



***Beyond Emissions Inventories: Reducing
Municipal Greenhouse Gas Emissions
Keeping Track to Get on Track!***

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**Alternative Energy Resource Organization (AREO)
Repowering Montana's Communities**

**Helena, MT
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The “Battle Plan”

- History of climate change action in Missoula
- Missoula’s greenhouse gas emissions inventory
 - Scope and methods
 - Overall results w/ specific data redacted (report not yet officially released)
- Recommended next steps for Missoula
 - Local solutions to climate change in Missoula
 - The role of energy monitoring / tracking in achieve municipal climate change goals
 - Lessons learned



Missoula's Climate Change Milestones

- **July 21st 1996** – Missoula joined the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection Campaign
- **May 10th 2004** – *Missoula Greenhouse Gas-Energy Efficiency Plan* released; Greenhouse Gas & Energy Conservation Team formed
- **May 3rd 2007** – Mayor John Engen signed a resolution of support for the *U.S. Conference of Mayors Climate Protection Agreement*



U.S. Mayors Climate Protection Agreement

- ICLEI, now the Local Governments for Sustainability, founded in 1990 at its inaugural conference at the United Nations in New York
- Now 1075 local governments representing over 400 million people worldwide
- Missoula, Bozeman, and Helena belong
- Framework of **5 milestones** for local governments to achieve emissions reductions
















The 5 Milestones

1. Conduct a Greenhouse Gas Emissions Analysis (Baseline Inventory and Forecast)
2. Establish a Reduction Target
3. Develop a Climate Action Plan
4. Implement the Climate Action Plan
5. Monitor Progress and Report Results



Progress Toward Milestones

Milestone	Helena	Bozeman	UM	Missoula
1. Conduct Emissions Inventory				
2. Establish a Reduction Target				
3. Develop Climate Action Plan				
4. Implement Climate Action Plan				
5. Monitor Progress and Report Results				

Approach - What We Included

- Examined energy use, costs and emissions from:
 - Wastewater treatment (electricity, natural gas, biogas)
 - Operation of 29 municipal buildings (electricity & natural gas)
 - Municipal vehicle fleet and equipment, over 500 including ~330 vehicles (unleaded, diesel and biodiesel),
 - Employee commuting survey (unleaded and diesel)
 - Outdoor lighting including Street Light Districts (electricity)
 - Water for streets, buildings and parks (electricity)



What Was Not Included

- Emissions from composted sewage sludge
- Solid waste – source or sink?
- Embedded energy in products consumed and materials used
- Energy associated with construction projects performed by outside contractors
- “Agriculture”
- Urban forests – source or sink?
- Solar electricity generation – zero-emission!



Main Data Sources

- **NorthWestern Energy** – Vicki Judd
- **Mountain Water** – John Kappes
- **Finance Dept.** – Mary Kay Wedgwood
- **Wastewater Division** – Starr Sullivan & Gene Connell
- **Vehicle Maintenance Dept.** – Jack Stucky
- **Fire Dept.** – Jason Diehl & Cheryl Schatz
- **Human Resources Dept.** - Melissa Bache
- **Public Works Dept.** – Greg Larson & Jolene Ellerton
- **National Climatic Data Center**
- **U.S. Census Bureau**
- **125 anonymous city employees**
- Baldridge, J. 2008. **2008 Missoula Long-Range Transportation Plan Survey Draft Final Report**. Bureau of Business and Economic Research, University of Montana, Missoula, MT



