

The Lisbon Declaration on CO₂ Reductions

**Submission of the Insulation Industry
to the Conference of Contracting Parties
of the UN International
Framework Convention on Climate Change.
Kyoto, December 1997**

Since the Second Assessment Report of the International Panel on Climate Change (IPCC) there can no longer be any real doubt about the impact of greenhouse gas emissions on the global environment. The greenhouse effect, in particular from CO₂ emissions, requires urgent action. Space heating and cooling of buildings in both Western Europe and North America are major contributors to CO₂ emissions.

One of the most efficient and quickly achievable means of cutting CO₂ emissions is to reduce energy use. In the residential and commercial building sector, the most effective energy saving can be accomplished through the use of a readily available energy efficiency technology - thermal insulation. Thermal insulation simply reduces the transfer of heat (and cold) through building structures or envelopes. Thermal insulation not only reduces energy use and therefore CO₂ emissions (see tables hereafter) but in addition the right insulation products also provide thermal comfort, acoustic insulation and fire protection. The same benefits hold true for the industrial/manufacturing sector.

The following tables give an indication of the massive use of energy for space heating and of its corollary, i.e. the massive potential for savings.

Table 1 summarises the energy savings already realised in the United States.

		Energy Use (Million GJ ¹ & Quadrillion Btu)			
		No insulation	Baseline (existing)	Savings	% