

**DENVER** THE MILE HIGH CITY **McKinstry**

# STRATEGIC ENERGY MASTER PLANNING

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## Municipal Government Trends & Current Challenges

Colorado Trends

- Improved Livability
- Resiliency to future risk
- Attainment of sustainability goals
- Economic development & public focus on quality of life

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## Addressing these Challenges and a City's Triple Bottom Line

**Energy efficiency and sustainable operations matter!**

- Economic Prosperity**  
Lowers utility bills and provides excellent financial investment in City Facilities
- Environmental Health**  
Produces significant reduction in GHG emissions, energy, and water
- Social Equity**  
Improves community facilities and occupant comfort

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## Which sectors value Energy efficiency the most?

Sector	Percent Important/Very important
Commercial real estate development or Property management	91%
Manufacturing	89%
Commercial architecture/Design-build/Construction	88%
Data center	82%
Shipping/distribution/Warehousing/Trade sale	80%
Business services/Financial	79%
Retail	78%
Health care	78%
<b>Government</b>	<b>71%</b>
Education	71%
Restaurant	67%
Hotels/business/conference centers	45%

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## What are the biggest drivers of investment in energy efficiency?

Anywhere from \$60-115 Billion is spent on efficiency improvements every year within the US. Drivers for this include:

- Policy is #1
- Building codes and appliance standards
- Utility energy programs and incentives
- Certifications - LEED & Energy Star
- Energy Performance Contracts

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## Denver Ranks 9th on ACEEE's 2017 Energy Efficiency Scorecard

City Scorecard Rank: **9** Denver, CO

Scorecard of 100: **70.50** (Based on 2017)

**DENVER THE MILE HIGH CITY** **Measuring Impact** **McKinstry**

- Denver has been tracking resource consumption metrics since 1990
- 2005 initiated focus on carbon intensity of resource consumption
- Realized that Government Operations represent a small percentage of Community resource consumption

**DENVER THE MILE HIGH CITY** **Comparison of Gov't Ops metrics to Community** **McKinstry**

- Denver Gov Ops vs. Community
  - 1.1% of Transportation Fuel
  - 5.6% of Electricity (Includes street lights)
  - 2.4% of Natural Gas for heating
  - 2.4% of Carbon emissions

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- In order to make Denver a Sustainable City, requires
  1. Leading by example
  2. Setting Community Goals to drive strategy, program, and policy development

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- In order to lead by example
- Government Operations Goals

<b>Air Quality</b> Reduce emissions of federal criteria pollutants by 1.5% per year.	<b>Climate</b> Reduce City greenhouse gas emissions to 450,000 tCO2e.	<b>Energy</b> 25% energy consumption reduction, double renewable energy production.	<b>Food</b> 25% food purchased from sources producing no chemicals.
<b>Health</b> 95% of Denver residents have access to primary medical care.	<b>Housing</b> 3,000 affordable housing units, 75% within 15-minute walk of light rail and 50% within 15-minute walk of bus.	<b>Land Use</b> Walkability score of Medium, High as measured by "Walkscore" metric.	<b>Materials</b> 60% or greater recycling rate.
<b>Mobility</b> 100% of employees commutes to work in single-occupant vehicles.	<b>Water Quality</b> 100% compliance with MCL permit (15.5 mg/L) and maximum discharge in priority 5. (Public Water System).	<b>Water Quantity</b> Reduce potable water use in parks & golf courses by 25% to 18 gpd/yr and 15% landscaping use.	<b>Workforce</b> 60% of CO employees who live in transit districts live in the walkable area of the district.

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- Established Community Goals
- Energy is a key Goal
  - Types of Energy influence Air Quality and Climate Goals
  - Mobility, Housing, Land Use, Food, Water, and Workforce, Materials all contribute to energy consumption

<b>Air Quality</b> Align all National Ambient Air Quality Standards.	<b>Climate</b> Reduce Denver CO2 emissions to below 1990 levels.	<b>Energy</b> Meet total energy usage below 2012 levels, while cutting food fuels by 50%.	<b>Food</b> Grow and/or produce at least 25% of food purchased by Denver & Colorado.
<b>Health</b> Increase the % of youth in Denver at healthy weight from 65% to 74%.	<b>Housing</b> Ensure 50% of neighborhoods are rated as affordable.	<b>Land Use</b> Move Denver's Walk-Friendly rating to Platinum from Good.	<b>Materials</b> Increase the average recycling rate to 50%, or greater.
<b>Mobility</b> Reduce trips in single-occupant vehicles to no more than 60% of commutes.	<b>Water Quality</b> Make all Denver creeks and rivers swimmable and fishable.	<b>Water Quantity</b> Reduce water usage by 25%.	<b>Workforce</b> Help at least 50% of workers living in transit districts get to work without driving alone.

