

CHATTANOOGA'S Climate Action Plan

*..... PATHWAY TO A SUSTAINABLE
CHATTANOOGA*

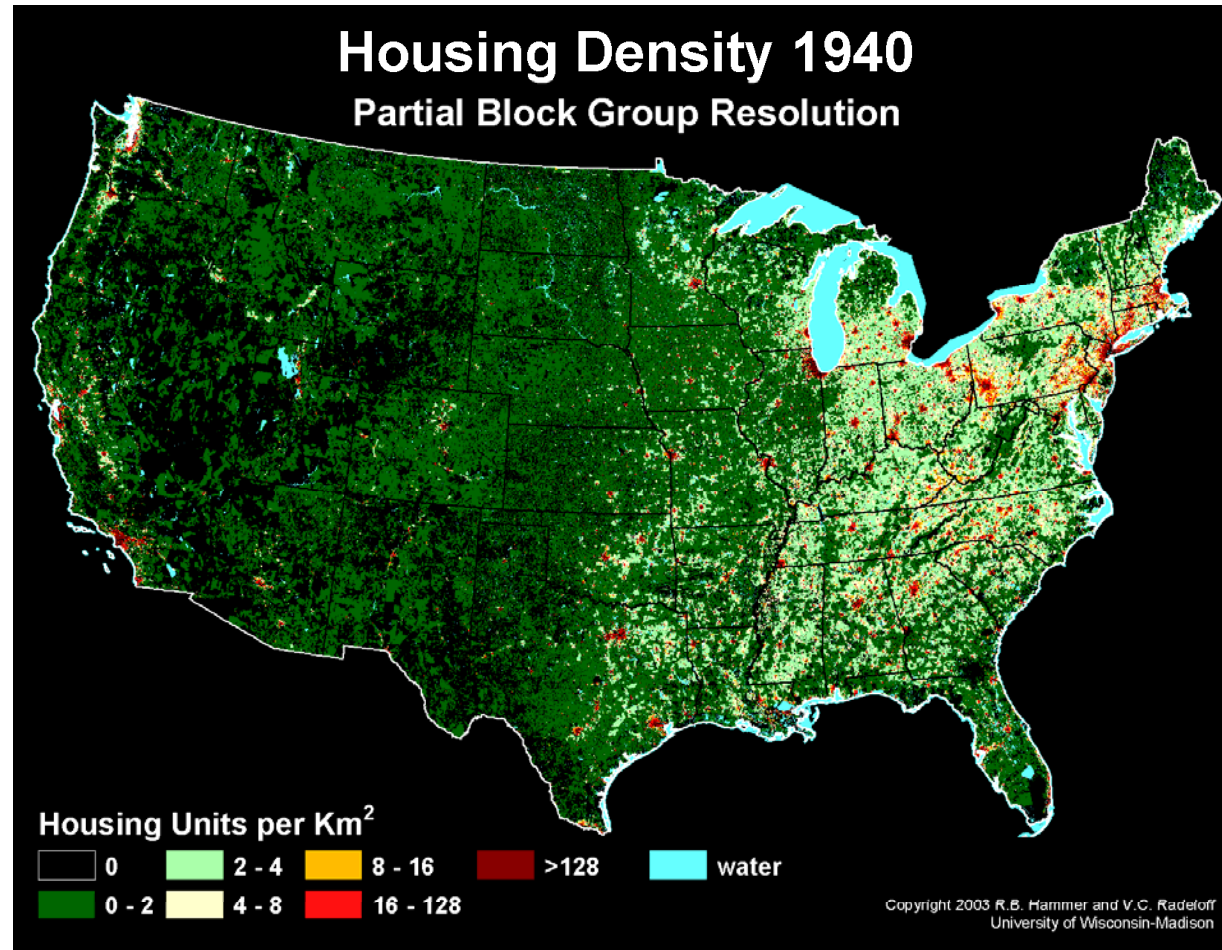


Special Edition

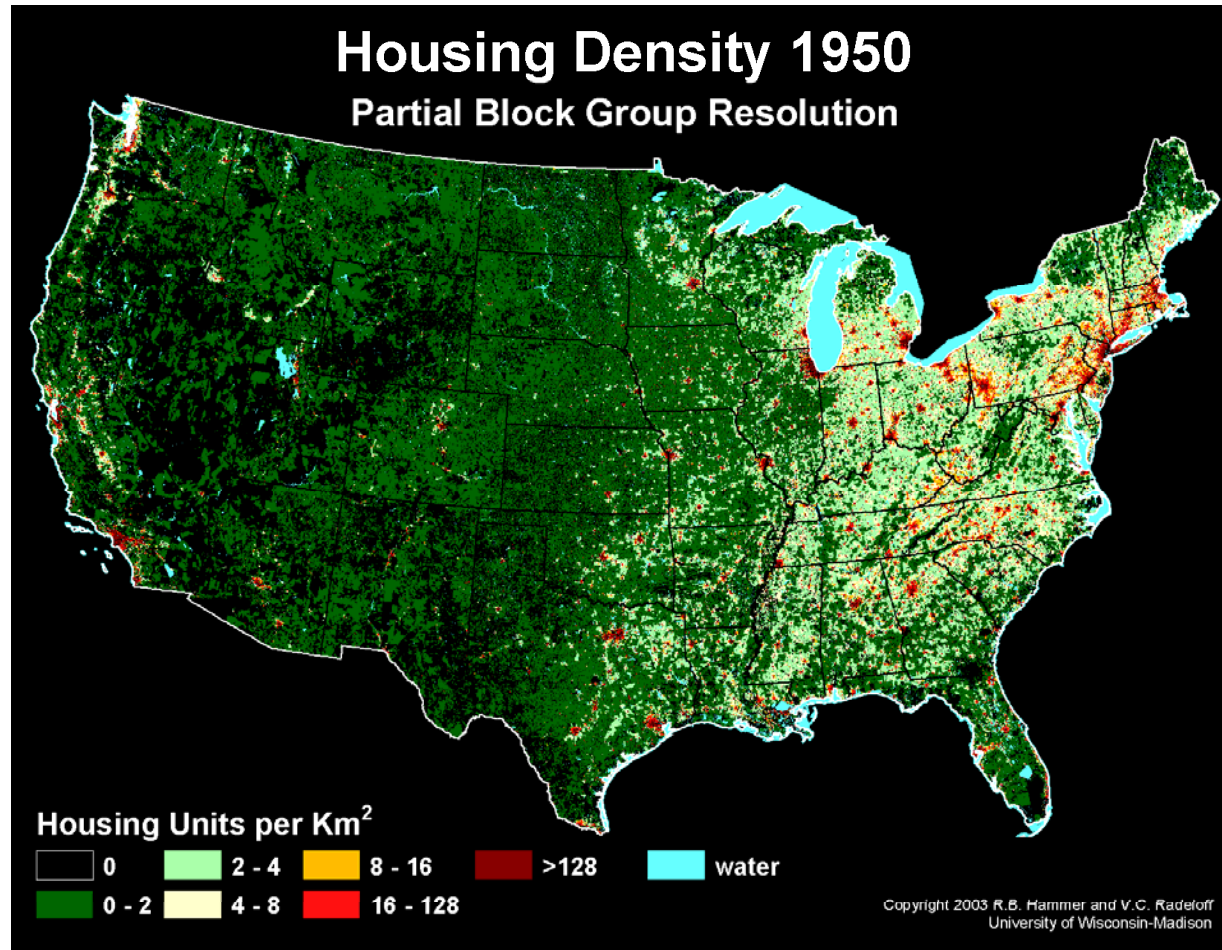
May 11, 2020



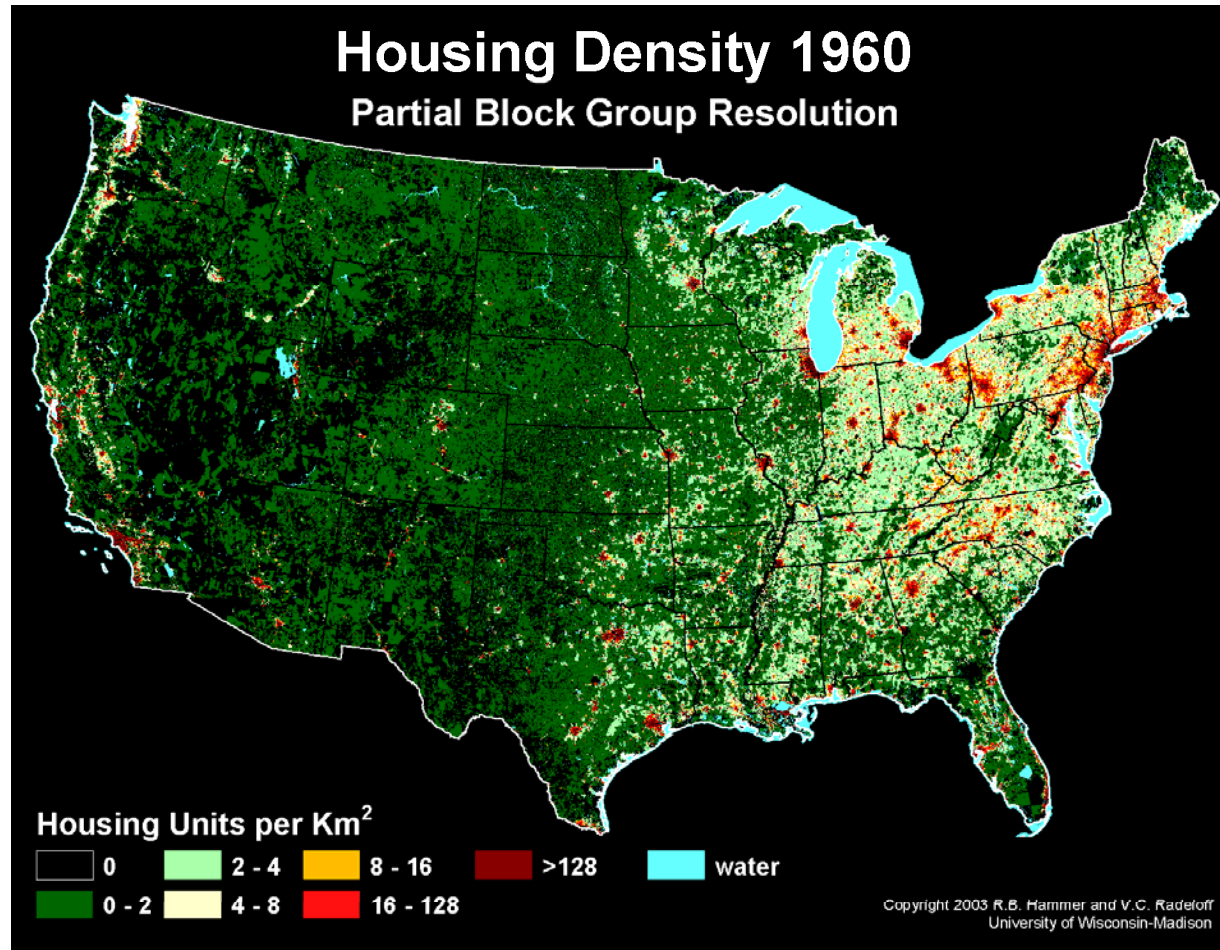
USDA: Urban and Community Forestry Program



