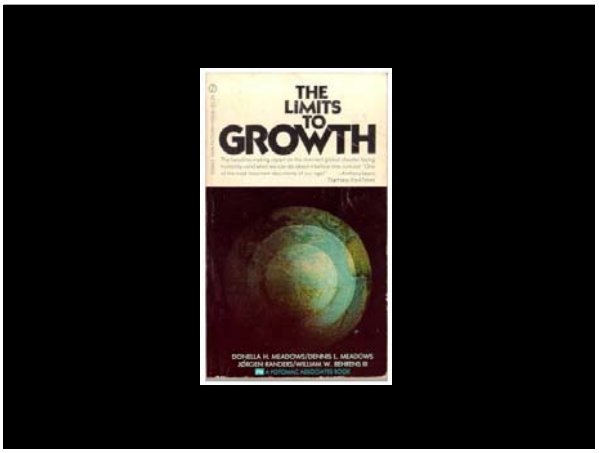
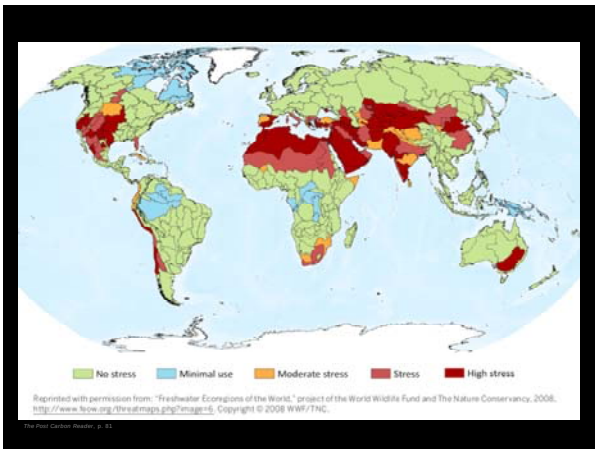

Post Carbon Cities:
Local authorities and the energy crisis
Daniel Lerch
Oregon / Washington APA Conference
Portland, Oregon — October 21, 2011
post carbon institute


post carbon institute


THE LIMITS TO GROWTH


No stress
Minimal use
Moderate stress
Stress
High stress
Reprinted with permission from: "Freshwater Ecoregions of the World," project of the World Wildlife Fund and The Nature Conservancy, 2008, http://www.feow.org/threatmaps.php?image=6. Copyright © 2008 WWF/TNC.
The Post Carbon Reader, p. 91