EVST Student Researchers / Authors

Kathryn Makarowski

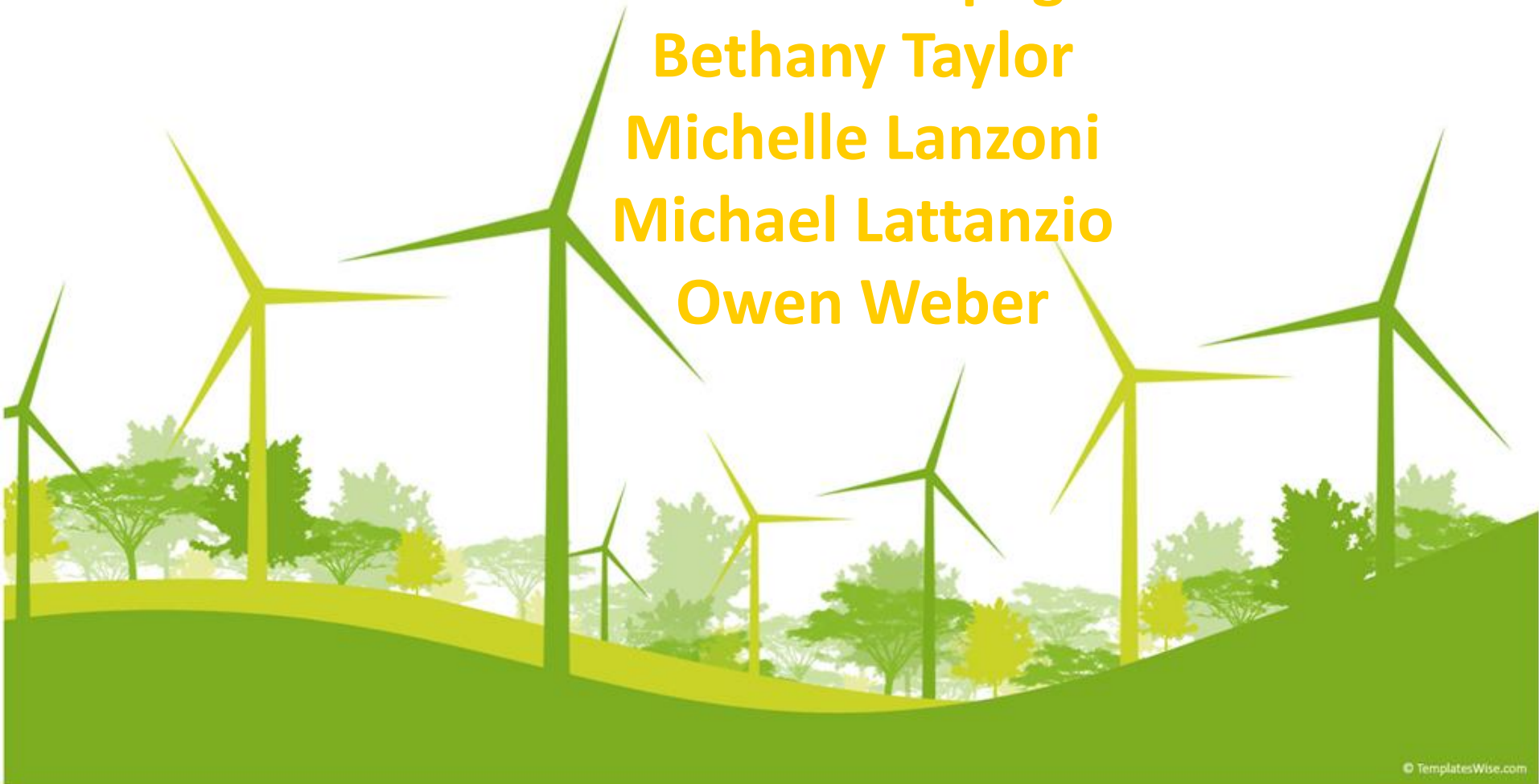
Russ J. Van Paepeghem

Bethany Taylor

Michelle Lanzoni

Michael Lattanzio

Owen Weber



Greenhouse Gas Emission Estimates

Used ICLEI's **Clean Air and Climate Protection (CACP) Software** – a collaborative product of the National Association of Clean Air Agencies (NACAA) and the U.S. EPA

Used Western Systems Coordinating Council/NWP (Region 11) ***grid intensity factor***

