

Sustainable Buildings 2030

Advisory Group Meeting Agenda—December 12, 2008



- Introductions and Welcome
Janet Streff, Office of Energy Security
- Introduction to SB 2030 Project
John Carmody, CSBR
- Benchmarking and Energy Use
Tom McDougall, The Weidt Group
- Case Studies
Rick Carter, LHB Inc.
- Cost Effectiveness and Relationship to Utilities
Sheldon Strom, CEE
- Building Operations
Peter Herzog, Herzog Wheeler & Associates
- Discussion and Next Steps



Center for Sustainable Building Research

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Working to transform the built environment in ways that provide for the ecological, economic, and social needs of the present without compromising those of the future.

The EcoCalculator Wins Awards

2007 Sustainable Building Industries Council's Beyond Green™ Competition

2007 United States Environmental Protection Agency (EPA) Lifecycle Building Challenge Award



More information on the Athena EcoCalculator for Assemblies →

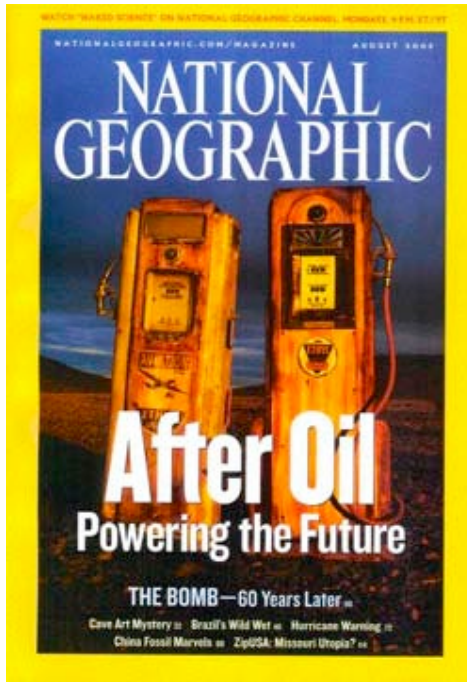
See Us at GreenBuild 2008!

CSBR staff will be attending and displaying at this year's GreenBuild International Conference & Expo representing areas of our work in Windows & Glazing, Housing, and Life Cycle Assessment

When: November 19-21, 2008

Where: Boston, MA



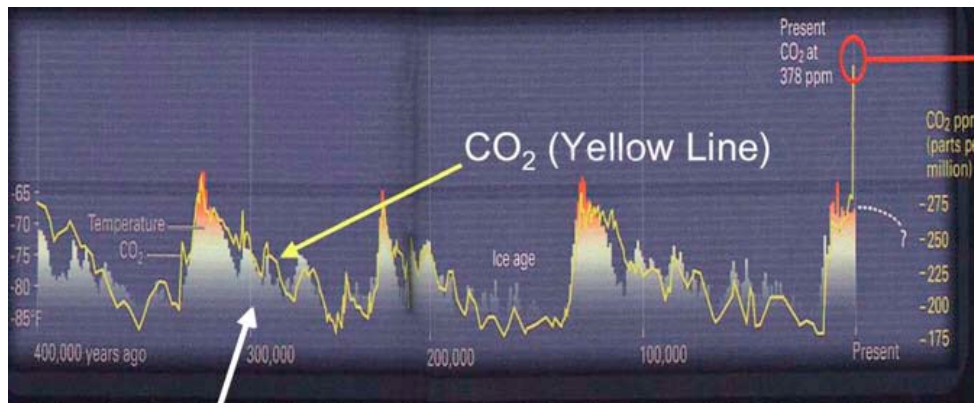


“Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.”