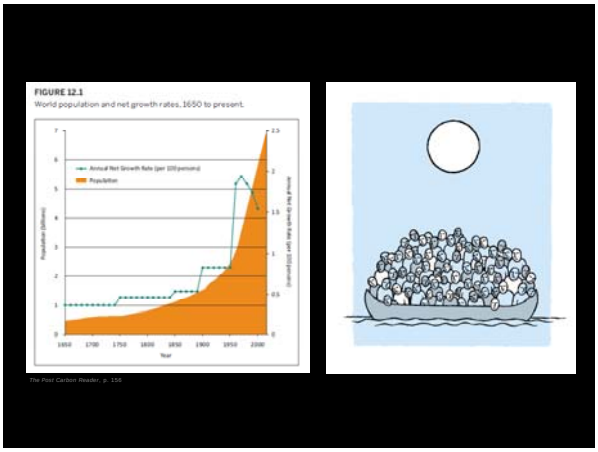
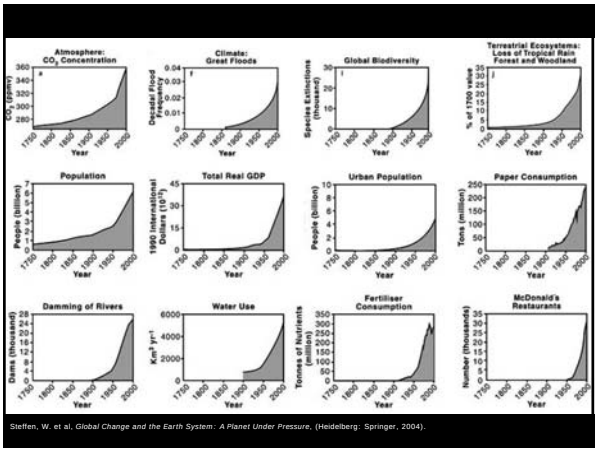
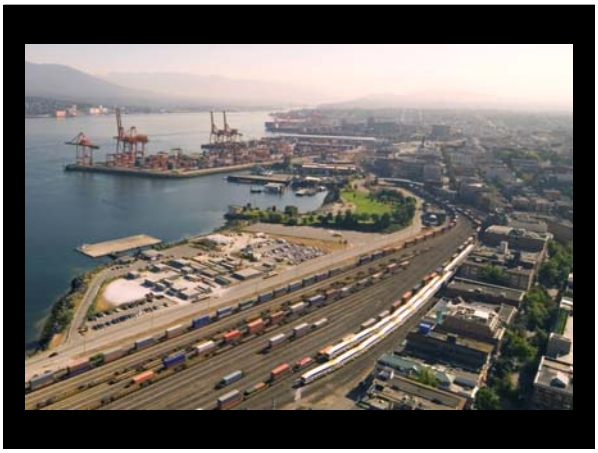
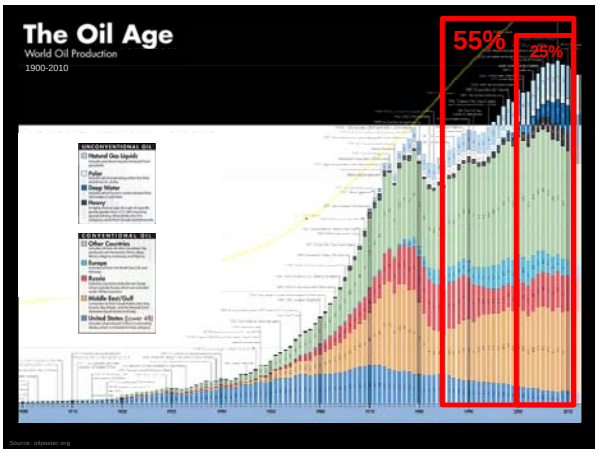
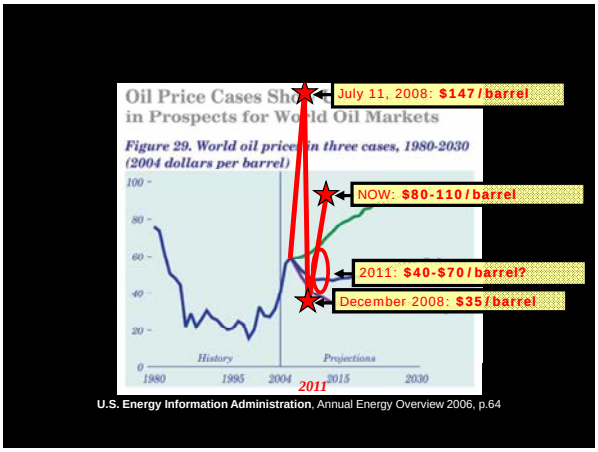


FIGURE 12.1
World population and net growth rates, 1650 to present.
The Post Carbon Reader, p. 156

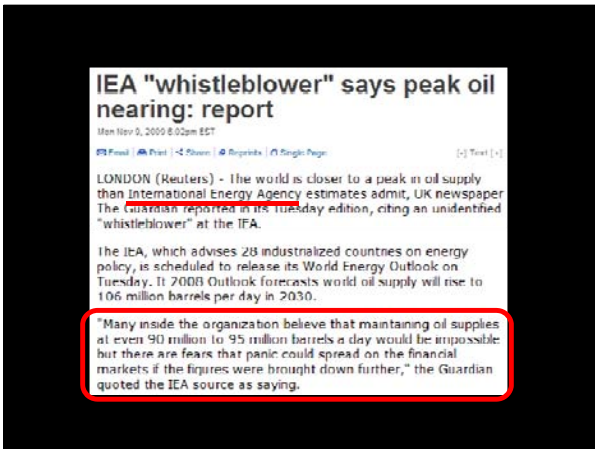

Atmosphere: CO2 Concentration
Climate: Great Floods
Global Biodiversity
Terrestrial Ecosystems: Loss of Tropical Rain Forest and Woodland
Population
Total Real GDP
Urban Population
Paper Consumption
Damming of Rivers
Water Use
Fertiliser Consumption
McDonald's Restaurants
Year
Steffen, W. et al, Global Change and the Earth System: A Planet Under Pressure, (Heidelberg: Springer, 2004).







