NIA
National Insulation Association
www.insulation.org

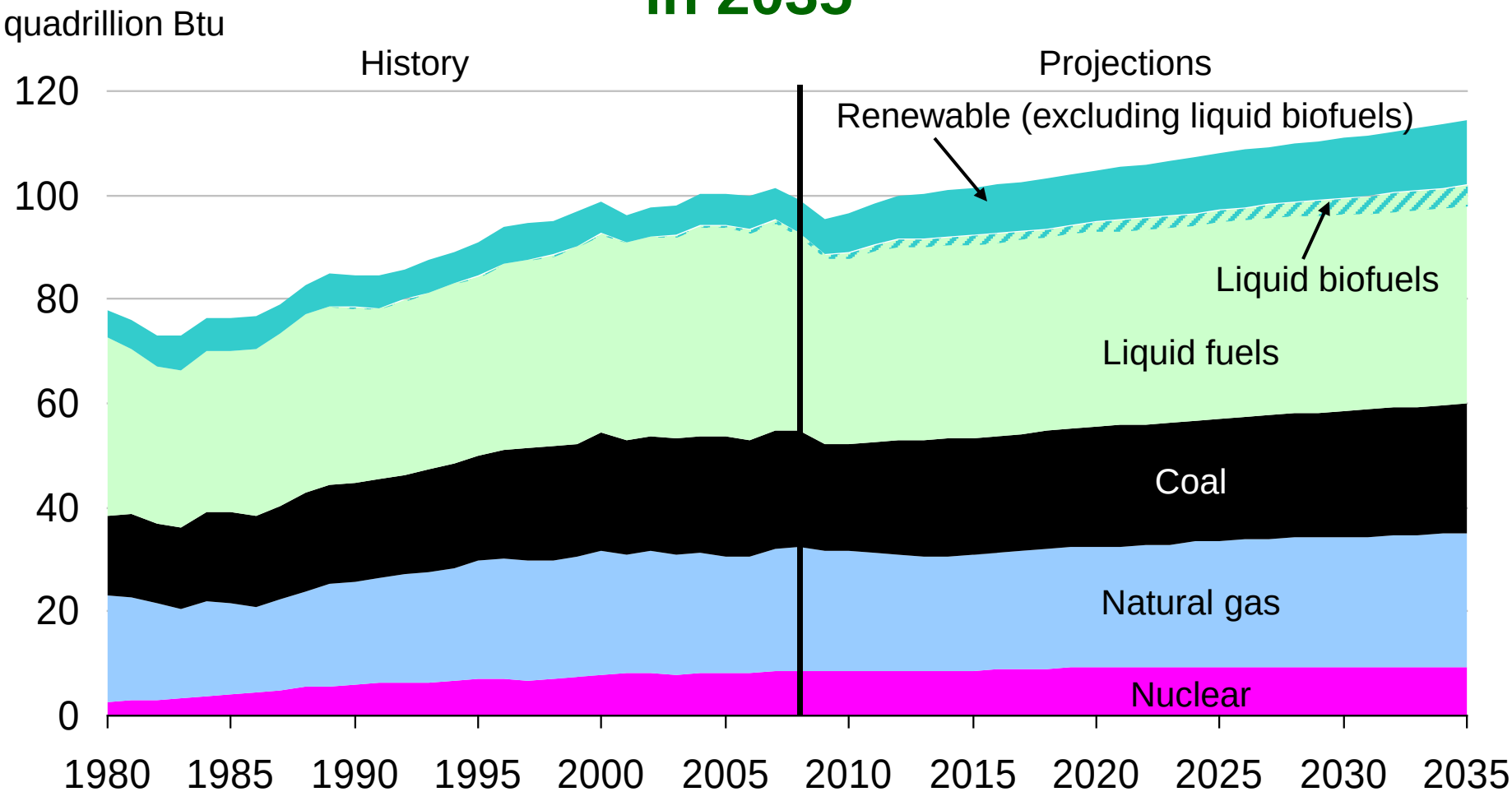
National Insulation Association
NIA
FOUNDATION
For Education, Training and Industry Advancement

FOUNDATION
GOLD-ELITE
JOHNS MANVILLE CORPORATION
KNAUF INSULATION GmbH
OWENS CORNING
PITTSBURGH CORNING CORPORATION
ROXUL, INC.
SPONSORS

