

City of Grand Rapids

The Water/Energy Nexus: Aiming for Net Zero Water Utilities

August 23, 2018

Mayors Innovation Project

Alison Waske Sutter, Sustainability Manager

Office of Sustainability



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Items to Review:

- Sustainability and energy leadership
- Sustainability and energy framework and goals
- Data, data, data – know your numbers
 - *You can't manage what you don't measure.*
 - Renewable energy goal progress
- Energy programs, projects and commitments
 - Zero Cities Project



City and Mayor opportunities:

- Create goals for energy or greenhouse gas emissions reductions or renewable energy
- Engage in programs and commitments (2030 District, Energy Star, etc.)
- Pass policy (PACE, solar panel tax abatements, etc.)
- Advocate for and bring attention to energy efficiency and renewable energy
- Hire an energy or sustainability manager
- Create an energy team and/or an energy committee (engage the community)
- Request at least annual updates on energy consumption and goal progress

Sustainability and Energy Leadership:

- 2004: Oak Industrial (water department office) LEED certification
- 2005: First renewable energy goal (20% by 2008); Creation of Community Sustainability Partnership (City of Grand Rapids plus educational institutions)
- 2006: United Nations University Regional Center for Expertise and Sustainability
- 2007: Achieved 20% renewable energy goal; increased goal to 100% by 2020
- 2010: U.S. Chamber of Commerce, Most Sustainable Mid-Sized City
- 2011: Oak Industrial solar array installed
- 2013: Grand Rapids Climate Resiliency Report published
- 2015: 1st Annual Grand Rapids Neighborhood Summit, Combined Sewer Overflow (CSO) separation completed, 2030 District launched
- 2016: second five-year Sustainability Plan FY2017 – FY2021 published; City accepted into the first ever Racial Equity Here Cohort with Government Alliance for Race and Equity (GARE); Mayor's Greening Initiative launched; renewable energy goal extended to 2025
- 2017: Zero Cities Project, We Are Still In, PACE, Neighborhood Match Fund, Grand Rapids Racial Equity Project, compressed natural gas (CNG) buses, biodigestion, Good for Grand Rapids

Sustainability and Energy Framework and Goals:

- Sustainability Plan

- First one completed in 2006
- Serves as City's Strategic Plan beginning in 2010 with first five year plan (FY11-FY15)
- Currently operating under our second five-year [Sustainability Plan \(FY17 – FY21\)](#)

- Energy Goals

- 100% renewable energy by 2025 for municipal operations
- 25% reduction in greenhouse gas emissions by 2021 as compared to 2009 baseline

- Committees

- Energy team (city staff)
- Energy Advisory Committee (community stakeholders)



Data, Data, Data Know Your Numbers

You can't manage what you don't measure.



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Grand Rapids Water Utilities

- Waste Water Treatment Plant (Water Resource Recovery Facility)

- Built in 1931; approximately 200,000 square feet
- 40 million gallons of sewage treated per day serving 272,000 customers
- Environmental attributes:
 - Green wall
 - Rain gardens
 - LEED certified facility
 - 2014 energy savings performance contract cost \$1.9 million; expected to save \$2.2 million over its life and reduce energy consumption by 10%
- Reduced annual electricity consumption by 23% from 27.8 million kWh in 2008 to 21.4 million kWh in 2017 (in light of increased service)

- Lake Michigan Filtration Plant

- 350,000 square feet
- Can generate 130 MGD; max peak day 75 MGD
- Energy savings performance contract cost \$6.3 million and estimated to be saving \$110,000 per year; 21 year simple payback

2017 Electricity Consumption

- Total billed from utility: 94.6 million kilowatt hours (kWh)
- Total owned by City: 87.7 million kWh
- Total owned by City servicing the City: 62.8 kWh (66% of total billed)

Electricity to be Excluded from City of Grand Rapids Renewable Energy Baseline in 2017			
Category	kWh	Multiplier for WW and Water	Exclude From Total
Libraries			2,578,695
Waste Water	26,183,343	40%	10,473,337
Water	30,831,039	47%	14,490,588
Griffs Ice Rink			785,152
Primary Circuit	20,995,778		3,515,618
Total:			31,843,390