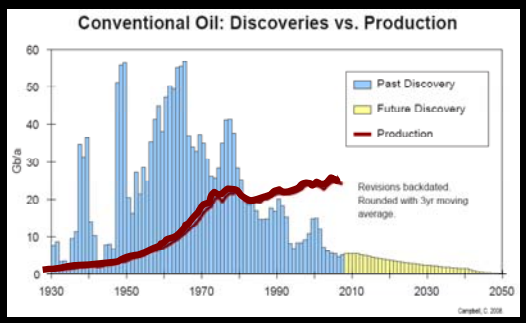
U.S. Energy Information Administration, Annual Energy Overview 2006, p.64



A quick summary of the oil situation

1. SUPPLY CONSTRAINTS
2. DEMAND GROWTH
3. OVERDEPENDENCE
4. NO GOOD SUBSTITUTES

1. SUPPLY CONSTRAINTS



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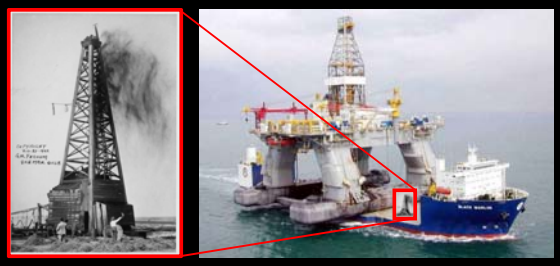
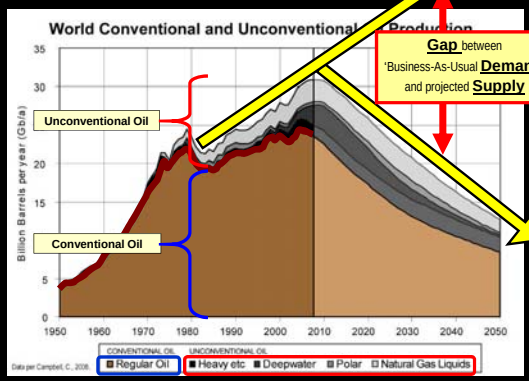
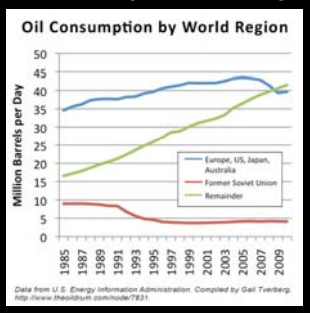


1. SUPPLY CONSTRAINTS



2. DEMAND GROWTH: The West keeps growing, and the East keeps modernizing



3. OVERDEPENDENCE

Gas prices highest level since 2008

Cost has jumped 18.9 cents a gallon in the past month

By Mark Williams
Associated Press

March 18, 2010

Motorists are paying the highest prices for gas since October 2008. Retail gasoline prices rose on Thursday on an expected increase in demand and as more expensive spring and summer blends of gasoline make their way to the pumps.

Americans now spend about a $1 billion a day to keep their cars and trucks filled, an increase of nearly $300 million from a year ago.

http://www.msnbc.msn.com/id/35935625/ns/business-oil_and_energy/

THE OREGONIAN • FRIDAY, APRIL 22, 20

Rising fuel prices ground profits of major air carriers

By DAVID KOENIG and JOSHUA FREED
THE ASSOCIATED PRESS

Soaring jet fuel prices are wiping out profits at the na-

prices. But these hedges only do so much to control the airlines' biggest cost. Hedging saved American Airlines $100 million in the first quar-

barrel. But the airlines are in better shape to withstand an oil shock than they were then.

The big difference is fares.

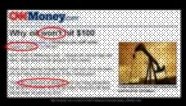
4. NO GOOD SUBSTITUTES

There is *nothing* of comparable versatility and quantity ready to replace oil.

BIOFUELS COAL NUCLEAR HYDROGEN

What does the end of cheap oil mean for the decisions we make as households, businesses, governments?

Higher Oil Prices +
Declining Supply + Rising Demand =
Oil Price / Supply Volatility



The end of cheap oil complicates our assumptions that energy will continue to be...

...**available**...

...and **affordable**.

Why government action?

