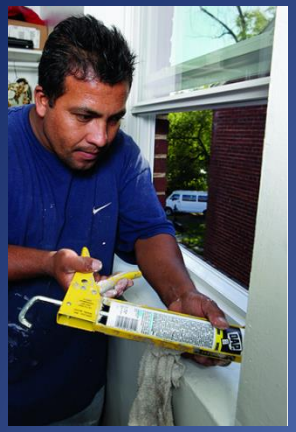
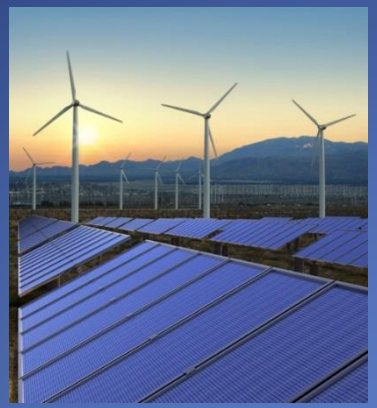


Telling Your Climate Story with Carbon Math

US Environmental Protection Agency Webcast

December 18, 2013

New Energy Cities
Pioneering the Clean Energy Economy in the Northwest

Agenda

- New Energy Cities Introduction
- Beaverton Case Study & Observations
- Q & A

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Climate Solutions Mission

Accelerate *practical, profitable* solutions to global warming by:

- ✓ Galvanizing leadership
- ✓ Growing investment
- ✓ Bridging divides

Make the Northwest a national and world leader in the clean energy economy

New Energy Cities Program

Small/medium-sized cities reducing greenhouse gas (GHG) emissions by accelerating climate-smart, clean energy solutions in:

- Highly efficient buildings
- Renewable energy
- Eco-mobility
- Smart technology

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JACKSON HOLE
ENERGY
SUSTAINABILITY
PROJECT

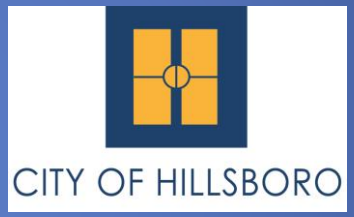

TOWN OF JACKSON
WYOMING


BOISE
CITY OF TREES


CLARK COUNTY, WASHINGTON


SunValley


THURSTON
ENERGY
YOUR
PATHWAY
TO SAVINGS


CITY OF HILLSBORO

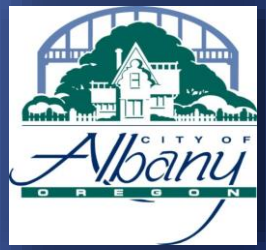

VANCOUVER
WASHINGTON


CITY OF EDMONDS
INC. 1890


CITY OF
SPOKANE


KING COUNTY-Cities
CLIMATE COLLABORATION


RE POWER
BAINBRIDGE


CITY OF
Albany
OREGON


CITY OF Salem
AT YOUR SERVICE

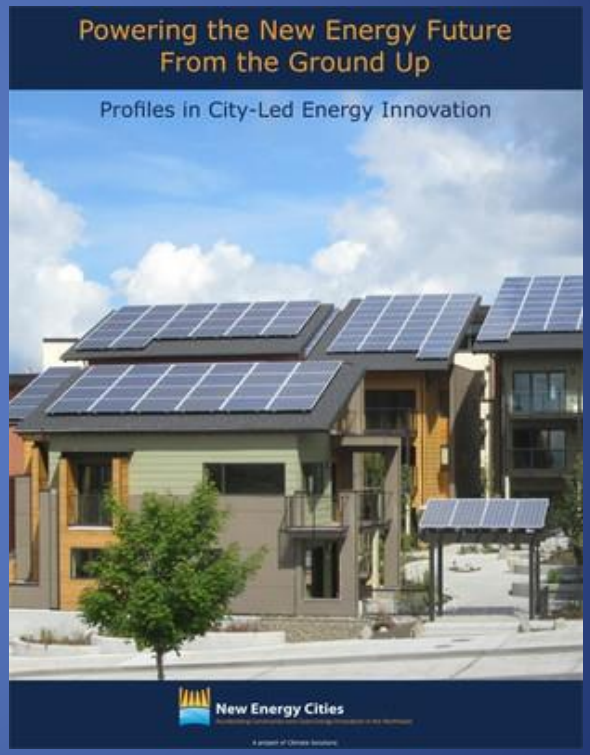

CITY OF
ISSAQUAH


City of
Wenatchee


Beaverton
OREGON

City-Led Clean Energy Innovation

- City-led clean energy innovation in communities under 250,000 population
- Innovation & bold leadership across the country
- Cities embracing climate solutions for their economic value as much as for climate benefits



New Energy Cities Approach

1. Set aggressive, attainable GHG targets over 20-30 year period
2. Do GHG math– and create Energy Map and Carbon Wedge graphics— to depict how community can reach targets
3. Create Sustainable Energy Strategies that complement local comprehensive plans
4. Assess GHG reduction potential of tactics in the built environment, transpo, waste mgt, wastewater, and carbon storage
5. Align clean energy efforts of geog. clustered communities w/ state, regional, and utility policies/programs

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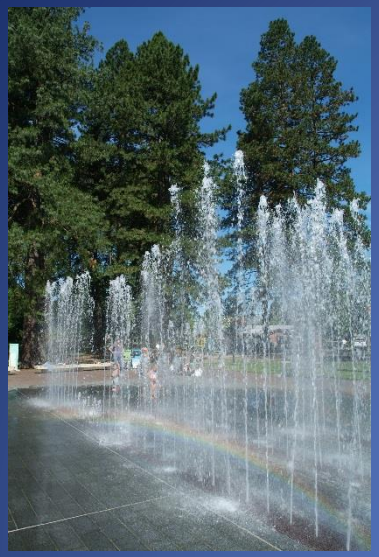