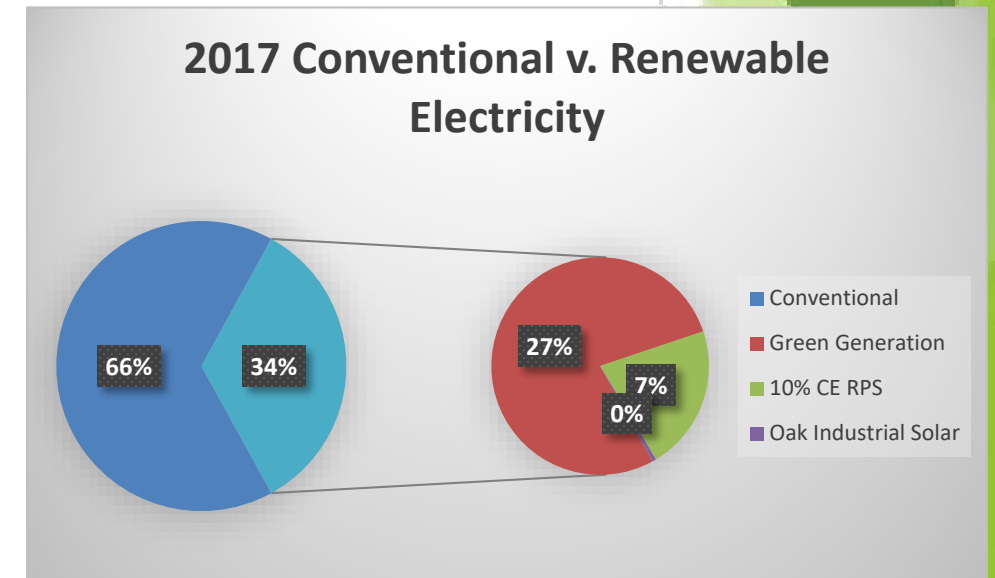
Waste Water treatment plant: 21.4 million kWh (82% of all waste water facilities' electricity consumption)

Water filtration plant: 17.3 million kWh (56% of all water facilities' electricity consumption)

2017 Renewable Energy (Electricity)

- 21.3 million kWh of 62.8 million kWh consumed by municipally owned facilities servicing the City is sourced from renewable sources
- 34% renewable energy

	kWh
Grand Total From Consumers Energy:	94,558,725
Excluded Total	31,843,390
City of GR CE Goal Baseline Total	62,715,335
Oak Industrial Solar	121,383
City of GR RE Goal Baseline	62,836,718



Path to 100% Renewable Energy by 2025

- Solar development (waste water plant, landfill, water filtration plant)
- Waste Water biodigestion (renewable natural gas)
- Utility commitment to 25% renewable energy
- Energy efficiency (reducing the baseline)

[WRRF biodigester groundbreaking](#)



2013 Butterworth Landfill Solar Reuse Assessment



Energy Programs, Projects and Commitments:

- PACE (Property Assessed Clean Energy) Program
- Grand Rapids 2030 District
- 6 Energy Star Certified facilities in 2018
- Municipal Portfolio Performance & Policy Opportunities (NBI and USDOE)
- We Are Still In



Grand Rapids 2030 District Members

PACE Program



Are you a property owner? Want to install energy efficiency upgrades or renewable energy? Check if you're eligible for the Property Assessed Clean Energy (PACE) program.