Peaking of World Oil Production: Impacts, Mitigation and Risk Management

Prepared for the U.S. Department of Energy by Robert Hirsch, SAIC, et al, 2005

- "Timely, **aggressive** mitigation…"
- At least "a **decade** of intense, expensive effort"
- Intervention by governments necessary because the economic & social implications "**would otherwise be chaotic**"

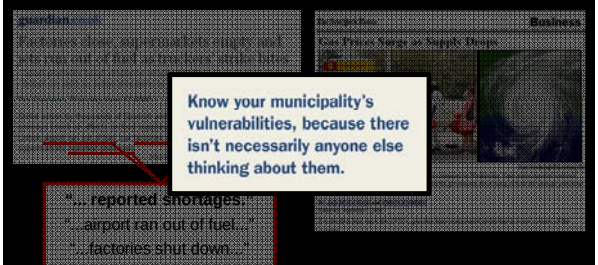
Why should we deal with peak oil locally?

1. Price volatility of goods

2006 - 2007:
"…higher fuel prices and energy costs; higher transportation costs…"

Why should we deal with peak oil locally?

2. Potential for shortages and emergencies



Why should we deal with peak oil locally?

3. Long-term economic shifts

- How will the **global economy** adjust? *(global trade flows)*
- How will this impact **regional and local economies**? *(relative advantage; provisioning systems)*

How can cities...

- set meaningful budgets
- make long-range land use and transportation plans
- serve residents and the local business community

...with such uncertainty surrounding the most important material to our global, regional and local economies?

" Energy Uncertainty "

Official Statement

A RESOLUTION ACKNOWLEDGING THE CHALLENGE OF PEAK OIL AND THE OPPORTUNITY FOR THE TOWN OF CHAPEL HILL TO PREPARE FOR THE POSSIBILITY OF A POST PEAK OIL ECONOMY (2008-10-27/R-3)

WHEREAS, peak oil is generally defined as the point in time when half of the world's oil reserves have been used, resulting in increased scarcity of this commodity and corresponding price hikes; and

WHEREAS, oil is an essential resource for transportation, food production, and other aspects of the current U.S. economy; and

WHEREAS, the Department of Energy-sponsored study on the mitigation of Peak Oil performed by the Science Applications International Corporation (SAIC) demonstrated that a twenty-year lead time is required for effective mitigation, while current measures supported by the federal government will replace only three-weeks worth of gasoline consumption by 2012; and

WHEREAS, sources of transport fuels from coal require high energy input and increase total carbon and other greenhouse gas emissions; and

WHEREAS, energy conservation measures and investments in renewable energy sources can serve as strategies for reducing demand and dependence on oil-based fuels; and

WHEREAS, the state of North Carolina currently imports nearly all of its transportation fuel resources, which represents funds that could in part be used to develop domestic, alternative energy resources; and

WHEREAS, Chapel Hill residents and businesses are negatively affected by rising oil and energy costs, which disproportionately affect low-income residents; and

WHEREAS, the Town of Chapel Hill has demonstrated leadership and an ongoing commitment to confront the challenges associated with the long-term protection and enhancement of our community's environmental quality, economic vitality, and social equity, all of which are directly impacted by access to affordable energy;

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Town accepts the obligation to inform its citizens of potential risks associated with Peak Oil, and to address the significant challenge of confronting Peak Oil locally; and

Marrickville, NSW
Chapel Hill, N.C.
Nottigham, U.K.

Internal Report

City of Burnaby

COMMITTEE REPORT

FROM: DIRECTOR PLANNING AND BUILDING

SUBJECT: GLOBAL PEAK OIL PRODUCTION - THE MUNICIPAL CONTEXT

PURPOSE: To provide the Committee and Council with a requested overview of the pending of global oil production.

RECOMMENDATION:

1. THAT the Committee recommend that Council receive this report for information.

REPORT

1.0 BACKGROUND

1.0 THE ISSUE

Burnaby, B.C.
Darebin, Vc.
Maribyrnong, Vic.

Resolution which creates...

