ENERGY MASTER PLAN
CITY & COMMUNITY STAKEHOLDERS

City of Rochester

July 1, 2014

LABELLA Associates, D.P.C. | Engineering Architecture Environmental Planning

New York Power Authority

AGENDA

01 Plan Overview /Status

02 Key Findings; Goals, Objectives and Recommended Initiatives

03 Implementation Strategy

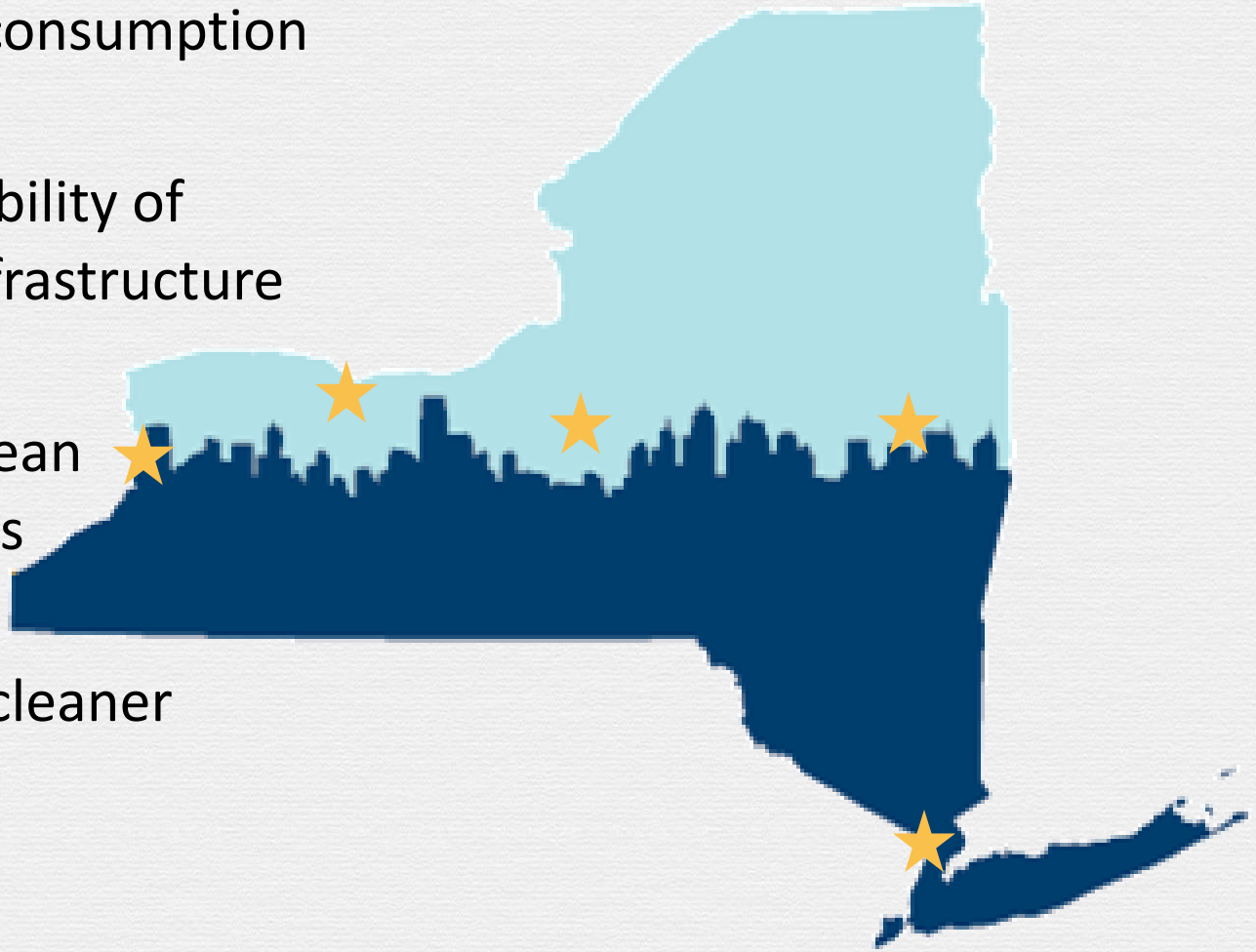
04 Next Steps

05 Questions and Discussion

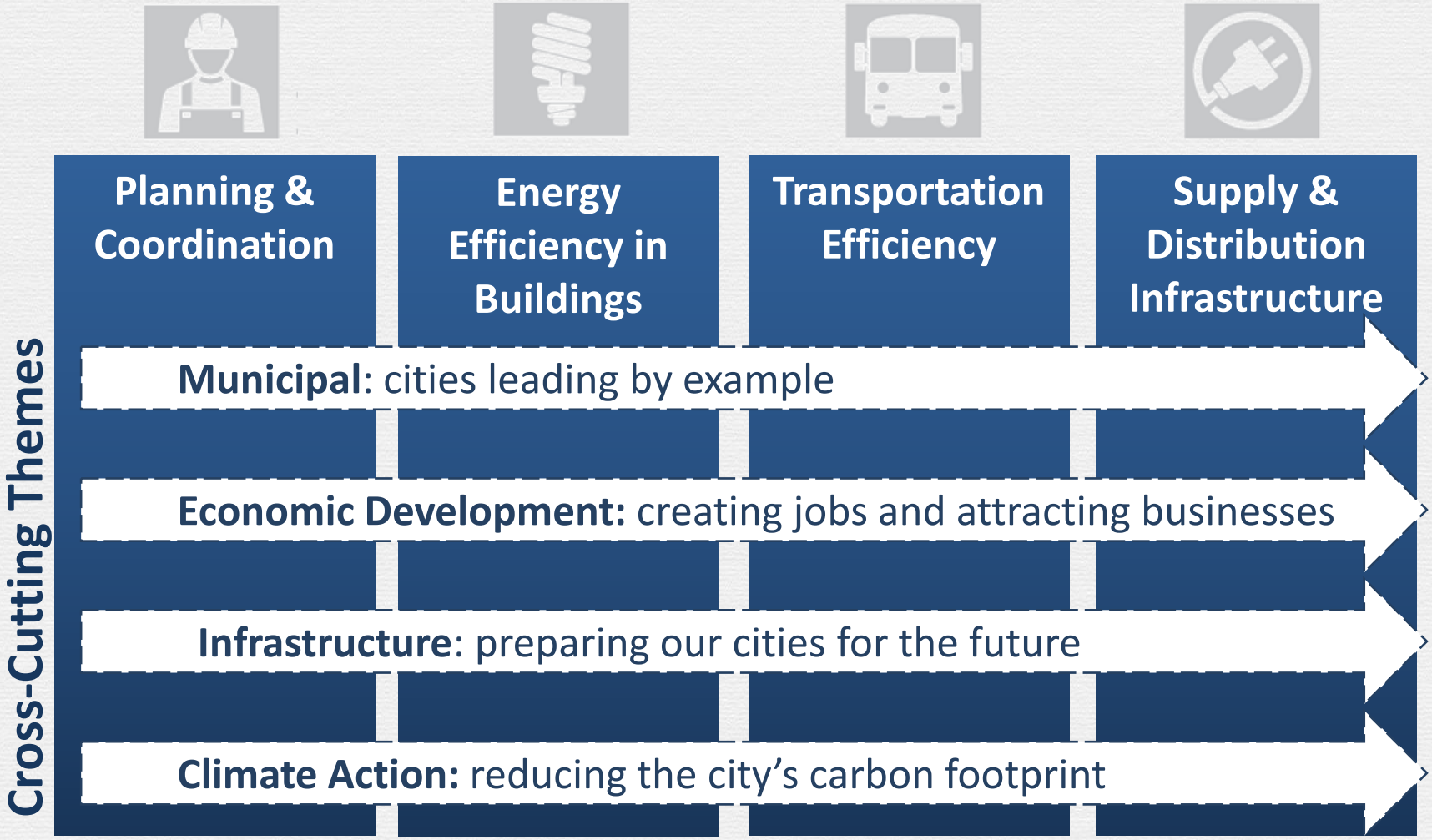
01 Plan Overview/ Status

Goals of Five Cities Energy Master Plans

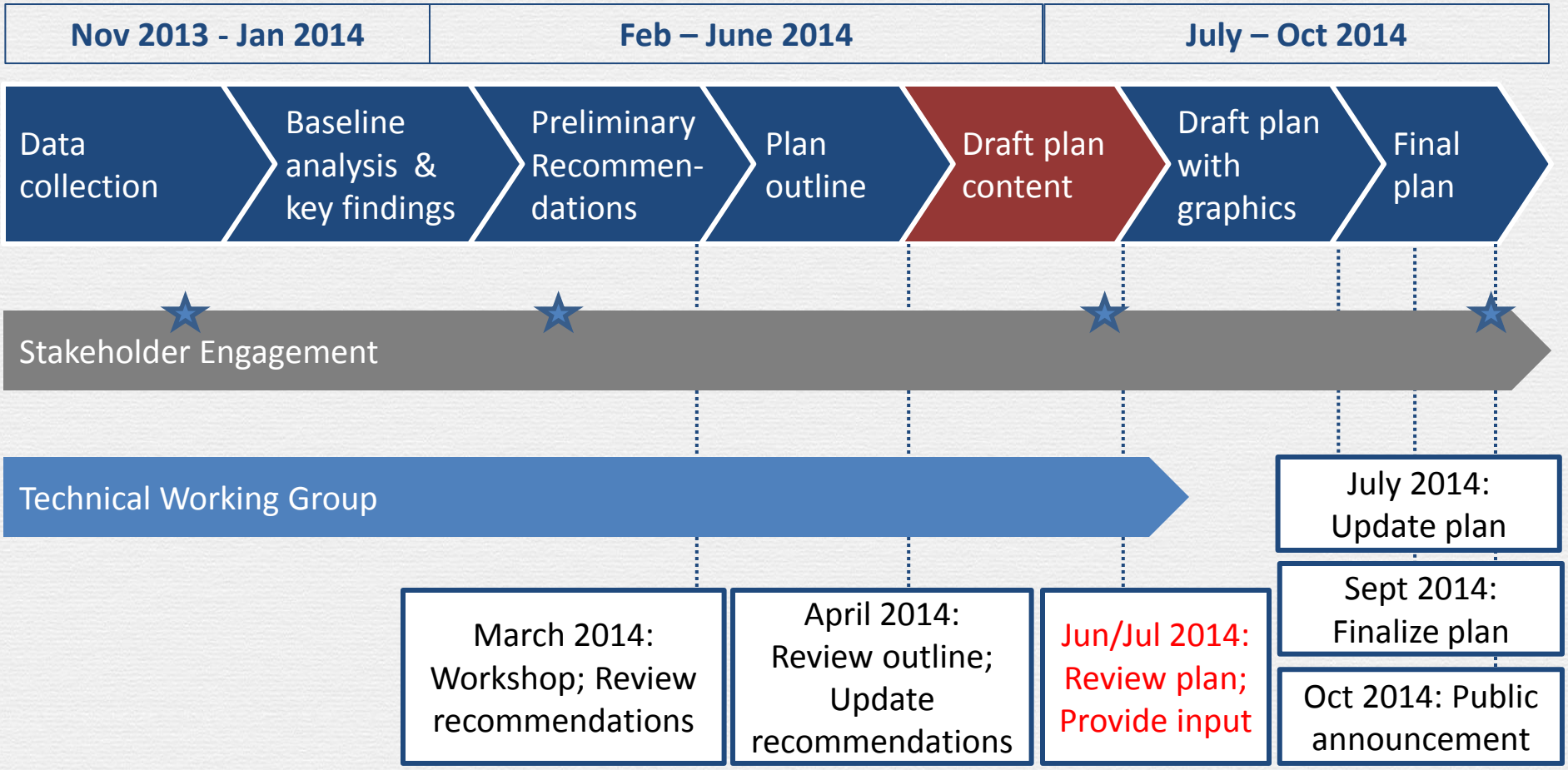
- Reduce energy consumption
- Strengthen reliability of cities' energy infrastructure
- Create jobs in clean energy industries
- Contribute to a cleaner environment



Action Areas and Cross-Cutting themes



Schedule


Nov 2013 - Jan 2014
Feb – June 2014
July – Oct 2014
Data collection
Baseline analysis & key findings
Preliminary Recommen-dations
Plan outline
Draft plan content
Draft plan with graphics
Final plan
Stakeholder Engagement
Technical Working Group
March 2014: Workshop; Review recommendations
April 2014: Review outline; Update recommendations
Jun/Jul 2014: Review plan; Provide input
July 2014: Update plan
Sept 2014: Finalize plan
Oct 2014: Public announcement

State Coordination

- Build Smart NY
- Regional Economic Development Councils
- Cleaner, Greener Communities
- Energy Highway Blueprint
- NY Green Bank
- Climate Smart Communities
- NY Sun Initiative
- Charge NY

Key Plan Components

Energy Master Plan

Energy Master Plan – Content

- **Key Findings from Data Collection and Analysis**
  - Energy usage baseline and projections
    - City buildings, fleets and operations
    - Community buildings and transportation
  - Energy generation, transmission and distribution
  - Current and planned programs and projects
  - Institutional and regulatory context
- **Goals, Objectives and Initiatives**
- **Supporting Information**
  - Recent/ current City initiatives
  - Best practices from other areas
  - Relevant case studies from Regional Economic Development and Sustainability Plans
- **Implementation framework**