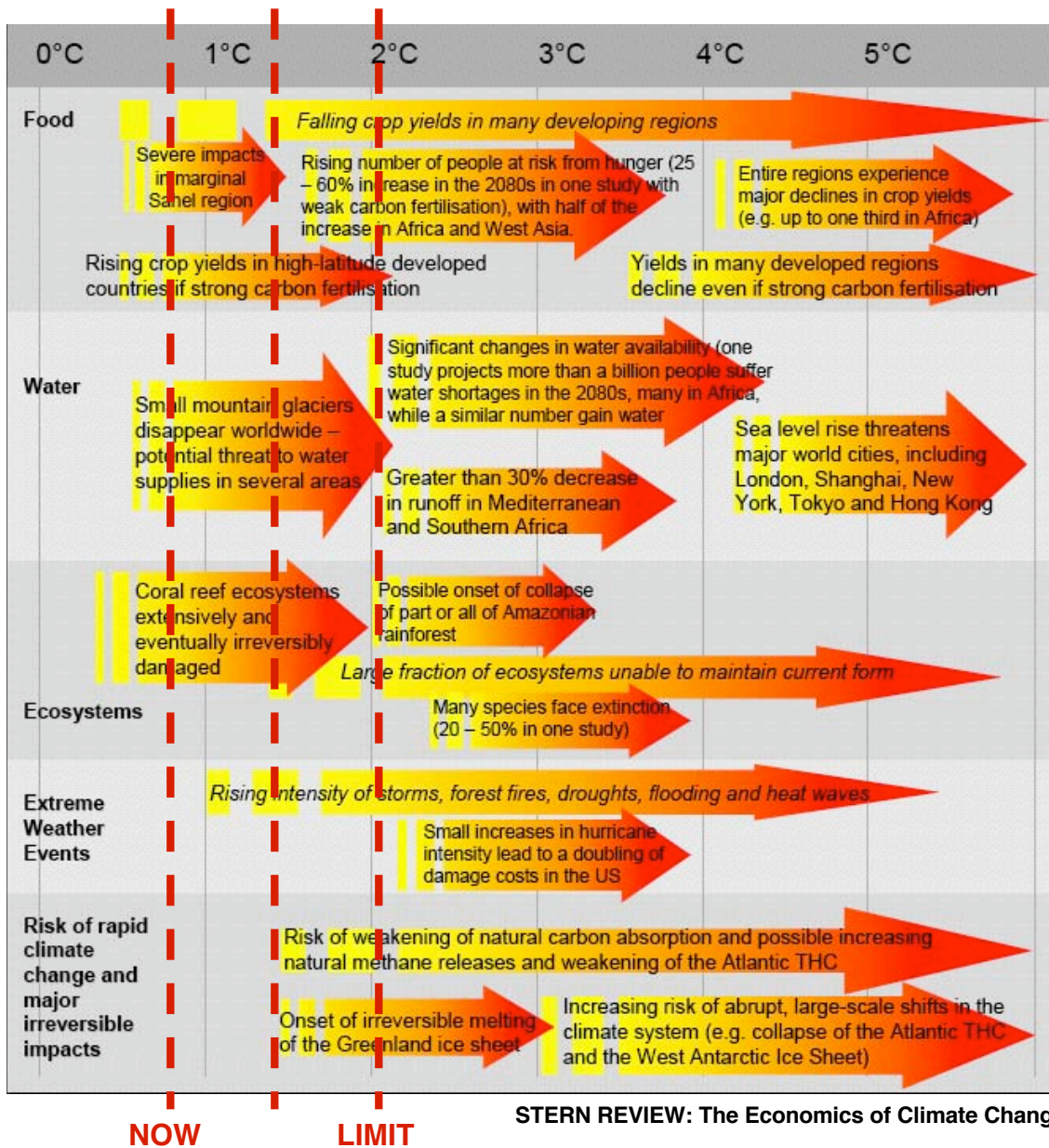
— *IPPC Synthesis Report, 2007*

“If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, ... CO₂ [in the atmosphere] will need to be reduced from its current 385 ppm [parts per million] to at most 350 ppm.”

— *James Hansen, NASA*

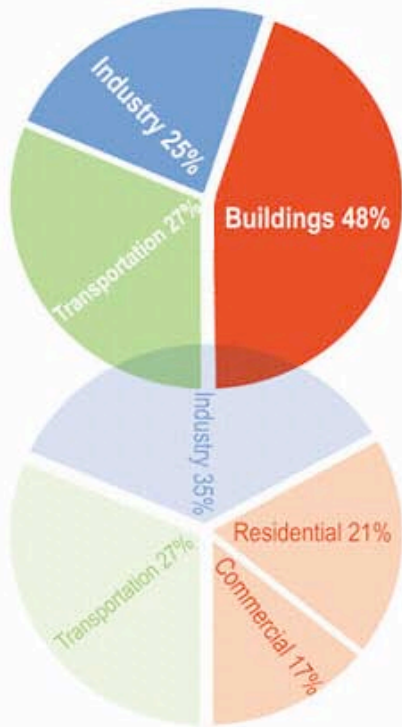


PROBABLE IMPACTS OF RISE IN GLOBAL TEMPERATURES



“Its main conclusions are that 1% of GDP/year is required to be invested in order to avoid the worst effects of climate change, and doing nothing, say the economic models, will cost the world the loss of 5% GDP per year “now and forever” or could risk global GDP being up to 20% lower than it otherwise might be..”