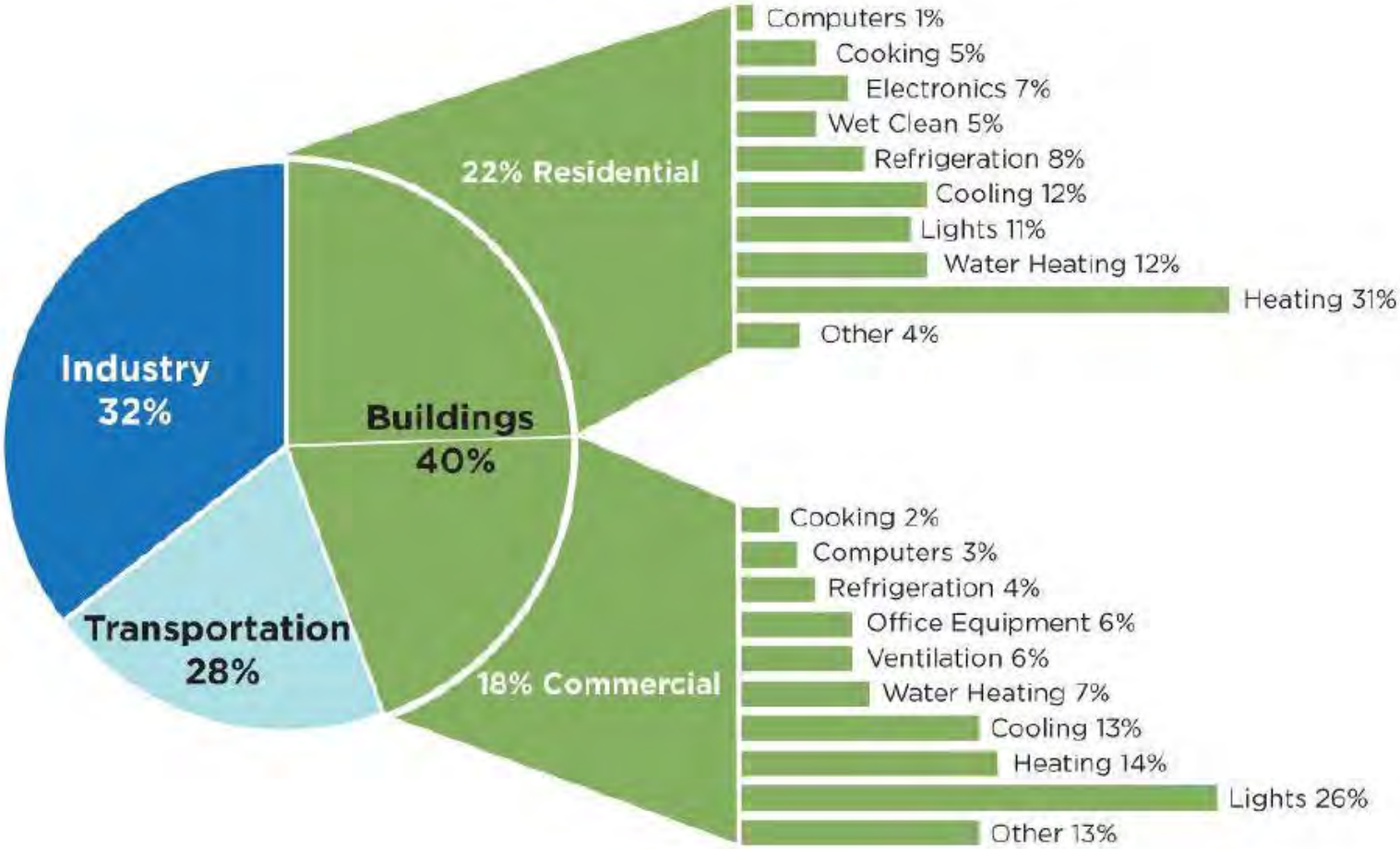
The Power of Insulation

Mechanical Insulation Seminar - Education & Awareness Discussion -

Non-fossil energy use grows rapidly, but fossil fuels still provide 78 percent of total energy use in 2035



Energy Consumption in the U.S.



National Science and Technology Council 2008. *Federal Research and Development Agenda for Net-Zero Energy, High-Performance Green Buildings*.

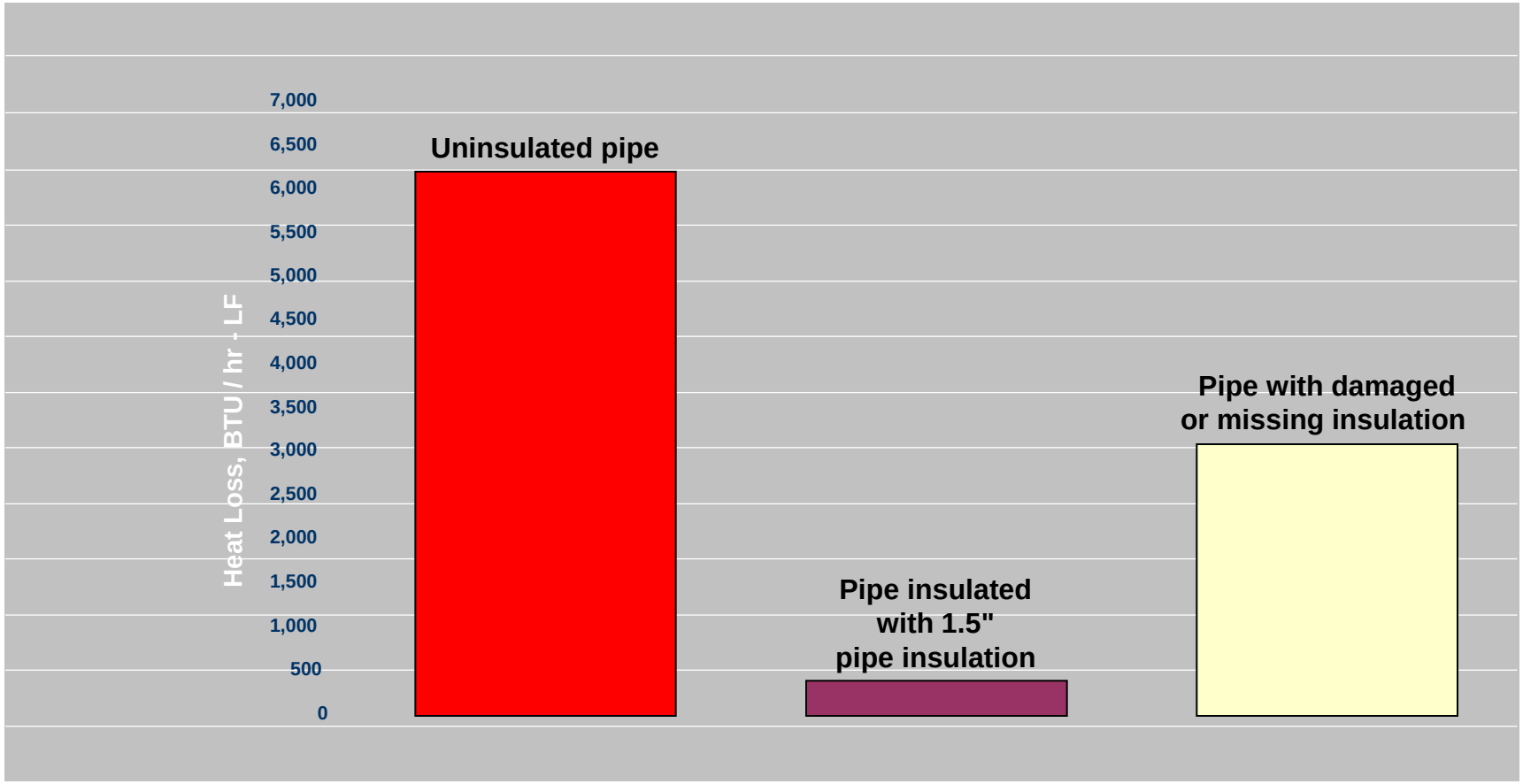
Did you know?

It has been estimated that between 10% & 30% of all mechanical insulation is missing or damaged!

Petroleum Segment– 21% Chemical Segment – 19%

This same characterization applies to basically mechanical insulation in all applications, some greater than others

Oil Refinery Illustrative Example
Heat Loss Analysis



1.87 million lineal feet of insulated pipe, 21% of insulation is missing or damaged, 8” NPS @600 F Operating Temperature with 60 F Ambient Temp. w/ 5 MPH wind and 1 ½ “Mineral Fiber insulation system

