National Conference

Sustainability for Community Colleges

Lane Community College

Rusty Stephens, Ed.D.

President

Wilson Community College

Sustainability

Community Colleges at the Heart Center:

An Essay

Download Slides

- 8:00 a.m. 4/22 – 5:00 p.m. 4/25
- Go to wilsoncc.edu
- Click on Growing Green tab on the top navigation bar.
- Click on the National Conference on Sustainability for Community Colleges Button located on the left hand navigation bar.
- Click on Sustainability: Community Colleges at the Heart Center.

Hello Mom

Thesis

Community Colleges are quintessentially positioned to describe, inform, resource, and lead their communities in a time of unprecedented global paradigm shift *AND* opportunity for fundamental improvement in the human condition.

Correlation

Shift Happens

Correlation

Unprecedented threat is allowing unprecedented new thinking.

Correlation

Sustainability is an idea whose time has come.

Correlation

It is never the who but the what.

Correlation

Denial ain't just a river in Egypt.

Correlation

Because of its inherently new conceptualizations of both individual and universal thought, the arrival of sustainable thinking marks the single greatest opportunity in the history of humankind.

Correlation

Community Colleges have matured and are now the long-term stakeholders and keepers of trust in our communities.

Sustainability is *dead center* in the Mission of the Community College

Correlation

Sustainability is the underpinning for all mission expressions as it becomes the new platform upon which the Community College can re-conceptualize, rethink, reinvent, replant, re-cultivate, re-member, and reinvest itself in its community.

Correlation

It is the Century of Community.

It is the Century of the Community College.

Correlation

Sustainable Governance

Move from the herd to the empowered intelligent group

Correlation

Sustainable leadership is leadership by empowerment

Sustainable leadership is 90 percent followership

Love them and launch them

You are teaching them to leave the nest of the herd and to join the flight of the intelligent group

Correlation

You are not a member of an organization;

You are a vital, creative part of a living, learning, growing, organism.

Correlation

All is energy, there is naught but energy

- Life cycle
- 1,000 mile food supply chain
- Embodied energy

Everything is but two steps from the natural environment

- Milk comes from the store?

Correlation

Multiple tipping points are now discernable:

- Synchronistic world view
- Urgency
- Public awareness/understanding

Correlation

Tipping point…

New technology of energy

- Amount of energy required to power the devices of the new world is plummeting
- At the same time amount of energy from renewables is accelerating

Correlation

In-flight aircraft assembly

- The needed parts will arrive just in time.

Correlation

Perseveration upon separation is killing us.

Correlation

Sharing and cooperation are the survival skills of our species.

Correlation

Sustainability is but metaphor for the greater and underlying crisis of this most extraordinary time: a spiritual crisis.

Where We Have Been

[From Cradle to Cradle – McDonough & Braungart]

Imagine that you have been given the assignment of designing the Industrial Revolution--retrospectively.

With respect to its negative consequences, the assignment would have to read something like this:

Design a system of production that:

- puts billions of pounds of toxic material into the air, water, and soil every year.
- produces some materials so dangerous they will require constant vigilance for future generations.
- results in gigantic amounts of waste.
- puts valuable materials in holes all over the planet where they can never be retrieved.

Design a system of production that: *(continued)*

- requires thousands of complex regulations -- not to keep people and natural systems safe, *but rather to keep them from being poisoned too quickly*.
- creates prosperity by digging up or cutting down natural resources and then burying them or burning them.
- erodes the diversity of species and cultural practices.

Where We Are

Peak Oil

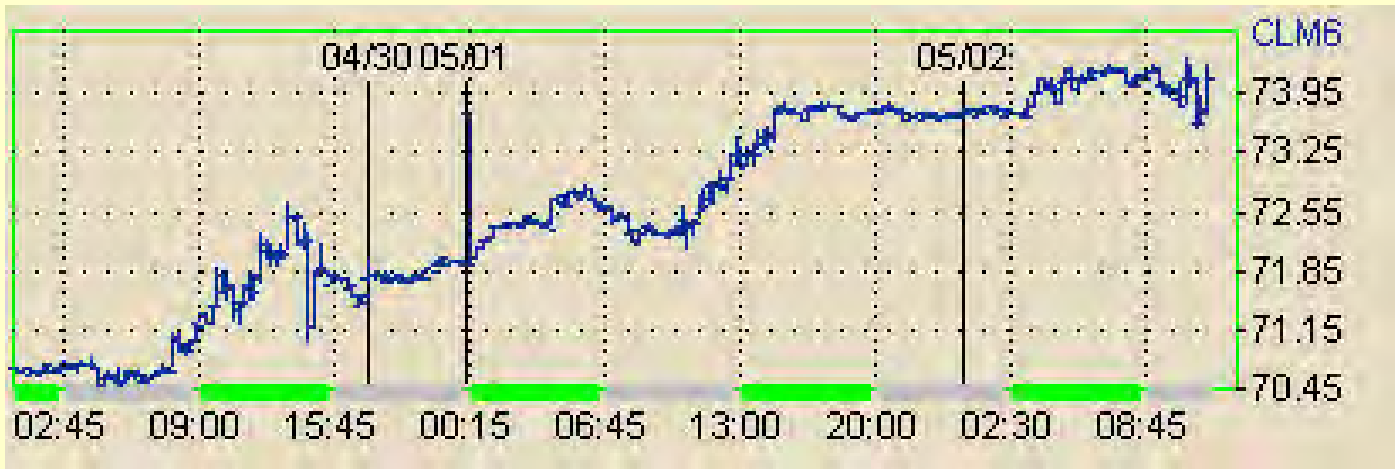
Crude Oil Price History & Future

Source: New York Mercantile Exchange, Inc.

Light Sweet Crude

Date	Price at the Pump	per barrel
5/3/04	$1.79 gal	$38.21
5/2/05	$2.20 gal	$49.50
5/1/06	$2.98 gal	$71.88

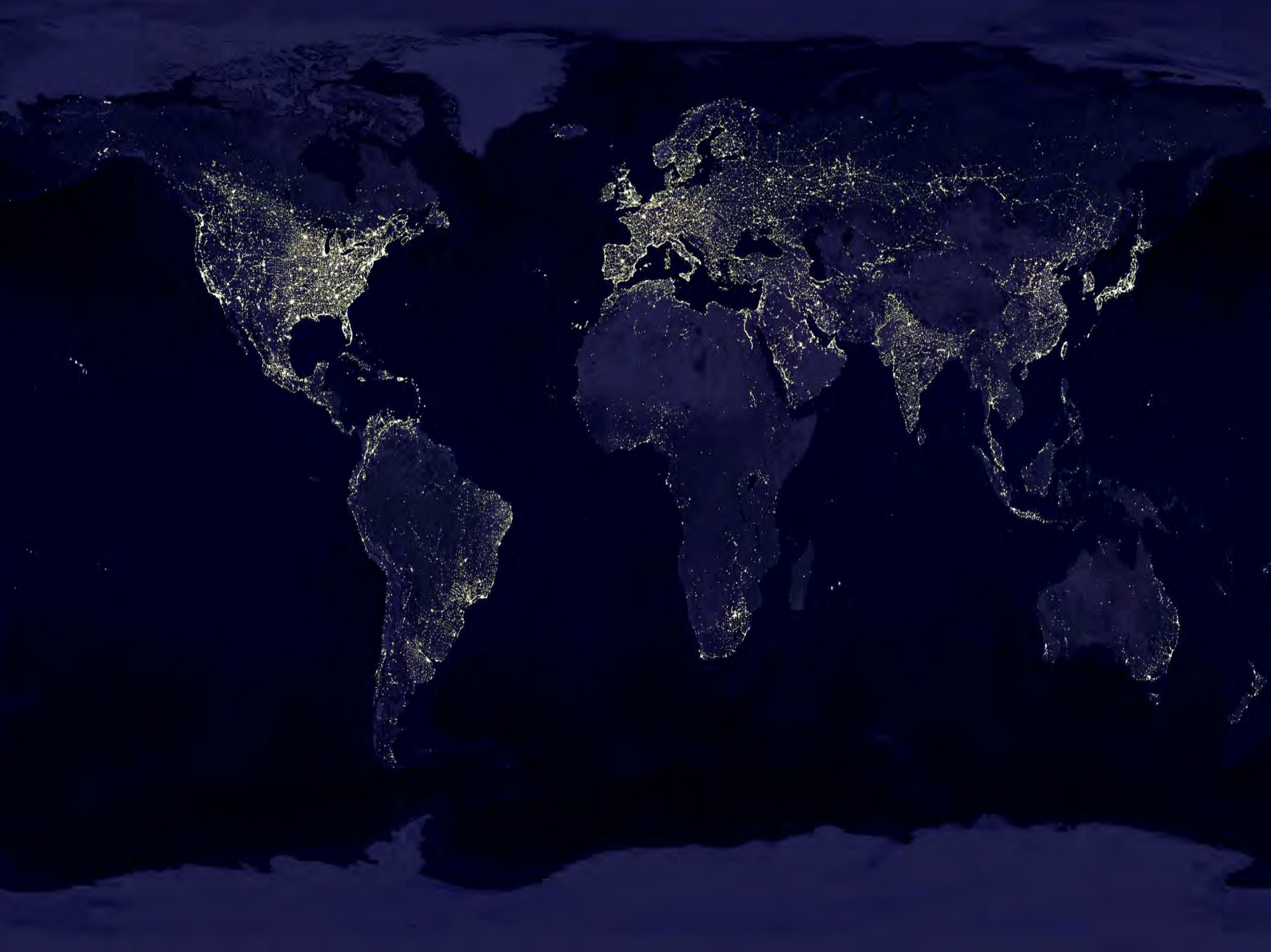
15 Minute Intraday Chart (Delayed Data)