Initiatives - Evaluation Criteria

- Clear role for City government
- Consistent with and furthers City goals
- Consistent with and furthers State goals
- Contribution to energy reduction goals (Btus)
- Technical and legal feasibility
- Return on investment/payback
- Contribution to climate action goals (GHG reductions)
- Ease of implementation (current availability of upfront capital or operating costs, necessary staff resources, requirements of legislative changes or regulatory approvals, etc.)

02

Key Findings; Goals, Objectives and Recommended Initiatives

Planning & Coordination

Advocacy, Procurement, Communications, Coordination among Agencies and Departments

Goal:

Coordinate municipal, utility, community and State energy policies to ensure safe, sufficient, reliable and clean energy that meets City needs

Key Actors

- NYS Public Service Commission
- Rochester Gas and Electric
- Energy Service Companies
- Other Governments
- City Departments

Targets in Existing Plans

- **U.S. Conference of Mayors Climate Protection Agreement, 2007**
  - reduce GHG emissions by 7% from 1990 levels by 2012
- **Greenhouse Gas Inventory, 2011**
  - reduce GHG emissions 20% from 2008 baseline by 2020
- **U.S. DOE Better Buildings Challenge**
  - reduce energy use intensity (EUI) by 20% by 2020 from the 2009 baseline
- **Climate Action Plan, 2013**
  - reported reduced GHG emissions from City operations by 8.62% by the end of 2011

Recommended Initiatives

- Participate in PSC decision-making processes relating to tariffs and utility regulation
- Maintain and communicate data regarding energy usage and building performance
- Expand energy procurement through ESCOs to include natural gas

Energy Efficiency in Buildings

City facilities;
Public and Private buildings citywide

Goal:

Reduce energy usage and greenhouse gas emissions from buildings by 10% by 2020

Citywide Building Stock (2010)

Type	Number	Unit
Residential	89,778,117	Sq. Ft
Commercial	35,771,430	Sq. Ft
Institutional (medical, education, government)	26,857,823	Sq. Ft.
Industrial	36,650,227	Sq. Ft.