City of Portland Peak Oil Resolution

RESOLUTION No. 36407

WHEREAS, global reserves of oil and natural gas are finite and sufficient substitutes are unlikely to be available in the immediate future; and

WHEREAS, U.S. oil and natural gas production have peaked and are now in decline, meaning any nation's continued and growing dependence on oil and natural gas imported from politically unstable regions; and

WHEREAS, a growing body of energy industry experts believe that the world has already arrived at, or will soon arrive at, the peak of global oil production, which will be followed by an inevitable decline in available supply thereafter; and

WHEREAS, global demand for oil and natural gas continue to increase; and

WHEREAS, following the global peaks of oil and natural gas production, the interaction of decreasing supply and increased demand will cause the price of oil and natural gas to become more volatile; and

WHEREAS, the United States Department of Energy's National Energy Technology Laboratory has stated that, "The problems associated with world oil production peaking will not be temporary, and post 'energy crisis' experiences will provide relatively little guidance. The challenge of oil peaking deserves immediate, serious attention, if risks are to be fully understood and mitigation begun on a timely basis"; and

WHEREAS, the City of Portland and its citizens and businesses depend on oil and natural gas for their economic welfare and their most critical activities, including transportation and food supply; and

WHEREAS, a large majority of money spent on fossil fuels leaves Oregon and provides no local economic benefit, while many of the solutions to lessening dependence on fossil fuels result in local jobs and substantial economic benefits;

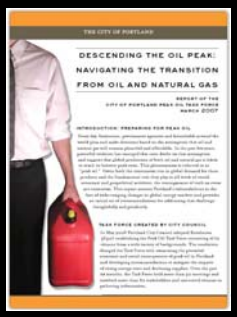
WHEREAS, Portland residents and businesses are not currently aware of the full implications of an impending decline and will greatly benefit from an objective source of information on this topic; and

WHEREAS, the City of Portland has adopted the *Local Action Plan On Global Warming*, the success of which depends upon reducing carbon dioxide emissions from burning fossil fuels; and

Portland, Ore.
Oakland, Calif.
Bloomington, Ind.

San Francisco, Calif.
Austin, Tex.
Brisbane, QLD

...a Task Force.



THE CITY OF PORTLAND

DESCENDING THE OIL PEAK:
NAVIGATING THE TRANSITION FROM OIL AND NATURAL GAS

REPORT OF THE CITY OF PORTLAND PEAK OIL TASK FORCE MARCH 2007

INTRODUCTION: PREPARING FOR PEAK OIL

TASK FORCE CREATED BY CITY COUNCIL

Spokane, Wash.
Bristol, U.K.
Alachua Cty., Fla

Bellingham, Wash.
Lawrence, Kan.
Westerly, R.I.

Portland (Oregon) Peak Oil Task Force

- **12 members vetted by City Council**
- **Split up into four subgroups:**
  - **Land Use / Transportation**
  - **Economy**
  - **Public and Social Services**
  - **Food & Agriculture**
- **In 6 months, meetings with over 80 stakeholders**

Peak Oil Task Force Transportation & Land Use Subgroup

Meeting #2 Notes – Freight and Fuel
24 August 2006

Attendees
Christine Caruso (moderator); Jeanne Longely (POTF member); Randy White (POTF member); Susie Lahsene (Port of Portland); Bob Hillier (PDOT); Steve Dotterer (Bureau of Planning); Peter Hurley (PDOT); Roland Chlapowski (Comm. Adams Office); Eileen Argentina (PDOT); Julie Rodwell (ODOT); Jim Karlock (citizen)

Overview
Basic data was provided by the Port of Portland, PDOT, and ODOT about Oregon and Portland fuel consumption by transportation mode. Discussions focused on fuel availability, fuel cost, freight modes, economic factors, political influences, regulatory control, transportation system conditions, and mobility.

The following handouts were provided:
Trucking Association slide show on Energy Issues and the Impacts on Freight Transportation
Owner-Operator Independent Drivers Association slide show on Effect of Fuel On Professional Truckers
Global Insight study on Global Economic Trends and Trade Patterns
"Transportation Energy" chapter from the Oregon Transportation Plan
Cambridge Systematic, Inc. chapter on "Sensitivity Scenarios"

Fuel

1. Comes in by pipeline from Washington State as well as by barge from the Alaskan fields and overseas suppliers.
2. There are no oil or natural gas supplies in Oregon. Fuel is 100% imported.
3. There are no petroleum refineries in Oregon. One of only a few States in this position.
4. It is important to remember that Oregon is at the very end of the supply pipeline and is

Impacts and Vulnerabilities

- Land Use / Transportation
- Economy
- Public and Social Services
- Food & Agriculture

Two Pillars and 11 Recommendations

- Reduce Exposure
- Strengthen Community

Recommendations of the Portland Peak Oil Task Force

1. Reduce total oil and natural gas consumption...
by 50 percent over the next 25 years.

2, 3. Educate and engage the public and leaders. Inform citizens about peak oil and foster community and community-based solutions. Educate and engage business, government and community leaders to initiate policy change.