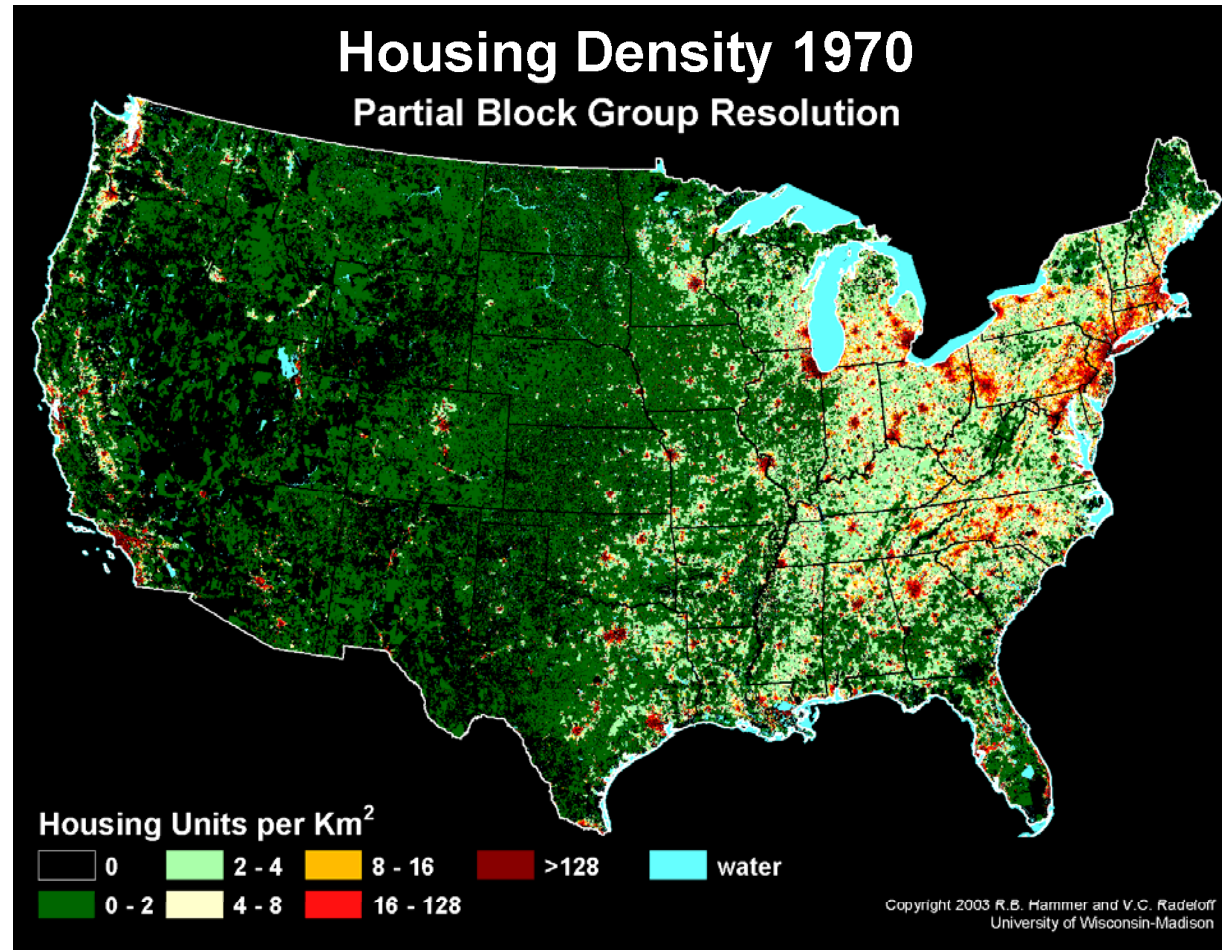
USDA: Urban and Community Forestry Program



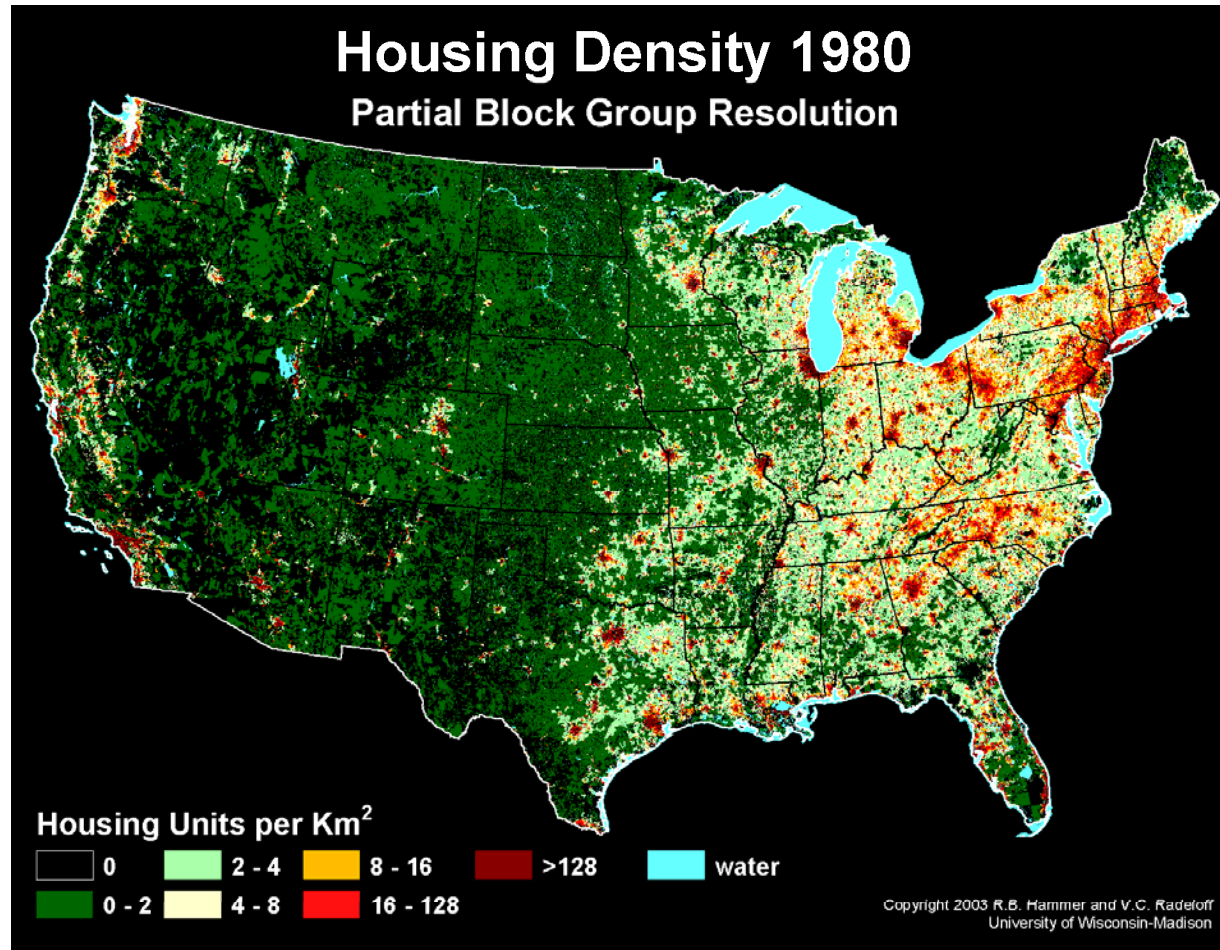
USDA: Urban and Community Forestry Program



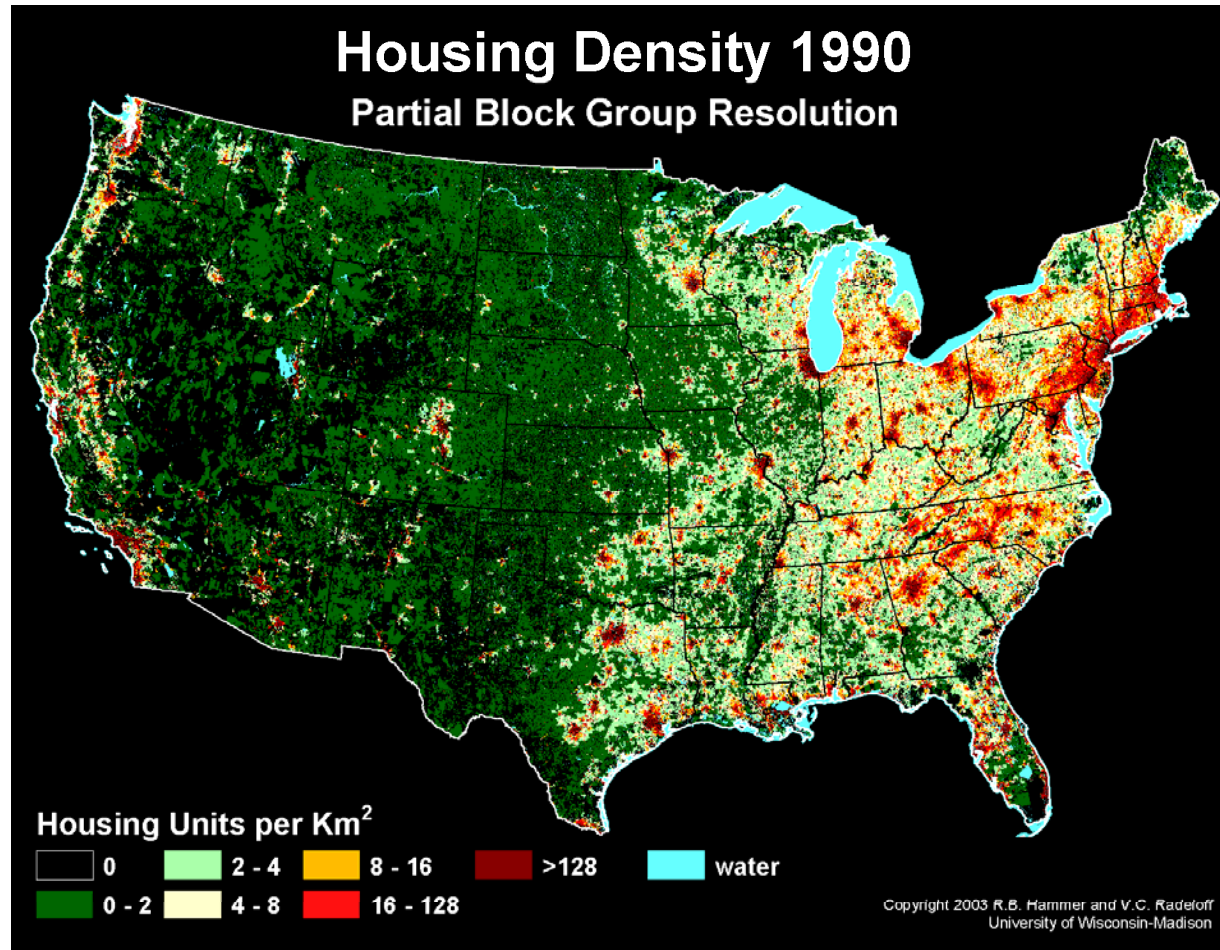
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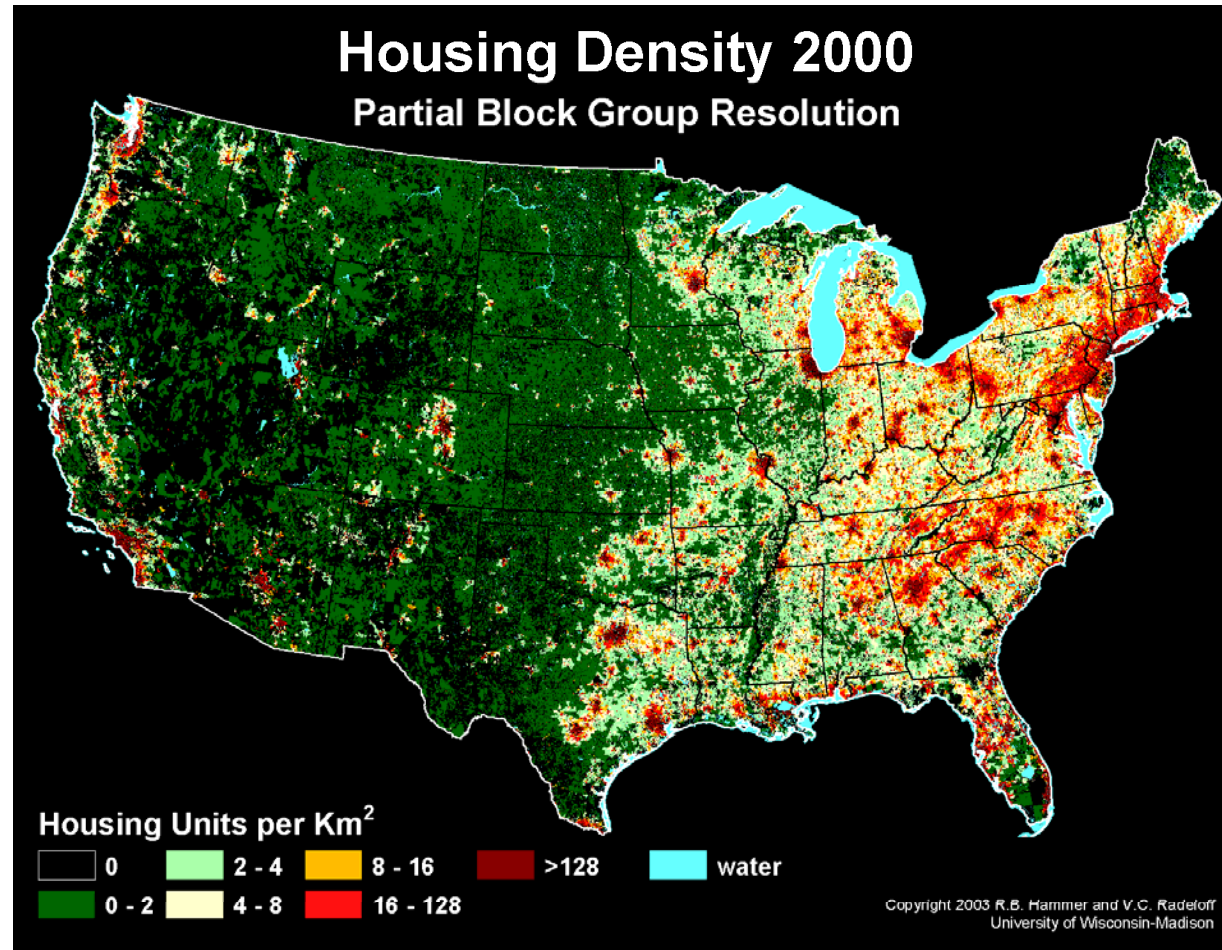
USDA: Urban and Community Forestry Program