Occupied buildings

Energy Usage from Citywide Buildings (2010)

Type	Electricity	Natural Gas	Other Fuels	Total	% of Total
Residential	2,504,256	6,655,286	473,915	9,633,457	38%
Commercial	1,174,405	3,146,878	142,277	4,463,559	18%
Institutional	1,535,044	3,187,226	144,101	4,866,371	19%
Industrial	1,926,342	2,521,601	1,846,178	6,294,121	25%

Energy usage converted to mm BTUs

Greenhouse Gas Emissions from Citywide Buildings (2010)

Type	Tons CO2e	% of Total
Residential	476,708	33.7%
Commercial	382,932	27.0%
Institutional (medical, education, government)	256,215	18.1%
Industrial	300,070	21.2%
Total:	1,415,925	100.0%

Objective – Citywide Buildings

Reduce energy usage in community buildings by 10% by 2020

Recommended Initiatives – Citywide Buildings

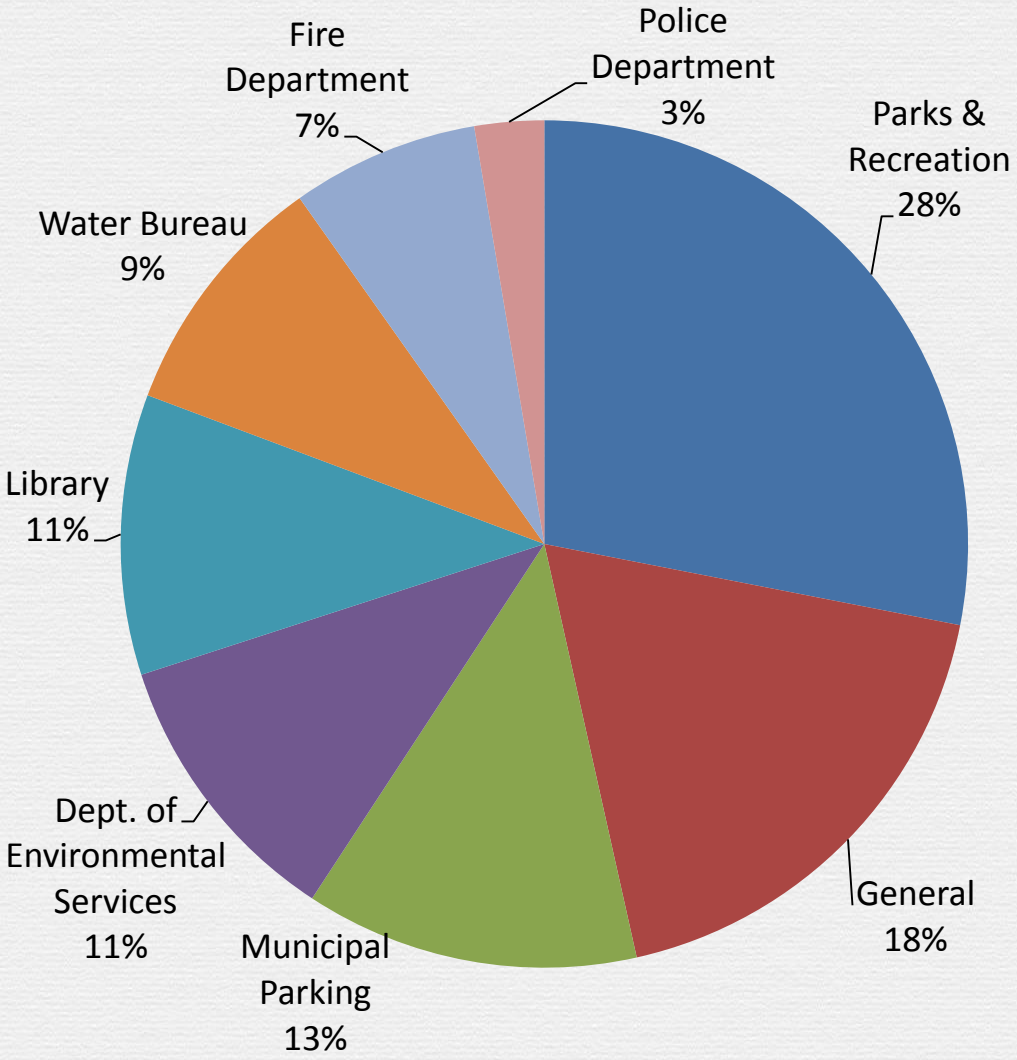
- Maintain effective enforcement of Energy Code
- Revise zoning and streamline permitting to incentivize energy efficiency improvements
- Partner with business and institutional leaders to increase benchmarking and implement long-term energy reduction targets in private sector buildings
- Partner with RG&E, not-for-profit organizations and other private or public entities to support community engagement programs such as bill comparison programs and competitions

Objective – City Buildings (municipal)

Reduce energy usage in municipal buildings by 20% (from 2009 baseline) by 2020

Total Energy Usage in Buildings

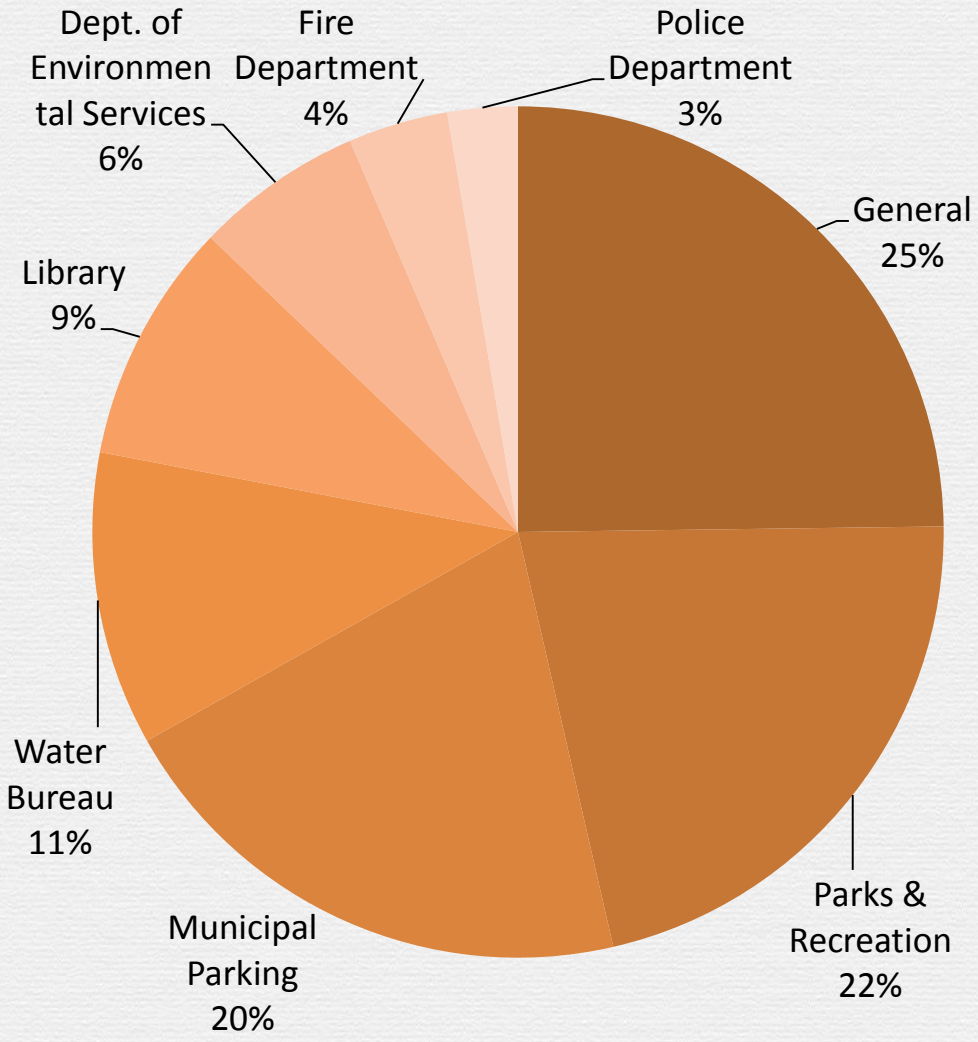
City of Rochester, April 2010- March 2011