"Would you mind turning your motor off, sir? You're gaining on me."

Peter Arno (11/15/1958)

Return to Main Menu ►




Acid Rain Devastation
Grandfather Mountain, NC

Poisoned Too Quickly

...laboratory tests of 10 American Red Cross umbilical cord blood samples taken from a random sample of American babies in August and September 2004... concluded that these babies averaged **200** contaminants in their blood.

Poisoned Too Quickly

Pharmaceuticals in the nation's drinking water is the focus of a hearing…

[USA Today 4/15/2008]

Humankind has rendered the Earth **Hostile To Life**.

Relentlessly Upbeat

Like Professor Hayes, I am relentlessly upbeat.

To be so one must also be irrationally persistent.

This describes most Community College folks I know.

Where We Are Going?

The post-sustainability revolution…

- Abundant, renewable, zero polluting, distributed (no power poles) and very cheap energy.
- Imagine the possibilities and implications of this for human-kind.
- A future so bright we will all need shades.

Photograph by Michael Nichols

Grand Canyon

National Geographic magazine, January 2006

Photograph by Michael Melford

Glen Canyon Revealed
National Geographic, April 2006

Photograph by Michael Poliza

Visions of Earth
National Geographic, April 2006

How Will We Get There?

The world will not evolve past its current state of crisis by using the same thinking that created the situation.

Albert Einstein

How Will We Get There?

Not the Same Thinking

Sustainability Defined

Sustainable Development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

In a sustainable society, environmental protection and economic objectives belong to a common framework. In a sustainable world, environmental protection, economic objectives, and social justice should be linked in harmony.

The Brundtland Commission

Single Bottom Line

Traditional [initial cost]

Is the cost of any activity less than the gain achieved by or through the activity?

The Financial Bottom Line – Is it Black?

Triple Bottom Line

Sustainable [Full Cost]

Does the activity achieve and contribute to

- ☑ economic prosperity,
- ☑ environmental quality, and
- ☑ social justice?

Sustainability Defined

In our every deliberation, we must consider the impact of our decisions on the next seven generations.

The Great Law of the Iroquois Confederacy

Sustainability Defined

A human being is a part of the whole, called by us "universe", a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest - a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty.

Albert Einstein

Photograph by József L. Szentpéteri

Dragonflies
National Geographic, April 2006

Sustainability Is The Metaphor

The underlying truth is that…

We are so much, much, more than consumers, sports fans, and taxpayers identified and driven by our suicidal perseveration on separation.

Case Study

Sustainable Workforce Development

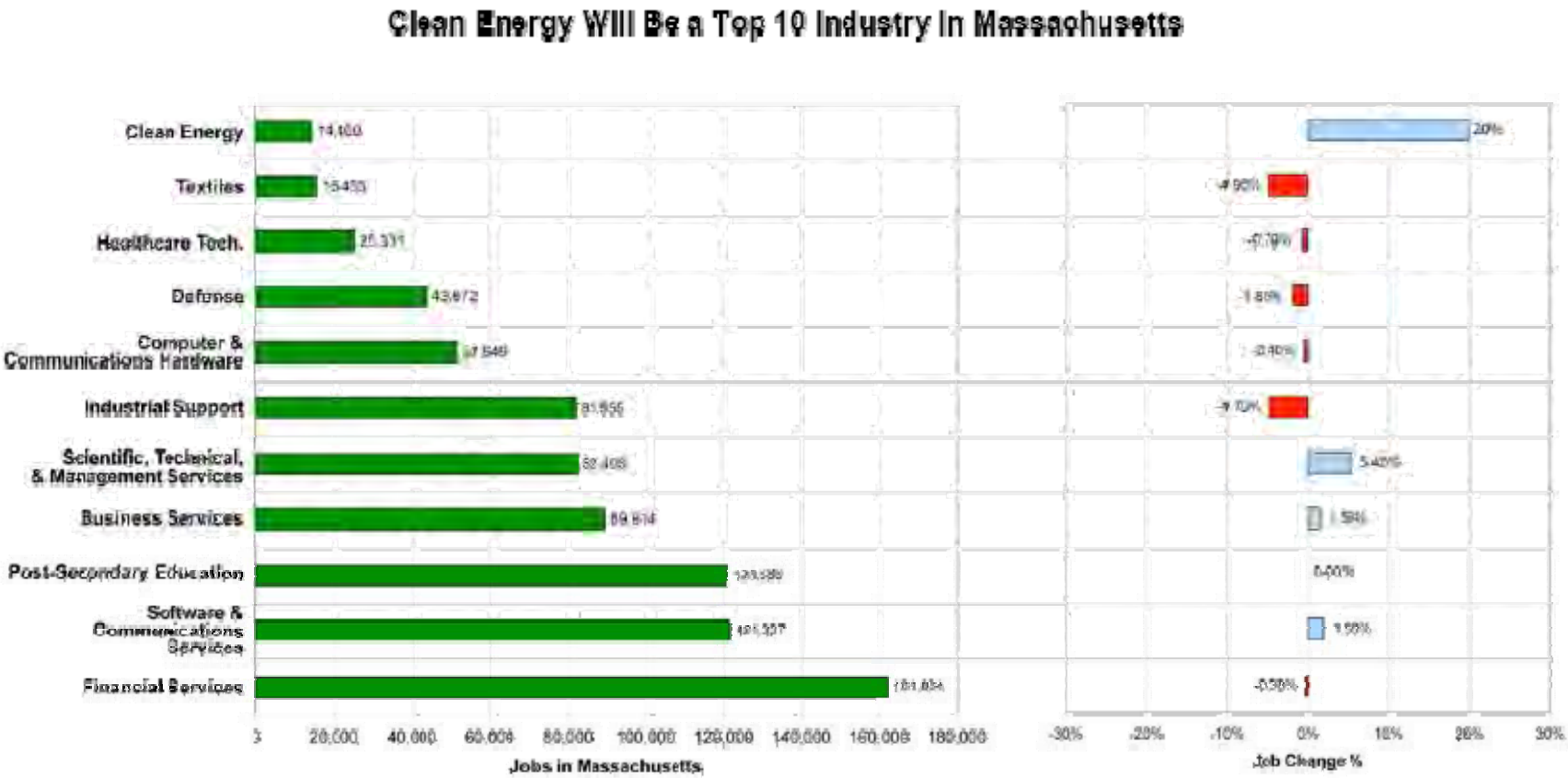
- Massachusetts Clean Energy Industry Census

Massachusetts Clean Energy Industry Census

August 2007

MASSACHUSETTS TECHNOLOGY COLLABORATIVE
RENEWABLE ENERGY TRUST
75 North Drive
Westborough, MA 01581

PREPARED BY:
Global Insight Inc.
24 Hartwell Avenue
Lexington, MA 02421



Source: Massachusetts Clean Energy Industry Census

Case Study

Energy efficiency – the Whale in the room.