4. Land use and transportation connection:
Support land use patterns that reduce transportation needs...

5, 6. Transportation infrastructure and choices:
Design infrastructure to promote transportation options and facilitate efficient movement of freight...

7. Energy-efficient buildings:
Expand building energy-efficiency programs and incentives for all new and existing structures.

8. Farmland and food:
Preserve farmland and expand local food production and processing.


San Francisco Chronicle

Study says greening will raise state's economy

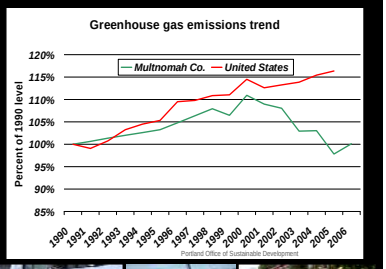
9. The Green Economy:
Identify and promote sustainable business opportunities.

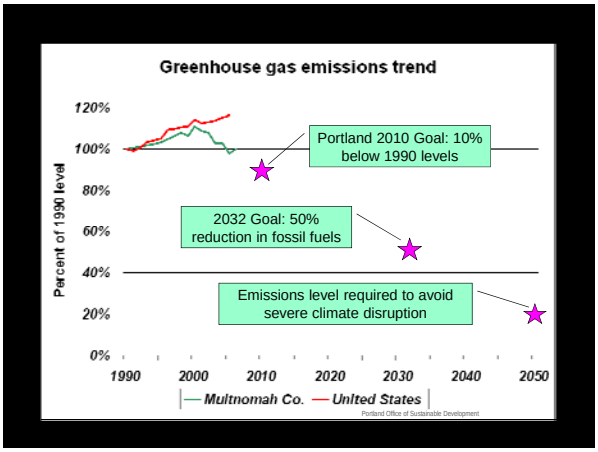
10. Social safety net:
Redesign the safety net and protect vulnerable and marginalized populations.

11. Emergency Planning:
Prepare emergency plans for sudden and severe shortages.

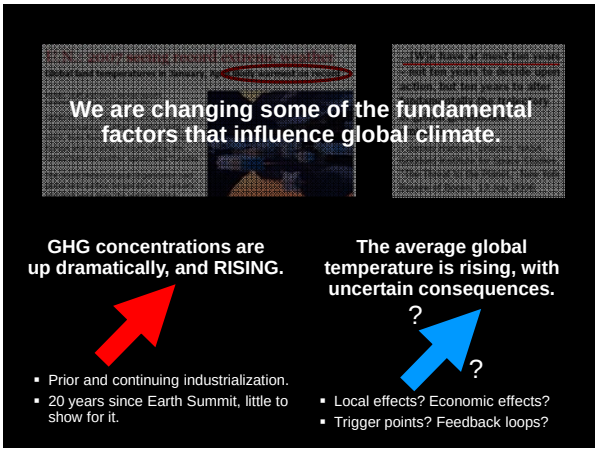
What HAD Portland been doing?

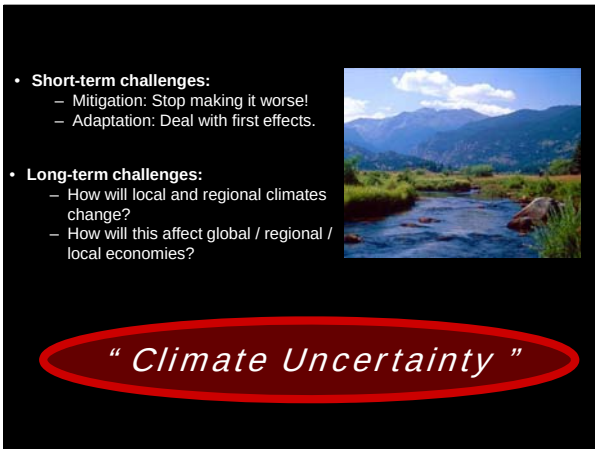
- Most **green buildings** in US (LEED)
- Highest per capita **hybrid auto** ownership in US
- **Transit** ridership up 85%
- **Bike trips** over bridges quintupled
- **Vehicle miles traveled** decreased 7% per capita
- **Gasoline sales** down 13% per capita
- **Household energy** down 5% per capita
- **City energy-efficiency** projects saving $2.6M/yr
- **Recycling** rate more than tripled