Department	MMBTu
Parks & Recreation	63,972
General Operations	41,995
Municipal Parking	29,018
Dept. of Environmental Services	24,554
Library	24,391
Water Bureau	21,625
Fire Department	16,296
Police Department	6,040
Totals	290,766

Total Electricity Usage in Buildings

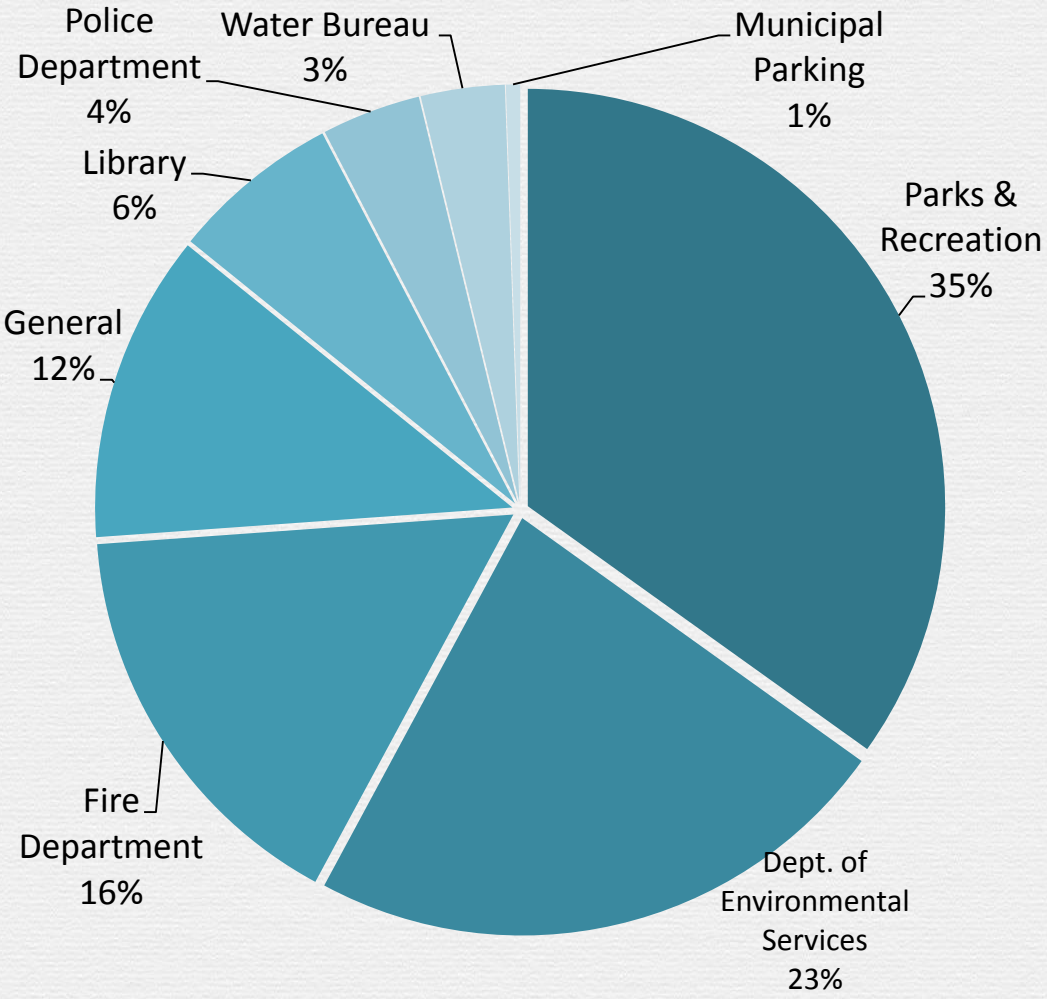
City of Rochester, April 2010- March 2011



Department	kWh
General	8,796,072
Parks & Recreation	7,667,755
Municipal Parking	7,250,885
Water Bureau	3,961,466
Library	3,246,878
Dept. of Environmental Services	2,265,822
Fire Department	1,344,442
Police Department	946,228
Totals (kWh)	53,906,288
Totals (MMBTu)	183,936

Total Natural Gas Usage in Buildings

City of Rochester, April 2010- March 2011

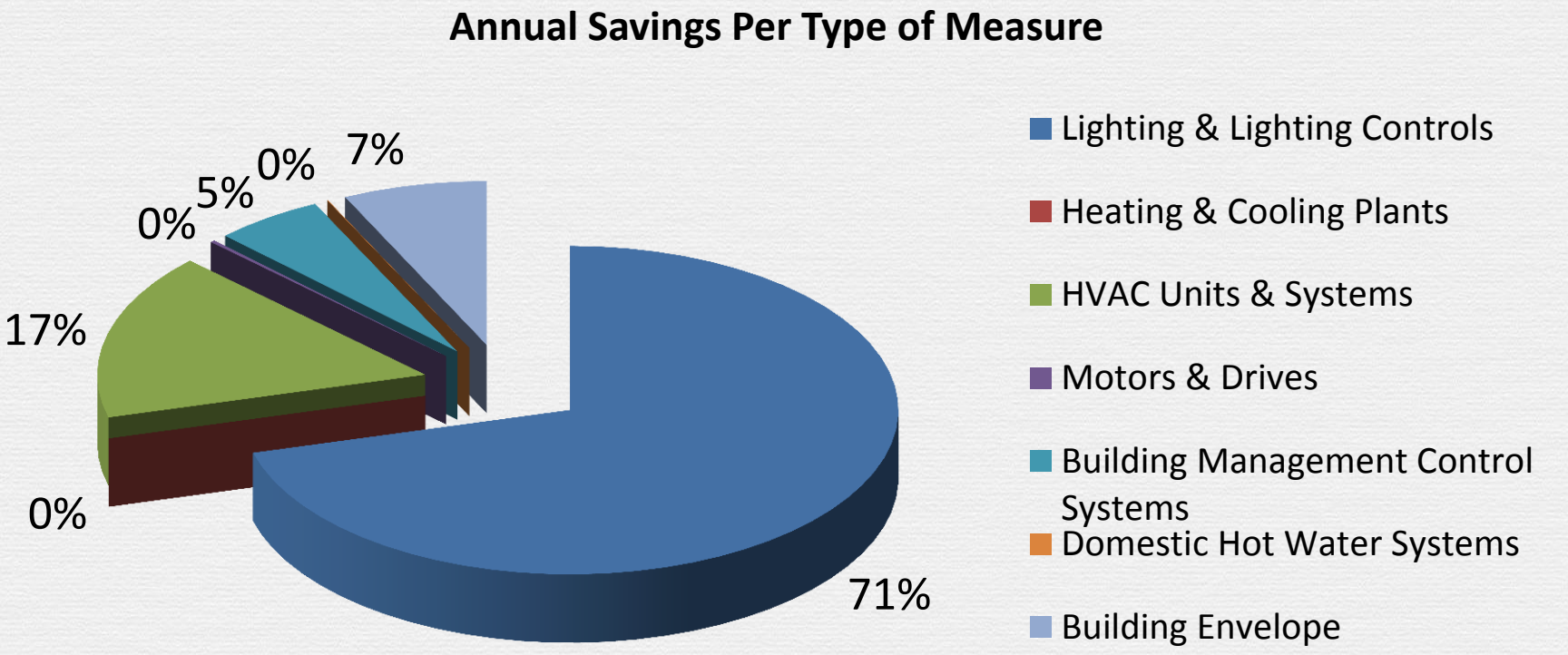


Department	Therms
Parks & Recreation	248,170
Dept. of Environmental Services	163,485
Fire Department	113,790
General	84,970
Library	46,583
Police Department	27,321
Water Bureau	23,101
Municipal Parking	3,922
Totals	711,342
Totals (MMBTu)	73,197