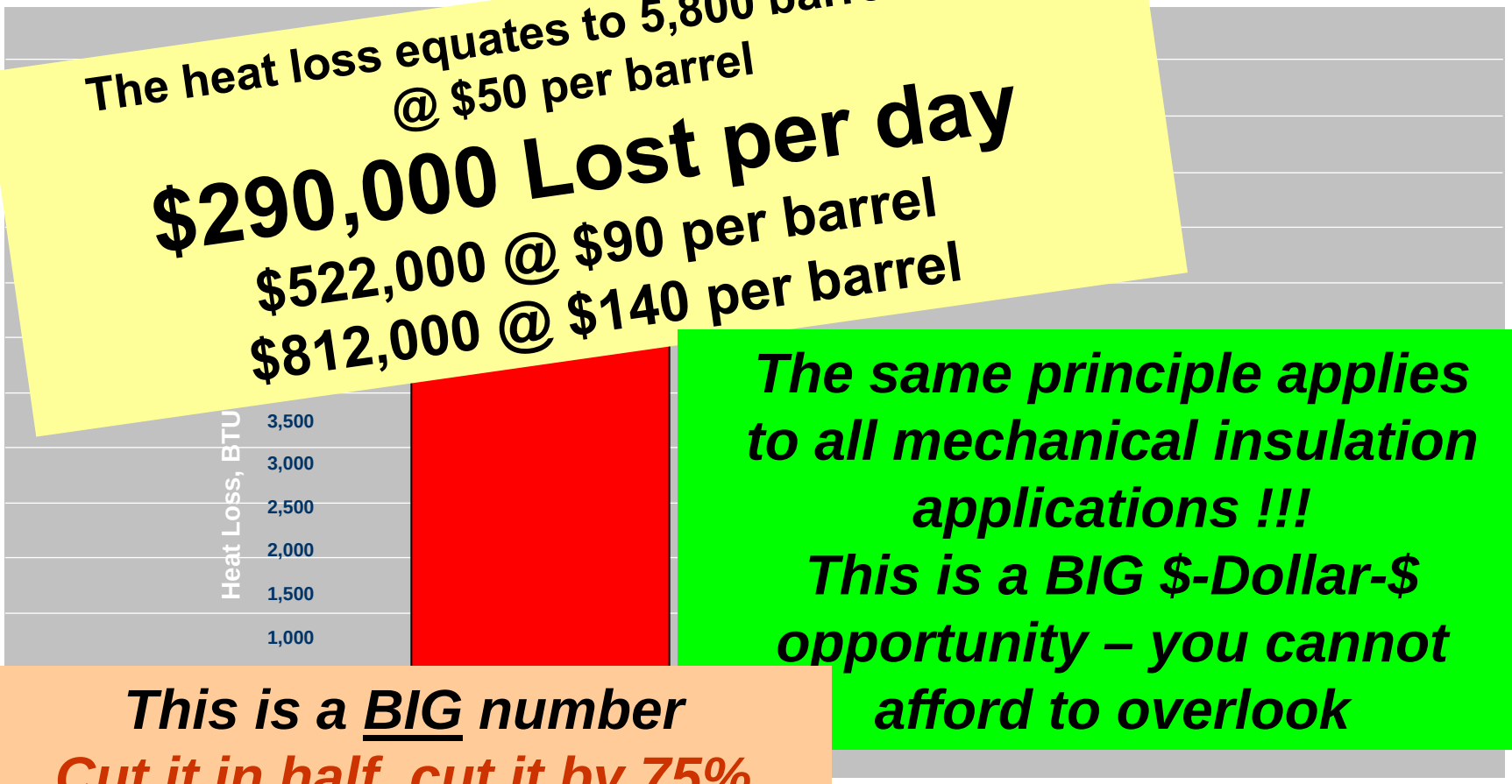
Oil Refinery Illustrative Example
Heat Loss Analysis

The heat loss equates to 5,800 barrels of oil @ $50 per barrel

$290,000 Lost per day

$522,000 @ $90 per barrel

$812,000 @ $140 per barrel



The same principle applies to all mechanical insulation applications !!!
This is a BIG $-Dollar-$ opportunity – you cannot afford to overlook

This is a <u>BIG</u> number
Cut it in half, cut it by 75%
This remains a <u>BIG</u> number

Oil Refinery Illustrative Example
Heat Loss Analysis

The heat loss equates to 5,800 Barrels of Oil
@ $50 per barrel

$290,000 Lost per day

$522,000 @ $90 per barrel
$812,000 @ $140 per barrel

This is one refinery ! – What about the power & process, pulp & paper, petro-chemical, manufacturing, food processing industries, etc?

- **717 Assessments complete** **(January 2, 2009)**
- **180 Public Reports Issued**

  51% have specifically mentioned insulation
- **Total potential annual energy savings & emission reduction for all initiatives**
  - **$937 Million in energy cost savings**
  - **87.2 Trillion BTU natural gas savings**
  - **7.9 Million metric tons potential carbon dioxide – CO_2 emissions reduction**

Assessment References Indicate Mechanical Insulation provides an attractive "Simple" return

Near Term (<1 yr. return) …….82%

Medium Term (<3 yr. return)...15%

Long Term (>3 yr. return) …... 3%

Missing, damaged, or uninsulated ..70%

Upgrade or improve …… 30%

Information determined by NIA from examination of published assessments

SAVE ENERGY NOW

NEAR TERM Insulation Initiatives

BAYER (2 Steam Plants), Institute, WV

By improving and replacing missing insulation on the steam and condensate lines – Potential savings $926,000 per year