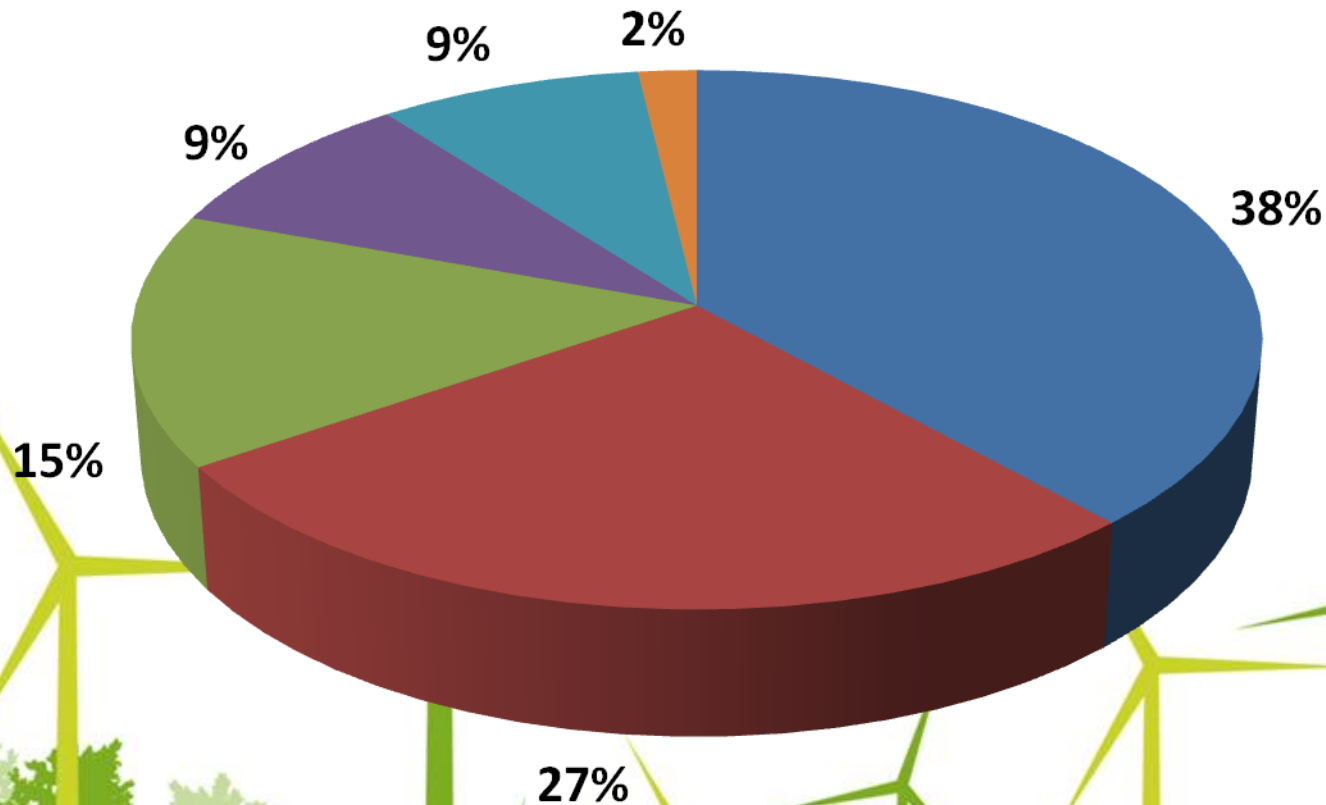


Number of NorthWestern Energy (NWE) Accounts, FY03 and FY08

Energy Type	FY03	FY08
Electricity	227	248
Natural Gas	16	24
Total	243	272

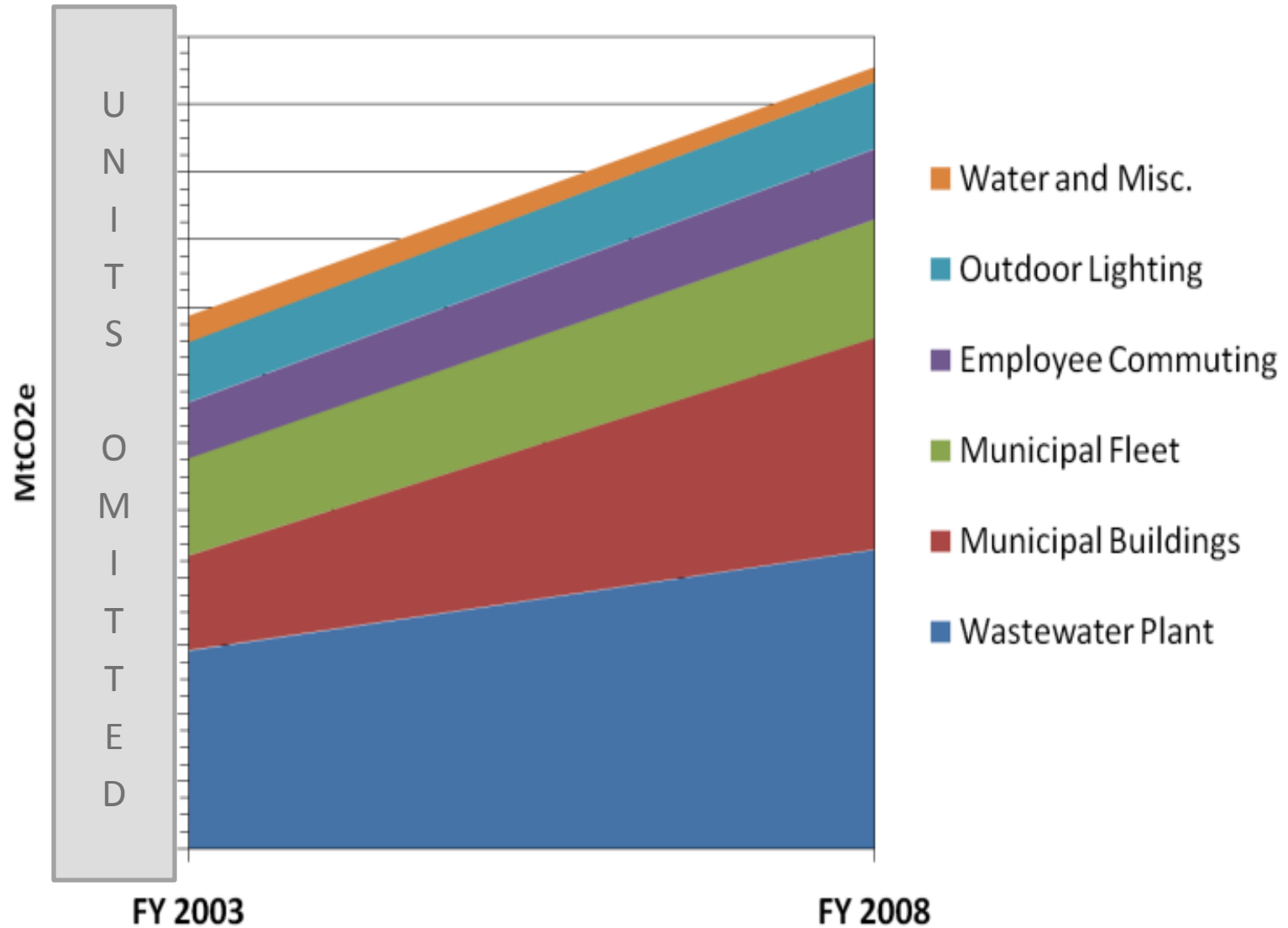


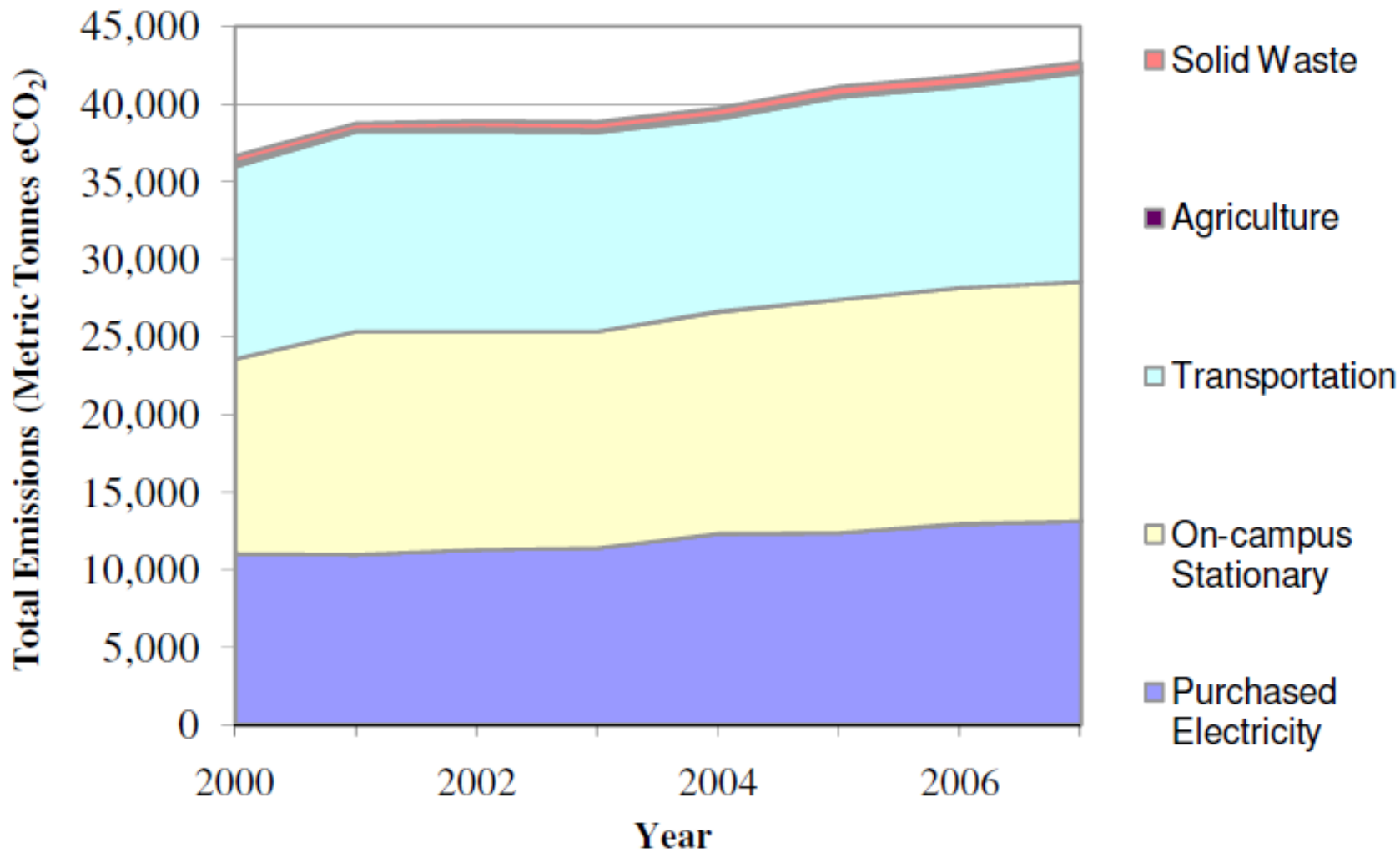
City of Missoula Greenhouse Gas Emissions by Sector in FY 2008



- | | |
|--------------------|-----------------------|
| ■ Wastewater Plant | ■ Municipal Buildings |
| ■ Municipal Fleet | ■ Employee Commuting |
| ■ Outdoor Lighting | ■ Water and Misc. |

Growth in City of Missoula Greenhouse Gas Emissions in Metric Tons of CO₂e by Sector in FY 2003 and FY 2008





University of Montana Emissions Inventory 2007

Figure 1. Greenhouse Gas Profile

UM Total Emissions (Metric Tons eCO2)

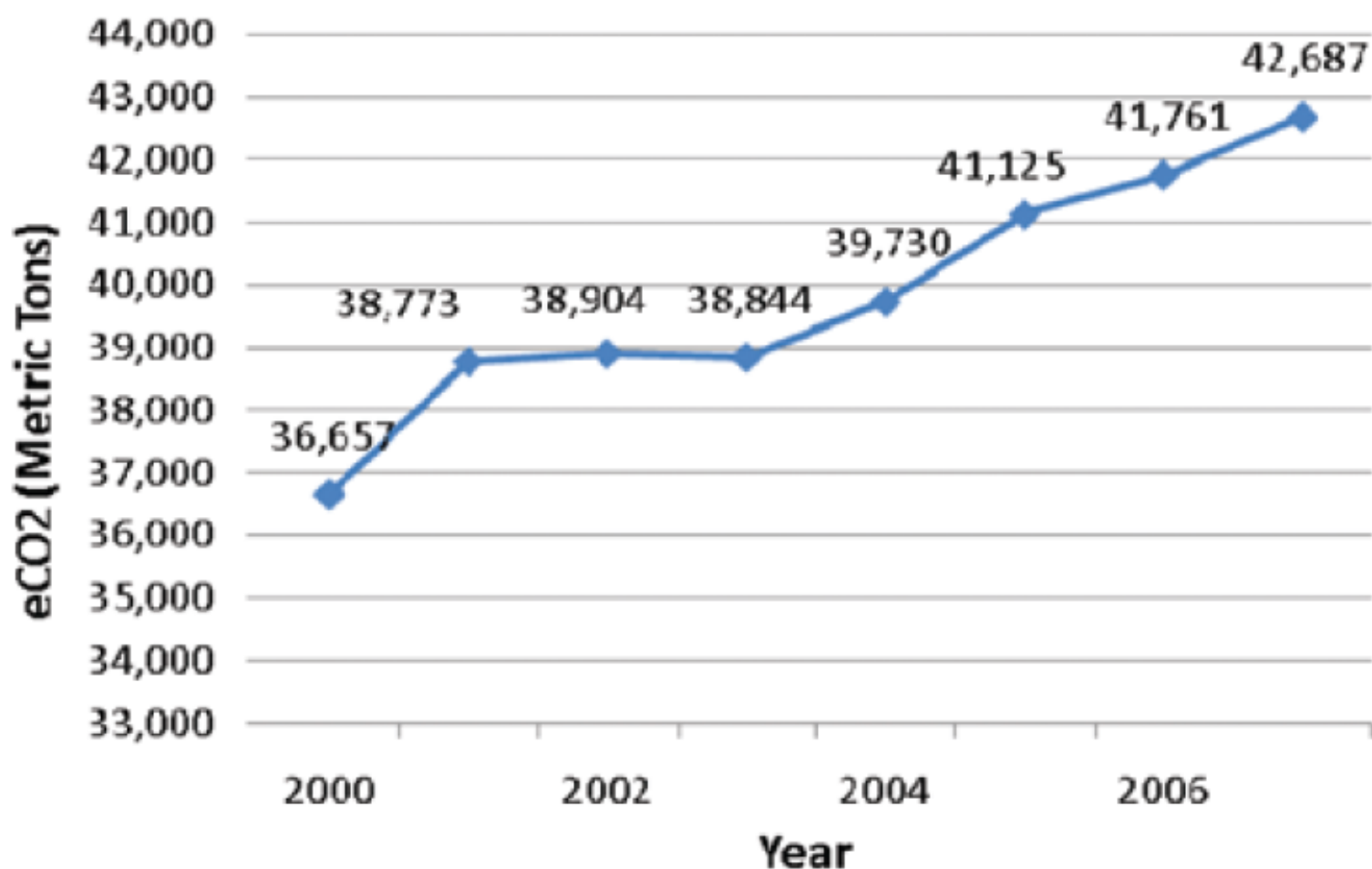
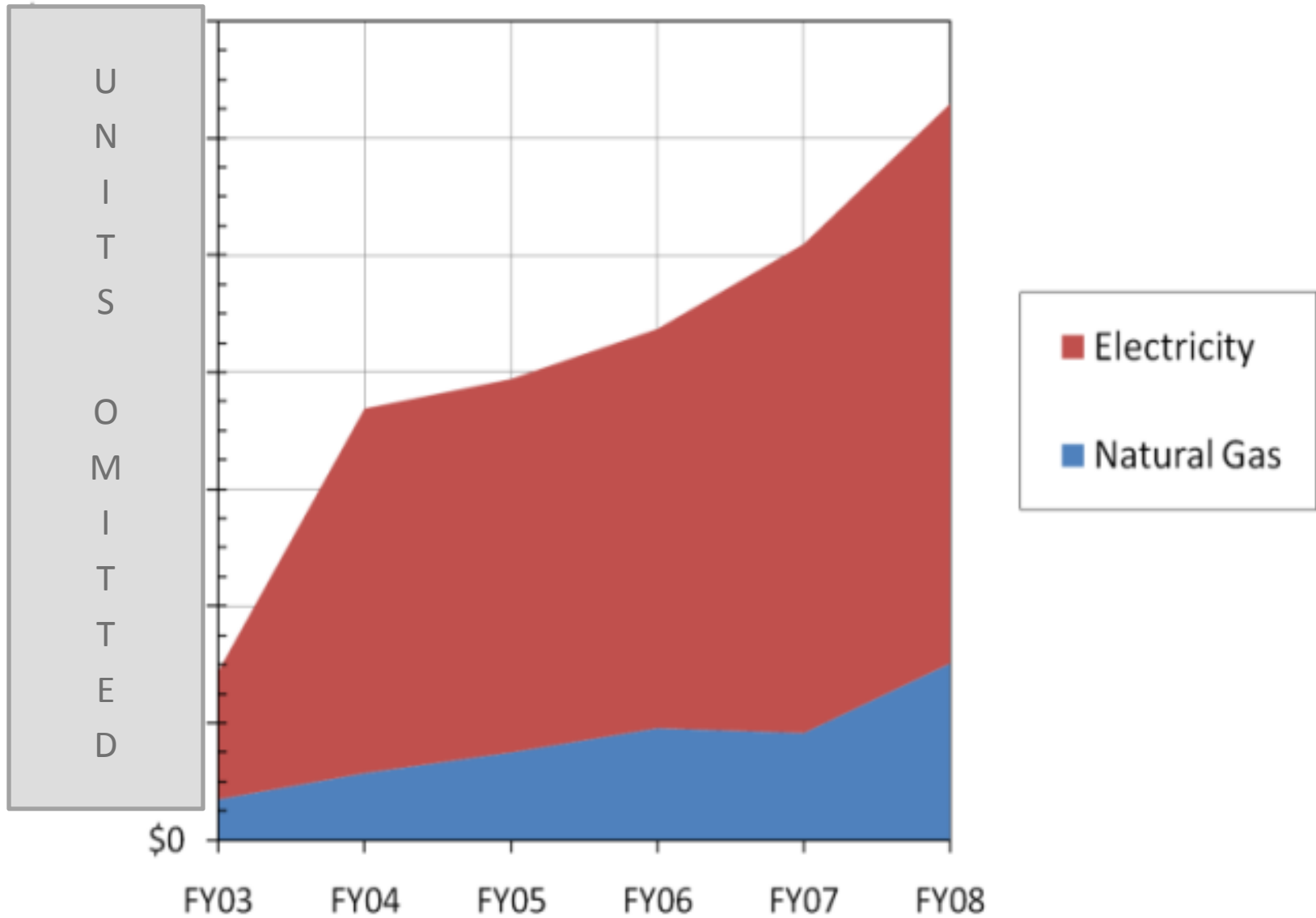


