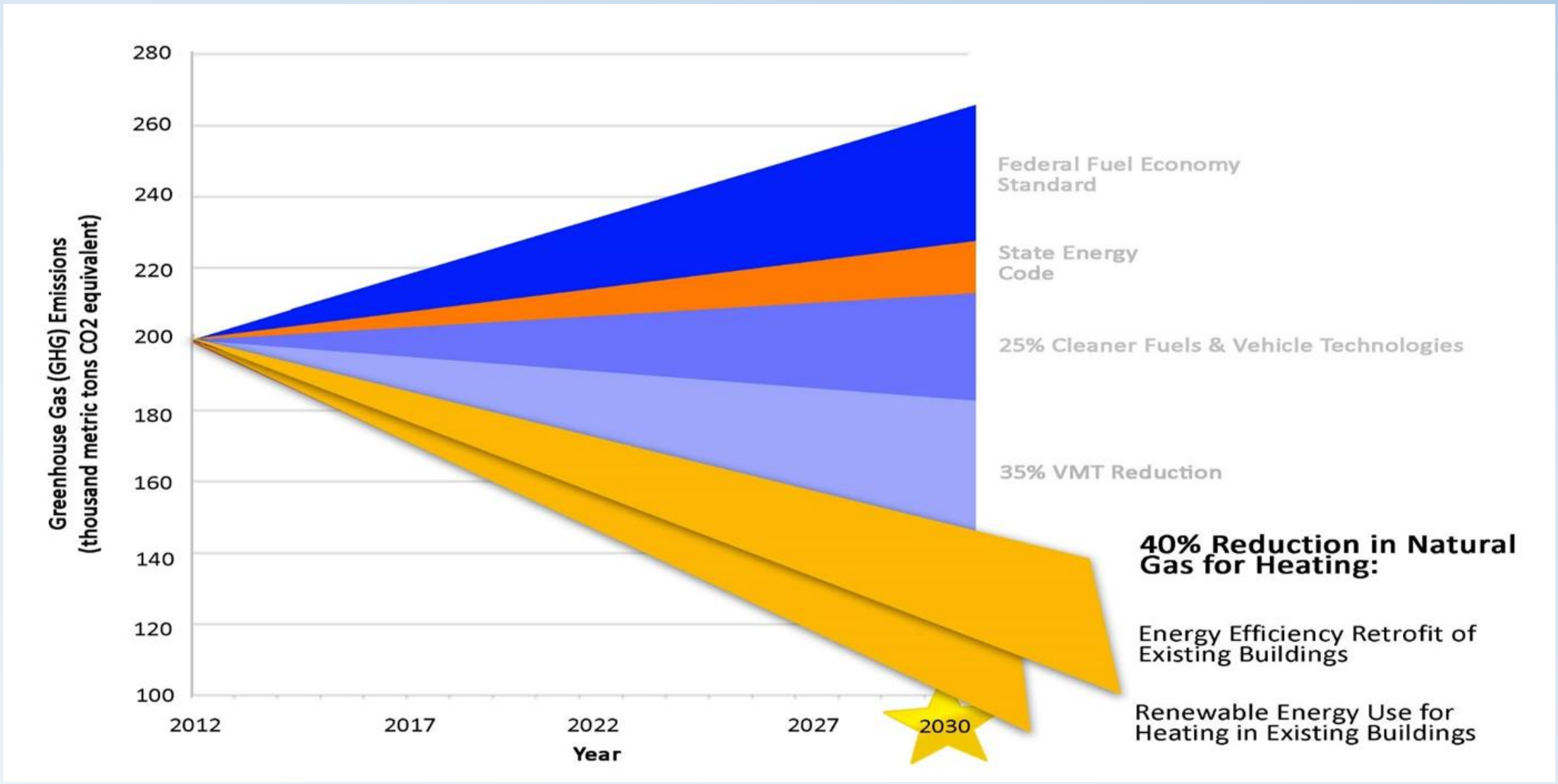
Shoreline 25% Cleaner Fuels



Shoreline 35% Reduction in VMT



Shoreline 40% Reduction in Natural Gas

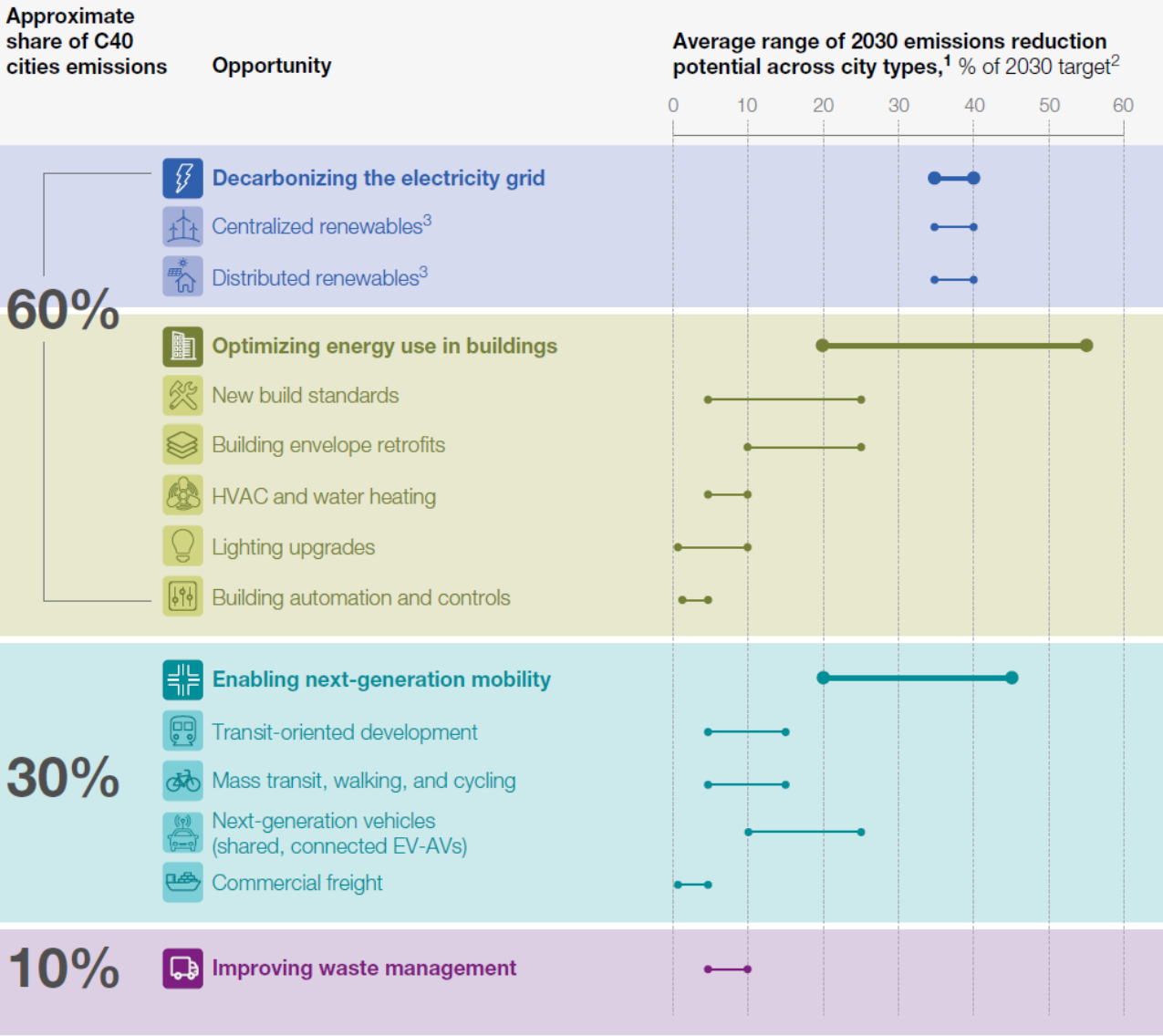


Best Practices & Lessons Learned

McKinsey's Top 12 Action Areas

Exhibit 3

Top 12 opportunities by action area

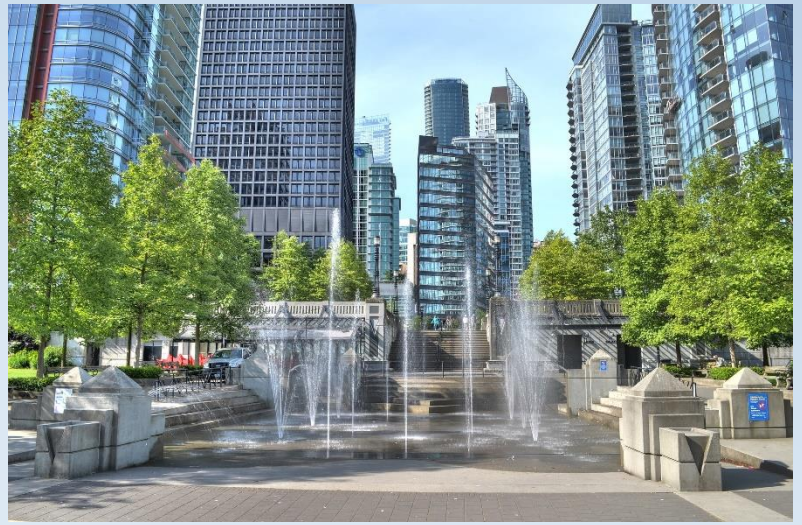


[1] Emissions reduction potential as modeled for a "focused acceleration" scenario across 6 illustrative city types, with highest and lowest outliers removed.
[2] 2030 target is based on *Deadline 2020* pathways for specific city types.
[3] Percentages given are for system level mix. Balance between centralized and distributed generation will vary by region.

SOURCE: McKinsey analysis

Critical Roles for Cities

- Urban planning and public transit policy with a climate lens
- Implement, enforce, and stretch building codes for energy efficiency
- Zone and permit renewable energy
- Enable electric vehicle infrastructure
- Local government financing for all of the above



Keys to Success

- Think systemically
- Break down siloed city departments
- Have an overarching plan, but break strategies down into achievable chunks
- Determine measurements of success and how you will communicate progress
- Community engagement, including the business community

Leveraged City Action

- Align and coordinate between local and state governments
- Build metro-scale coalitions of cities and counties
- Use local governments' aggregate buying power to influence markets
- Establish mechanisms for cities and private sector to coordinate climate solutions

Summary

- Set targets and do the carbon math to know your community's energy landscape so you can plan with a climate lens
- Focus on what city's control: land use, zoning, public transit
- Look to contiguous communities to aggregate demand and action
- Engage the community, citizens & businesses

Thank you

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Clean Energy Transition

Transitioning from Fossil Fuel to Clean Energy

www.cleanenergytransition.net