BOISE CASCADE (Paper Mill), Jackson, AL

By replacing missing pipe insulation – Estimated savings $80,000 per year, cost to complete the work $25,000 = Payback in 3.2 months

DOW CHEMICAL (Chemical Plant), Hahnville, LA

By replacing, repairing and improving insulation on steam system - Potential savings of $811,000 per year

GENERAL MOTORS (Power Plant), Pontiac, MI

By replacing missing insulation and repair others – Estimated savings of $298,000 per year

SAVE ENERGY NOW

NEAR TERM Insulation Initiatives

GOODYEAR Union City, TN

A significant number of process units are partially insulation

Potential savings = $402,000 per year. Estimated cost to insulate ranges between $80-$200,000 = payback in 2 – 5 months. "This same opportunity can be applied to other company facilities"

MEAD WESTVACO, Silsbee, TX:

Commissioned an "insulation strike team" to go through the plant to repair areas of poor, damaged or missing insulation. They determined that reducing insulation heat loss by 10%, the savings would be over $486,000 per year.

UNITED STATES STEEL, Gary, IN:

Estimated that by using proper type, size and thickness of insulation and improving maintenance of the insulation systems Potential energy savings could be in excess of $1,500,000 per year

SAVE ENERGY NOW

NEAR TERM Insulation Initiatives

MITTAL STEEL, Weirton, WV

Hot water washing tanks are located throughout the facility, 50,000 SF of surface area. The surface temperature of these tanks is 140ºF

Assuming ½ the heat loss can be saved with an inexpensive – simple insulation system, the annual savings would be $371,000 + per year

FRITO-LAY, Frankfort, IN

Adding insulation to bare pipes and fittings –

$150 M estimated cost = annual savings of $80 M

= simple payback of 1.88 years – medium term project

SAVE ENERGY NOW
NEAR TERM Insulation Initiatives

- **Coors Brewery,** Golden, CO
- **Dairyman's Land O' Lakes,** Tulane, CA
- **Foremost Farms,** Richland, WI
- **Leprino Foods,** Lemoore, CA
- **Welsh Foods,** North East, PA

Replace, repair and improve insulation

Associated Milk Producers – Con Agra Foods – Hormel – Imperial Sugar – Kraft

How much energy is being saved or lost with mechanical insulation?

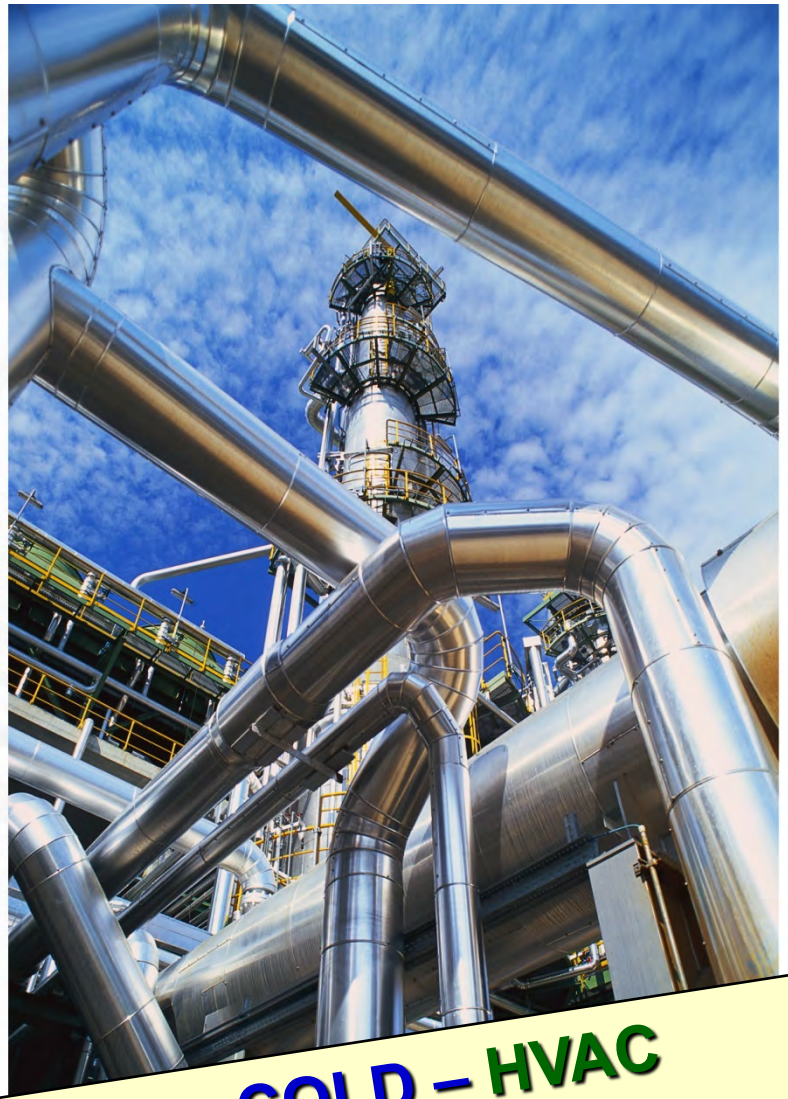
How Big is the Opportunity?

