

Fort Collins Climate Action Plan Update



**Citizen Advisory Committee meeting
November 20, 2014**

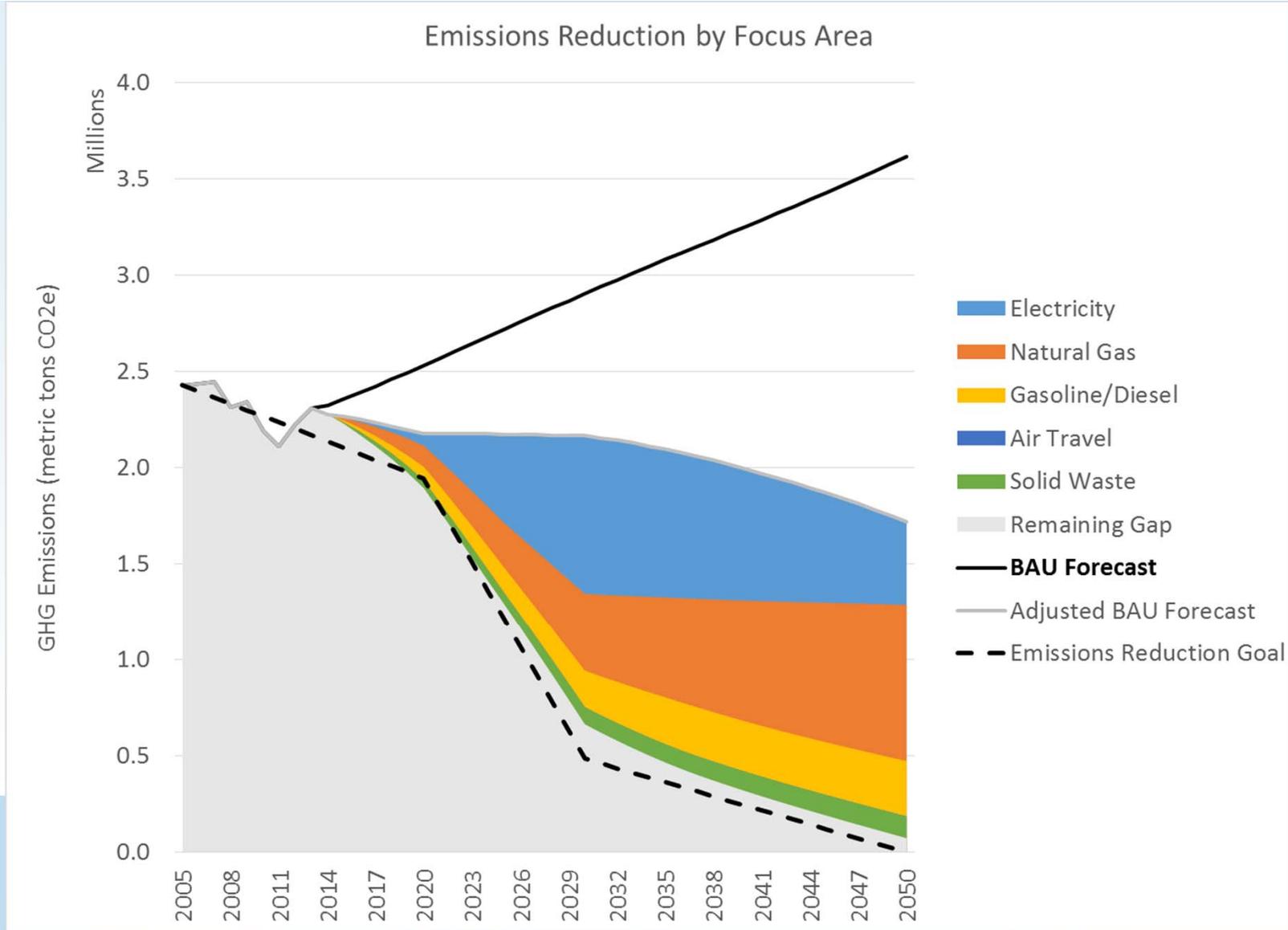
CAC Meeting Packet Overview

- Summary of results
 - Decadal emissions reduction, costs, savings
 - Cost effectiveness and contribution by strategy
- Preliminary sensitivity analysis
 - Financial discount rate
 - Cost of carbon
- Strategy descriptions
 - Tactics
 - Analysis
 - Roles and responsibilities
 - Climate adaptation impacts
 - Co-benefits
 - Supporting city policies