**DENVER THE MILE HIGH CITY** **Plan Development** **McKinstry**

- 2014 emphasis was placed on developing actionable plans to meet 2020 community goals
- Energy Plan required robust, flexible, and independent analysis.
- Plan needed to project energy consumption to 2020, identify the gaps, and analyze potential strategies that will meet the goal.
- Strategies needed to be evaluated by impact, feasibility, and estimate of cost, transparent assumptions/methodology, co-benefits, timeline, and complimentary strategies.

**DENVER THE MILE HIGH CITY** Energy Plan Strategy **McKinstry**

- Top Strategy and Key to Success
  - Energy Benchmarking & Transparency
    - Provides better measurements for improved management
    - Delivers data and transparency to the market for informed decision making
    - Moves the City beyond two points of data
    - Proven strategy in cities
    - Leads to better City programs or policies
  - Building on Benchmarking:
    - Developing a performance track for under-performing buildings
    - Could require audit, building commissioning, or demonstrated savings

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• **Energize Denver Ordinance – December 2016**

Department of Environmental Health

Our Division About Us Animal Order Community Health Public Health Inquiries Environmental Quality

Department of Environmental Health / Environmental Quality / Energize Denver / Commercial and Multifamily Building Benchmarking

**Benchmarking**

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- Energy Code updated to IECC 2015 and exploring “Beyond Code”
- Reviewing Residential Strategies aimed at Energy Efficiency improvements at time of sale and increase access to renewables
- Utilize tool to demonstrate distributed renewables impact on energy and climate goals
- Serves as a backdrop for consideration of community goals like 80% GHG reduction and 100% renewables.

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City and County of Denver Energy Plan

- Gap analysis
- Strategy recommendations
- Dynamic energy model

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Hold total energy consumed in Denver for buildings, mobility and industrial processes below the total consumed in 2012, while cutting fossil fuel consumption by 50% from 2012 levels.

**Total Fossil Fuel Energy Plan Forecast**

Water Quality: Help us reach 40% of water being recycled. (Source: Denver Water 2016 report)

Climate: Reduce Denver CO2 emissions to 2005 levels.

Energy: Hold total energy demand below 2012 levels, while cutting fossil fuels by 50%.

Buildings: Increase the number of high-performance buildings.

Mobility: Hold total transportation emissions to no more than 40% of 2012 levels.

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**2012 Fossil Fuel Consumption Mobile vs Stationary**

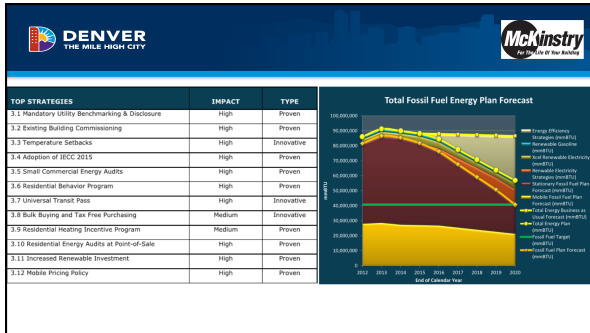
35% Stationary Fossil Fuel Consumption  
65% Mobile Fossil Fuel Consumption

**2012 Energy Consumption by Fuel Type**

38.89% Total Gasoline (Btu) | 27.29% Total Diesel (Btu) | 26.00% Total Electricity (Btu) | 7.84%

**2012 Energy Consumption by Sector**

Sector	Consumption (mmBtu)
Total	21,428,037
Total Gasoline (mmBtu)	8,774,122
Total Diesel (mmBtu)	5,976,177
Total Electricity (mmBtu)	12,868,036
Total Gas (mmBtu)	16,331,402
Total Gasoline + Diesel (mmBtu)	20,375,189



Dynamic Tool Demonstration

Thank you!

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