What about Commercial Facilities?

What About Industrial and Manufacturing Facilities?

IT'S BIG!

YET, MECHANICAL INSULATION GETS LITTLE RESPECT!



HOT – COLD – HVAC
IT IS CLEARLY A BIG OPPORTUNITY

Working with the Department of Energy and Oak Ridge National Laboratory, NIA was able to extrapolate the data from the completed assessments for the universe of large and medium size industrial facilities

Facility Size Definition (*)	Number of Facilities
Large > 500 Bbtu/yr	4,014
Medium 26-500 Bbtu/yr	112,398
Small <26 Bbty/yr (Not included within the assessment universe)	84,298
Total	200,710

(*) Number of plants determined from the 2002 Energy Information Administration Manufacturing Energy Consumption Survey (EIA-MECS)

Estimated energy savings, emission reduction and jobs created with improved maintenance and focus on mechanical insulation

A portion of the

Industrial – Maintenance Segment

Plant Size Large Plant >500BBtu/yr Medium Plant 26-500BBtu/yr Small Plant <26BBtu/yr	Energy Savings Billions ($)/year	CO_2 Reduction Billion Lbs/yr	Payback (Months) ROI (*) (20 yrs)	Jobs (*) Created Preserved
Large & Medium	> $ 1.9	> 45.6	12.0 / 103%	12,069
Small (*)	> $ 0.6	> 15.9	9.6 / 135%	2,930
Total	> $ 2.5	> 61.5	11.3 / 109%	14,999
Distribution (*)				1,533
Total	> $ 2.5	> 61.5	11.3 / 109%	16,532

* Estimated by NIA

Estimated energy savings, emission reduction and jobs created with improved maintenance and focus on mechanical insulation

A portion of the

Industrial – Maintenance Segment

Plant Size Large Plant >500BBtu/yr Medium Plant 26-500BBtu/yr Small Plant <26BBtu/yr	Energy Savings Billions ($) /year	CO_2 Reduction Billion Lbs/yr	Payback (Months) ROI (*) (20 yrs)	Jobs (*) Created Preserved
Large & Medium	> $ 1.9	> 45.6	12.0 / 103%	12,069
Small (*)	> $ 0.6	> 15.9	9.6 / 135%	2,930
Total	> $ 2.5	> 61.5	11.3 / 109%	14,999
Public Utility – Power Plants (*) Same as Large Plant >500BBtu/yr	> $ 1.1	> 22.0	17.2 / 73%	10,011
Distribution (*)				2,557
Total	> $ 3.6	> 83.5	13.1 / 95%	27,567

* Estimated by NIA

A simplistic view

Insulation, a better option than a light bulb?

Energy Conservation Option	Energy Savings, MMBtu/yr (1)
1 ft of insulation on 350°F pipe	14.4
1 car, 5% increase in mpg	3.7
1 compact florescent light bulb	0.9
1 ft of insulation on 180°F pipe	0.9
1 ft of insulation on 42°F pipe	0.6
1 tree	n/a

Energy conservation with the use of mechanical insulation -"Low Hanging Fruit" - is simply an OPPORTUNITY that should not be overlooked

It is an investment that may have few rivals from a return perspective.

(1) Equivalent energy savings in Millions of Btu/yr (MMBtu/yr) of primary fuel

National Insulation Association
Insulation Outlook – January 2009

What if insulation regulations were changed and/or thicknesses increased?