Beaverton, OR

- Community in Portland metropolitan area– 91,000 pop.
- Comprehensive Plan process underway
- Energy Map & Carbon Wedge research to measure carbon reduction impact of existing laws, and examine scenarios to meet potential 80x2050 (40x2030) goal

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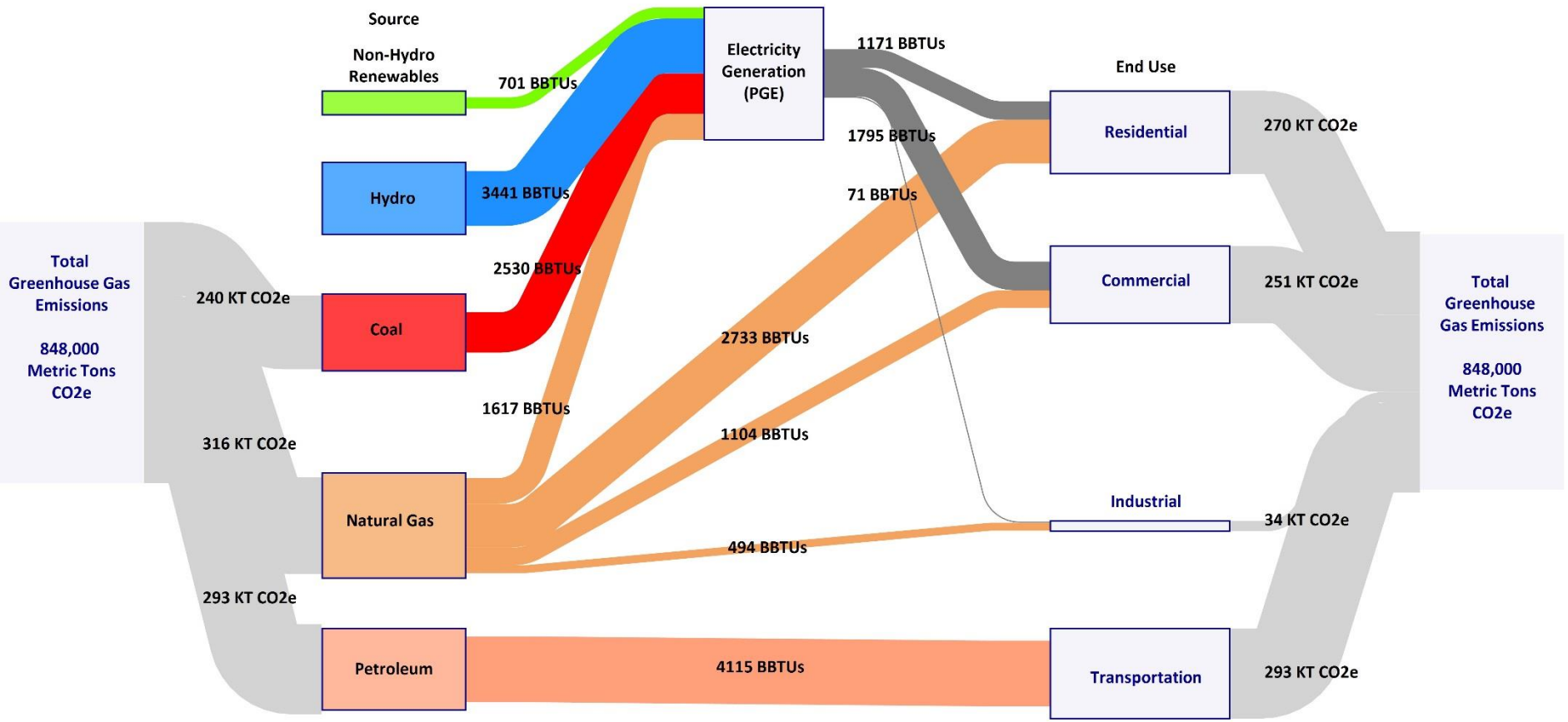
2012 Beaverton Energy Flow and Greenhouse Gas Emissions Profile



Completed August 23, 2013. Based on order-of-magnitude analysis by New Energy Cities, not intended as a precise greenhouse gas emissions inventory. Flows are proportionally sized. Boxes are proportionally sized where possible. Greenhouse gas (GHG) emissions were calculated as carbon dioxide equivalent (also noted as CO2e). KT CO2e is thousand metric tons of carbon dioxide equivalent. BBTU is billion British thermal units. Energy and GHG figures are rounded to BBTU and KT CO2e, and GHG subtotals may not add up exactly to totals.

Data sources: Portland General Electric (PGE) and Northwest Natural 2012 energy purchase data; Oregon Department of Energy data on PGE 2012 fuel mix; and Oregon Department of Transportation estimate for Beaverton vehicle miles traveled.

Other notes: Nuclear energy accounts for less than 1 percent of PGE's resource mix and therefore does not show up on the Energy Flow graphic at this scale. Waste, petroleum, and other electricity generation resources together represent less than 1 percent of PGE's fuel mix and are excluded from this analysis.