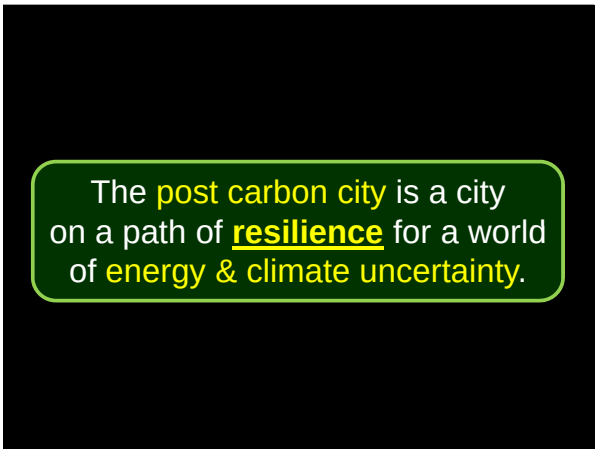



Greenhouse gas emissions trend
120%
100%
80%
60%
40%
20%
0%
Percent of 1990 level
1990
2000
2010
2020
2030
2040
2050
Portland 2010 Goal: 10% below 1990 levels
2032 Goal: 50% reduction in fossil fuels
Emissions level required to avoid severe climate disruption
Multnomah Co.
United States
Portland Office of Sustainable Development


Post Carbon Cities:
Planning for Energy and Climate Uncertainty
POST CARBON READER
postcarboncities.net
postcarbonreader.com
post carbon institute


We are changing some of the fundamental factors that influence global climate.
GHG concentrations are up dramatically, and RISING.
Prior and continuing industrialization.
20 years since Earth Summit, little to show for it.
The average global temperature is rising, with uncertain consequences.
?
?
Local effects? Economic effects?
Trigger points? Feedback loops?


Short-term challenges:
Mitigation: Stop making it worse!
Adaptation: Deal with first effects.
Long-term challenges:
How will local and regional climates change?
How will this affect global / regional / local economies?
" Climate Uncertainty "


The post carbon city is a city on a path of resilience for a world of energy & climate uncertainty.

Resilience. The capacity of a system to absorb disturbance and reorganize while undergoing change, so as to retain essentially the same function, structure, identity and feedbacks.
(Rob Hopkins)

The New York Times — Business

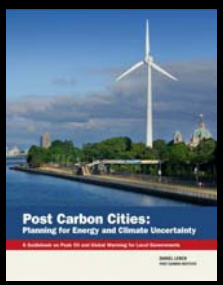
Gas Prices Surge as Supply Drops

Accept change
Adaptive management. "How do we build for this?" We re-learn.

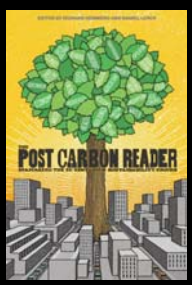
Identify + reduce vulnerabilities
Diversity means choices. Redundancy. Avoid "stranded infrastructure"

Use resources wisely
"If you're going to do it, do it right." Local economic multiplier.

Invest in the people
Build capacity of communities to make decisions. Decentralize some decisions.



postcarboncities.net



postcarbonreader.com

post carbon institute

Portland's
Local Energy Assurance Plan

Tricia R. Sears, LEAP Project Manager

Oregon/Washington APA Conference
Resilience for a Changing Future

October 21, 2011

What is Energy Assurance?

Energy assurance is a confidence that energy will be available when needed.

To reach that level of security and availability of energy, we must take actions to reduce our vulnerabilities and prepare for an energy disruption.

What is the Portland LEAP?

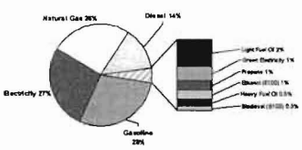
A **plan** that addresses our dependency on energy before (mitigation), during (response) and after (recovery) an energy disruption.

An **emergency plan** that provides an understanding of roles, responsibilities, and response actions for emergency response organizations, energy providers and energy distributors.

LEAP Cities

Sources of energy used in Portland

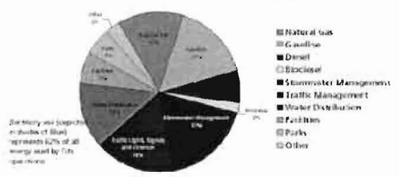
Total 2007 Portland Energy Use by Fuel Source
in percent of Millions of BTU



Total energy used from all fuel sources = 105,077,140 Million British Thermal Units (MBTU).