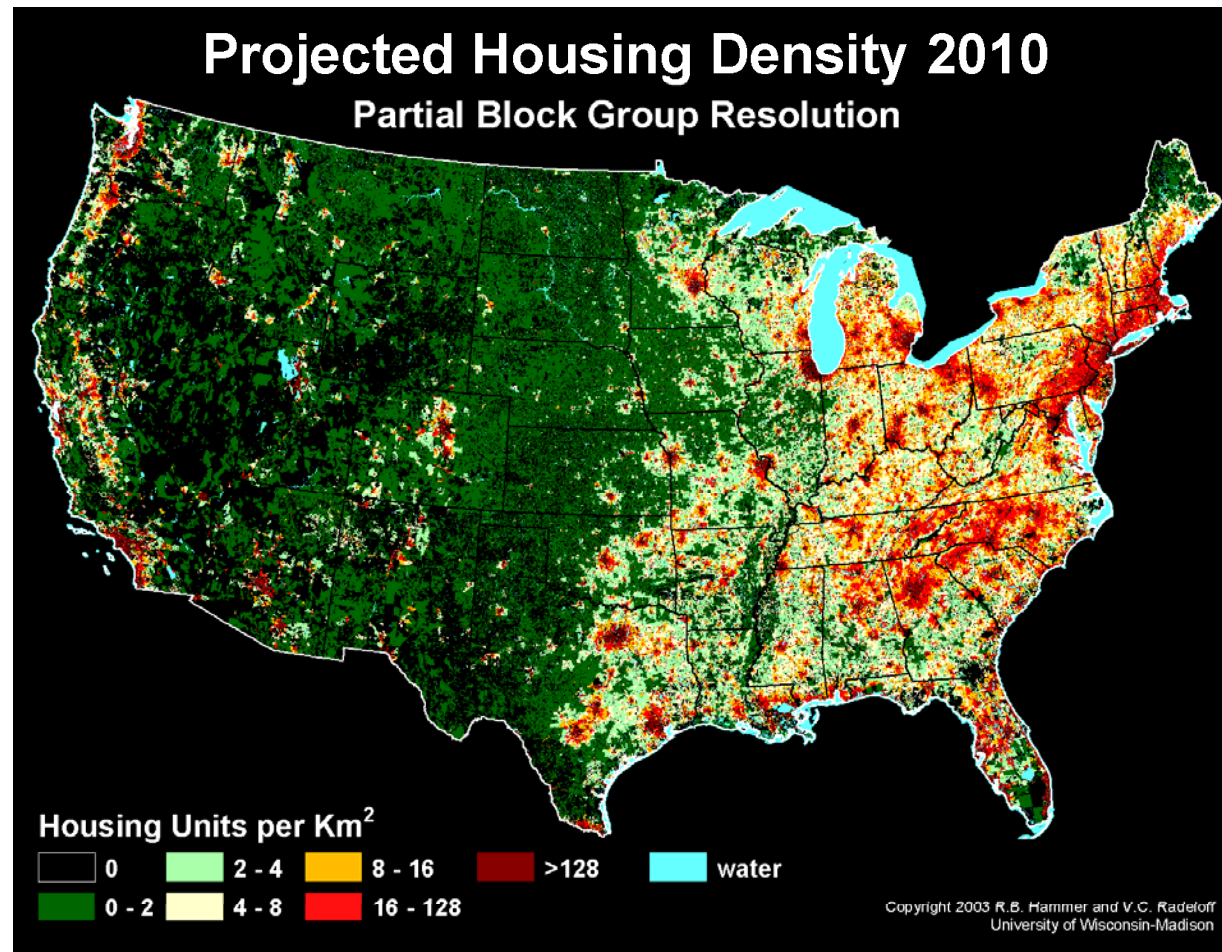
USDA: Urban and Community Forestry Program



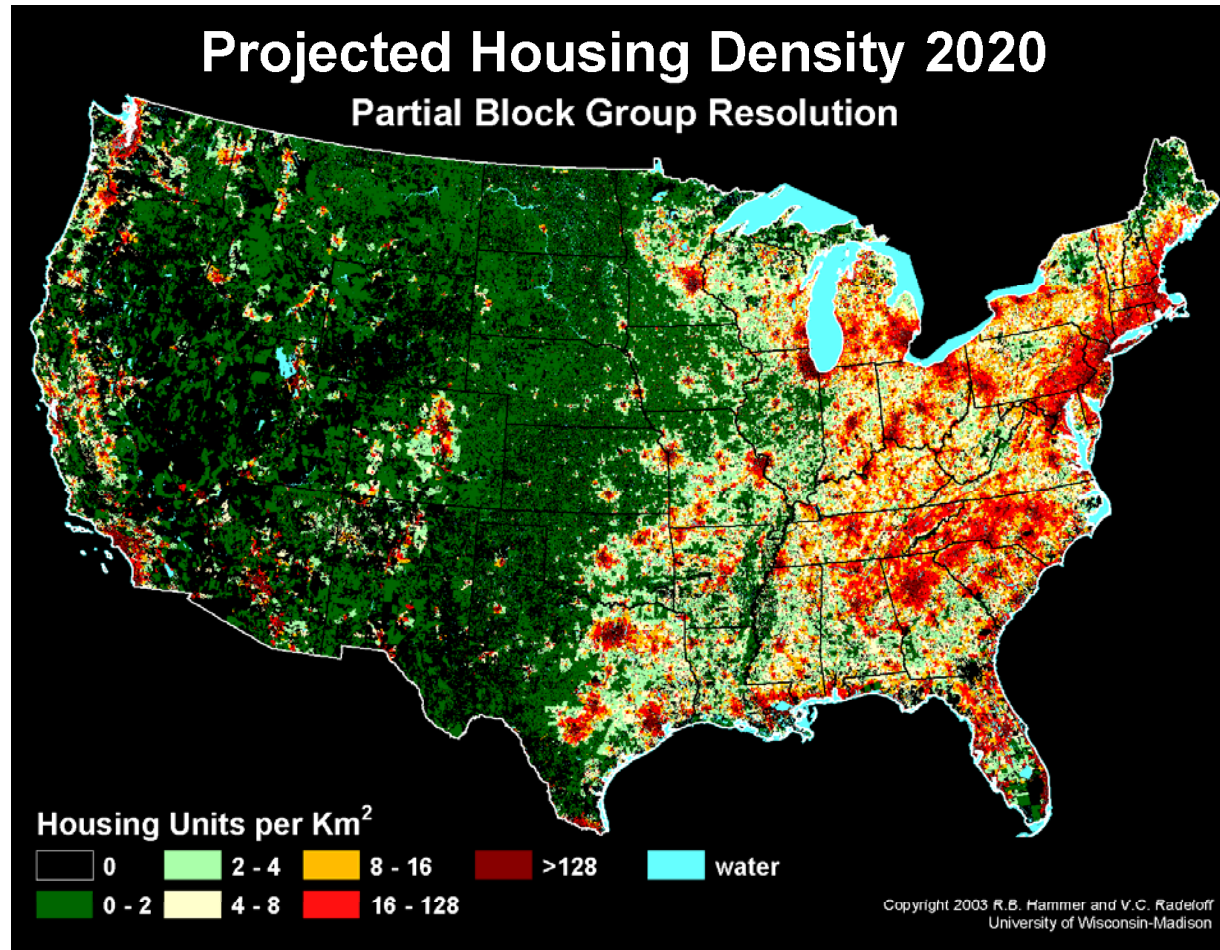
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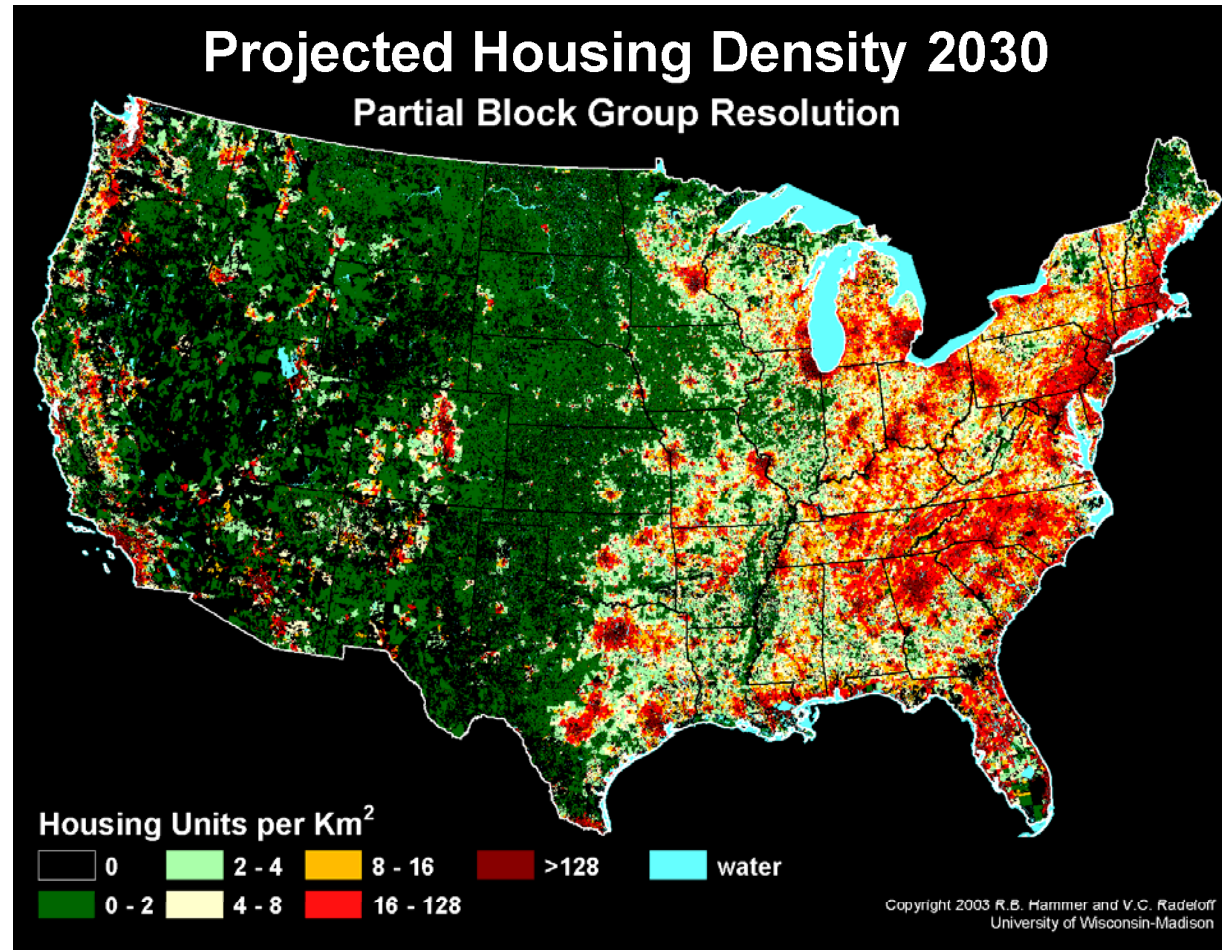
USDA: Urban and Community Forestry Program