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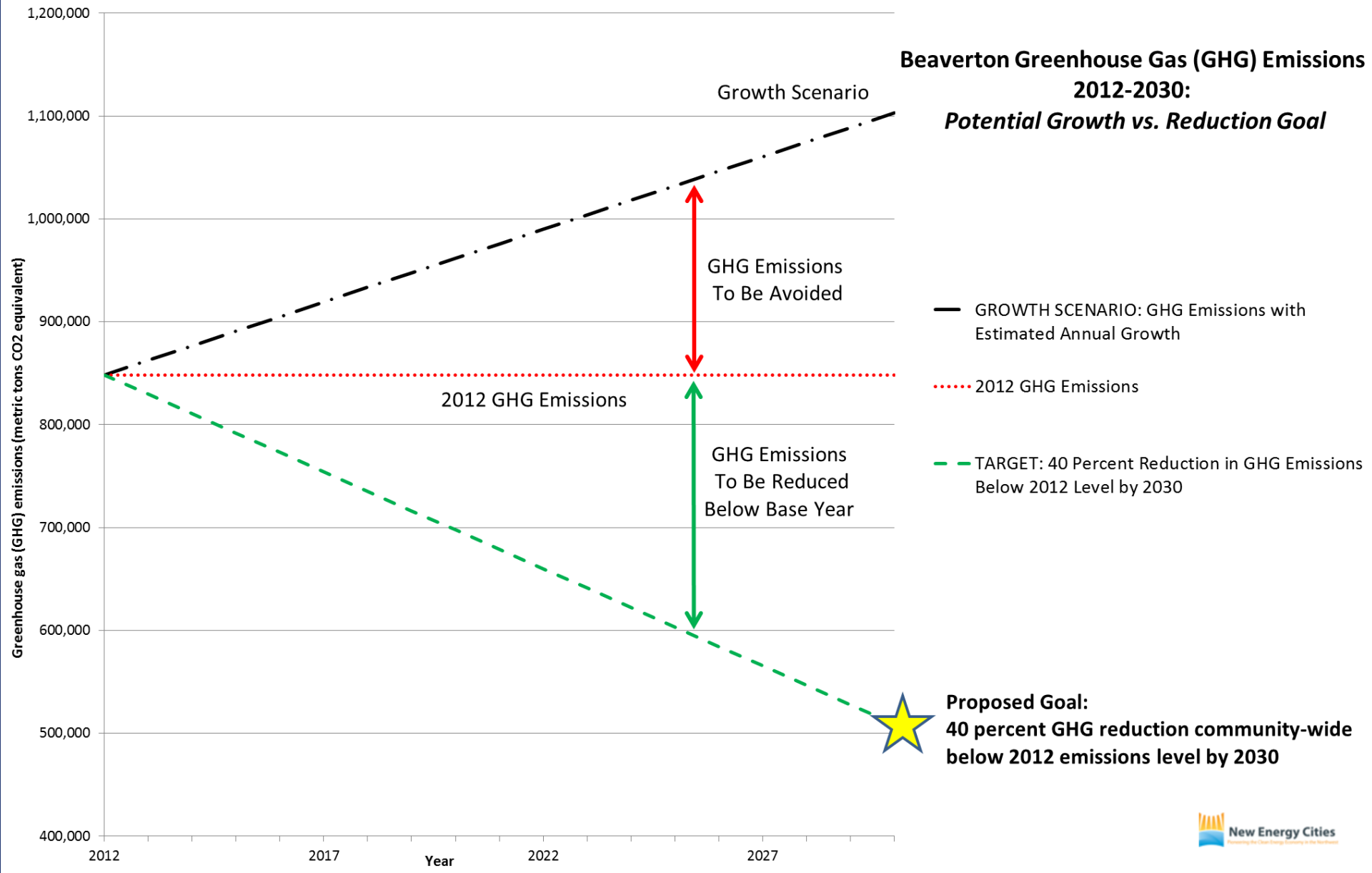
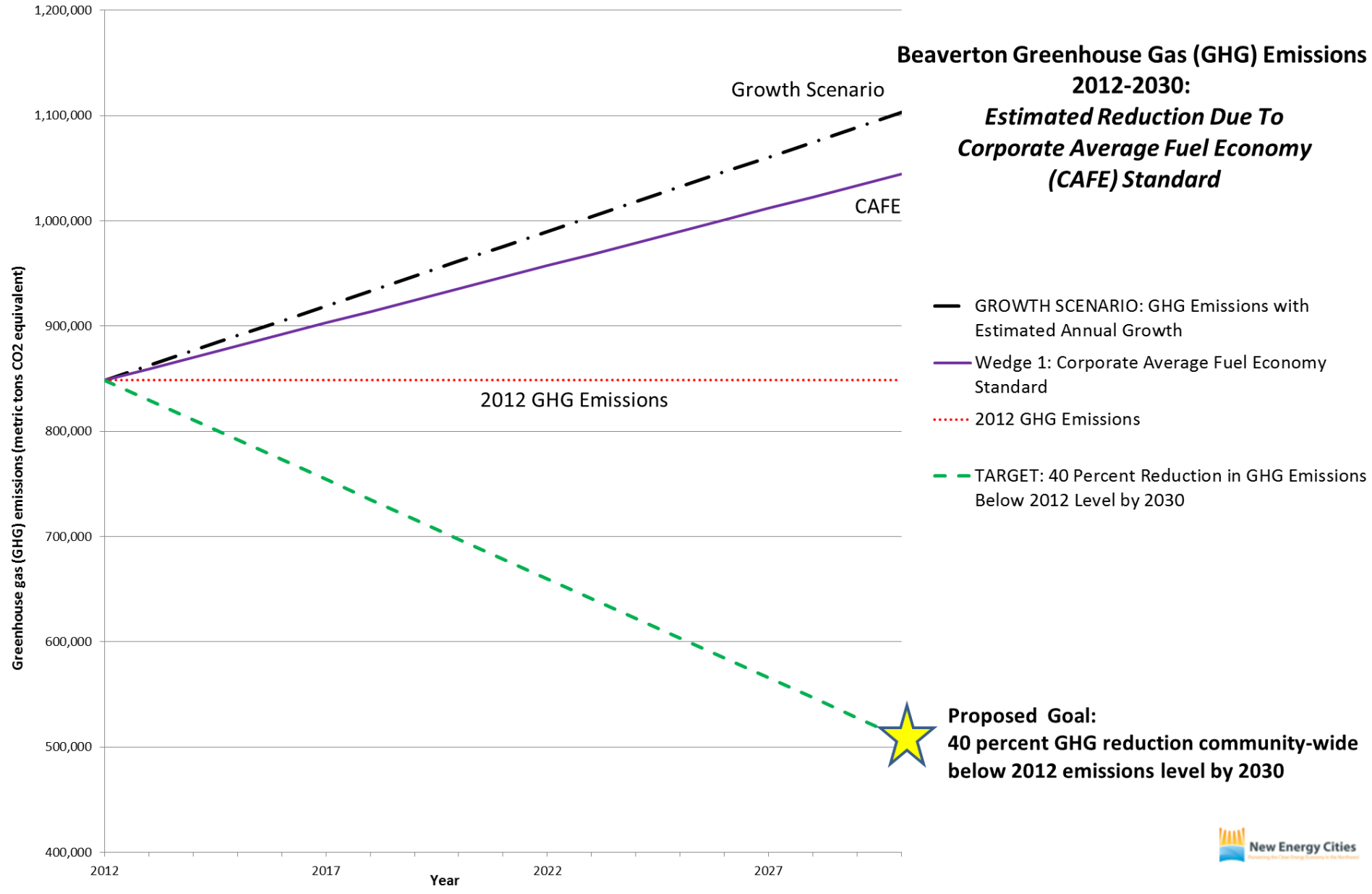