About the CAP Model

- There are many ways to fly from Denver to LA
- We've built the 'flight simulator' and are in the process of testing and commissioning the simulator
- Model looks at carbon and financials
- Things left to do, for example (carbon and cost impacts)
 - Sequestration – can it help, how much?
 - Closer look at energy efficiency strategies
 - Sensitivity analysis – testing the model's input assumptions to quantify uncertainties
 - Iteration with PRPA
- Tonight's discussion and packet materials – an example flight path from Denver to LA (80x30) with early results of sensitivity analysis and framing of 'what-if' questions
- As suspected, it will be a challenge to fly so far so fast

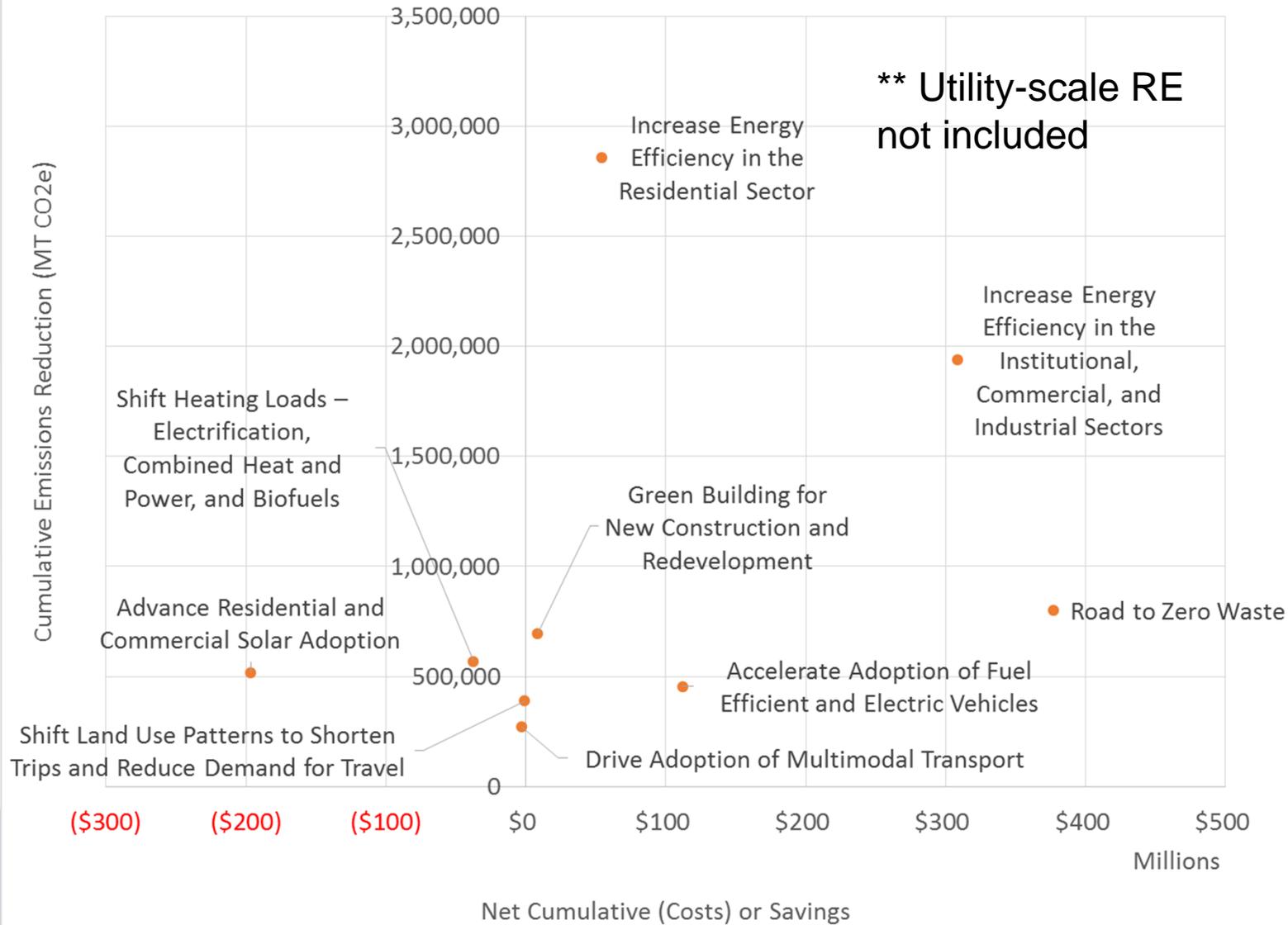
First Iteration Model Output – Wedge Diagram