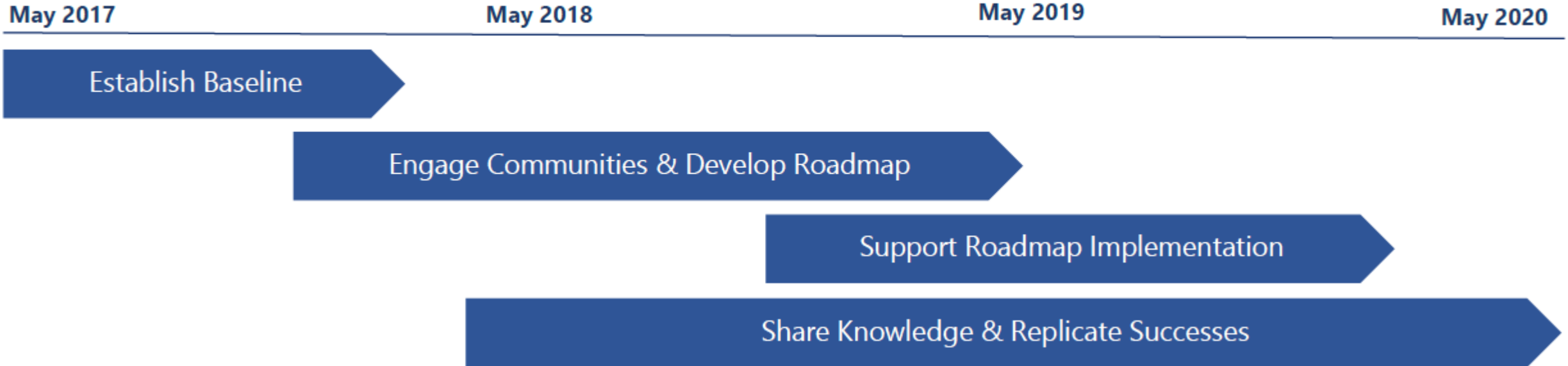
Zero Cities Project:

- Three-year grant funded project to develop a **policy roadmap** toward a zero net carbon building sector by 2050
 - Zero net carbon: produce on-site, or procure, enough carbon free renewable energy to meet the building operations' energy consumption
- 12 U.S. cities selected to participate
- Policy process informed by technical analysis that will include community collaboration and a focus on equity
- Meant to create a plan the City will implement to achieve the zero net carbon goal by all buildings – with economic incentives and planning programs
- USGBC West Michigan partnership

Boston, MA
Boulder, CO
Cambridge, MA
Grand Rapids, MI
Minneapolis, MN
New York, NY
Palo Alto, CA
Phoenix, AZ
Portland, OR
San Francisco, CA
Seattle, WA
Washington, D.C.

Zero Cities Project:

Project Phases & Timelines



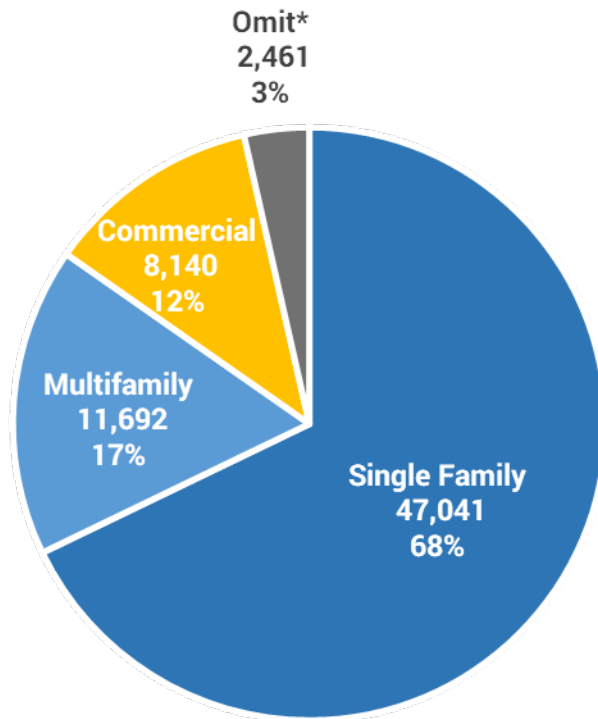
Zero Cities is a partnership with:



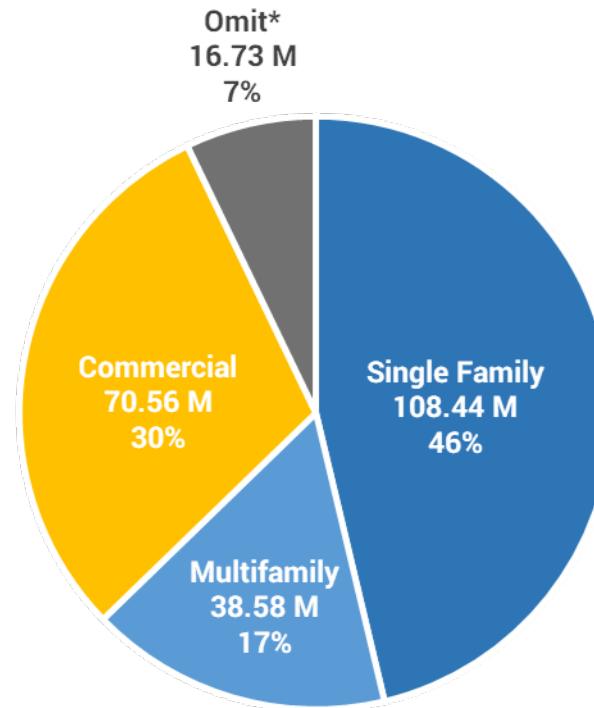
ZCP: Preliminary Building Stock Baseline Analysis

– Building Count and Floor Area

BUILDING
QUANTITIES



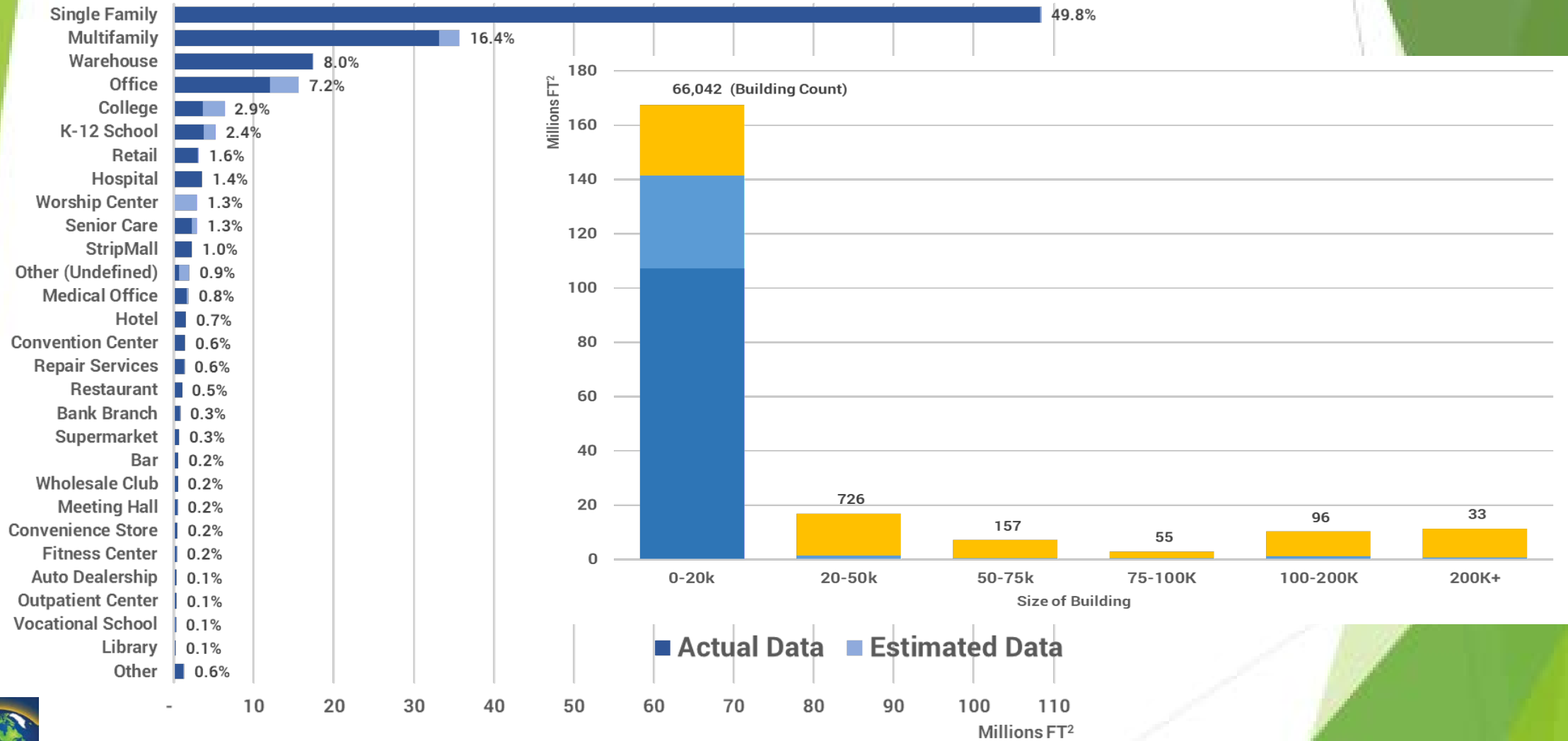
BUILDING
GROSS FLOOR AREA (FT²)