Figure 6: This graph represents UM's total amount of GHG emissions (in Carbon Dioxide Equivalents) measured in metric tons produced from 2000 -2007.

City of Missoula Purchased Energy Costs in 2009 Dollars by Energy Type, FY03 to FY08



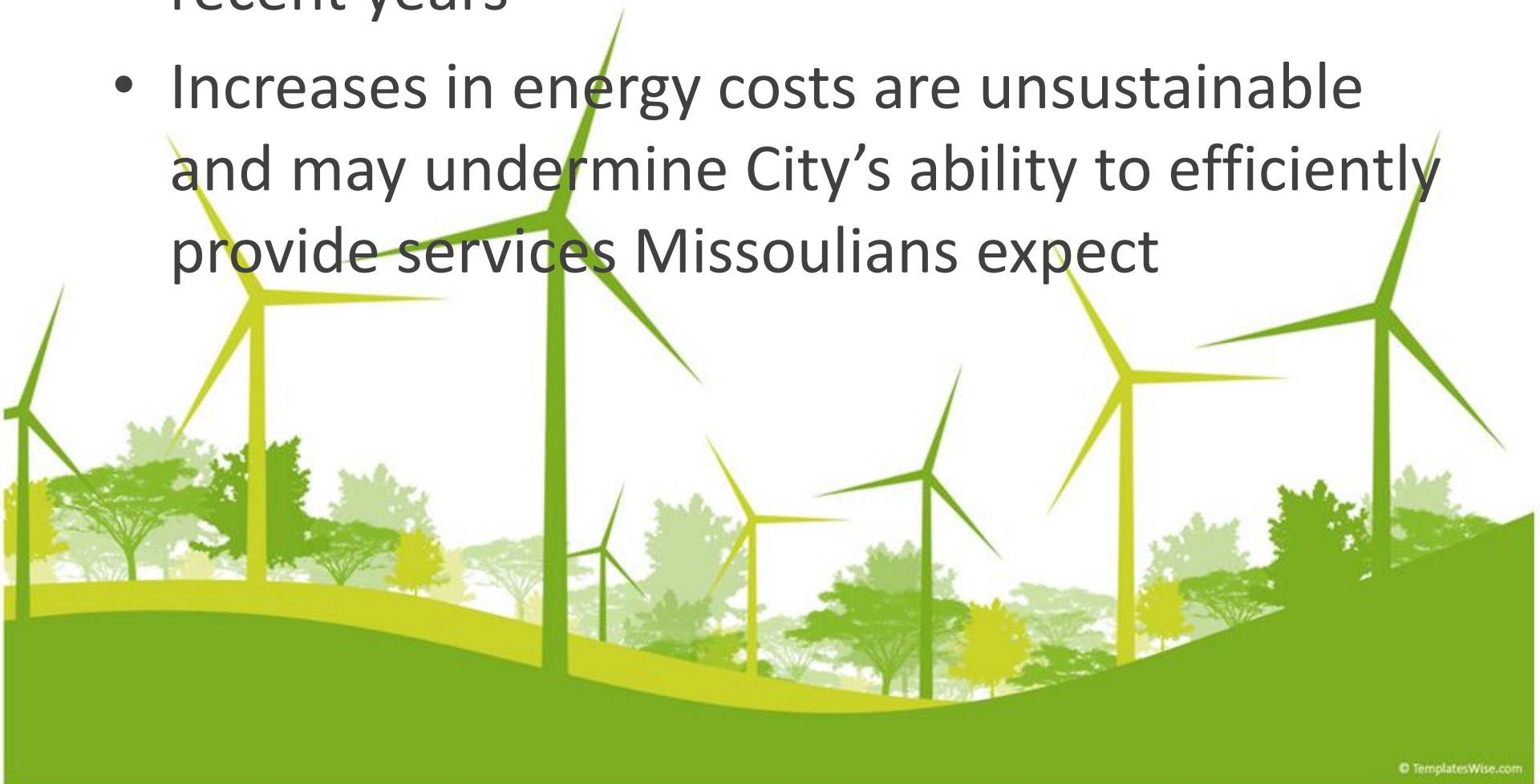
Conclusions – Missoula’s “Dirty Little Secret”