USDA: Urban and Community Forestry Program



USDA: Urban and Community Forestry Program



Broad Street - 1938



Broad Street - 2010



Broad Street - 1969



Catalysts for Change:

1. EPA Mandates

2. Citizen's Desires

3. Foundations and Philanthropy

4. Vision 2000

Vision 2000

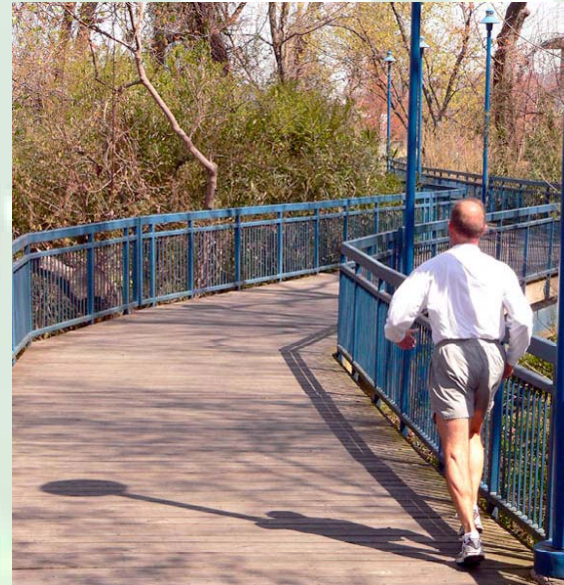
The task force settled on four goals to revitalize the Chattanooga riverfront and downtown: Build on Chattanooga's assets:

1. natural beauty,
2. fascinating history and industry; preserve and enhance these natural and historic treasures;
3. carefully add private development sites along the river; and
4. create new parks, trails, attractions and industry to replace run down and abandoned spaces."

Through Vision 2000, Chattanoogaans made the commitment to reconnect with their river and set the stage for the development of the Tennessee Aquarium, the Riverpark, the Walnut Street Bridge and Coolidge Park among others.

During the next 20 years, over \$850 million would be invested in the riverfront and downtown Chattanooga.

The Tennessee Riverpark



The Walnut Street Bridge



Coolidge Park



Riverbend Festival



The Tennessee Aquarium



Early Leanings

1. Zero Emissions Electric Busses



2. President's Council on Sustainability met here in 1994.

Corporate Sustainability Reporting

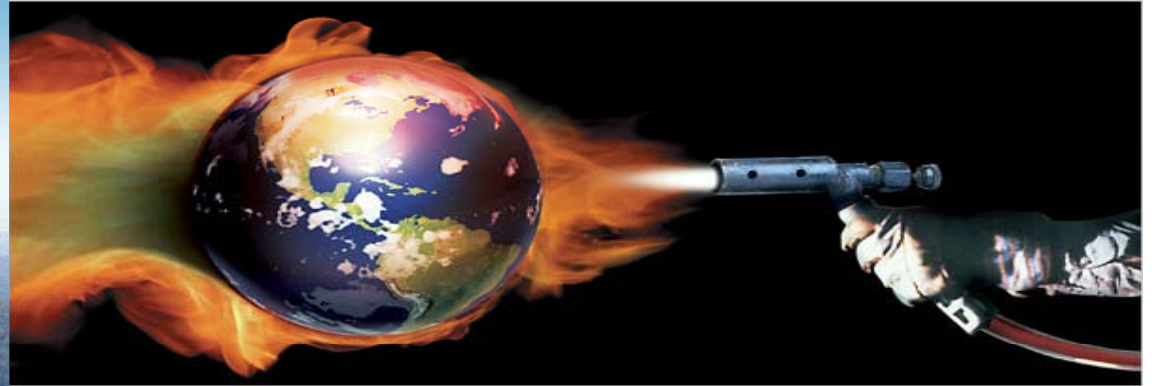
80% of the largest companies in the world

and

73% of the largest companies in the USA

Find out more at: WWW.corporate-register.com

U.S. Conference of Mayors Climate Protection Agreement



Chattanooga Signed on
August 2006

**GOAL: Reduce Greenhouse
Gas Emissions to 7% below
1990 levels.**



**Conserve Energy
Reduce Waste
Save Money**

GLOBAL
WARMING

FOSSIL FUEL
SUPPLY

\$

NATIONAL
SECURITY

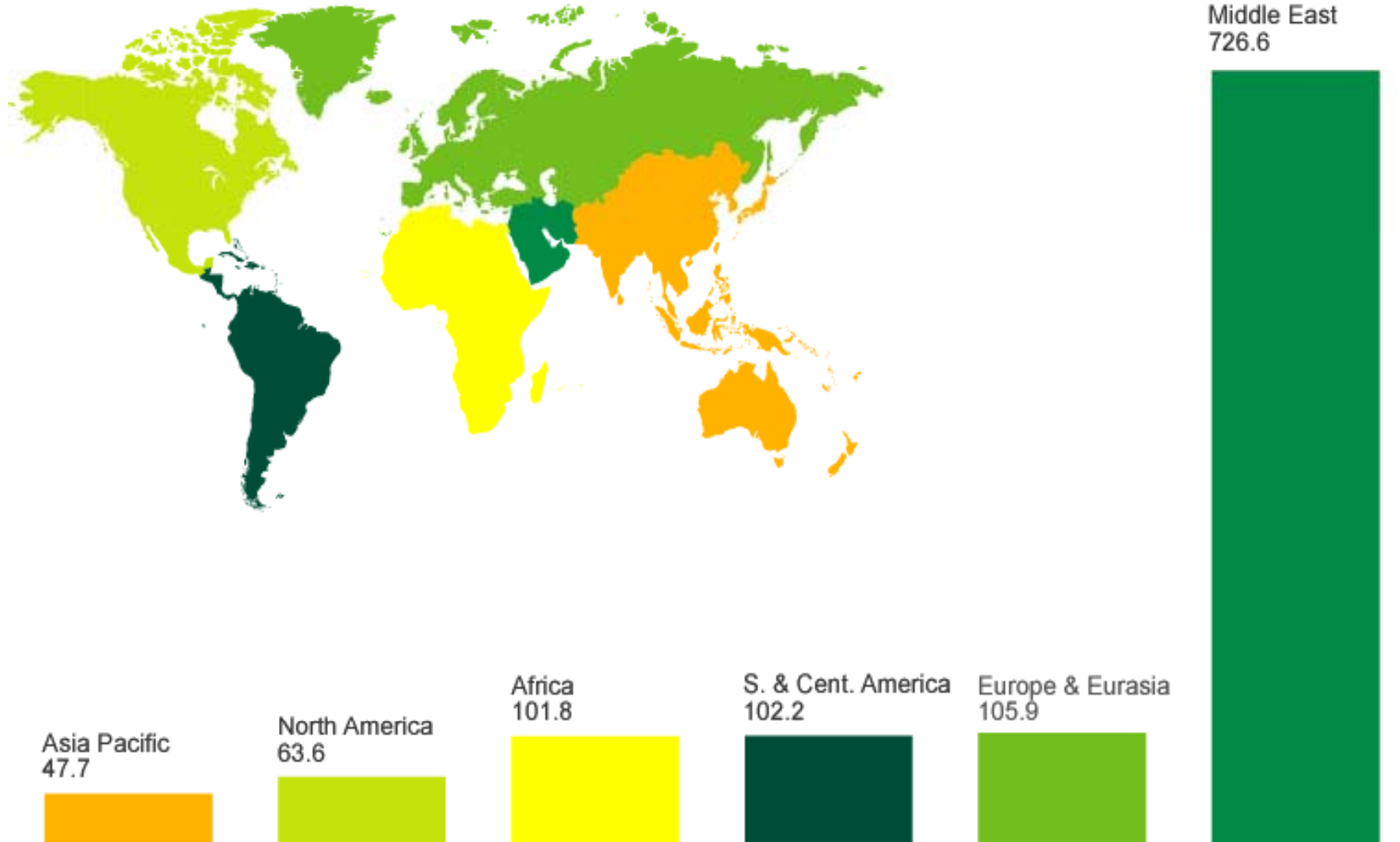
NATIONAL
SECURITY

AIR
QUALITY

Proven oil reserves

Total = 1,148
Billion barrels

Thousand million barrels



When Will World Oil Peak?

Iranian Oil Exec

Investment Banker

Petro Journal Editor

Oil co. geologist (ret.)

Vice Provost, Cal Tech

Oil co. geologist (ret.)

World Energy Council

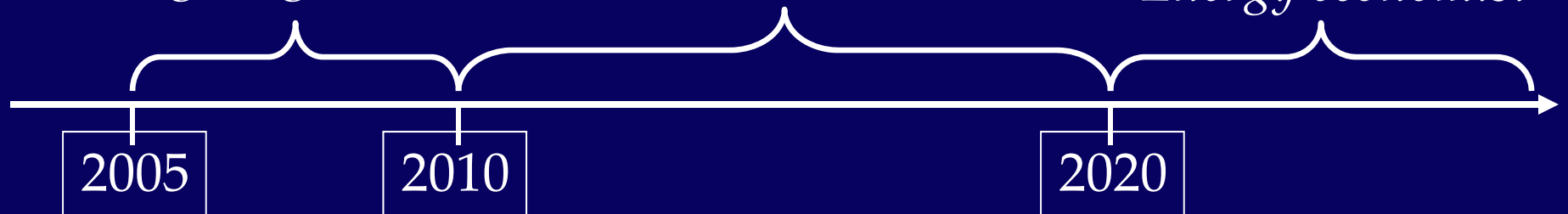
Oil co. geologist (ret.)