* Buildings omitted from this study include those designated as parking areas or industrial use (primarily process energy)

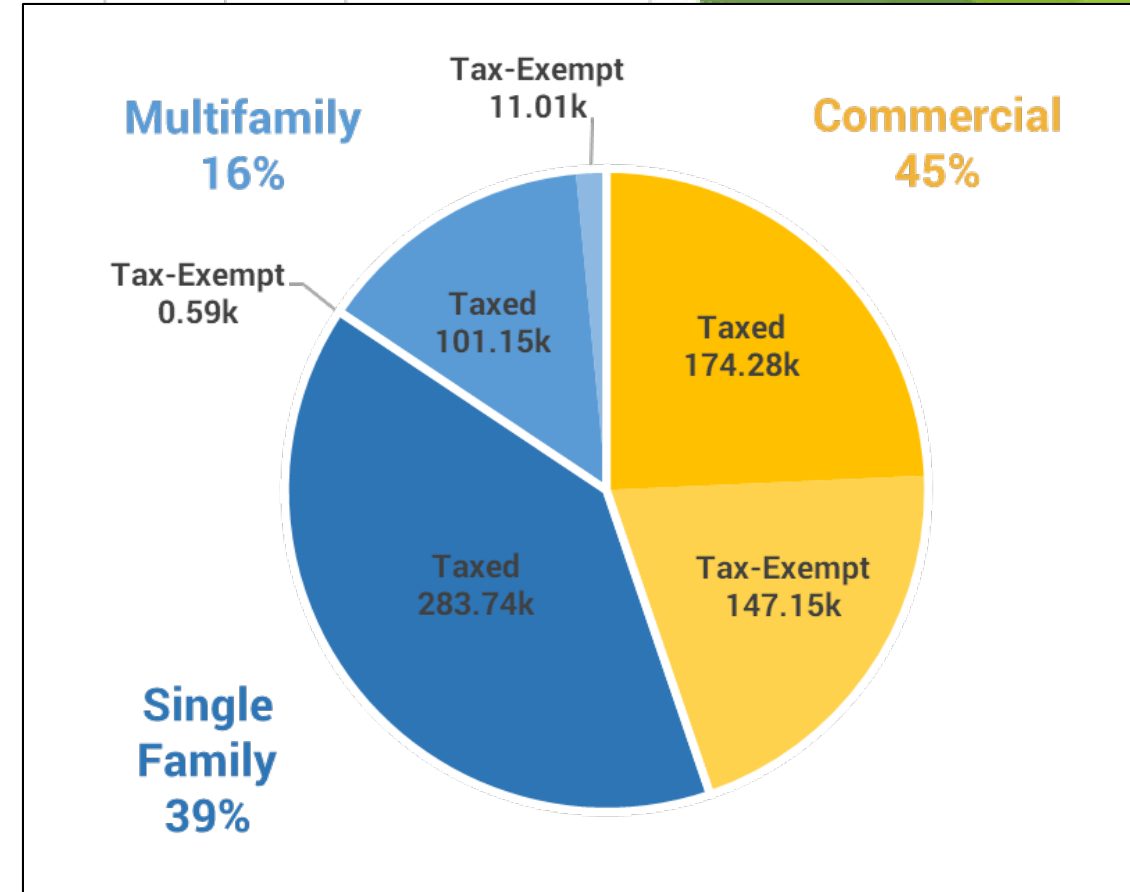
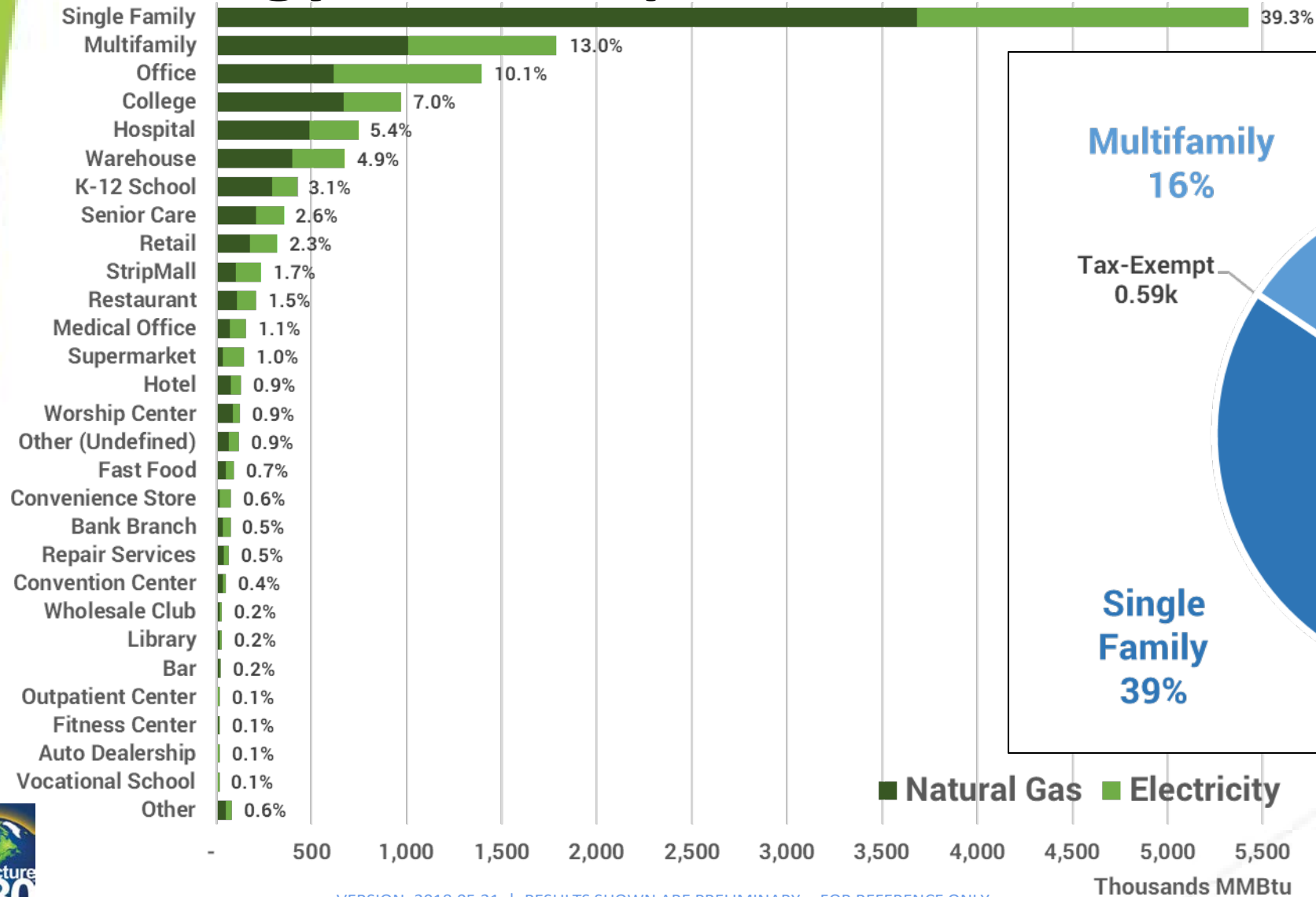
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– Floor Area