Recommended Measures in Energy Audits of City-Operated Buildings

- Lighting and Lighting Controls
- Heating and Cooling Plants
- HVAC Units and Systems
- Motors and Drives
- Building Management Control Systems
- Domestic Hot Water Systems
- Building Envelope

Energy Audit Implementation



Annual Savings Per Type of Measure	
Lighting & Lighting Controls	$351,048
Heating & Cooling Plants	$0
HVAC Units & Systems	$81,542
Motors & Drives	$1,123
Building Management Control Systems	$26,694
Domestic Hot Water Systems	$170
Building Envelope	$35,211

Level 1 Energy Audit Implementation

Building Name	Total Per Building		
	Simple Payback (Years)	Cost	Annual Cost Savings
Blue Cross at the War Memorial	3.3	$166,402	$50,903
Building Services - 414 Andrews St.	6.5	$7,790	$1,195
Genesee Crossroads Garage	1.6	$87,200	$54,091
David F. Gantt Community Center	2.3	$80,870	$35,820
Hemlock - Facility Support	8.4	$44,720	$5,329
Hemlock - Plant Operation Center	34.3	$378,770	$11,034
High Falls	4.3	$135,540	$31,285
Mortimer Street Garage	4.4	$62,140	$14,102
Park & Maintenance Building	2.1	$79,080	$38,204
Court Street Garage	1.3	$97,190	$75,125
High Falls Garage	2.6	$54,900	$21,408
Sisters City Garage	2.9	$79,550	$27,788
South Ave Garage	1.4	$132,911	$92,844
Washington Square	1.7	$62,100	$36,660
Total Program		**$1,469,163**	**$495,788**
Total Program Payback		**3.0 Years**	

Recommended Initiatives
City-Operated Buildings

- Conduct Level 2 Audits and/or retro-commissioning of City buildings
- Sort energy conservation measures (ECMs) in order of payback period and select those that would result in an average cumulative payback of 6-8 years.
- Schedule and implement energy conservation improvements in conjunction with planned capital improvements
- Secure financing through NYPA or utilize Energy Performance Contracts (EPCs) to provide up front capital funding, with payments provided out of the annual energy savings
- Allow energy efficiency savings to accrue to a dedicated fund within the centralized facilities department and be used for additional efficiency measures
- Implement incentive programs to encourage employees to reduce energy usage in City facilities

Transportation

Energy Efficiency, Alternative Fuels and Administrative Policies

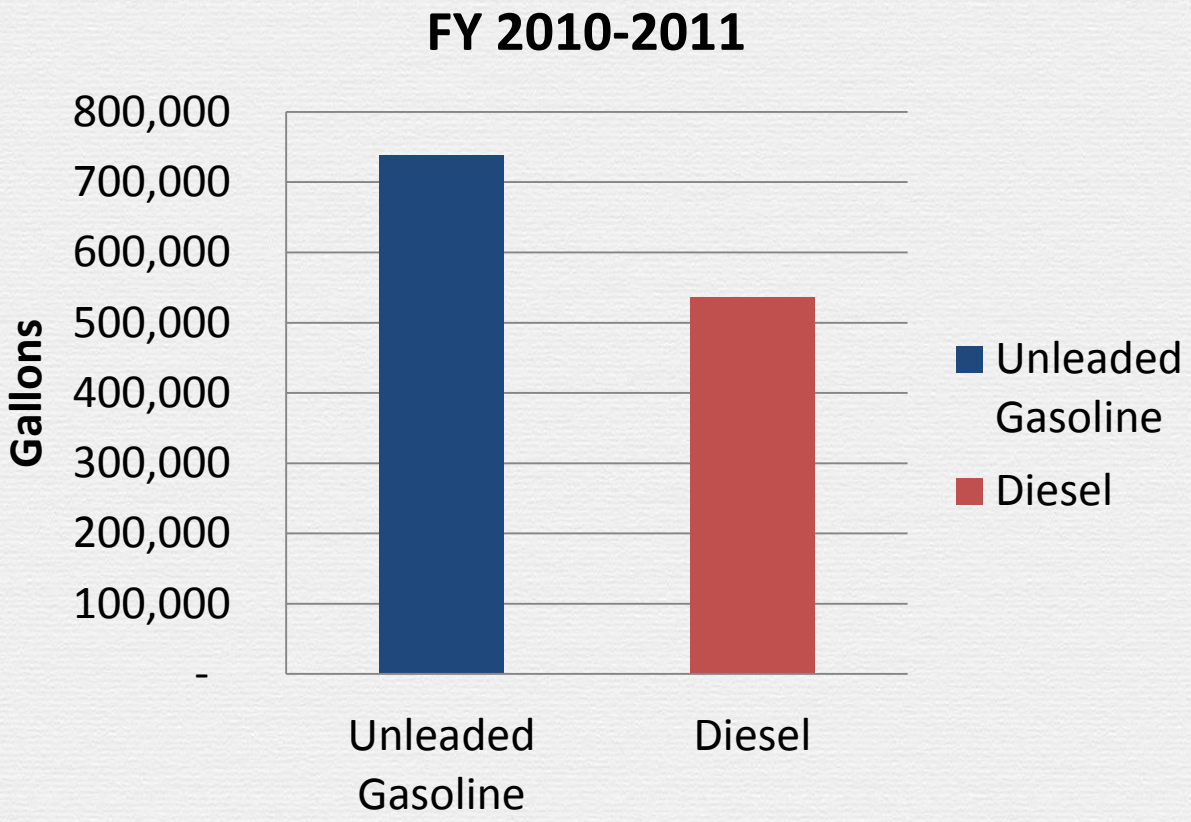
Goal:

Reduce energy usage and greenhouse gas emissions in the transportation sector by 20% (from 2008 baseline) by 2020

Objectives – Transportation Efficiency

- Reduce energy usage and greenhouse gas emissions from vehicular transportation – municipal operations and citywide
- Increase the use of alternative fuels
  - City fleets
  - Other public and private fleets
  - Community vehicles
- Increase the proportion of trips made by walking, bicycle and transit
- Replace street lighting with more efficient LEDs

Baseline Year City Fleet Fuel Statistics



Transportation Energy/ GHG Reduction Target: 10% by 2020

Example for Baseline Year:
Total Diesel + Gasoline =
1,281,095 gallons of fuel used

Reduction Target

10% = 12,811 gallons of petroleum based fuels

City Fleets Initiatives

- Implement pilot anti-idling program with dump trucks.
- Create EcoDriving with Train-the-Trainer Model.
- Initiate Right-Sizing program for City of Rochester fleet to ensure that the most fuel-efficient vehicles are purchased for the duty application
- Strategically increase the number of alternative fuel vehicles in the fleet
  - Transition the refuse sector of the fleet to CNG
  - Increase the use of biodiesel in heavy-duty vehicles
  - Increase the number of EVs and PHEVs