Energy Efficiency:

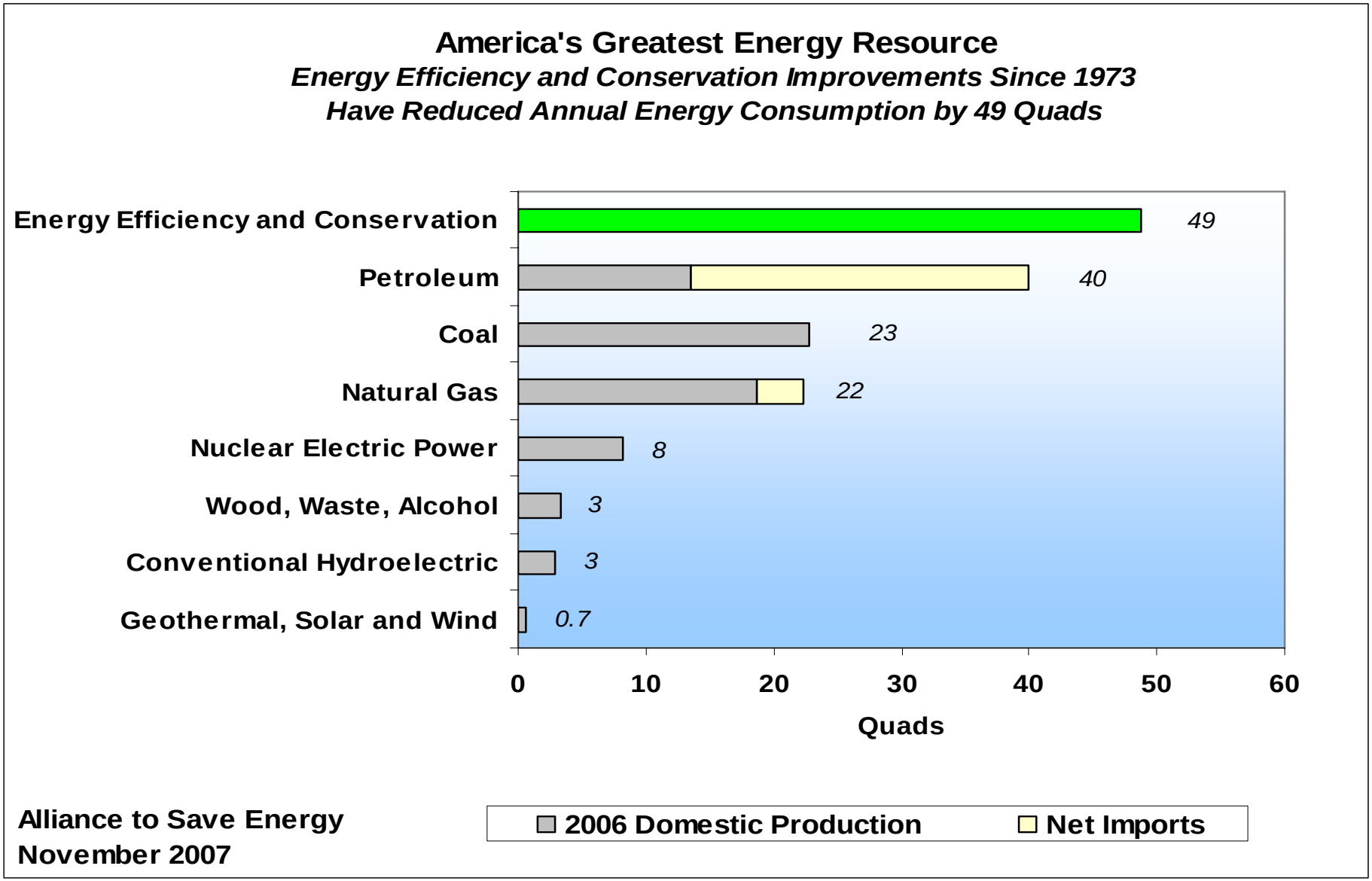
The Cornerstone to A Sustainable World Energy Future

5th Annual North Carolina Sustainable Energy Conference – Our Future Now

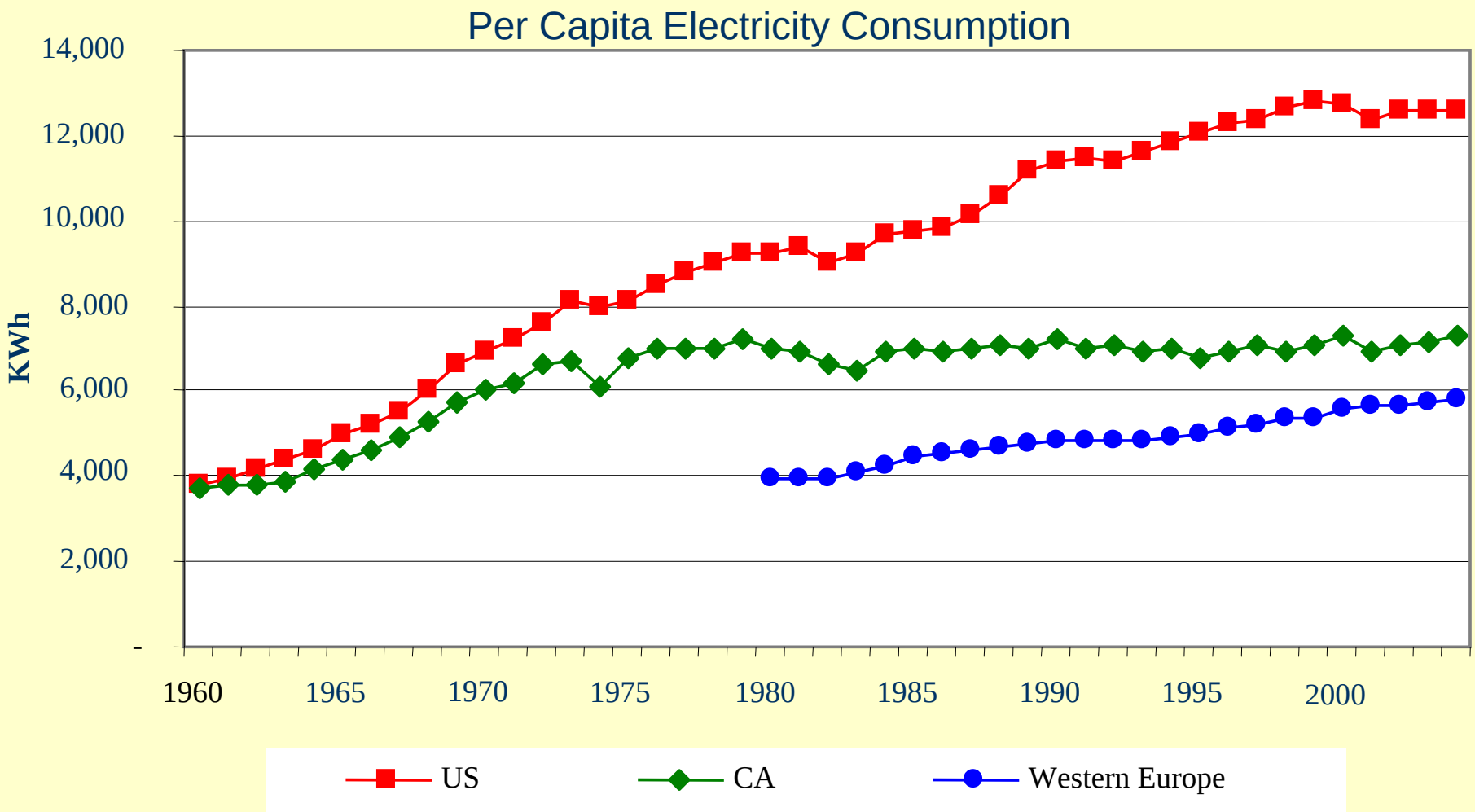
April 8, 2008

Brian T. Castelli, Executive Vice President & Chief Operating Officer
Alliance to Save Energy

Efficiency Is



But More Can & Must Be Done!