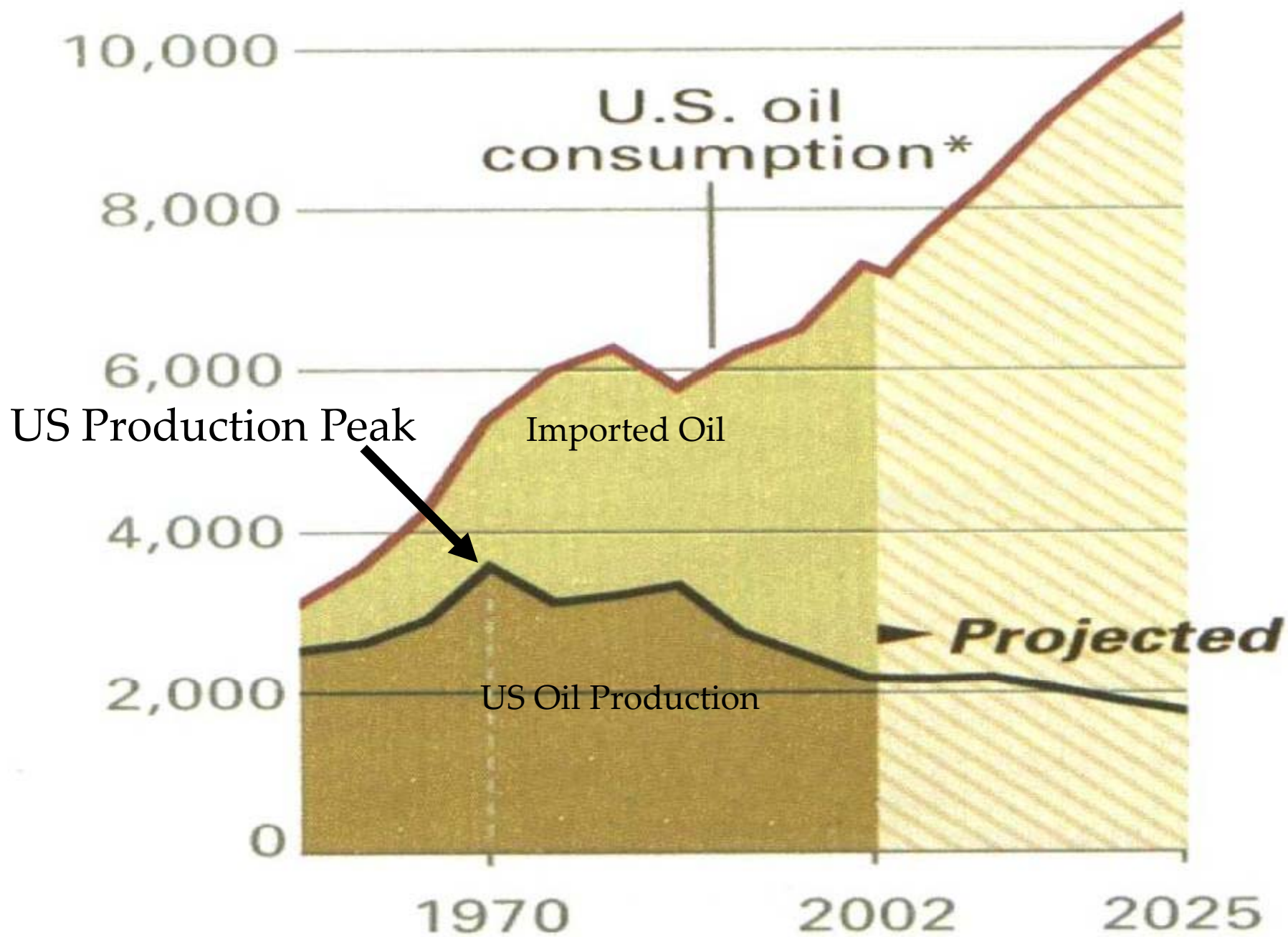
U.S. Dept. of Energy

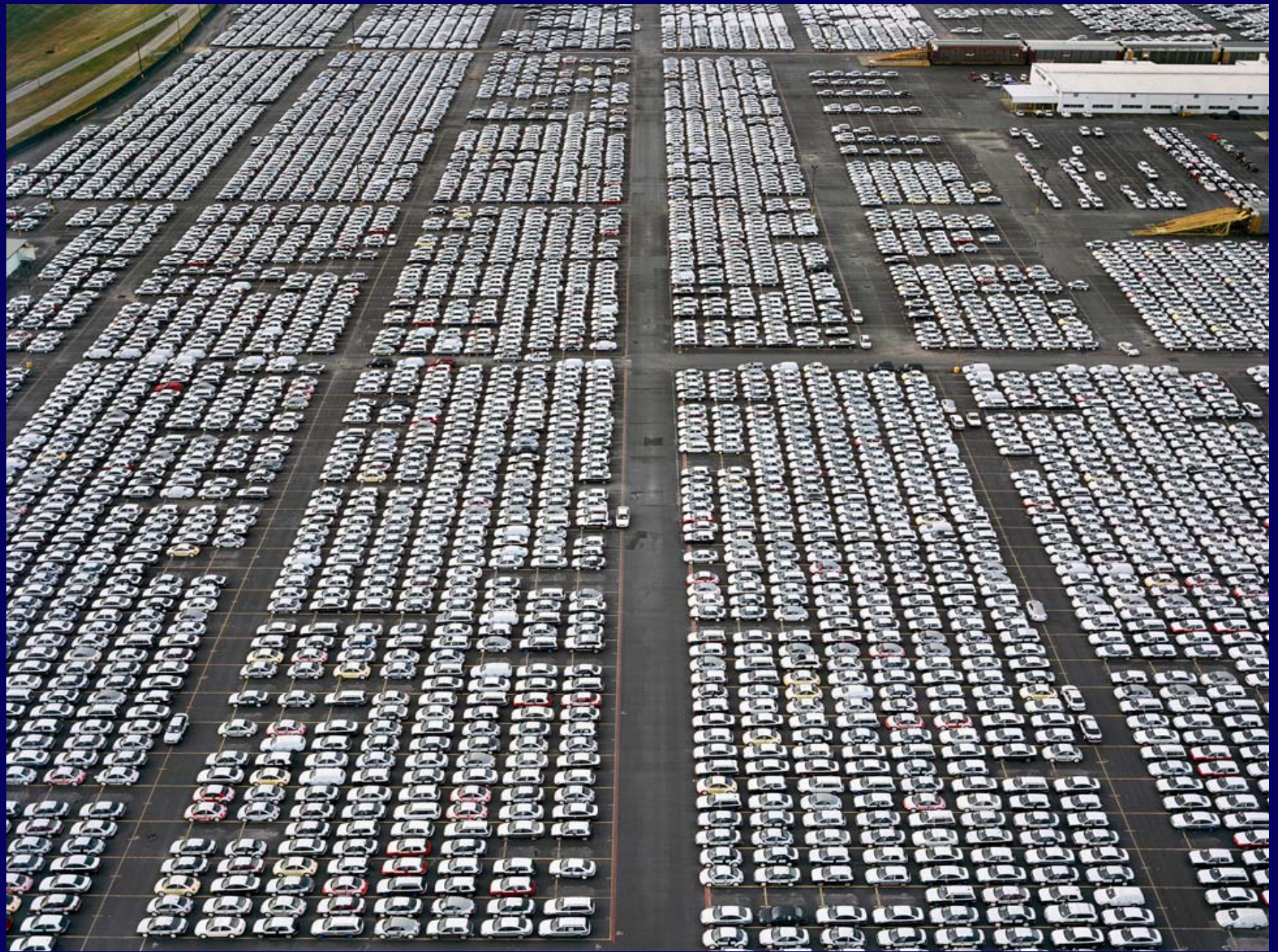
CERA

Shell

Energy economist







1,017 cities have signed on.

In Tennessee:

Chattanooga
Cookeville
Crossville
Franklin
Manchester
Nashville
Signal Mountain

ICLEI Membership:

Chattanooga
Cookeville
Franklin
Gatlinburg
Knoxville
Nashville
Oak Ridge
Signal Mountain

ICLEI – Local Governments for Sustainability

International association of local governments that have made a commitment to sustainability