– *Stern Review, The Economics of Climate Change*

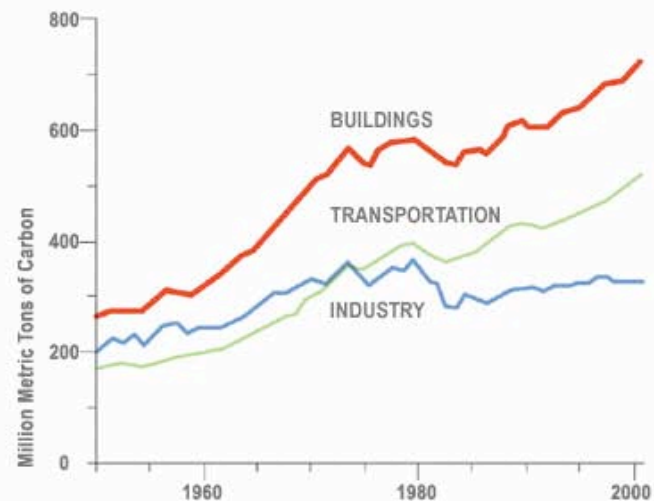


U.S. ENERGY CONSUMPTION BY SECTOR

Source:
U.S. Energy Information Administration statistics
Graphic Published first in *Metropolis Magazine*,
October 2003 Issue.

"Unknowingly, the architecture and building community is responsible for almost half of all U.S. greenhouse gas emissions annually. Globally the percentage is even greater."

Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming and greenhouse gas emitting sector.



U.S. CO₂ EMISSIONS BY SECTOR

Source: U.S. Energy Information Administration statistics



To stay under the 2°C threshold we must reduce greenhouse gas emissions by 40-60% below 1990 levels by 2050. By enacting the proposed Climate Action Plan, we can meet this target.



Mazria Inc. Odems Dzurec, 2005. (Generated from U.S. Energy Information Administration statistics)

[previous](#)

2030

C

building
sector

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Join Us

Sustainable Building Guidelines Commercial Institutional Buildings



LEED
US Green Building Council
www.usgbc.org



Green Globes
Green Building Initiative
www.thegbi.org



Energy Star Program
www.energystar.gov



Minnesota Sustainable Building Guidelines
www.csbr.umn.edu/B3

Sustainable Building Guidelines

Commercial Institutional—Existing Buildings



LEED-EB (Existing Buildings)
US Green Building Council
www.usgbc.org



Green Globes CIEB (Continual
Improvement for Existing Buildings)
Green Building Initiative
www.thegbi.org



Go Green Program
BOMA Canada
www.bomagogreen.com



B3 Benchmarking Tool
www.mnbenchmarking.com

Sustainable Building Guidelines

Residential Sector



LEED for Homes
US Green Building Council
www.usgbc.org



NAHB Green Home Building Guidelines
Green Building Initiative
www.nahbrc.org/greenguidelines/



Green Communities Program
Enterprise Foundation
www.greencommunitiesonline.org



Minnesota GreenStar
Twin Cities Builder's Association/NARI
www.mngreenstar.com/



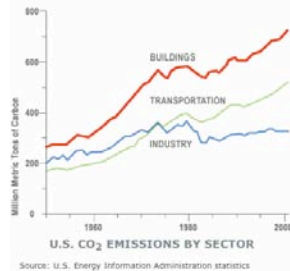
Recent Trends



- A diverse set guidelines and rating systems are continually evolving in response to the scale of development, building type and regional issues
- Guidelines are being adopted by states and cities as basis for codes, standards and incentives
- There is a movement away from simple point-based checklists toward more requirements and a focus on performance outcomes such as carbon emissions and energy consumption
- Life cycle assessment of materials is beginning to be included in guidelines and ratings
- There is increased focus on actual performance during operation and the need for a feedback loop and continuous improvement

Problems

Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming and greenhouse gas emitting sector.