- Missoula’s municipal GHG emissions have increased rapidly in recent years
 - At a far greater rate than other cities in Montana
 - Rate outpaces our population growth
 - Outpaces Montana as a whole and the nation
- Emissions contribute to threats to the things Missoulians value:
 - Our open space, rivers and streams, forests and parks, clean air, our health, and our economy



More ... Costly Conclusions

- Energy costs have also risen substantially in recent years
- Increases in energy costs are unsustainable and may undermine City's ability to efficiently provide services Missoulians expect



The Good News Is ...

- Climate protection and energy costs savings, fiscal responsibility, are mutually-beneficial civic goals



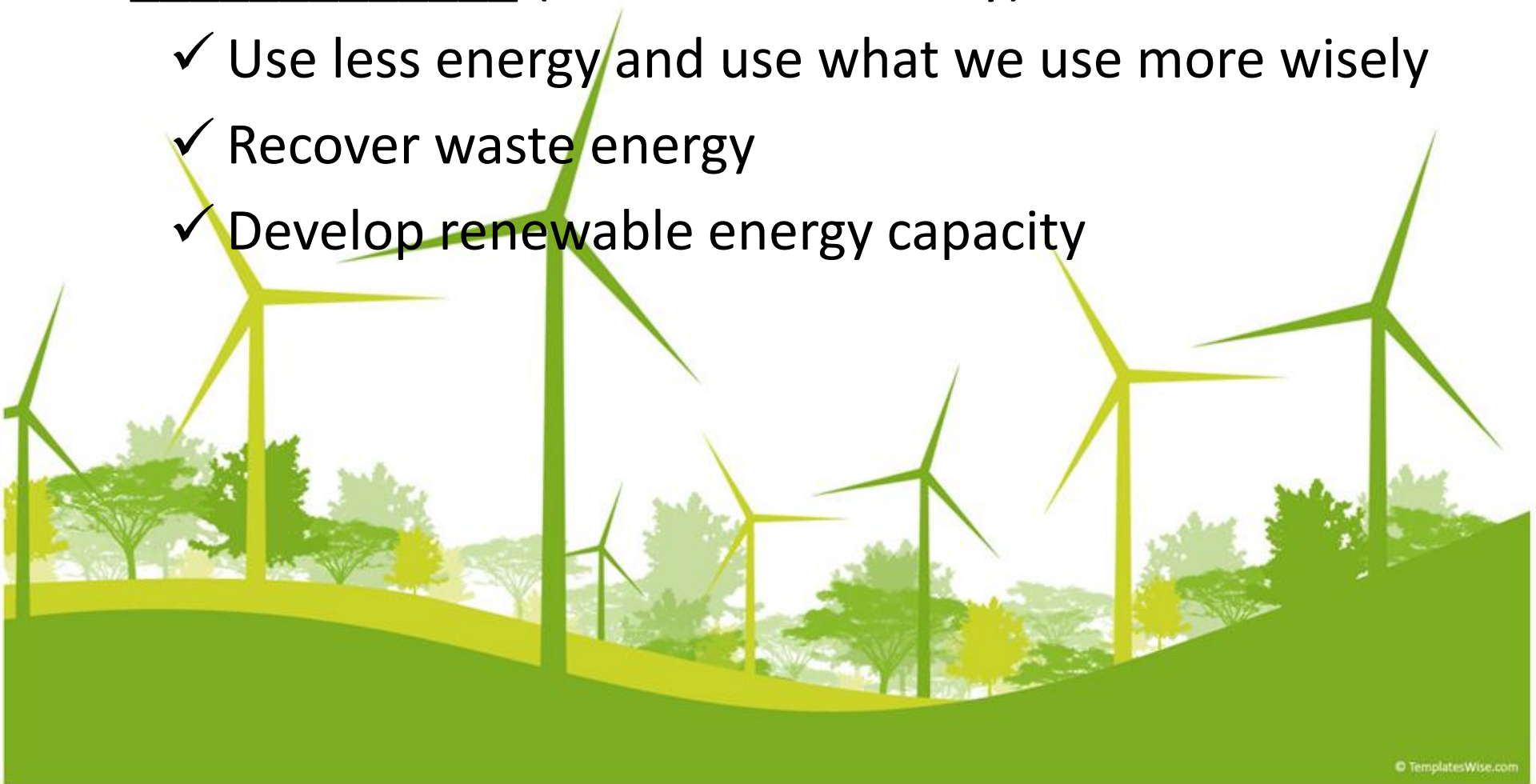
Costs of Inaction

- Continued increase in energy costs
 - Bites into municipal and household budgets
 - Higher costs of goods and services
 - Less to spend and invest on city services and local economy
- Threats of climate change unabated
 - Impacts to the things Missoulians value
 - Parks and open space
 - Forests and streams
 - Wildlife habitat
 - Quality of life and livability of our neighborhoods
 - Our economy



The Basic Strategy to Reel in Emissions Growth and Then Ramp Down Emissions

- Adopt emissions reduction strategies for Missoula ... or _____ (fill in the blank city) that:
 - ✓ Use less energy and use what we use more wisely
 - ✓ Recover waste energy
 - ✓ Develop renewable energy capacity



Recommendations for Missoula

- Form a **climate action task force** of public, private, and non-profit stakeholders
- Set an **emissions reduction target**
- Develop a **climate action plan** to achieve reduction goals
- Conduct a **community-wide emissions inventory**
- Develop **energy and emissions monitoring and reporting system**
- Continue implementing existing energy conservation and efficiency policies and programs



Adopt No-Net Cost Policies and Create Human Resource Infrastructure

- Consider a Four-day Work Week and Work-at-Home
- Create a Revolving Energy Loan Fund
- Explore Renewable Energy Partnerships
- Consider Municipal Energy Bond or Renewable Energy Loan Fund
- Establish Renewable Energy Certificate and/or Carbon Offset Program
- Hire a Sustainability Coordinator
- Integrate GHG Emissions into Planning and Decision Making



Good Ideas – I think!

- Develop a new program to assess and monitor building performance and set goals, benchmarks, and a monitoring plan
- Consider using Energy Performance Certificates, “energy identity cards” for buildings <http://epc.direct.gov.uk/index.html>
- Hire a new position to manage energy use for buildings, or train and reassign existing staff to serve in that capacity