Citywide Transportation - 2010

Fuel Type	mmBTUs
Gasoline	9,566,228
Diesel	1,655,237
Total	**11,857,000**

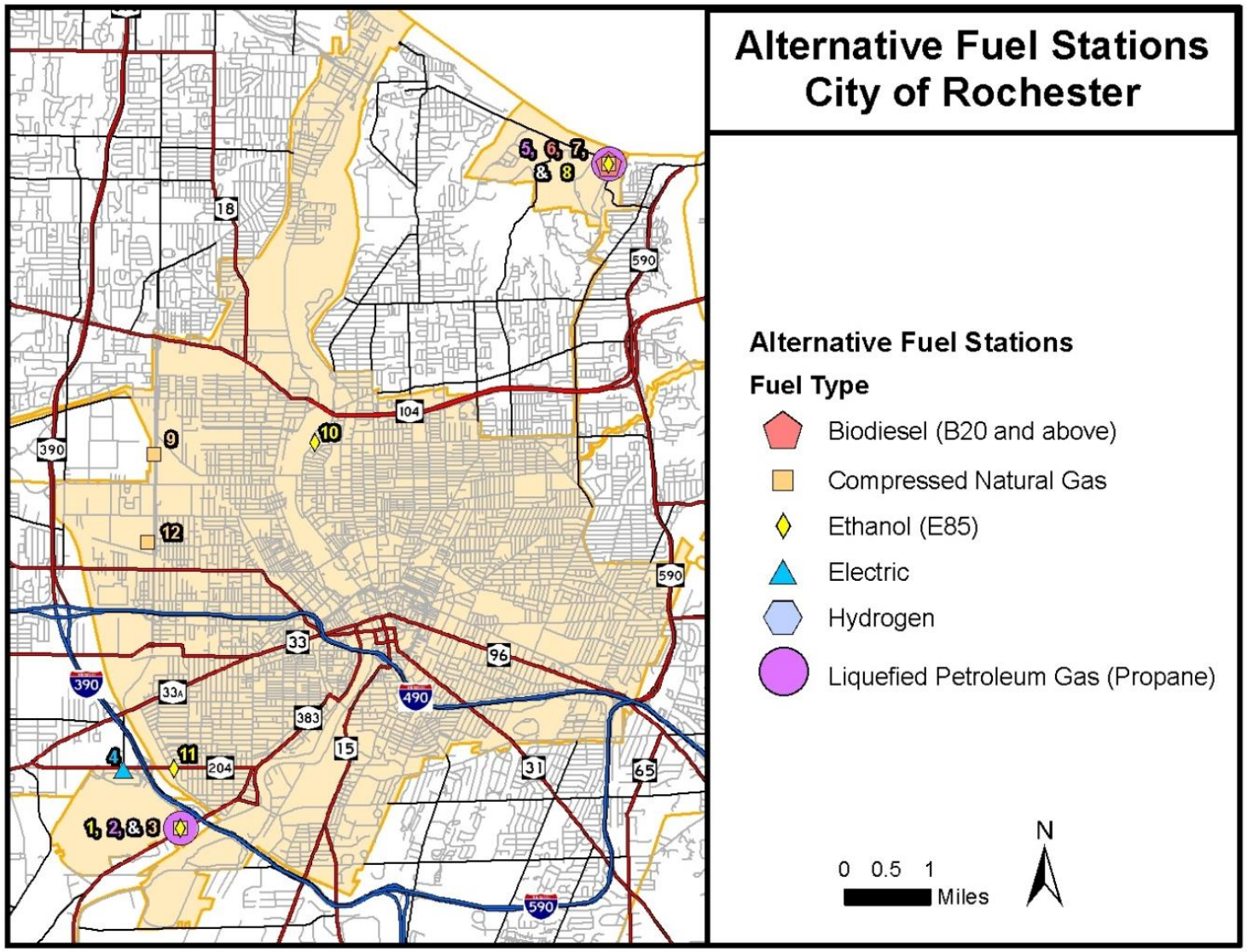
Total Vehicle Miles Traveled	**1,148,924,269**

- CAFÉ standards will result in an average 31% greater vehicle fuel efficiency by 2016

Citywide Transportation Initiatives

- Support efforts by other municipal and private fleets to reduce energy use and greenhouse gas emissions through continued involvement with the local Clean Cities affiliate, Genesee Region Clean Communities, Inc

Alternative Vehicular Fuel Stations



Increase the Proportion of Trips Made by Walking, Bicycling and Transit

- Continue to construct bicycle lanes and supporting infrastructure as recommended in the Bicycle Master Plan
- Improve walkability through maintenance of infrastructure, zoning regulations that promote compact development patterns and enforcement of pedestrian-friendly design standards
- Partner with RGRTA, businesses and institutions to encourage and support the retention and expansion of transit routes and promote of transit usage
- Encourage and support bike share and car share programs

Total Energy Usage – Street Lighting

City of Rochester, April 2010- March 2011

	kWh	MMBTu	Cost
Street Lights	18,426,740	62,875	$2,003,705

Convert Street Lighting to LEDs

- Install LED street lighting and advanced metering and controls.
  - Replace bulbs in existing fixtures – same spacing, number, height
  - Monitor technology advances, pricing and funding for advanced metering and controls for LED lighting (such as dimming)
  - Consider reducing illumination below current levels in certain areas

Supply and Distribution Infrastructure

Infrastructure Capacity and Maintenance, Renewable Energy, Resiliency

Goal:

Ensure an energy supply within Rochester that is safe, sufficient, reliable and affordable, and that contributes to reductions in greenhouse gas emissions and dependence on fossil fuels

Electricity Generation Fuel Mix

Upstate NY

Non-Hydro Renewables	4.3%
Hydro	28.2%
Nuclear	28.9%
Oil	0.8%
Gas	22.2%
Coal	15.3%