Source: U.S. Energy Information Administration statistics



- Architecture 2030 is a great concept but needs work to apply it in practice
- Current guidelines and rating systems do not necessarily get you where you want to go
- There is an overwhelming amount of information
- There is no central source of information that shows costs and benefits based on actual performance in our region
- Lack of connection and information sharing between sectors — policy, finance, planning, design, construction and operation
- The problem is urgent — we have ten years!

A Regional Knowledge Base



- Focus on measurable environmental performance indicators and set targets

Energy, CO₂, Water, Wastewater, Waste, Stormwater, Health, Biodiversity, Embodied Impacts of Materials

- Provide tools to determine performance and links to utility incentive programs
- Track actual performance during building operation and provide a feedback loop resulting in continuous improvement
- Create a regional case study database and identify most cost effective approaches
- Develop effective training for design professionals and building operators



Draft Policy Option

RCI-3 Green Building Guidelines and Standards Based on Architecture 2030

Policy Description

Promote, incentivize, or adopt green building guidelines and standards for the reduction of carbon emissions for all commercial and residential buildings consistent with *Architecture 2030* targets. Clearly communicate the fact that reducing energy use does not always proportionally reduce emissions. Consider developing disincentives to technologies that do not reduce emissions.

Require state and local government agencies including school districts to adopt required building guidelines and standards for the reduction of carbon emissions for all buildings consistent with *Architecture 2030* targets. New buildings must require the following reductions in carbon emissions:

2010	60% reduction
2015	70% reduction
2020	80% reduction
2025	90% reduction
2030	100% reduction

All guidelines and standards for major renovations of existing buildings must require reductions in carbon emissions consistent with the *Architecture 2030* target of 50% reduction. Provide a variance process when meeting criteria is not appropriate or financially unfeasible.

Sustainable Buildings 2030

Minnesota Version of Architecture 2030 Initiative



- The program concept emerged from the recommendations of the Minnesota Climate Change Advisory Group and was passed by the Minnesota legislature in the last session.
- The purpose is “to establish cost-effective energy-efficiency performance standards for new and substantially reconstructed commercial, industrial and institutional buildings that can significantly reduce carbon dioxide emissions by lowering energy use ...”
- The performance standards should be designed to achieve the following reductions measured against energy consumption by an average building in each applicable building sector in 2003: (1) 60 percent in 2010; (2) 70 percent in 2015; (3) 80 percent in 2020; and (4) 90 percent in 2025.

Sustainable Buildings 2030

Minnesota Version of Architecture 2030 Initiative



The commissioner and the Center for Sustainable Building Research shall, in consultation with utilities, builders, developers, building operators, and experts in building design and technology, develop a Sustainable Building 2030 implementation plan that must address, at a minimum, the following issues:

1. training architects to incorporate the performance standards in building design;
2. incorporating the performance standards in utility conservation improvement programs; and
3. developing procedures for ongoing monitoring of energy use in buildings that have adopted the performance standards.

Sustainable Buildings 2030

Minnesota Version of Architecture 2030 Initiative



- These standards will become the energy use requirements for state-bonded projects through the Minnesota Sustainable Building Guidelines (B3).
- “The commissioner shall require utilities to develop and implement conservation improvement programs that are expressly designed to achieve energy efficiency goals consistent with the Sustainable Building 2030 performance standards.”
- A performance standard must not be established or increased absent a conclusive engineering analysis that it is cost-effective based upon established practices used in evaluating utility conservation improvement programs.”

Sustainable Buildings 2030

Minnesota Version of Architecture 2030 Initiative



Project Team

- Center for Sustainable Building Research
- The Weidt Group
- Center for Energy and the Environment
- LHB Inc.
- Herzog Wheeler and Associates

Sustainable Buildings 2030

Minnesota Version of Architecture 2030 Initiative



Program Elements

- Set 2030 Benchmarks for Minnesota Buildings
- Assist in Development of Utility Incentive Programs
- Develop a Case Study Database
- Track Building Performance in a Database
- Develop Knowledge Base
- Assess Needs and Deliver Training Program for Design Professionals
- Assess Needs and Deliver Training Program for Building Operators