Beaverton Greenhouse Gas (GHG) Emissions 2012-2030:
Potential Growth vs. Reduction Goal
Growth Scenario
GHG Emissions To Be Avoided
2012 GHG Emissions
GHG Emissions To Be Reduced Below Base Year
GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
2012 GHG Emissions
TARGET: 40 Percent Reduction in GHG Emissions Below 2012 Level by 2030
Proposed Goal:
40 percent GHG reduction community-wide below 2012 emissions level by 2030
Greenhouse gas (GHG) emissions (metric tons CO2 equivalent)
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
2012
2017
2022
2027
Year
New Energy Cities

40 Percent Reduction by 2030: What Will It Take?

First we estimated the greenhouse gas (GHG) emission reduction due to existing federal & state laws

Level	Sector	Law or Policy	What It Requires
Federal	Transportation	Corporate Average Fuel Economy Standard	2011 model year: 24.1 miles per gallon; we assumed that all vehicles on the road in 2030 will have 2011 model year fuel economy
State	Energy supply	Renewable Portfolio Standard	At least 25 percent of total fuel mix must come from renewable energy by 2025
State	Transportation	Clean Fuel Standard, with 2015 sunset removed	10 percent reduction of fuel carbon intensity from 2010 levels by 2025


Beaverton Greenhouse Gas (GHG) Emissions 2012-2030:
Estimated Reduction Due To Corporate Average Fuel Economy (CAFE) Standard
Growth Scenario
CAFE
2012 GHG Emissions
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
Greenhouse gas (GHG) emissions (metric tons CO2 equivalent)
2012
2017
2022
2027
Year
GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
Wedge 1: Corporate Average Fuel Economy Standard
2012 GHG Emissions
TARGET: 40 Percent Reduction in GHG Emissions Below 2012 Level by 2030
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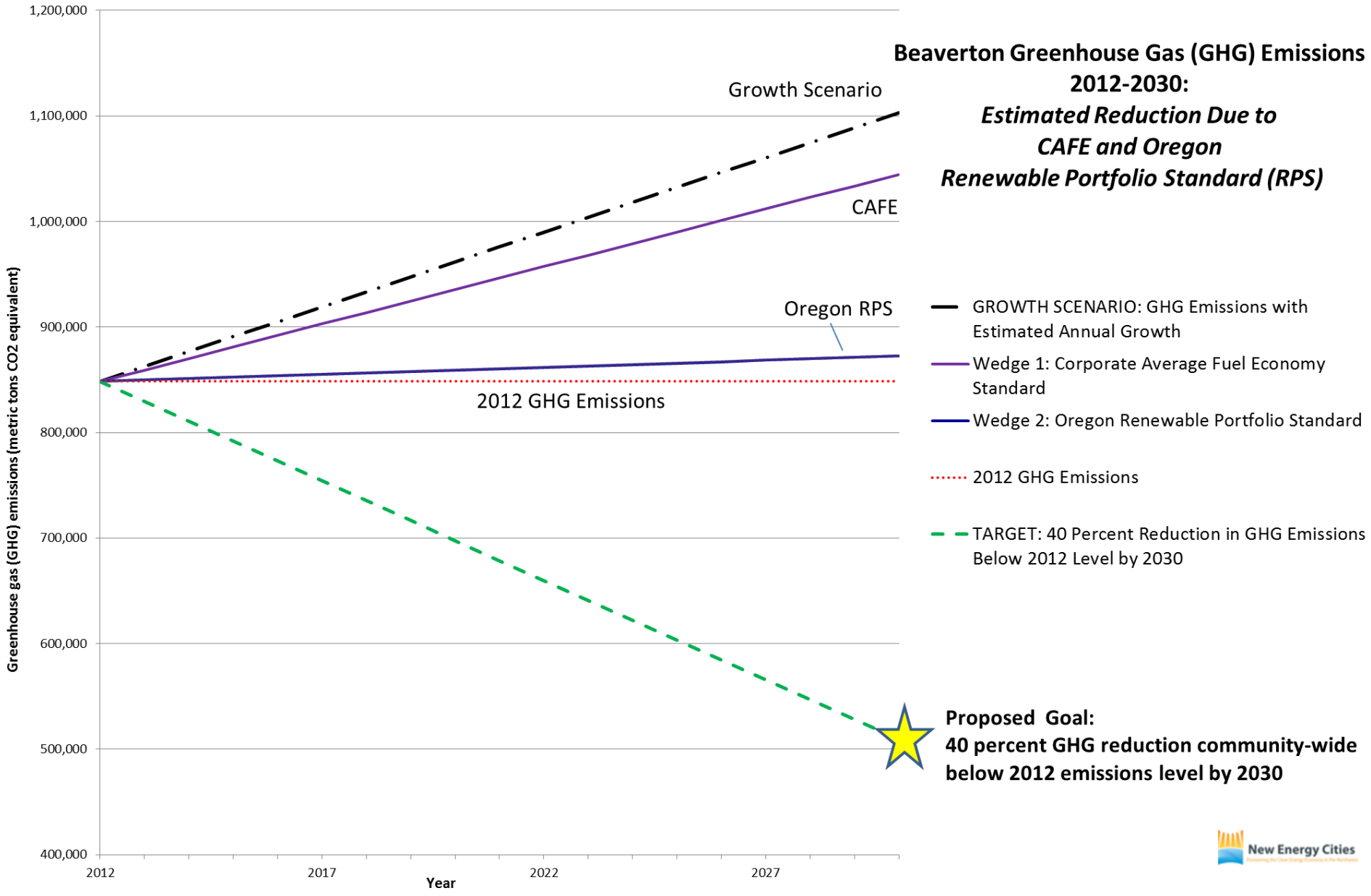
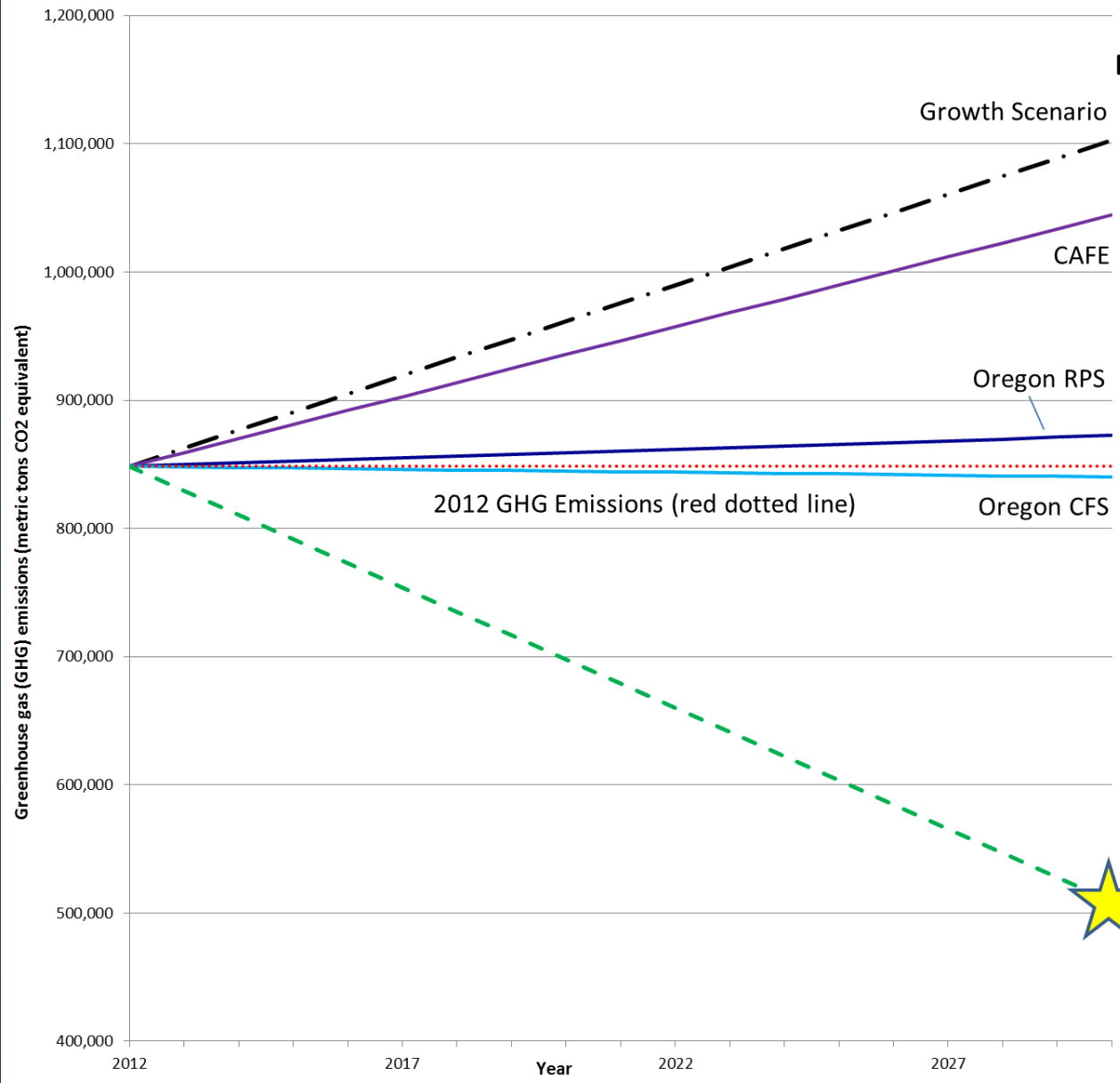
New Energy Cities