Appliance and Equipment Standards

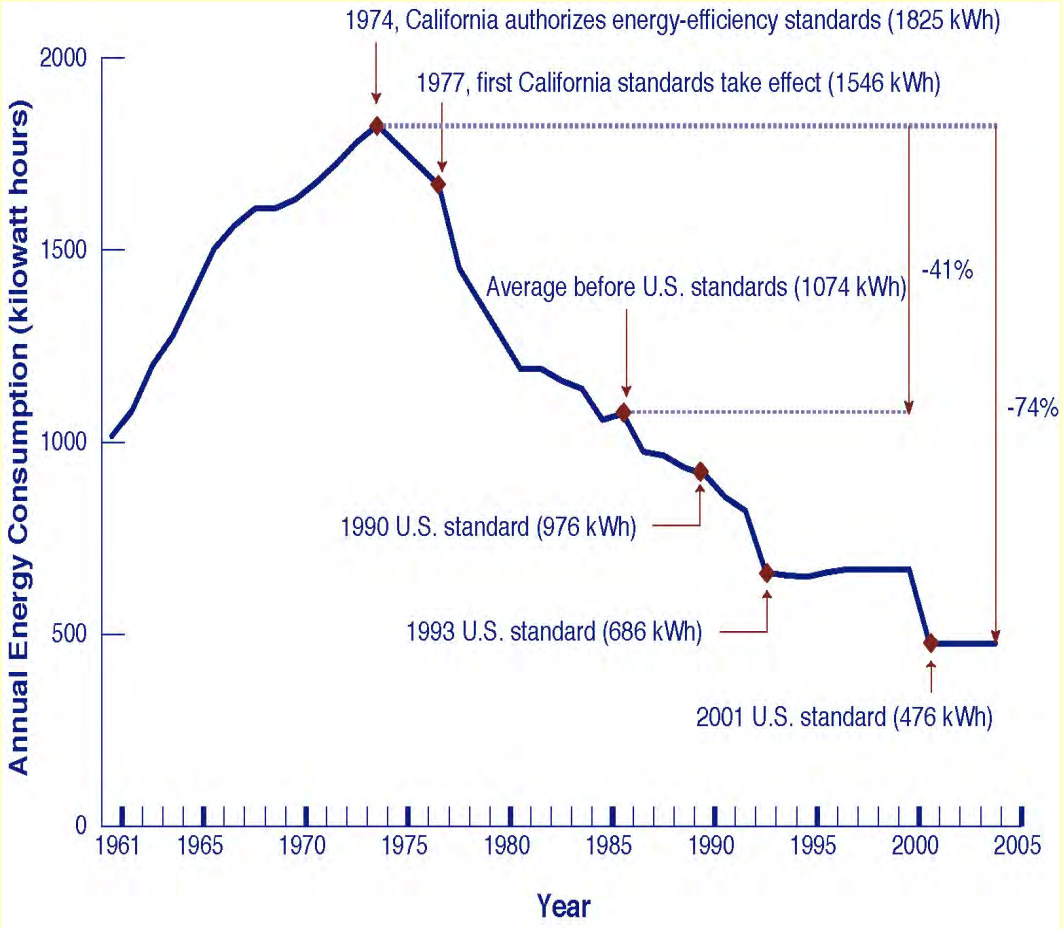
Refrigerators

- **Sets minimum energy performance**
- **Refrigerators sold today use three-fourths less energy than in 1973**
- **Demand reduction = 18 Nuclear Plants**

- **Refrigerator** Price **72-03**
  - Decrease = **64 %**
    - **In 1983 $**

- **Refrigerator** Size **72-03**
  - **17.5 ft3 to 22.5 ft3**
  - Increase = **29 %**

- **Energy** Use **72-03**
  - Decrease = **74 %**



Source: Graphic -- Collaborative Labeling and Appliance Standards Program

Statistics – Art Rosenfeld (CEC) and David Goldstein (NRDC)

Realizing the Potential: A Win for Everyone!

"Our greatest energy resource is the energy we currently waste."

Former U.S. Secretary of Energy
Spencer Abraham

Case Study

THE PROMISE OF SOLID STATE LIGHTING FOR GENERAL ILLUMINATION

- LIGHT EMITTING DIODES (**LEDS**) AND ORGANIC LIGHT EMITTING DIODES (OLEDS)

OPTOELECTRONICS INDUSTRY DEVELOPMENT ASSOCIATION
AND
– U.S. Department of Energy
2001

Not the Same Thinking

Executive Summary:

The potential benefits of solid state lighting (SSL) are enormous.

1. It is estimated that by *2025* SSL could reduce the global amount of electricity used for lighting by 50%; no other electricity consumer has such a large energy-savings potential.

Not the Same Thinking

Executive Summary:

The potential benefits of solid state lighting (SSL) are enormous. (Continued)

2.Most of the electricity comes from burning fossil fuel hence the reduction [sic] energy consumption results in reduced carbon-emission at the level of hundreds of million tons a year.

Not The Same Thinking

Executive Summary:

The potential benefits of solid state lighting (SSL) are enormous. (Continued)

3. The cumulative savings potential in the US alone over *2000 - 2020* could amount to:
   - Saving 16.6 Quads (760 GW) of electrical energy
   - Eliminating 258 million metric tons of carbon emission
   - Alleviating the need of 133 new power stations (1000 MW each)
   - Cumulative financial savings of $115 Billion (1998 dollars).

Not the Same Thinking

Executive Summary:

The potential benefits of solid state lighting (SSL) are enormous. (Continued)

4. And finally, SSL represents a new lighting paradigm that will create a new lighting industry of over $50 Billion/year worldwide.

Rocky Mountain Institute

- **Household CO2 Savings—Lighting Measures**

  Residential, commercial, industrial, and municipal lighting uses about 22 percent of all the electricity generated in the United States, and accounts for thirty-nine million tons of carbon dioxide emissions. RMI estimates that the technology already exists to cost-effectively save 50–90 percent of the power now consumed by lights in the United States. That would save $30 billion a year— enough electricity to retire 70 to 120 large power plants —and reduce carbon-dioxide emissions by twenty to thirty-five million tons per year.

  An incandescent light bulb costs seventy-five cents or less at the store, but it will typically cost six to ten times that for electricity over its relatively short (750-hour) life. This is because incandescent lights put out more heat than light. In fact, 90 percent of the electricity that runs an incandescent is lost to heat.

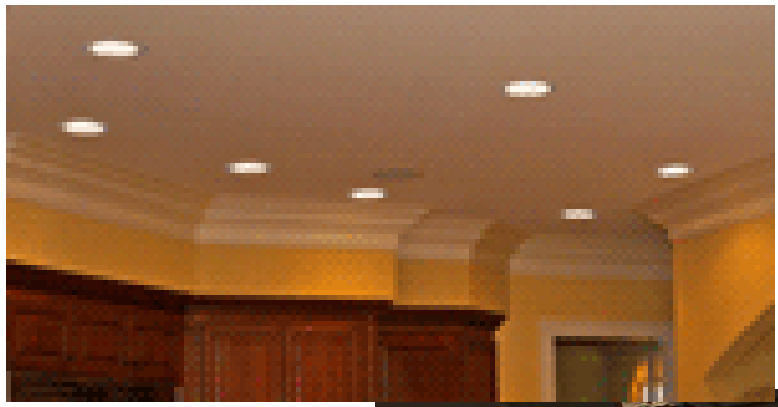
  Compact fluorescent bulbs are four times more efficient than incandescents, and last nine to thirteen times as long. They cost more up-front, but not over the long term.