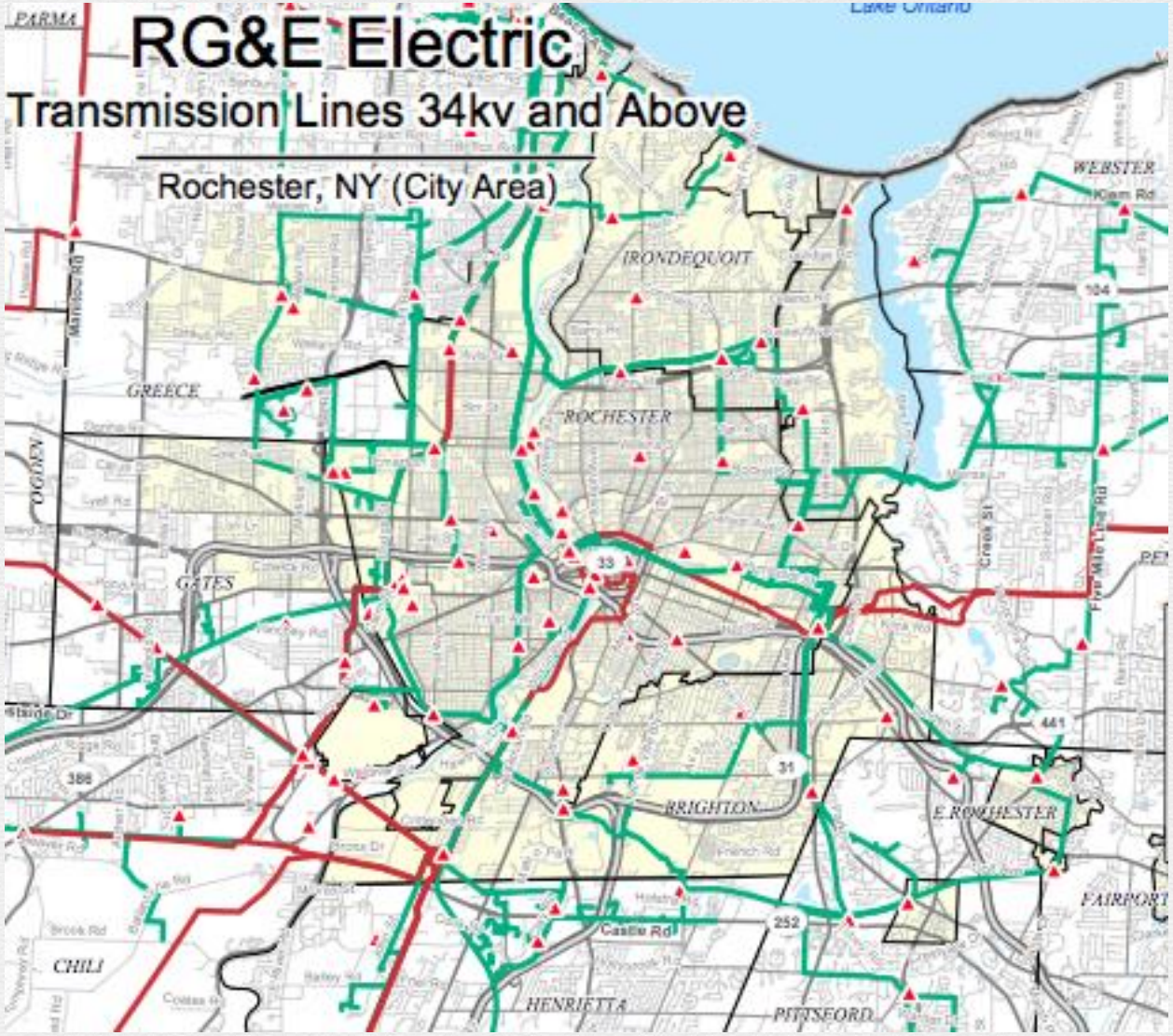
SOURCE: US EPA Power Profiler, 2010

Electricity Generation Emission Factors

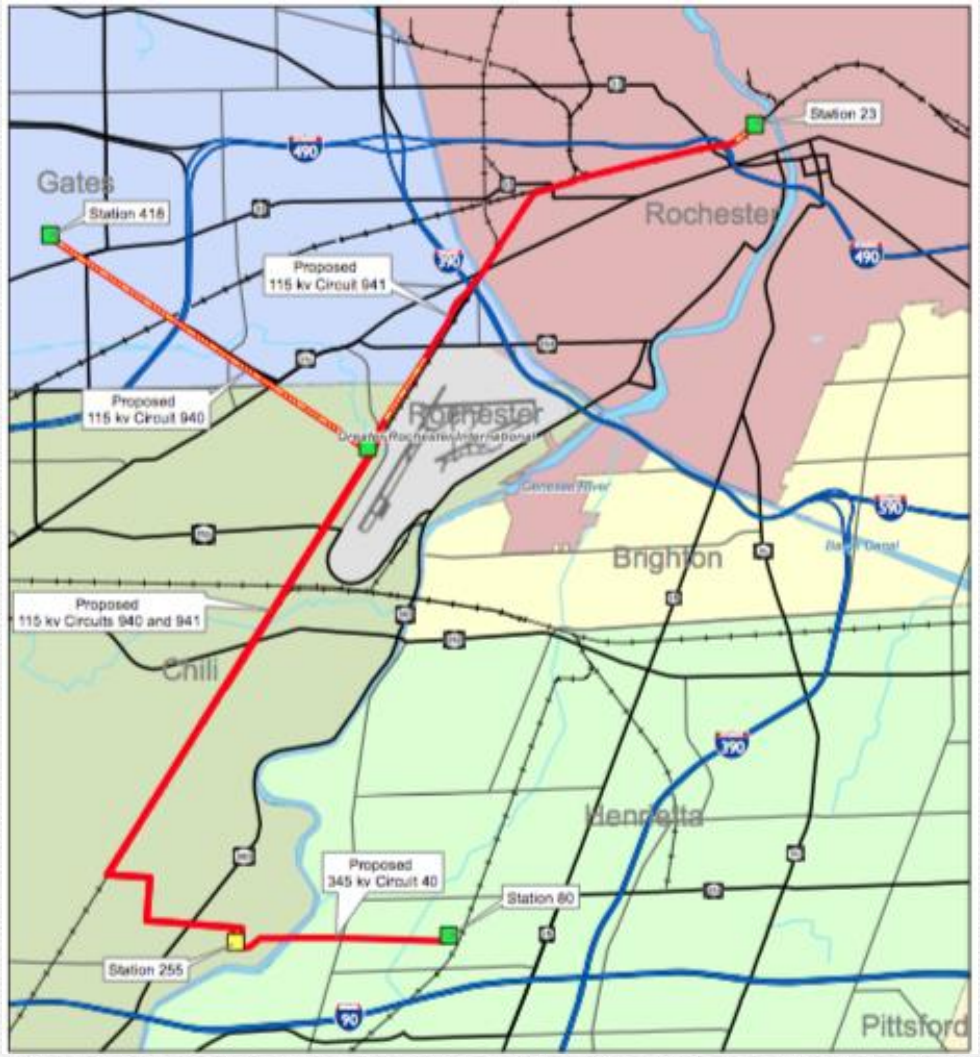
Upstate NY, U.S. Average- 2010

eGRID Subregion	Carbon dioxide (lb/MWh)	Methane (lb/GWh)	Nitrous oxide (lb/GWh)
Upstate New York (NYUP)	545.79	16.30	7.24
US Average	1,232.35	24.14	18.26