Over 1052 cities, towns, counties

Provides technical consulting, training, and information services



Climate Protection Agreement

Inventory emissions

Reduce sprawl

Preserve open space

Create walkable communities

Diversify transportation options

Develop alternative energy sources

Promote energy efficiency

Purchase green products

Promote green buildings

Increase efficiency of municipal fleets

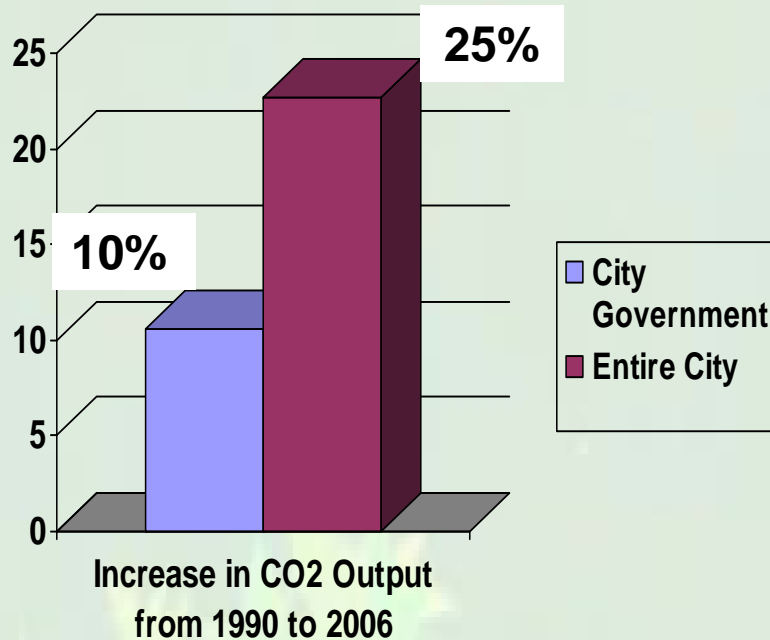
Conserve water

Increase recycling rates

Plant trees

Educate everyone

Chattanooga's Carbon Footprint

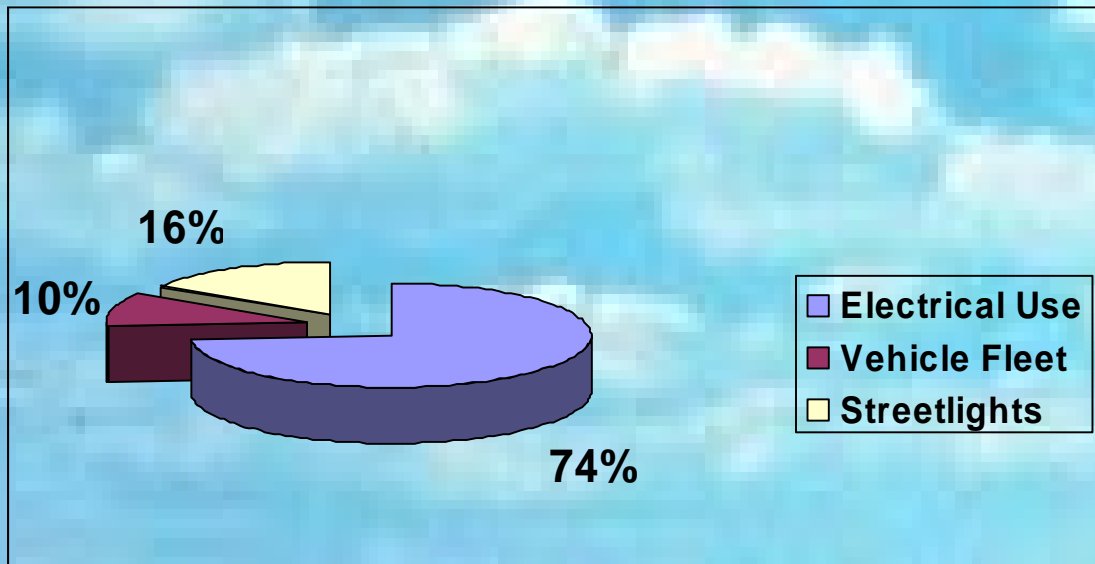
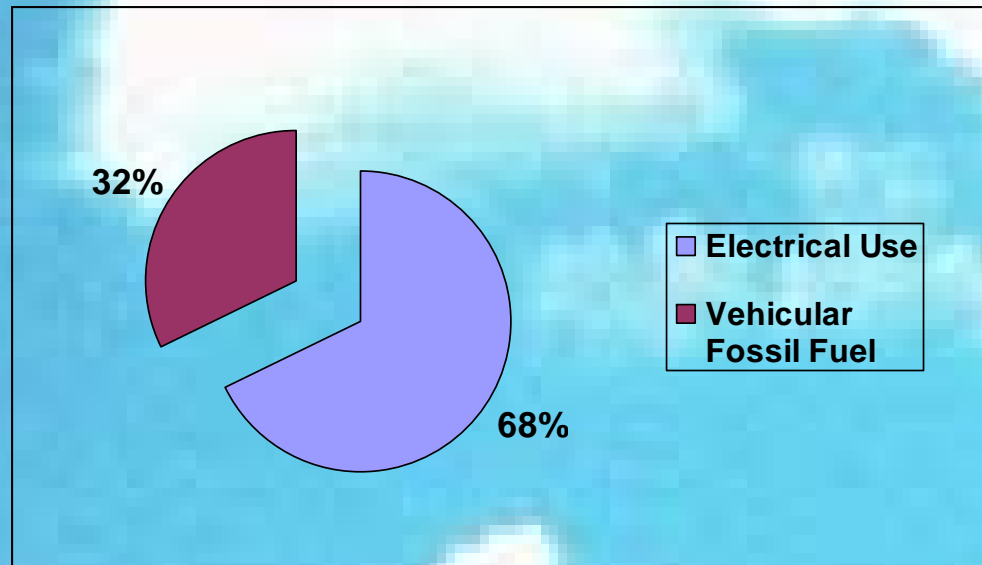


. . . the amount of green house gases produced through human activities, measured in metric tons of carbon dioxide equivalents (CO₂e)

	<u>1990</u>	<u>2006</u>	<u>% CHANGE</u>
ENTIRE CITY	4.5 mil	5.6 mil	+ 25%
CITY GOVT	67,382	74,398	+ 10%

CHATTANOOGA'S BIGGEST SOURCES OF CO₂ IN 2006

Entire City



City Government

CHATTANOOGA GREEN COMMITTEE

**EDUCATION
& POLICY
TASK FORCE**

**NATURAL
RESOURCES
TASK FORCE**

**HEALTHY
COMMUNITIES
TASK FORCE**

**ENERGY
EFFICIENCY
TASK FORCE**





**MAYOR RON LITTLEFIELD
AND THE CHATTANOOGA GREEN COMMITTEE
INVITE YOU TO A**

CHATTANOOGA GREEN PUBLIC INPUT MEETING

Please join us and share your knowledge, concerns and hopes for Chattanooga's environment. Bring your ideas about conservation, transportation, natural resources, recycling, air quality, education, energy, water and other environmental issues.

THURSDAY, APRIL 24, 2008

6:30 PM to 8:30 PM

**THE CHATTANOOGAN, MAIN BALLROOM
1201 BROAD STREET**

RSVP to (423) 648-7353

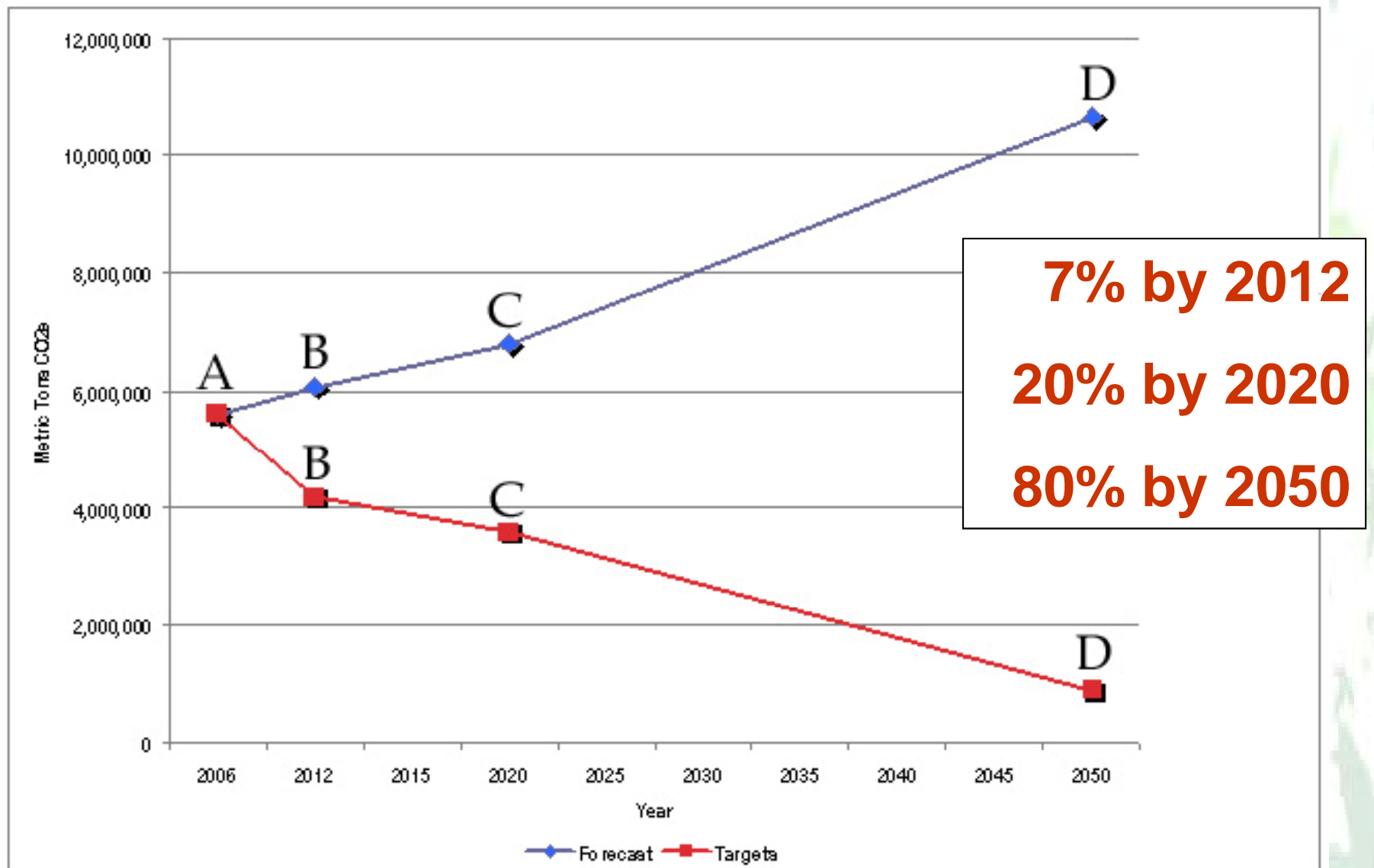
**Help us spread the word by passing this invitation along.
Invite your friends, family, neighbors and coworkers.**

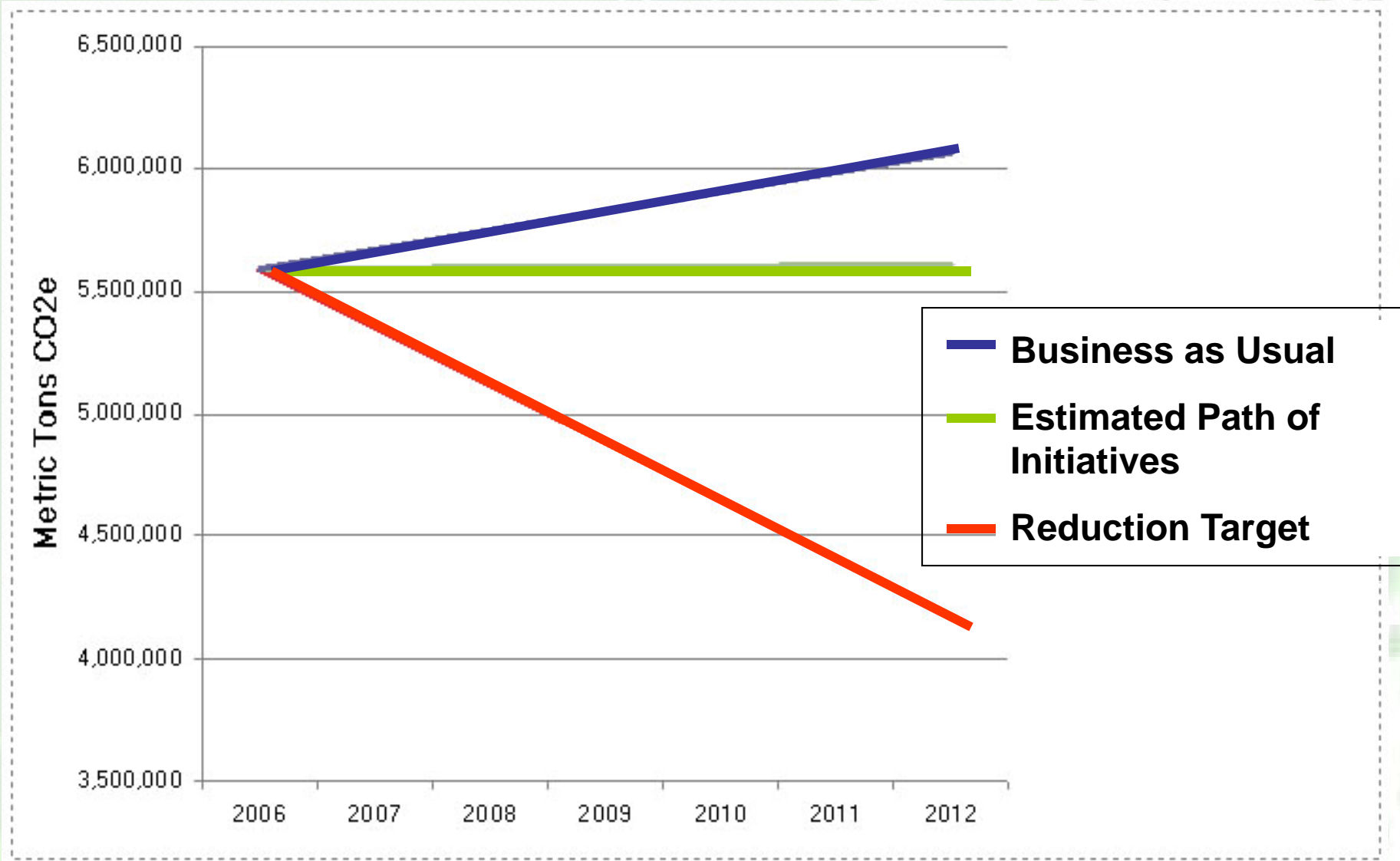
Special thanks: **WTCL** **Recycle
RIGHT**



Overall Rank	TOPIC
1	Recycling & Waste
2	Transportation
3	Green Buildings
4	Community Awareness & Participation
5	Government Policy & Purchasing
6	Schools
TIE 7	Energy Conservation
TIE 7	Green Infrastructure
TIE 7	Water Quality & Quantity
8	Built Environment & Smart Growth
9	Food & Agriculture
10	Alternative Energy Sources
11	Urban & Regional Forests
12	Business Participation
13	Air Quality
14	Biodiversity
15	Sustainable Industry

GHG REDUCTION TARGETS





What happens if we implement all 47 recommendations?