Beaverton Greenhouse Gas (GHG) Emissions 2012-2030:
Estimated Reduction Due to CAFE and Oregon Renewable Portfolio Standard (RPS)
Growth Scenario
CAFE
Oregon RPS
2012 GHG Emissions
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
Greenhouse gas (GHG) emissions (metric tons CO2 equivalent)
2012
2017
2022
2027
Year
GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
Wedge 1: Corporate Average Fuel Economy Standard
Wedge 2: Oregon Renewable Portfolio Standard
2012 GHG Emissions
TARGET: 40 Percent Reduction in GHG Emissions Below 2012 Level by 2030
Proposed Goal:
40 percent GHG reduction community-wide below 2012 emissions level by 2030
New Energy Cities



Beaverton Greenhouse Gas (GHG) Emissions 2012-2030:

Estimated Reduction Due to CAFE, RPS, and Oregon Clean Fuel Standard (CFS)

- GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
- Wedge 1: Corporate Average Fuel Economy Standard
- Wedge 2: Oregon Renewable Portfolio Standard
- Wedge 3: Oregon Clean Fuel Standard
- 2012 GHG Emissions
- TARGET: 40 Percent Reduction in GHG Emissions Below 2012 Level by 2030

Proposed Goal:
40 percent GHG reduction community-wide below 2012 emissions level by 2030

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What Will It Take? (Part 2)

We then estimated the GHG emission reduction associated with achievement of targets in three areas, consistent with the Governor's 10-Year Energy Plan and national best practices

Sector	Governor's Energy Plan Goal	Proposed Beaverton Target
Transportation	Accelerate market transformation to a more efficient, cleaner transportation system	Meet Metro's Climate Smart Communities target of 1.2 MT CO_2e* transportation GHG emissions per capita in 2035 (1.63 MT CO_2e estimated by 2030)
Energy efficiency	Maximize energy efficiency and conservation to meet 100% of new electricity load growth	25% reduction in energy use from existing buildings community-wide by 2030* (exceeding the Governor's goal)
Renewable energy	Enhance clean energy infrastructure development	40% non-hydro renewable energy use in electricity & heating community-wide by 2030*

*CO_2e = carbon dioxide equivalent

**Targets adapted from "The Road to 2050: '80x50' Strategy Maps for Carbon-Neutral Cities," Innovation Network for Communities and O-H Community Partners, March 2013.

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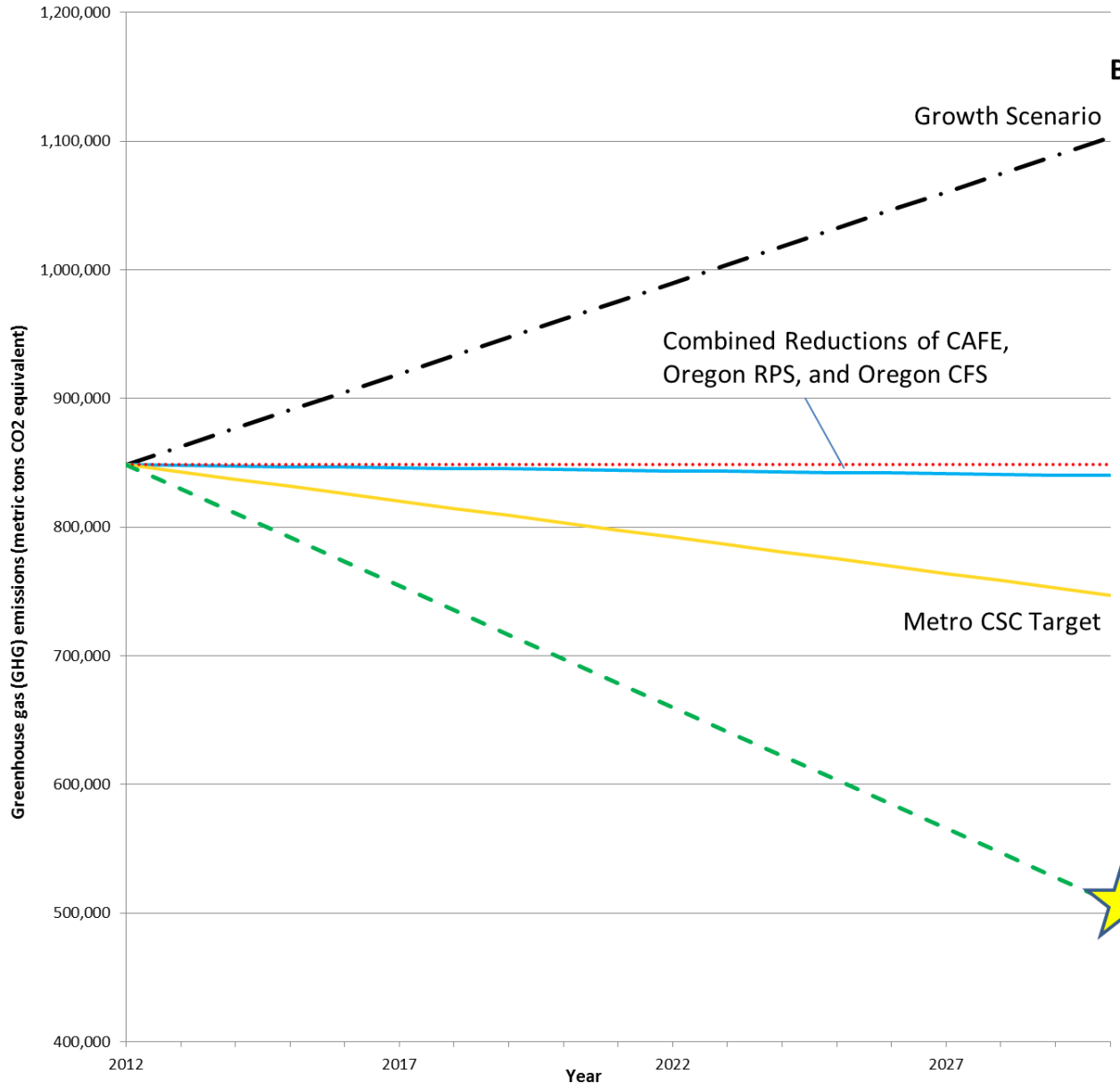
Beaverton Greenhouse Gas (GHG) Emissions 2012-2030: *Estimated Reduction Due to Metro Climate Smart Communities (CSC) Target*



- GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
- Wedges 1-3: Combined Reductions of CAFE, RPS, and CFS
- Wedge 4: Metro Climate Smart Communities (CSC) Target (Est. 2030)
- 2012 GHG Emissions
- TARGET: 40 Percent Reduction in GHG Emissions Below 2012 Level by 2030

Proposed Goal:
40 percent GHG reduction community-wide below 2012 emissions level by 2030

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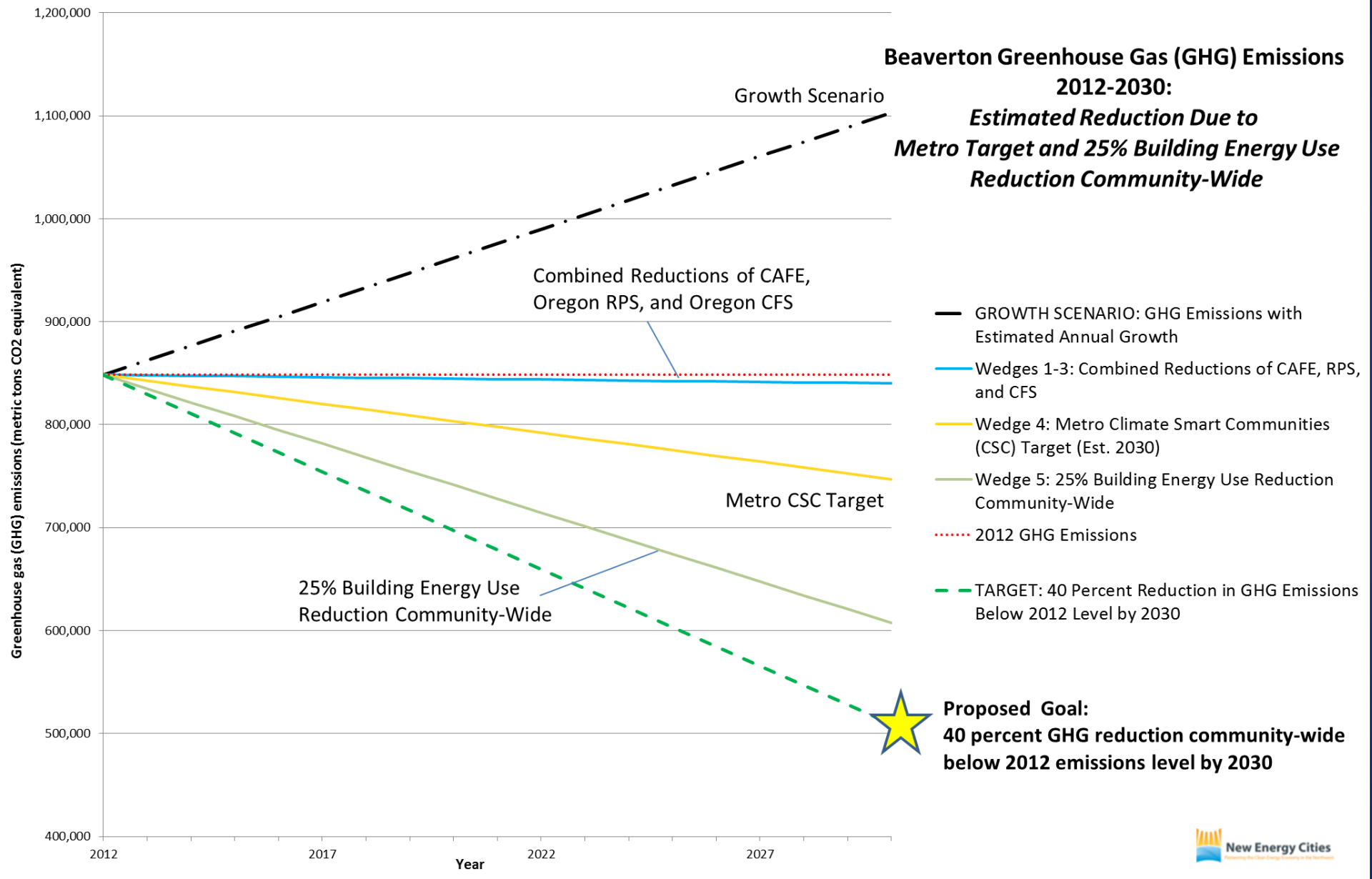