As modeled, this would require...in the next 15 years

- Electric supply: 80% reduction in PRPA emissions factor
- Existing homes and businesses:
 - Are 36% more efficient
 - 40% of homes and 10% of existing commercial buildings are converted to all electric (heating, cooking, etc.)
 - 22% of homes and 50% of businesses have installed solar
- New construction:
 - Will be 85% more efficient than current code
 - 45% will have enough solar PV to achieve net zero energy
 - 30% of new homes and 10% of new businesses will be all electric
- Vehicles and Mileage
 - 90 percent are electric vehicles
 - Remaining 10 percent are ~40% more efficient than avg. new stock
 - On the whole, people are driving 29% less miles per year

First Iteration Model Output – Cost Effectiveness Scatter



Advance Renewable Energy at the Utility Scale

(first iteration model output)

% Contribution to 80x30: **38 percent**

2030 Cost Effectiveness: **(\$10) per MTCO₂e**

Key Assumptions:

- 80 percent reduction in PRPA emissions factor by 2030
- Net increase in electricity rates

*** All results for this strategy are draft pending model results from PRPA*

Increase Energy Efficiency – Residential and Commercial

First iteration model output

% Contribution to 80x30: **28 percent**

2030 Cost Effectiveness: **\$60 per MTCO₂e – Residential**
\$200 per MT CO₂e – Commercial

Key Assumptions:

- By 2030 existing buildings are 36 percent more efficient
- Program costs: \$0.26 per kWh saved + \$110k annually

% Contribution to 80x30: **8 percent**

2030 Cost Effectiveness: **\$500 per MTCO₂e**

Key Assumptions:

- 100 percent diversion rate by 2030
- Waste tipping fee increases to \$450 per ton by 2025

Shift Heating Loads – Electrification, Combined Heat and Power, and Biofuels First iteration model output

% Contribution to 80x30: **6 percent**

2030 Cost Effectiveness: **(\$70) per MTCO₂e**

Key Assumptions:

- By 2030, conversions to all electric include:
 - 40 percent of all homes
 - 10 percent of all businesses
- Strategy never pays back due to escalating electricity prices

Green Building for New Construction and Redevelopment

First iteration model output

% Contribution to 80x30: **5 percent**

2030 Cost Effectiveness: **\$10 per MTCO₂e**

Key Assumptions:

- By 2030:
 - All new homes and businesses will be 85 percent more efficient than current code
 - 45 percent of new homes and businesses will have enough solar PV to achieve net zero energy
 - 30 percent of new homes and 10 percent of new businesses will be all electric

Advance Residential and Commercial Solar Adoption

First iteration model output

% Contribution to 80x30: **5 percent**

2030 Cost Effectiveness: **(\$400) per MTCO₂e**

Key Assumptions:

- By 2030, solar PV has been installed on:
 - 22 percent of all existing homes
 - 50 percent of all businesses
- PV installation cost of \$2.30 per Watt in 2030

Accelerate Adoption of Fuel Efficient and Electric Vehicles

First iteration model output

% Contribution to 80x30: **4 percent**

2030 Cost Effectiveness: **\$200 per MTCO₂e**

Key Assumptions:

- By 2030, of total annual vehicle sales in Fort Collins:
 - 90 percent are electric vehicles
 - 10 percent are ~40% more efficient than average new stock
- The incremental cost for electric vehicles reduces from \$12,500 today to \$0 in 2030

Shift Land Use Patterns to Shorten Trips and Reduce Demand for Travel First iteration model output

% Contribution to 80x30: **4 percent**

2030 Cost Effectiveness: **\$0 per MTCO₂e**

Key Assumptions:

- By 2030, total vehicle miles travelled have been reduced by 17 percent due to shifting land use patterns
- An implementation cost of \$0.75 per mile reduced

Drive Adoption of Multimodal Transport

First iteration model output

% Contribution to 80x30: **3 percent**

2030 Cost Effectiveness: **(\$10) per MTCO₂e**

Key Assumptions:

- By 2030, total vehicle miles travelled have been reduced by 12 percent due to shifting land use patterns
- An implementation cost of \$0.75 per mile reduced

Scenario Discussion: “What If...”

- “...we removed Airline travel emissions from the analysis?”
- “...the discount rate was 5 percent instead of 2.5 percent?”
- “...there is no carbon tax in the future?”
- “...we only included strategies that are above a certain cost effectiveness threshold?”
- “...population growth is only half of what we are currently assuming?”