LEDs in Real World Applications
HAPPENING NOW!

CREE LED Light

Indoor & Outdoor Applications

- Recessed Can Lights
- Chandeliers
- Pendants
- Ceiling Fan Lighting
- Carriage Lights
- Globe Lights
- Signs - Forward Illumination



CREE LED Light

Retail Display Lighting

- **High-end Retail**
  - **“High-tech” look; interesting effects; design flexibility**
- **Cosmetics**
  - **Lack of radiated heat from source**
- **Jewelry**
  - **Sparkling appearance form point light source**
- **Refrigerated display cases**
  - **Efficiency at low temperatures; rapid start up; long lifetime; no Hg**

CREE LED Light

Commercial Indoor - Recessed Down Lighting

- Incandescent
  - 65W BR30
  - 5135W Total

- LED Light Fixture
  - 12W LR6
  - 948W Total

LLF Light Reinvented.

CREE LED Light

Today's Outdoor LED Luminaires

Parking Lots

Courtesy of Ruud Lighting/Beta LED

140W LED vs. 300W HPS Comparison

Street Lights - Torraca, Italy

Courtesy of Elettronica Gelbison, SRL

530 Luminaires Installed, 75% Power Savings

www.ledworkplace.org

LED Workplace™

LED Workplaces | Q & A | Press Room

LED Lighting Comes to Today's Workplace

LED lighting is ready for office buildings, factories, schools, hospitals – almost every place that people work.

This website shows how Cree is converting its indoor and outdoor lighting to LEDs. The site also provides examples of how other workplaces are joining the LED Lighting Revolution.

View *CREE's* Campus Plan

View *OTHER* Workplaces

CREE LED Light

LEDCITY

CREE LED Light

Socket LED will obsolete the CFL

REPLACE ONE INCANDESCENT LIGHTBULB
WITH A COMPACT FLUORESCENT LAMP AND YOU
WILL SAVE THIS 500 POUND PILE OF COAL.

National Geographic, August 2005

Time and Tools

2020

Compost

Time and Tools

2025

Excrement of the Male Bovine

Case Study

Living Laboratories:

Wilson Community College Green Buildings

Green Buildings: New and Used

PEOPLE WHO WORK IN GREEN BUILDINGS:

- Report less illness
- Take less medical leave
- Demonstrate greater efficiency
- Use much less energy.

Dinosaurs to Butterflies

We will not build our way out of this crisis.

All buildings can be retrofitted.

Retrofit Will Be Huge

This recycling of older structures will mean development, manufacture, transportation, installation etc. of every building envelope, electrical device and appliance now on the Earth.

Retrofit

Every roof, every window, every square foot of insulation, every light, every switch, every motor, every control device, every appliance, every plumbing fixture in every structure on the planet. And who will be training the technicians, entrepreneurs, managers, engineers, teachers etc. –

Community Colleges.

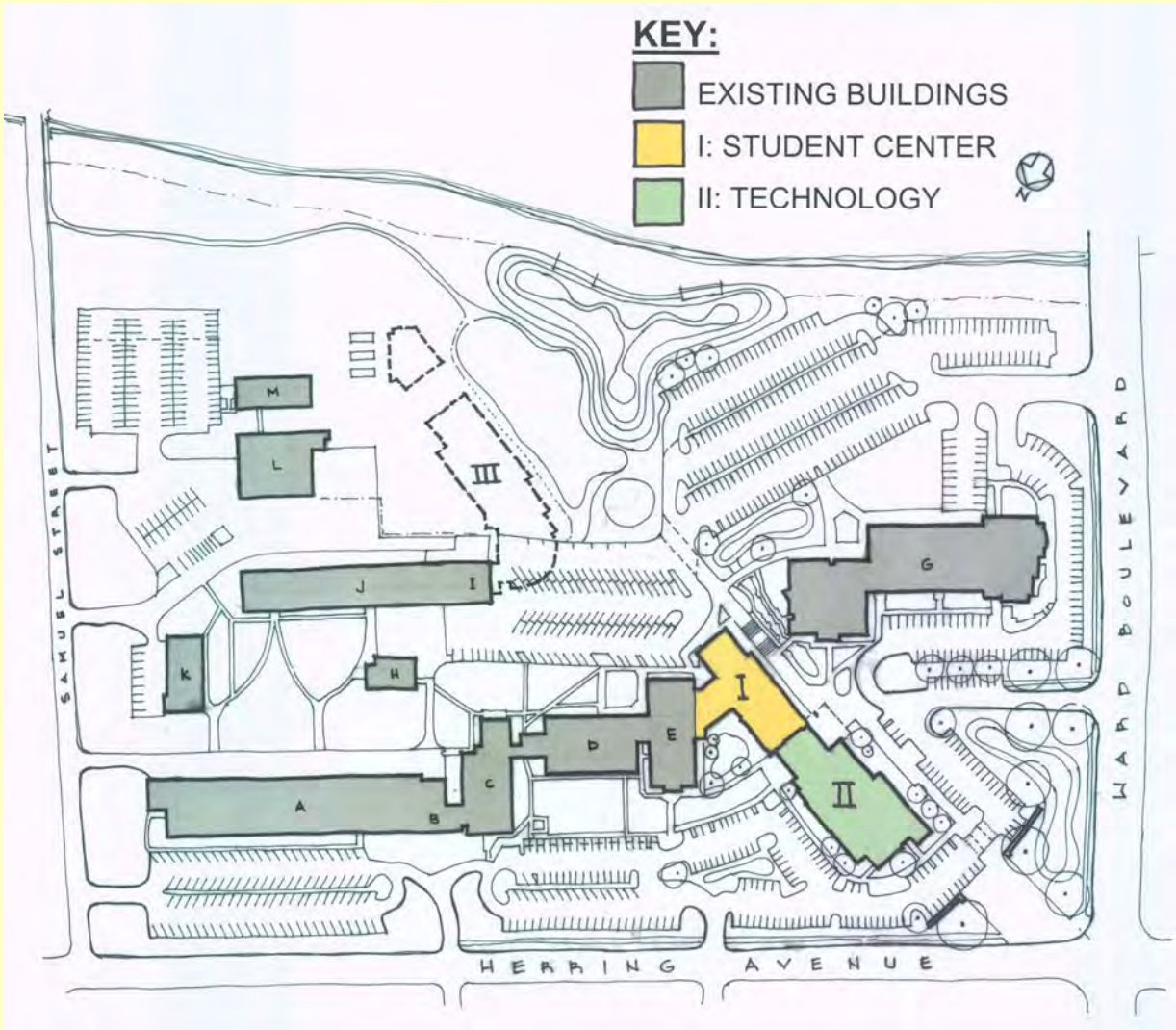
New Building

New Green Buildings over their lifetime will save more money in energy costs than the original construction cost of the building.

They use 60% less energy than a standard building.

And, cost no more to build.