Existing Electric Transmission Lines and Substations

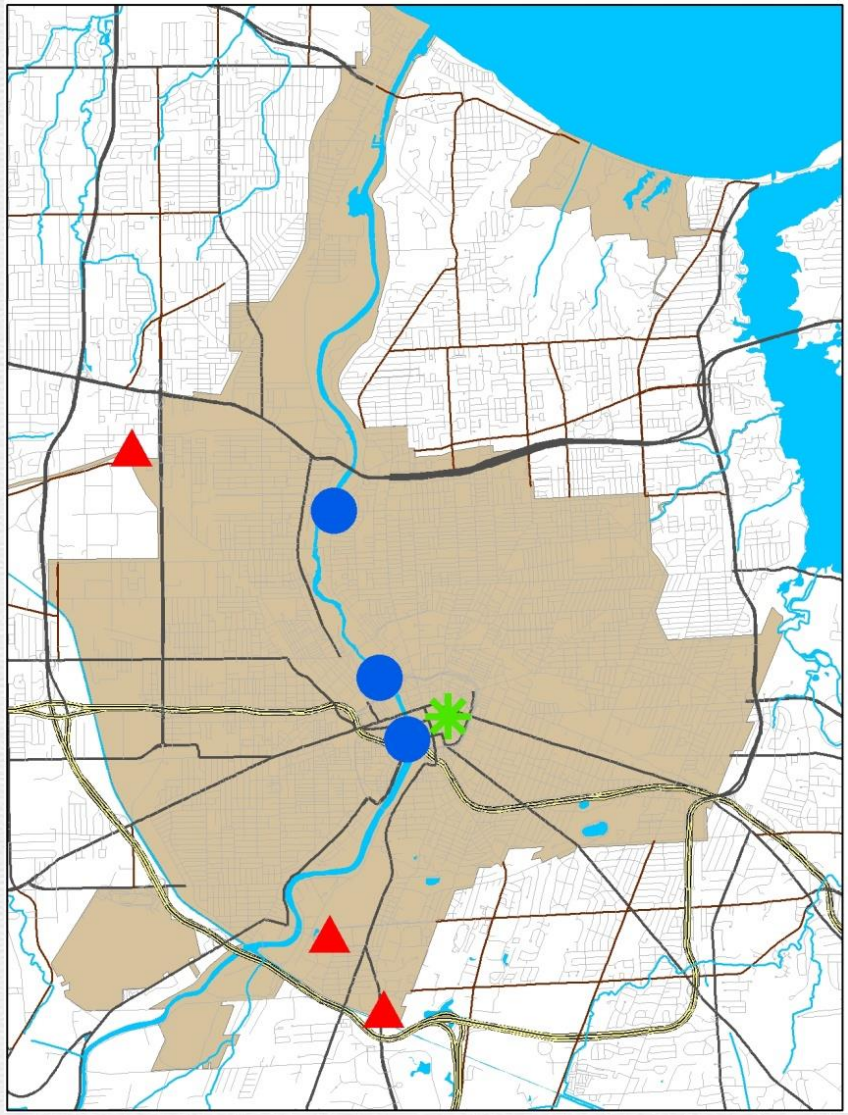


RG&E – Planned Electrical Transmission System Upgrades



Natural Gas Transmission

Energy Generation and Combined Heat/ Power



Combined Heat/ Power

District Heating (steam)

RG&E Hydro-Electric

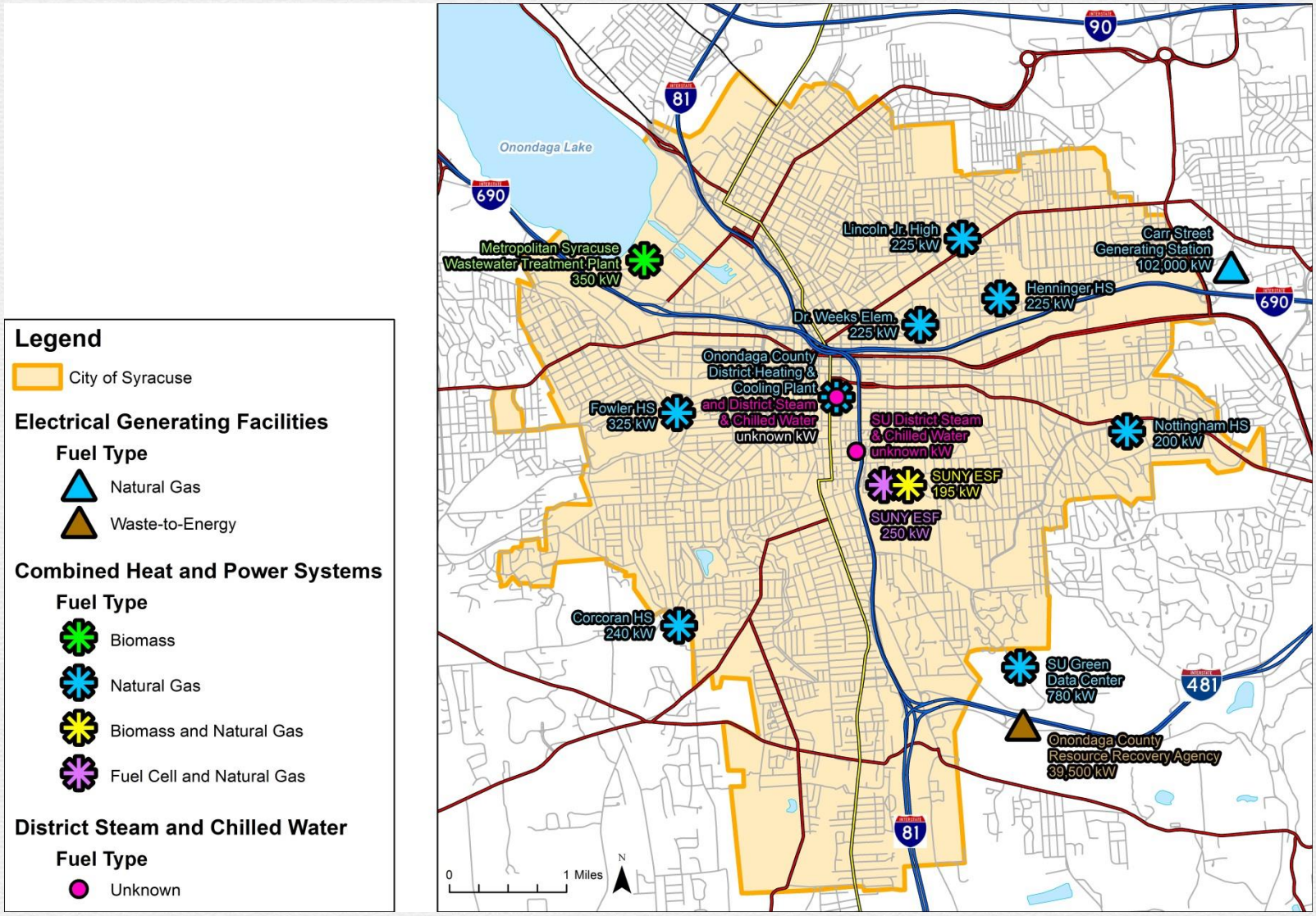
Renewable Generation

Type	Capacity (MW)	# of Systems
Photo-voltaic	0.674	35
Hydro	57.100	3

District Heating, Combined Heat & Power

Facility	Capacity
Rochester District Heating Cooperative (RDH)	260,000 pounds per hour of high pressure steam
Eastman Business Park/ Recycled Energy Development (RED) (Coal boilers to be replaced by combined-cycle gas turbines)	125 MW of electricity 1.7 million pounds of steam 65,000 tons of chilled water/ hour
University of Rochester	24.3 MW
Monroe County Iola Powerhouse	4.05 MW

District Energy, Cogeneration



Objectives- Infrastructure

- Coordinate with RG&E to improve the safety, reliability and capacity of electric and natural gas infrastructure
- Increase the amount of energy generated by renewable sources
- Facilitate the improvement/ extension of infrastructure at key economic development sites
- Increase the generation of electricity from renewable sources at City-owned facilities

RG&E

Recommended Initiatives

- Continue regular meetings of City staff and RG&E to coordinate planning and scheduling of City road construction and utility infrastructure projects
- Facilitate the improvement/ extension of infrastructure at key economic development sites
- Encourage Rochester Heating District Cooperative (RDH) and its members to develop on-site generating capability
- Partner with other governments, private institutions and RG&E to maintain, expand and improve district energy facilities, micro-grids and Smart Grid technologies
- Facilitate permitting for solar energy generation
- Partner with other organizations to implement a program to coordinate bulk purchases of solar energy equipment (“Solarize Rochester”)
- Install renewable capacity at City-operated facilities where it is cost-effective to do so

RG&E

03 Implementation Framework

Implementation Framework For Key Initiatives

- Responsible party
- Key partners
- Estimated costs
- Estimated benefits (i.e., energy and cost savings, GHG emissions reduction)
- Source of funding
- Immediate next steps
- Short-term, medium-term, and long-term milestones

04 Next Steps

Next Steps

June 25-July 1	• City and Stakeholder comments
July 7	• Submit Draft Plan to NYPA
July-August	• Finalize Plan
Sept-ember	• NYPA/ City Presentations

THANK YOU!