Other Tools: EnergyCAP Software

- Accounting features allow financial officers, facilities/bldg. managers to predict, track, and analyze the energy usage data of all buildings.
- Does “what if” scenario analysis
 - Allows energy cost savings from retrofits (such as performance contracting) to be estimated based on projected energy costs.
- Because the software also enables energy use forecasting, it can be used to support more accurate energy budget projections and monitoring within the fiscal year (EnergyCAP 2009).



Other Tools: Climate Action Planning Program

Assistant CAPPA

- Assist local governments in developing customized plans for reducing climate and local air pollution.
- Provide a comprehensive, customizable, and expandable library of emissions reduction strategies
- Decision support capability to assist in identifying strategies for emissions reduction plans.
- Information and quantitative tools for over 100 distinct emissions reduction strategies



Other Tools: U.S. EPA Energy STAR Portfolio

- Yet another energy management tool!
- For measuring and tracking energy use of buildings
- Can normalize energy use for weather and square footage to assess energy efficiency of buildings and energy savings from efficiency upgrade



Why Track Energy Use and Emissions

- Measure and report on progress toward emission reduction targets
- Can provide useful comparisons between facilities
- Identify where energy reduction efforts should be focused
- Save in energy costs and assist with budget planning
- Provide building users with motivation to improve – may be positive or negative



Final Lessons from Missoula's Inventory

- Energy use data is scattered hither and yon – need systems for “one-stop shopping”
- Energy use monitoring / tracking is the name of the game
- Make energy use visible!
- Count costs not just kilowatts, dekatherms, gallons, etc.
- Human resources save resources!
- Montana cities need (EPA/DEQ) guidance and protocols to measure up!
 - California Climate Action Registry *General Reporting Protocol, version 2.2 (March 2007)*.
 - *International Organization of Standards (ISO) 14064-1 (inventory) and 14064-3 (verification) standards*



Thank You!

City of Missoula

Mayor John Engen

Ginny Merriam

Bruce Bender

Jacky Stucky

Starr Sullivan

Gene Connell

Brentt Ramharter

Mary Kay Wedgwood

Marty Rehbein

Chase Jones

Anne Guest

Mike Painter

Jason Diehl

Cheryl Schatz

Roger Millar

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Vicki Judd, NorthWestern Energy

John Kappes, Mountain Water

Alex Stockman, Msla In Motion

Laura Millin, Msla Art Museum

WGM Group, Inc

Tim Magee, City of Helena

Liz Hirst, City of Helena

Carrie Hahn, City of Helena

Pat Judge, Helena