Facilities Phasing Master-Plan



Phase I:

Consolidate Student Services

Retrofit New Classroom in Existing Building

Phase II:

Science & Technology Building:

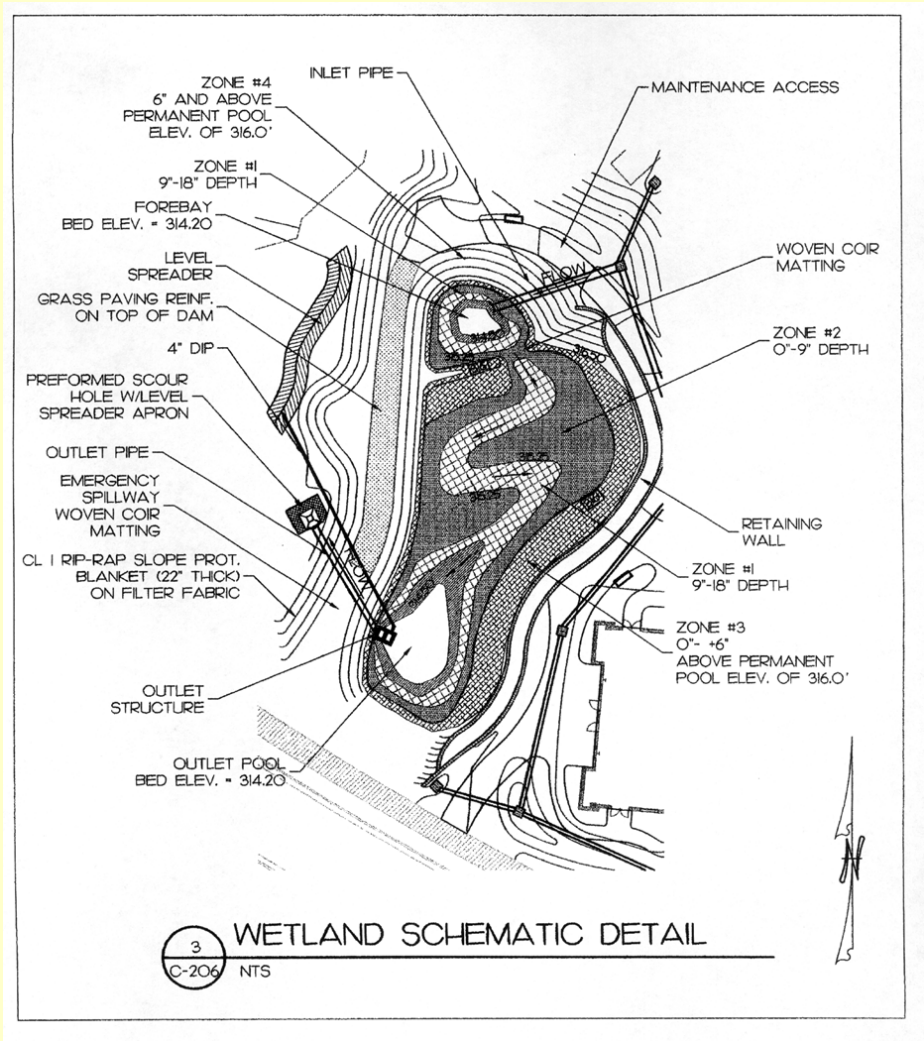
- Information Technology
- Sustainable Energy
- Sustainable Design
- Allied Health
- Business Incubators
- Flexible Space

Stormwater Wetland

Best Means of
Removing Pollution

Model for Others to Emulate

Educational Demonstration
of Management Techniques
that Incorporate Water,
Landform, Species Diversity,
and the Nature of
Succession to Build for a
Benefit to the Environment



LEED Gold

Student Center/Green Building Laboratory

Architect: **Williard Ferm Architects, PA**

General Contractor: **Macallan Construction**

Project is registered with the US Green Building Council and expected to achieve a LEED® Gold Rating

Student Center/Green Building Laboratory

Project Sustainable Strategies

Site
Habitat restoration of a previously developed site

Shaded paving to reduce heat island effect

Low maintenance, drought-resistant native landscaping

East-west building orientation to maximize daylighting

Preferred parking for fuel-efficient vehicles and carpools

Water Efficiency
Dual flush toilets and waterless urinals to reduce water consumption

Rainwater recycling system

Energy
High efficiency direct exchange geothermal heat pump mechanical system

HVAC systems commissioning

HVAC systems use no ozone depleting refrigerants

Superinsulated, energy star, high albedo, low-E roof system

Solar hot water heating

Low-E windows

Light shelves to enhance daylighting

Photovoltaic renewable energy system

Materials
Construction material recycling during building construction

Construction materials containing recycled and recyclable content

Regional construction materials

Locally manufactured brick and block masonry

FSC certified wood

Indoor Environmental Quality
Views to outdoors for 95% of all regularly occupied interior spaces

Daylighting for 75% of all regularly occupied interior spaces

Low VOC adhesives, sealants, paints, and carpet

Interior woodwork contains no urea-formaldehyde resins

Operable windows for natural ventilation

Glazed interior partitions to provide interior work spaces with natural light and views to outdoors

Photovoltaic Panels

Figure 3. 24 In this solar house in Oxford, UK, a 4 kWp grid-linked array of monocrystalline PV modules forms an integral part of the roof, alongside solar water heating panels. The PV array supplies the house's annual electricity requirements, plus a small surplus used to provide some of the power for a small electric car

Wind Energy:
Micro Turbines Integrated into Architecture

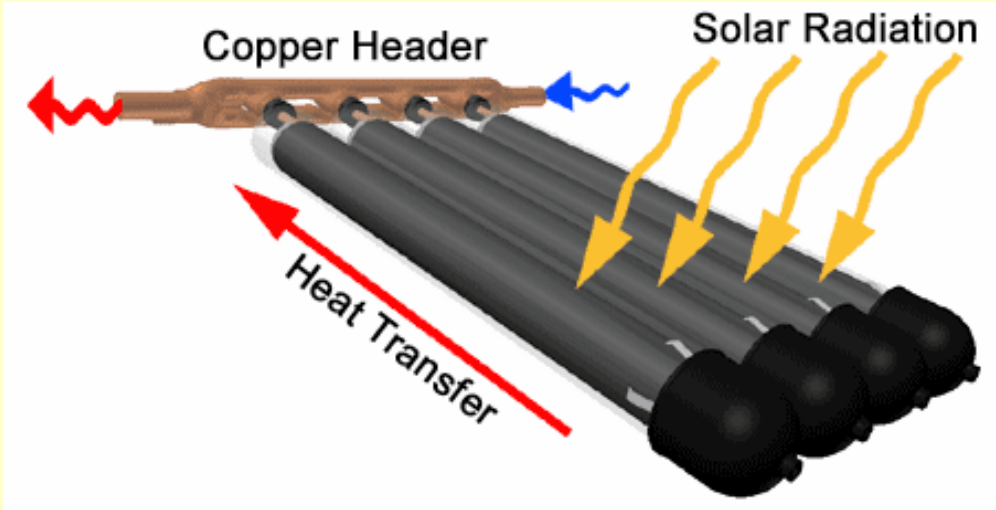
Figure 7.1 The 70 watt rated Marlec 'Rutland Wind Charger'. Many thousands of small wind turbines like these are in use world-wide

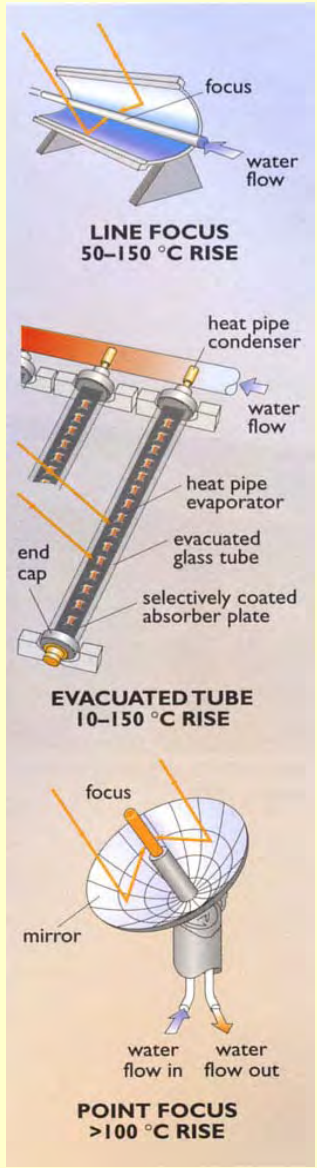
Electric Meters Turn Both Ways

Waterless Urinals

Each urinal saves 40,000 gallons of water per year.