Emission Reduction

Capitol Hill Likes Numbers

Energy Dollars Saved

Jobs Created

Pipe Insulation Market Segment "Going Beyond the Minimums"

Service & Product Illustrated	Thickness ASHRAE/ Utilized	Payback (yrs) ROI (20 yrs)	Reduction Energy & CO_2
380°F HP Steam 8" NPS Min. Wool	4" / 5"	6.7 / 17%	13%
250°F LP Steam 3" NPS Fiber Glass	2" / 3"	2.8 / 39%	22%
140°F Hot Water 1" NPS Elastomeric	½" / 1"	3.9 / 29%	32%
42°F Chilled Water 4" NPS Cell. Glass	1½" / 2"	15.0 / 5%	17%
Simple Average		7.1 / 22.5 %	21%

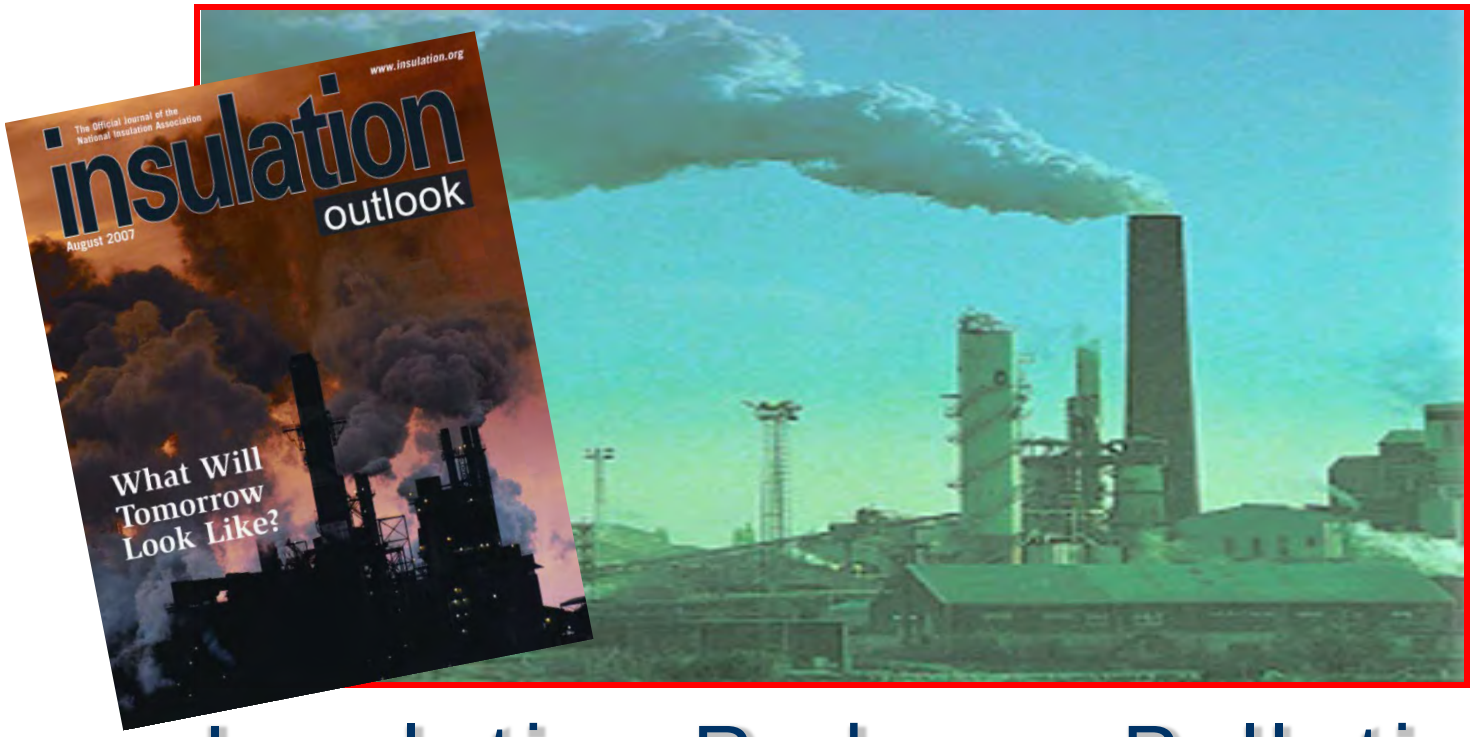
"Estimated" U.S. Pipe Insulation Market 370,000,000 LF

$ 302 Million Energy Savings/yr

3.3 Billion lbs/yr Emission Reduction

2,000 Jobs

Estimated by NIA



Insulation Reduces Polluting Emissions

Insulation reduces plant greenhouse gas emissions by reducing plant energy consumption

CO_2 – NO_2 – Carbon Equivalents (CE)

This is a great example of why we need to think about insulation differently

Insulation, Is "Greener" than Trees

Carbon Reduction Option	Lbs of CO_2 per Year
1 ft of insulation on 350°F pipe	2,308
1 car, 5% increase in mpg	570
1 compact florescent light bulb	130
1 ft of insulation on 180°F pipe	109
1 ft of insulation on 42°F pipe	88
1 tree	50

There is no question!