City of Portland Energy Use

Energy Use in BTUs by Fuel Type with Breakout of Electricity Use

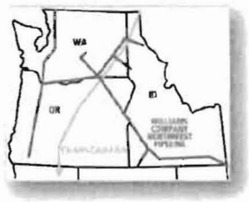


Why Should You Care about LEAP?

- Energy is the backbone of our economy.
- Portland's energy infrastructure is concentrated primarily in one area – the NW Industrial Area.
- That area is vulnerable to numerous potential hazards.

Oregon's Petroleum Supply

Oregon's Natural Gas Supply



LEAP Project Committees

- Steering
- Industry, Response Agencies and Utilities
- Neighborhood and Small Business
- Environment, Economy, and Alternative Energy

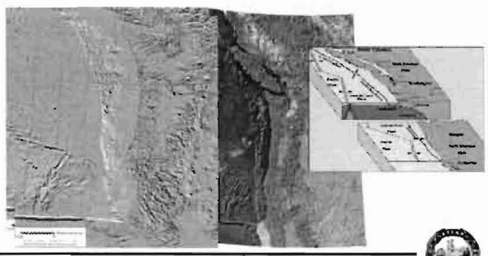
LEAP Aha! Moments

- Access, transportation, debris management
- PBOT, Portland Fire & Rescue, Police Bureau
- Fuel use data
- Alternative energy in emergency management
- Building damage assessment
- Communication, roles and responsibilities

LEAP Outreach

- Portland LEAP web pages
- FAQ, general statement, project handouts
- Presentations
- Business survey, site visits
- Collaborations with State of Oregon
- Table Top Exercise

Cascadia Subduction Zone



Portland Hills Fault

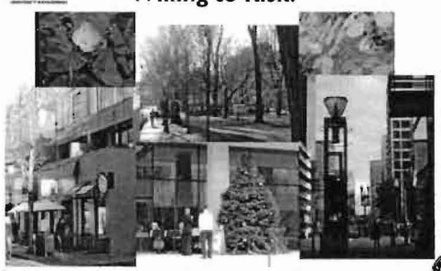
Earthquake faults:

East Bank Fault

Oatfield Fault

Portland Hills Fault

What are We Willing to Risk?



Planning for Our Community

- **Goals** – 20 minute neighborhoods, resilience
- **Analysis** – Buildable Lands Inventory, Asset Status and Conditions Report, Peak Oil Task Force
- **Projects** – Citywide Tree Project, Portland LEAP
- **Plans** – Portland Plan, Climate Action Plan, Natural Hazard Mitigation Plan, Critical Infrastructure Protection Plan

Vulnerability, Mitigation & Resiliency

- **Vulnerability** - The degree to which people, property, resources, systems, and cultural, economic, environmental, and social activity is susceptible to harm, degradation, or destruction.
- **Mitigation** – Risk Reduction. Comprised of strategies and actions to lower or lessen the impacts of a disruption or disaster. These can occur before, during and after a disaster.
- **Resilience** -The ability to respond effectively to an emergency and recover quickly from damage "bounce back".

What will LEAP do for you?

- Portland LEAP doesn't add, subtract or otherwise change rules.
- LEAP analysis will be used so the region can have informed conversation.
- Inspire communication, share resources, and take action to prepare.
- An emergency response plan: Energy Annex in the City of Portland Basic Emergency Operations Plan.
- November 2011 Table Top Exercise; March 2012 City Council with our LEAP report.
- **Check out our web pages:** http://www.portlandonline.com/oem/leap

Any questions?

Contact

Tricia R. Sears

LEAP Project Manager

Phone #503-823-2360

Penny Bowman

LEAP Project Assistant

Phone #503-823-9799

Energy assurance and sustainability have similar goals!

State of Oregon Fuel Allocation Program

Priority Fuel Users

•Tier 1 – Emergency Services Sector

Law enforcement, fire services, medical services (ambulances, air transport, hospitals)

•Tier 2 – Essential Services Sector

Energy production, transportation (highways, roads, bridges), sanitation, public works (sewer, water), public transit, agriculture production and distribution, telecommunications

•Tier 3 – Community Hardship Sector

City, county, other sectors as appropriate

Earthquake Fault Lines in Portland

East Bank Fault

Portland Hills Fault

Oatfield Fault