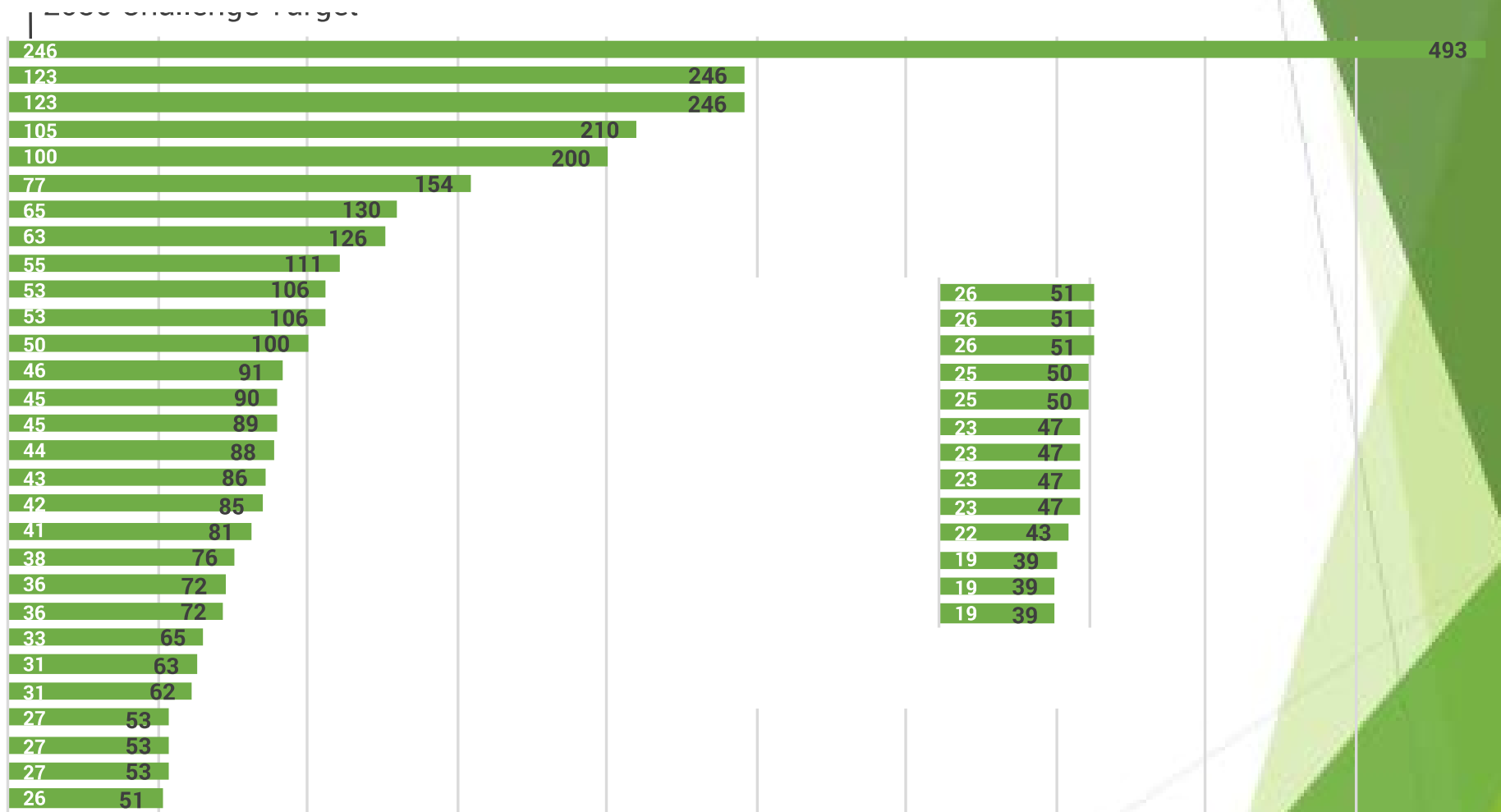
ZCP: Preliminary Building Stock Baseline Analysis

– Energy Consumption



ZCP: Preliminary Building Stock Baseline Analysis

– Average EUI (kBtu/ft²-yr)



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Thank you!

Alison Waske Sutter, Sustainability Manager

Office of Sustainability

City of Grand Rapids

300 Monroe Ave NW, Suite 480

Grand Rapids, MI 49503

616-456-3689

asutter@grcity.us



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