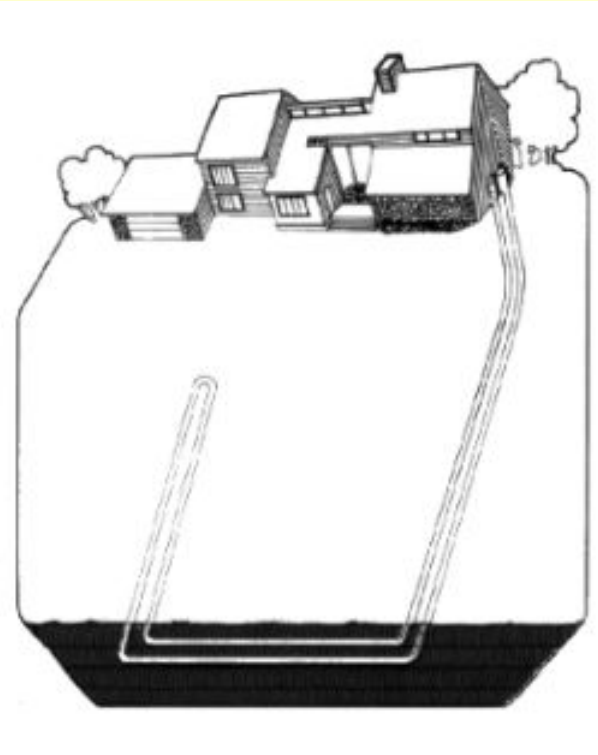
Solar Energy: New Evacuated Tube Solar Collectors



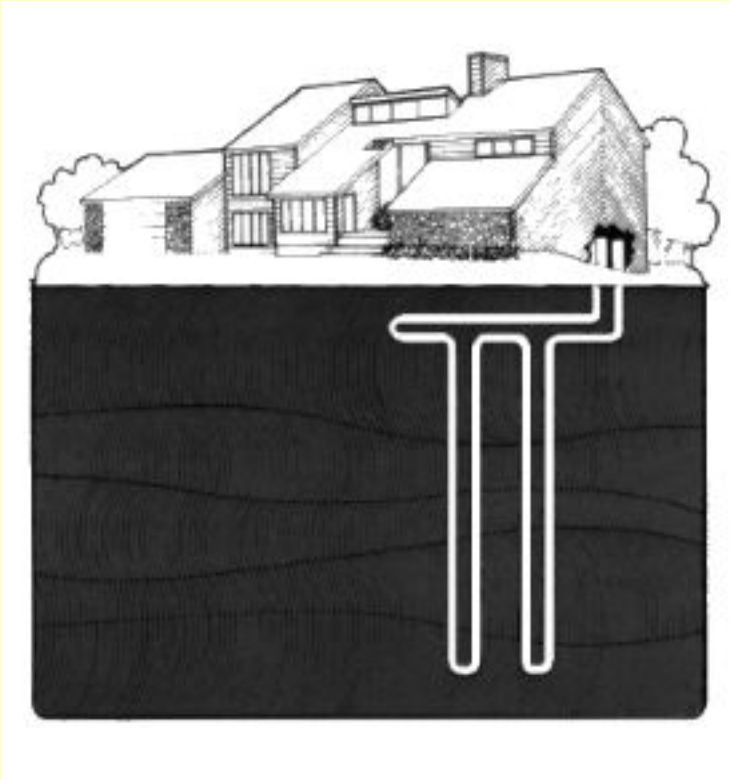


Intended for Heat, Hot Water and for Solar-Assisted Air-Conditioning Systems

Geo-thermal Systems



Horizontal Closed-Loop System



Vertical Closed-Loop System

Promote Local Agri-Business Fuel Crops and Renewable Building Materials

Building Panels Made from Sorghum

Examples of Fuel Crops:
Agriculture Waste
Corn or Cane Ethanol
Soy Bio-diesel
Hybrid Sweet Potatoes

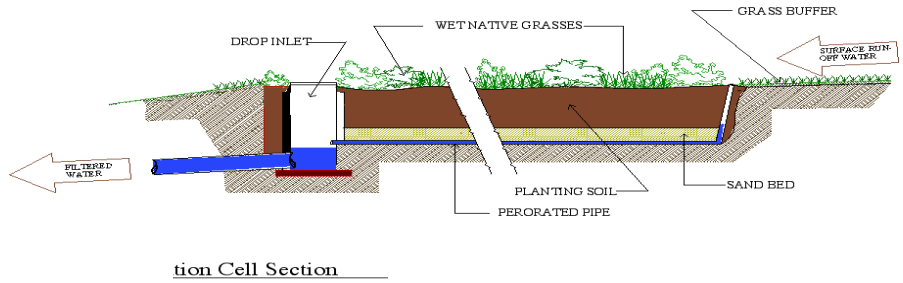
Figure 4.18 Sugar cane

Figure 4.5 Harvesting miscanthus using conventional agricultural machinery

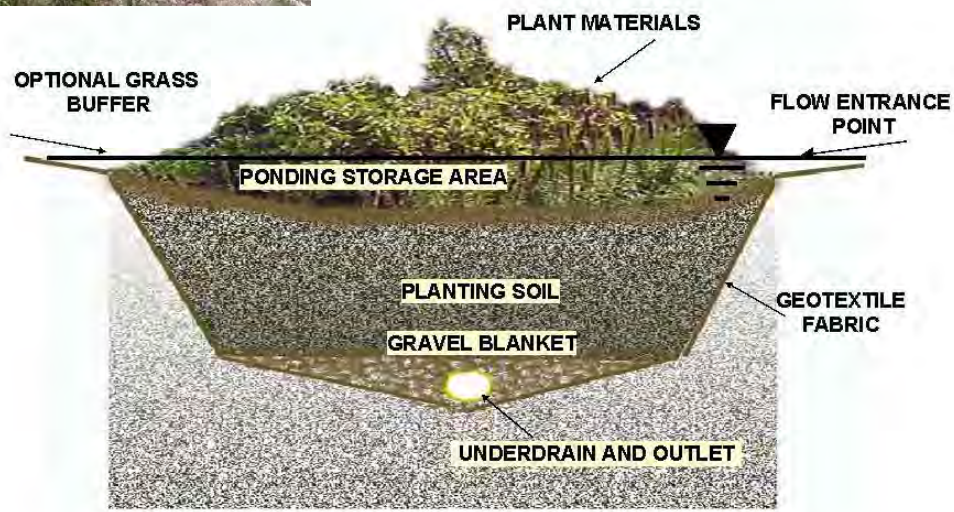
Other Agri-Business Opportunities:

- Wheat Board Building Panels
- Bamboo Panels
- Cotton Insulation
- Wool Insulation
- Certified Lumber

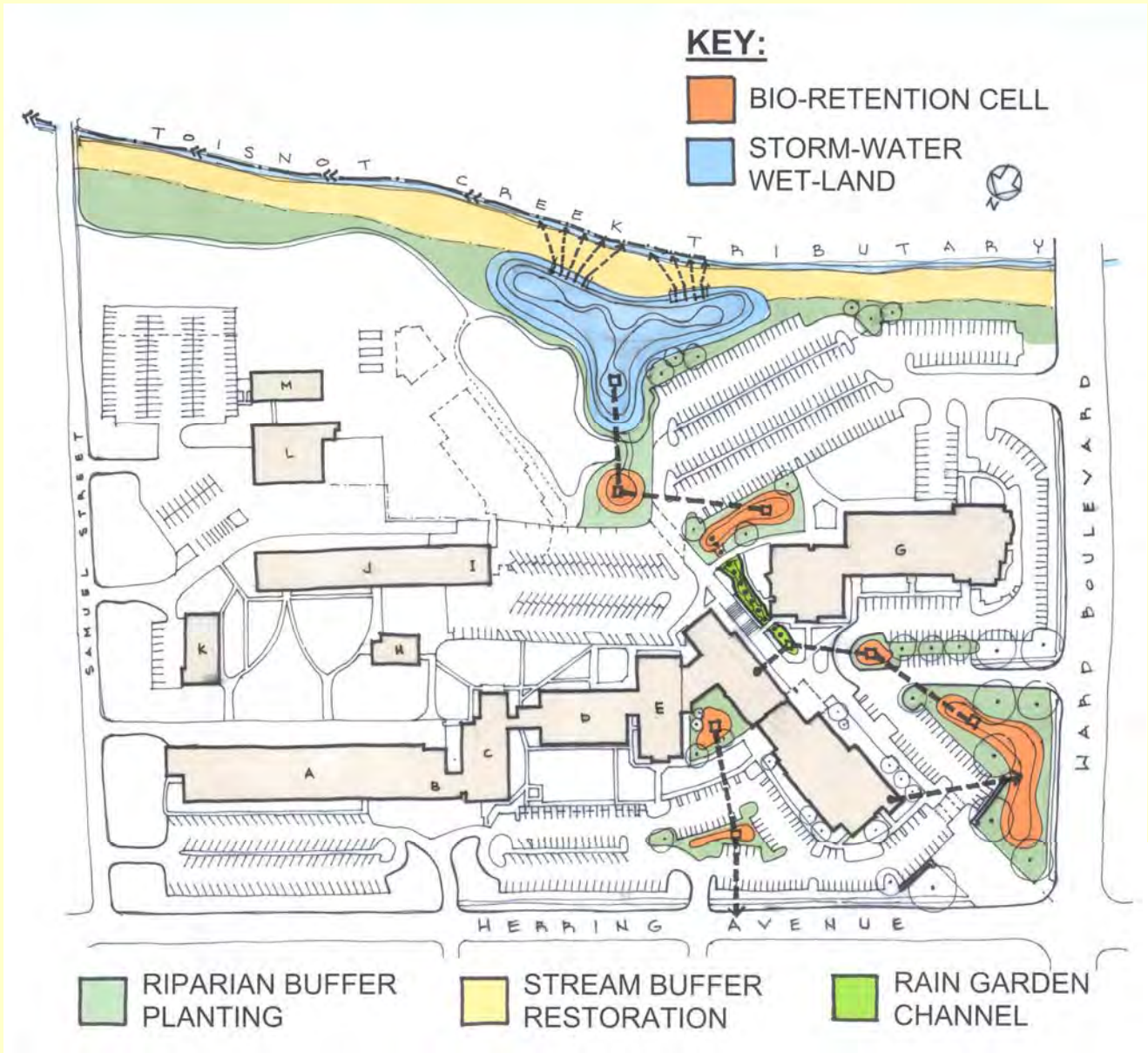
Storm-Water Management Bio-Retention Cell Details



tion Cell Section



Storm-Water Management Plan



Green Roof Demonstration:

Sustainable Site and Energy Concepts

North Carolina - 50 m Wind Resource Map

Transmission Line*
Voltage (kV)

- 115 - 138
- 161
- 230
- 500

* Source: POWERmap, ©2002 Platts, a Division of the McGraw-Hill Companies

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed [a] at 50 m m/s	Wind Speed [a] at 50 m mph
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	> 800	> 8.8	> 19.7

[a] Wind speeds are based on a Weibull k value of 2.0

40 0 40 80 120 160 Kilometers
25 0 25 50 75 100 Miles

The annual wind power estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. It has been validated with available surface data by NREL and wind energy meteorological consultants.

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

09-JAN-2003 1.1.2

Weather Station

Helical Wind Turbine

Resources:

Recommended Readings

Bibliography

- Collapse: How Societies Choose To Fail Or Succeed. Jared Diamond. 2005. Penguin Books. Diamond explores how humankind's use and abuse of the environment reveal the truth behind the world's great collapses.
- Cradle to Cradle. William McDonough & Michael Braungart. 2002. North Point Press. McDonough and Braungart explain how products can be designed from the outset so that, after their useful lives, they will provide nourishment for something new.
- Deep Economy: The Wealth of Communities and the Durable Future. Bill McKibben. 2007. Times Books. Henry Holt and Company, LLC. A new way to think about things we buy, food we eat, energy we use, and the money that pays for it all.
- Mid-Course Correction. Ray C. Anderson. 1998. Chelsea Green Publishing Company. Business book about the environment that is written from a personal perspective.
- Natural Capitalism: Creating The Next Industrial Revolution. Paul Hawken, Amory Lovins, L. Hunter Lovins. 1999. Back Bay Books/Little, Brown and Company. This book reveals how tomorrow's most successful global businesses will draw profit from their own environmental responsibility.

Bibliography (Continued)

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- Science Magazine's State of the Planet 2006-2007. Donald Kennedy and the Editors of *Science*. Island Press. 2006. Brings together leading environmental scientists and researchers to give readers a comprehensive yet accessible overview of current issues.
- The Consumer's Guide to Effective Environmental Choices: Practical Advice From The Union of Concerned Scientists. Michael Brower, Ph.D. and Warren Leon, Ph.D. Three Rivers Press. 1999. "This guide will help you distinguish the crucial from the trivial and make choices that are congruent with your values." by Denis Hayes, Chair, Earth Day 2000.
- The Ecology of Commerce: A Declaration of Sustainability. Paul Hawken. Harper Collins Publishers. 1993. Ecological analysis of business.
- The End of Oil: On the Edge of a Perilous New World. Paul Roberts. Houghton Mifflin, 2004. The New York Review of Books calls this book "the best single book ever produced about our energy economy and its environmental implications."

Association for the Advancement of Sustainability in Higher Education

- **AASHE, the Association for the Advancement of Sustainability in Higher Education, is a member organization of colleges and universities in the U.S. and Canada working to create a sustainable future. Our mission is to promote sustainability in all sectors of higher education - from governance and operations to curriculum and outreach - through education, communication, research and professional development. We work in partnership with businesses, nonprofit organizations and government agencies that support our mission.**

- **http://www.aashe.org/lists/lists.php**

Higher Education Associations Sustainability Consortium - HEASC

Tell staff on your campus about www.heasc.net and www.presidentsclimatecommitment.org

- Shared professional development,
- Shared publications,
- Sustainable practices and policies in offices and for conferences
- Informing the public about higher education's commitment to sustainability
- Sustainability in Many Job Descriptions

Disciplinary Associations Network for Sustainability – DANS

www.aashe.org/dans

- American Psychological Association
- Sociology
- Religion
- Philosophy
- Math
- Broadcasting
- Architecture
- Engineering (civil, mechanical, eng. ed.)
- Ecological Economics
- Chemistry
- Biology
- American Association for the Advancement of Science
- Computer Research
- Humanities
- Women's Studies
- Political Science
- Anthropology
- More…Tell your professors

DANS – Infusing s.d. into:

1. Curricula – working on real world solutions as part of general education core and infused throughout the disciplines
2. Promotion and tenure and accreditation
3. Legislative briefings
4. Informing the public
5. Cross-disciplinary approaches
6. Professional identity as an academic

Offer professional development in sustainability curricula infusion to your faculty!

(e.g. Houston, Maricopa, Miami Dade, SUNYs, ICCD at Cornell)

What does a sustainable society look like?

This Pattern Map offers a visual guide to the building blocks — or "patterns" — that provide a framework for the evolving language of sustainability. We call it a Conservation Economy. Visit www.ConservationEconomy.net for detailed descriptions, case studies, and links related to each of these patterns.

LEARN MORE:

WWW.CONSERVATIONECONOMY.NET

info@conservationeconomy.net

ecotrust

Alliance to Save Energy

website at:

www.ase.org

In Conclusion

Become a student of sustainability.

Reinvent yourself and your Community College.

AND,

***Create the world anew*.**

NAMASTE

I honor the place in you in which the entire Universe dwells,
I honor the place in you which is of Love, of Integrity, of Wisdom and of Peace,
When you are in that place in you, and I am in that place in me, we are One.

Image by: **Stöckli**, Nelson, Hasler
Laboratory for Atmospheres
Goddard Space Flight Center
http://rsd.gsfc.nasa.gov/rsd

Hurricane Linda west of Mexico
September 9, 1997 17:45 UTC
Data from: NASA, NOAA, USGS

Download Slides

- **8:00 a.m. 4/22 – 5:00 p.m. 4/25**
- **Go to wilsoncc.edu**
- **Click on Growing Green tab on the top navigation bar.**
- **Click on the National Conference on Sustainability for Community Colleges Button located on the left hand navigation bar.**
- **Click on Sustainability: Community colleges at the heart center.**