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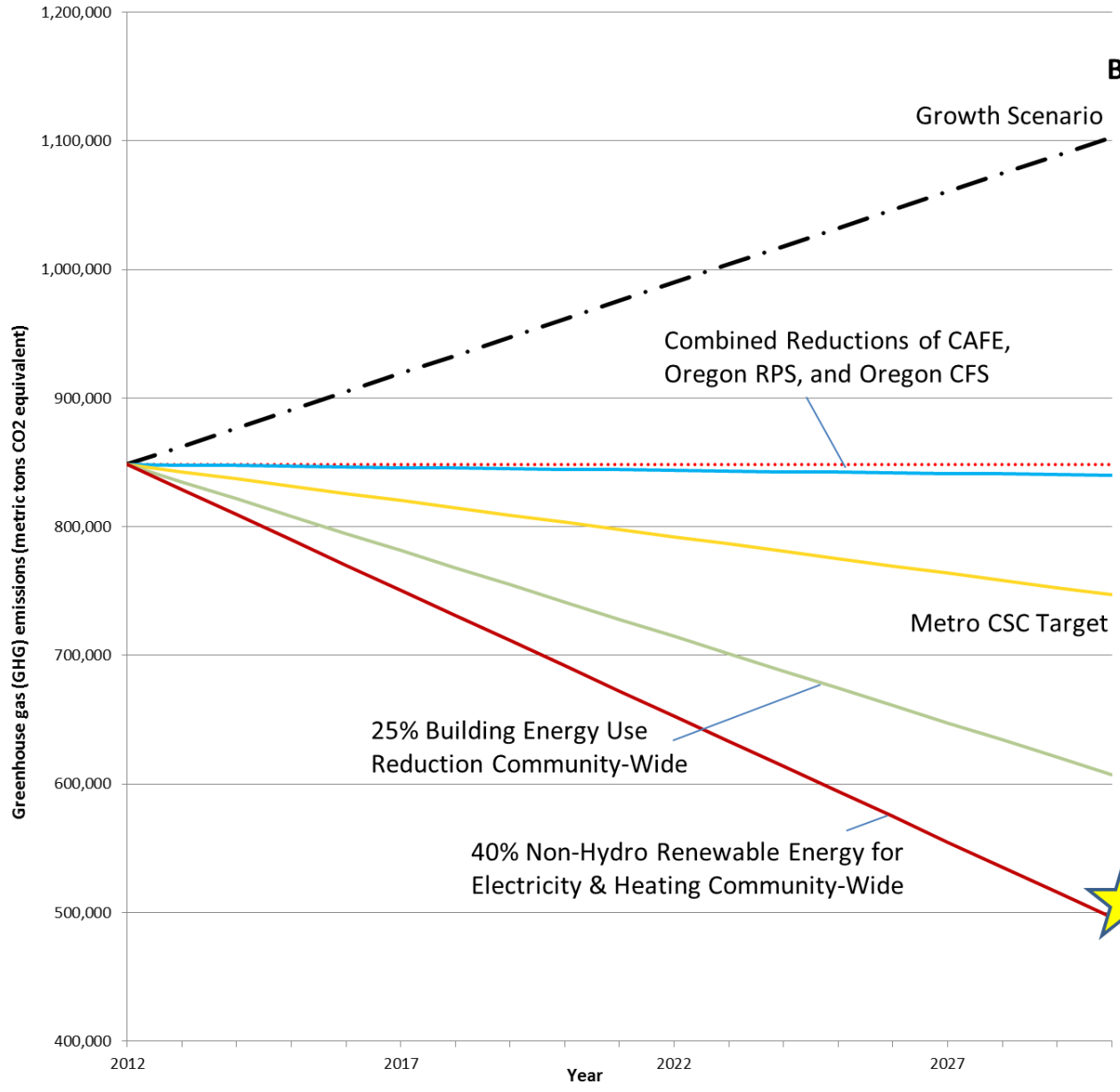

Beaverton Greenhouse Gas (GHG) Emissions 2012-2030:

Estimated Reduction Due to Metro Target, Energy Use Reduction, and 40% Non-Hydro Renewable Energy Use in Electricity and Heating Community-Wide

- GROWTH SCENARIO: GHG Emissions with Estimated Annual Growth
- 2012 GHG Emissions
- Wedges 1-3: Combined Reductions of CAFE, RPS, and CFS
- Wedge 4: Metro Climate Smart Communities (CSC) Target (Est. 2030)
- Wedge 5: 25% Building Energy Use Reduction Community-Wide
- Wedge 6: 40% Non-Hydro Renewable Energy in Electricity & Heating Community-Wide

Proposed Goal:
40 percent GHG reduction community-wide below 2012 emissions level by 2030

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Carbon Wedge Findings

- Existing laws are important, but they alone will not achieve the goal
- State, regional, and local levers of change are all essential to meet the 2030 and 2050 goals
- City will need to implement new actions on its own, but also band together on others for broader action

Achieving 40 percent reduction by 2030 is possible, but requires bolder, more organized action

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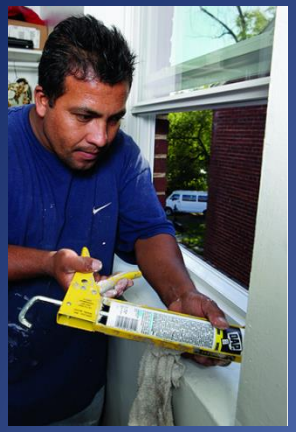
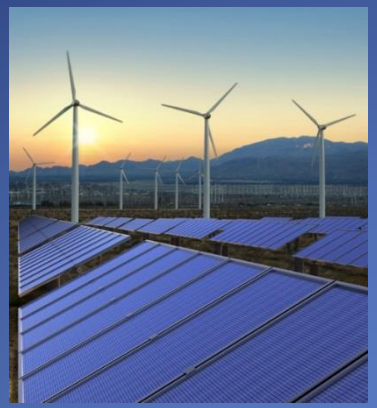


Thank you!

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Elizabeth Willmott, New Energy Cities Program Manager
elizabeth@climatesolutions.org

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