“When we try to pick out anything by itself, we find it hitched to everything else in the universe.”

John Muir

OBJECTIVES / POTENTIAL ACTIONS		LEAD AGENCY	PARTNERS	TIMEFRAME		
				SHORT	MID	LONG
<i>How?</i>	Create an incentive program to make <u>existing</u> buildings more energy efficient and less consumptive, beginning with energy audits.	Sustainability Office	AIA-COTA,ASHRAE, EPB, TVA,USGBC, Green/Spaces, Lyndhurst, Chattanooga Gas, TAWC	✓	✓	✓
	Create a program to provide free or reduced-cost home energy efficiency upgrades for eligible families.	Neighborhood Services, Sustainability Office	Lyndhurst, GreenSpaces, Benwood, Housing Authority, EPB/TVA, IPL, local churches, Local home improvement stores; City Human Services	✓	✓	✓
B2. Reduce energy and monetary waste from lighting.		City Engineer	EPB			
<i>How?</i>	Reduce hours that streetlights are on each day, balance safety with environmental impacts (city govt)	City Engineer	EPB	✓	✓	
	Switch to LED or other low energy (metal halide, high pressure sodium) streetlighting techniques for city operated lighting	City Engineer	EPB		✓	✓
Objective C. Increase GREEN BUILDING practices.						
C1. Lead by example by making a City commitment to upgrade and build LEED certified and energy-efficient buildings.						
<i>How?</i>	Perform energy audits on all existing City buildings.	EPB	Sustainability Office, General Services	✓		
	Prioritize energy efficiency/green building upgrades for City buildings. (Possible candidates include: Development Resources Center, Tivoli Theater, Memorial Auditorium, South Chattanooga Recreation Center).	Sustainability Office	EPB, General Services, Chattanooga Green Committee	✓	✓	✓
C2. Make sustainable building practices mainstream and increase the number of green buildings in Chattanooga.		Multiple	Multiple			
<i>How?</i>	Promote and enforce existing energy code standards.	Public Works: Land Development Office	AIA-COTE, USGBC, AGC, Mayor office, Chattanooga Green Committee, ASHRAE	✓	✓	✓
	Evaluate existing building codes and consider updating the necessary sections to accommodate green buildings and adaptive reuse of older buildings.	Public Works: Land Development Office	Sustainability Office, AIA-COTE, USGBC, AGC	✓	✓	✓
	Offer incentives, such as streamlined permitting for LEED administration on green development, to facilitate the development approval process.	Public Works	Sustainability Office, AIA-COTE, USGBC, AGC, Home Builders, Green Spaces	✓	✓	
	Research and publicize residential and commercial financial incentives and grants for green buildings and energy efficiency.	Sustainability Office	Green/Spaces, USGBC, Home Builders	✓		

47 Recommendations

FIGURE 28: ALTERNATIVE TRANSPORTATION OPTIONS TO DECREASE VMT

Initiative	Sector	Estimated GHG Reduction (metric tons)	Estimated Cost	Estimated \$ Savings
PROMOTE TELECOMMUTING	GOVERNMENT	480	NOT CALCULATED (N/C)	★★★★
	COMMUNITY	6,784	N/C	★★★★
PROMOTE CARPOOLING & VANPOOLING	GOVERNMENT	520	N/C	★★★★
	COMMUNITY	7,358	N/C	★★★★
PARKING VOUCHERS	GOVERNMENT	1,254	N/C	★★★★★
	COMMUNITY	17,731	N/C	★★★★★
BICYCLES FOR EMPLOYEES	GOVERNMENT	320	\$\$	★★
	COMMUNITY	1,551	\$\$	★★
BIKE SHARE PROGRAM	COMMUNITY	524	\$	★

COST AND SAVINGS KEYS		
Government Cost & Savings Key		
Categories	Cost	Savings
> \$2 million	\$\$\$\$\$	★★★★★
\$1 million-\$2 million	\$\$\$\$	★★★★
\$500,000-\$1,000,000	\$\$\$	★★★
\$100,000-\$500,000	\$\$	★★
\$0-\$100,000	\$	★
Community Cost & Savings Key		
Categories	Cost	Savings
> \$10 million	\$\$\$\$\$	★★★★★
\$5.1 million-\$10 million	\$\$\$\$	★★★★
\$2.6 million-\$5 million	\$\$\$	★★★
\$1 million-\$2.5 million	\$\$	★★
\$0-\$999,999	\$	★
N/C = Not Calculated; FC = Future Calculation		

Energy Efficiency Task Force



Alternative Energy Sources



Energy Conservation



Green Building



Recycling & Waste



Sustainable Industries



Energy Efficiency

GREEN BUILDINGS

WORLDWIDE, BUILDINGS
ACCOUNT FOR...

17% fresh water withdrawals

25% wood harvest

33% CO2 emissions

40% material and energy use

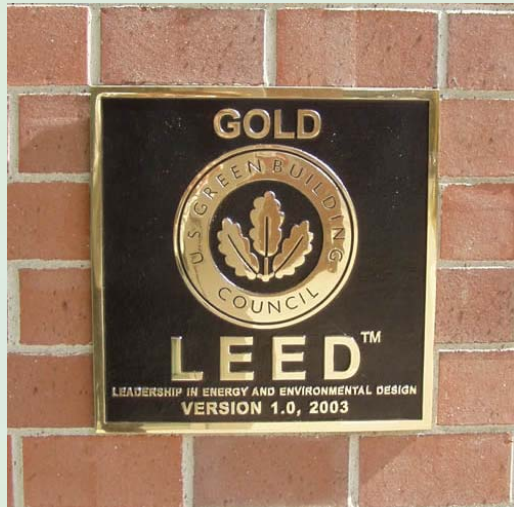


Recommendations:

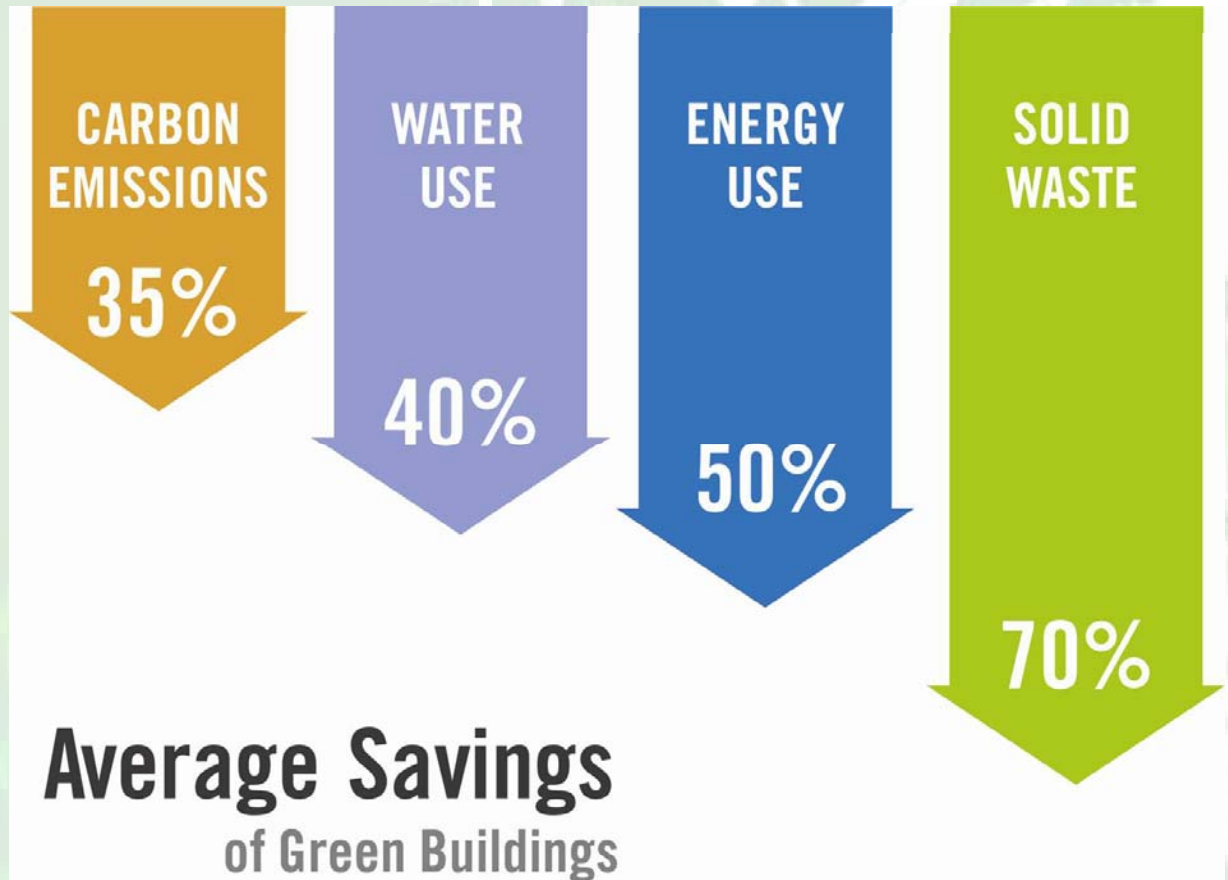
- Perform **energy audits** on all City buildings.
- Offer incentives, such as **streamlined permitting** for LEED buildings.

Green Buildings Initiative

(Thanks to the Lyndhurst Foundation)



According to Greenspaces 27 Buildings are currently in the pipeline for approval



Healthy Communities Task Force



**Built Environment &
Smart Growth**



Transportation



Food & Agriculture



Healthy Communities

TRANSPORTATION



Recommendations:

- Restructure **transit routes** to promote frequent, convenient service to areas that have the residential **density** to support it (12 units per acre or more) and to major destinations.
- Provide **plug-in parking meters** for daytime recharging of electric vehicles. 1,200 commercial chargers in Tennessee in preparation for the Nissan Leaf and other electric vehicles. In addition TVA will be providing 125 solar assisted chargers in TN only.
- Incentivize the installation of **sidewalks and greenways** as an integral part of new development.