Insulation CAN HELP Reduce Polluting Emissions and Increase Available Carbon Credits

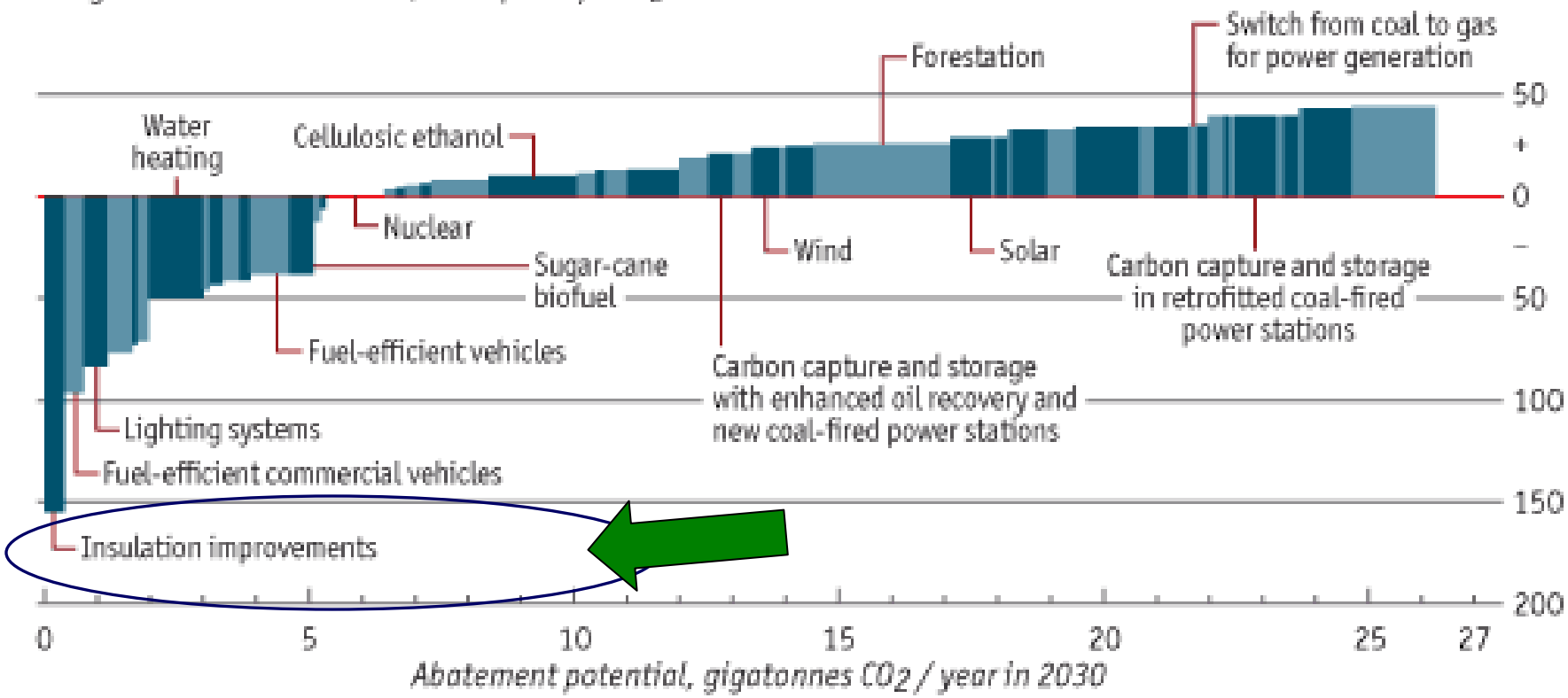
The environment, along with energy conservation, is going to be, if they are not already, center stage in the financial and political arenas for years to come

One credit is considered equivalent to one ton of CO_2 emissions

The cost of cutting carbon in different ways

3

Marginal cost of abatement, examples €/t CO_2



Source: Vattenfall

THE NEED FOR EDUCATIONAL AND AWARENESS PROGRAM AS TO THE "VALUE OF INSULATION"

National Insulation Association
NIA
FOUNDATION
For Education, Training and Industry Advancement

FOUNDATION
GOLD-ELITE
THE DOW CHEMICAL COMPANY
INDUSTRIAL INSULATION GROUP, LLC
JOHNS MANVILLE CORPORATION
KNAUF INSULATION GmbH
OWENS CORNING
PITTSBURGH CORNING CORPORATION
ROXUL, INC.
SPONSORS

OUTREACH INITIATIVE

TO PARTNERS

IN KNOWLEDGE