Natural Resources Task Force



Air Quality



Biodiversity



Green Infrastructure



Urban & Regional Forests



Water Quality & Quantity



Support for a Natural Lawns Ordinance



Support for Native Plant Sales



Take Root Plantings



Take Root Initiative



Take Root

Amount of
money raised to
date: \$350,000



Amount of Trees
Planted to date:
1,049



Conducted a STRATUM analysis using i-tree

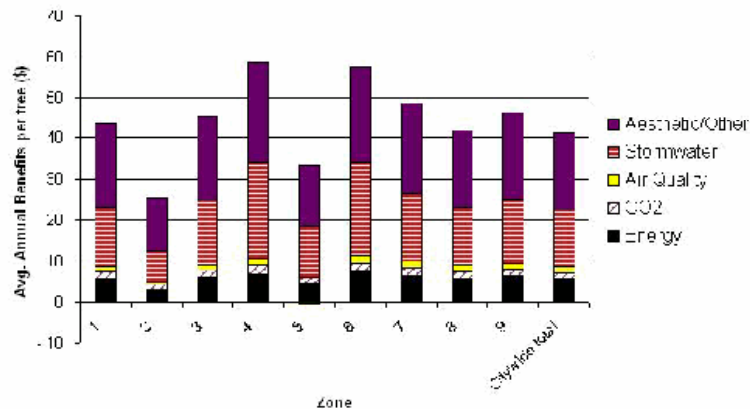


STRATUM Results:

City of Chattanooga

Annual Benefits of All Trees by Zone (\$/tree)

2/20/2008



Zone	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error
1	5.78	1.65	1.19	14.47	20.37	43.46	(±17.75)
2	3.24	0.91	0.80	7.43	12.89	25.27	(±3.09)
3	6.01	1.69	1.36	15.68	20.84	45.58	(±7.27)
4	6.86	2.16	1.46	23.67	24.46	58.60	(±19.53)
5	4.58	1.28	-0.74	12.49	15.02	32.63	(±7.37)
6	7.32	2.12	2.05	22.53	23.43	57.45	(±9.91)
7	6.32	1.79	1.71	16.53	22.40	48.75	(±14.22)
8	5.79	1.56	1.74	13.90	18.81	41.79	(±7.1)
9	6.14	1.68	1.49	15.77	21.35	46.43	(±15.73)
Citywide total	5.62	1.51	1.36	14.05	18.74	41.27	(±3.13)

We now have a tool by which we can assign an economic value to the environmental services which trees provide for:

1. Rainwater interception
2. CO₂ Sequestration
3. Energy Savings
4. Air Quality Improvement
5. Aesthetic benefits

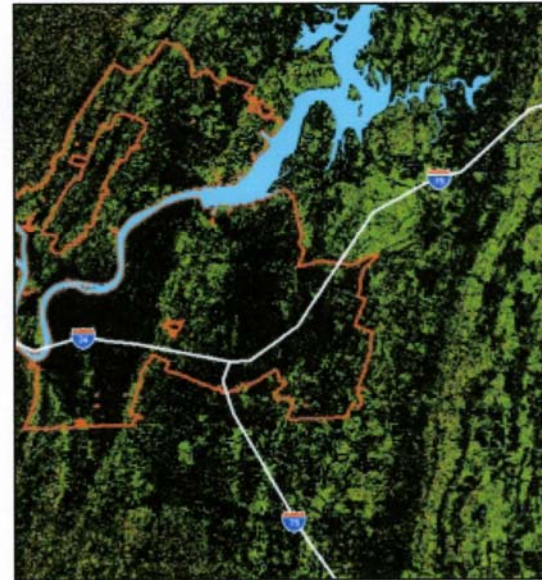
Urban Ecosystems Analysis

Regional Analysis



Landsat MSS 1974 80 Meter Pixel Resolution

Key: % Tree Cover



Landsat TM 1996 30 Meter Pixel Resolution

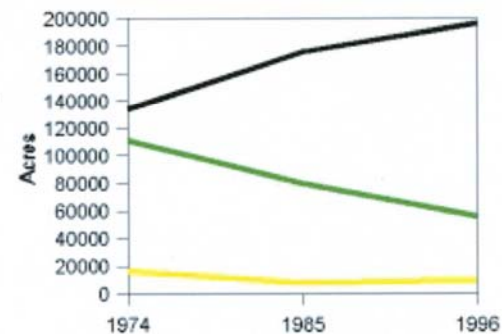
Satellite Images of Metropolitan Chattanooga

Classified satellite images show the change in land cover in the Chattanooga region over a recent 22-year period. High density tree cover ($\geq 50\%$) is indicated in green, low density tree canopy ($< 20\%$) and impervious surfaces associated with urban areas are in black. The GIS analysis measures nine categories of tree cover. Canopy categories are displayed in five groupings to accommodate the limitations of printing the images at this scale.

Graphing Change

The changes in vegetation depicted in the satellite images (above) are represented by a line graph (at right). The graph shows the change in tree cover over a 22-year period. Natural forest cover is represented by a green line and indicates areas with greater than or equal to 50% tree canopy. Developed areas are represented by a black line and indicate areas where tree canopy is less than 20%. The yellow line represents land where the tree cover is between 20% and 49%.

Vegetation Change Chattanooga Area, 1974-1996



- Low Canopy (<20% Vegetated)
- Moderate Canopy (20-49% Vegetated)
- High Canopy ($\geq 50\%$ Vegetated)

Urban Ecosystems Analysis



Analysis Report for City of Chattanooga



Land cover in acres and percentages

Impervious Surfaces: Buildings/ structures	23,252.5	23.9%
Open Space - Grass/Scattered Trees	17,220.9	17.7%
Trees	48,199.9	49.6%
Trees: Impervious understory	2,311.7	2.4%
Urban: Bare	775.5	0.8%
Water Area	5,442.2	5.6%
Total:	97,202.8	100.0%

Tree Canopy: 50,511.6 acres (52.0%)



Green Infrastructure plan

In progress.....

Physical elimination of Invasives

Privet

Kudzu

English Ivy

Shrub Honeysuckle

Callery Pear

Mimosa

Ailanthus

Cost to treat = \$6,000 per acre



The famous Weed Wrench

Natural Resources

AIR QUALITY – CO₂

Approximately 32%
of our Carbon
Emissions comes
from Autos and
Trucks



Any policy that seeks to reduce transportation – related CO2 emissions will require some combination of the following:

- Vehicle efficiency**
- Alternative fuels**
- Travel demand / VMT**



Education and Policy Task Force



**Community Awareness
& Participation**



Business Participation



**Government Policy &
Purchasing**



Schools





GOVERNMENT POLICY AND PURCHASING

Carbon Trading

Local government and businesses anticipate new federal policy changes in 2009 that may move the country toward a mandatory "cap and trade" regulatory system in which carbon reduction credits from an established baseline are calculated, verified and given an economic value. However, even under the existing voluntary markets for trading of these credits, other local governments are successfully harvesting the economic benefits of energy efficiency, carbon reduction and sequestration measures taken since 1999.

Nearby Calhoun County in North Georgia demonstrates convincingly that the use of methane gas (a particularly potent greenhouse gas) from a county landfill can generate an appreciable economic return to local government, offsetting fixed costs. In the case of Hamilton County, landfill methane gas could be captured for industrial energy generation, banked as an offset for unavoidable carbon emissions or sold on the Chicago Climate Exchange.

Objective P: Set the standard and provide leadership in sustainable GOVERNMENT POLICY and PURCHASING programs.

Potential Action P1: Adopt green policies for government buildings, products purchased and employee programs.

Why? In America today, buildings consume more than 70% of our electricity. They emit nearly 40% of our CO₂ and more than 30% of greenhouse gases. Building new and retrofitting old buildings to be more energy efficient is the first step in reducing these numbers and meeting our goals for greenhouse gas reduction.

How? Build all City facilities to green standards, such as LEED. Leading by example, institute a program to promote energy efficiency in the City Government workplace, such as allowing "business casual" dress codes to reduce energy consumption from air conditioning. Adopt a City of Chattanooga green purchasing program. (See Figure 41) Government is a major purchaser and consumer, and thus has the potential to influence the local market in a significantly 'greener' way. Support the creation of continuing education and credits for city professionals to learn about sustainable practices.

Potential Action P2: Create an 'Alliance for Growth' with the surrounding counties to network for combined brainstorming and problem solving.

Why? According to the Energy Information Administration, transportation accounts for 1/3 of CO₂ emissions. Less dense and single use suburbs require residents to travel further to get to places of work, recreation, commerce and worship, thus increasing CO₂ emissions. Strategic planning for the future to incorporate compact, walkable, mixed use neighborhoods and more options for transportation can help us decrease our carbon footprint.

How? Initiate a regional planning effort. Work with green|spaces, the Ochs Center, and other organizations to bring speakers and smart growth experts into town as resources.

Potential Action P3: Explore the potential of carbon cap and credit trading for the City.



CHATTANOOGA GREEN LODGING PROGRAM

The Chattanooga - Downtown

The Doubletree - Downtown

Staybridge Suites – Downtown

Courtyard by Marriott – Downtown

Chattanooga Marriott at the Convention Center

Hilton Garden Inn - Downtown and Hamilton Place

Residence Inn and Suites – Downtown and Hamilton Place

Fairfield Inn and Suites – East Ridge and Lookout Mountain

Marketed by the Convention and Visitor's Bureau



"If you're a leader think about the impact of your decisions on seven generations into the future."

-Chief Wilma Mankiller, Cherokee Nation

Efficiency
Market Advantage
Protect Limited Resources
Wellbeing of Future Generations

What can YOU do?

**Green Power
Switch**



Plant a Tree!

**Champion Recycling
at your Business**

Take Transit

**Request a home
Energy Audit**

Inexpensive ways to get involved



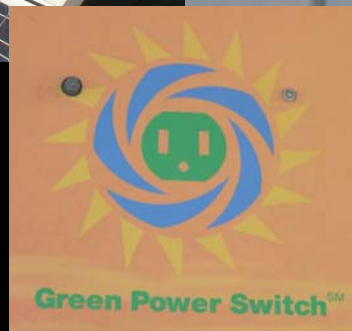
1 million Incandescent light bulbs, if replaced with compact florescent light bulbs, would result in **\$12 million** in savings on energy bills.

And - **147 million pounds** Reduction in carbon-dioxide emissions from replacing those 1 million light bulbs.

Source: USA Today 4-18-2007

Inexpensive ways to get involved

Green Power Switch: \$4.00 per 150 KWH block



Buying two blocks of Green Power
(\$8/month) is the same as
annually:

Recycling 15,322 aluminum cans, or

Planting an acre of trees, or

Recycling 1,766 pounds of newspaper, or

Not driving your car for four months



Reduce

Reuse

Recycle

For every **1 ton of plastic** that is recycled we save the equivalent of 2 people's energy use for 1 year, the amount of water used by 1 person in 2 month's time and almost 2000 pounds of oil.

Buy Energy Star



Plant a Tree



Trees:

Absorb pollutants

Reduce energy costs

Intercept stormwater

Provides oxygen

Aesthetics - Flowers,
Fruit, Fall Color

For each dollar that the Chattanooga community invests into its managed urban forest it receives \$12.18 in benefits

Business Recruiting



Mr. Jacoby said **environmental sustainability is a core value at Volkswagen**, and Chattanooga has moved to make environmental awareness part of the city's fabric.

"Your values complement our own," he said.

What is Our Future?

Clean Industry

Green Leadership

Outdoor Living



Old Motto: I think I
can; I think I
can.....

**New Motto: I know
I can; I know I
can.....**

THE CHATTANOOGA CLIMATE ACTION PLAN

Recommendations
To
Mayor Ron Littlefield

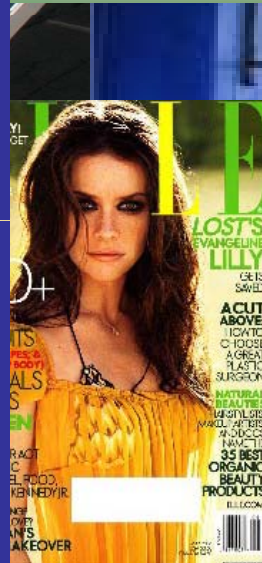


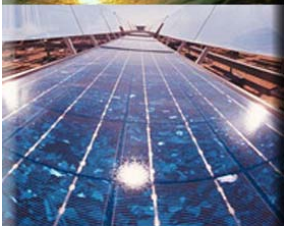
www.chattanooga.gov/chattanoogagreen





“The Green Wave is here.”





Gene Hyde, City Forester

Department of Public Works

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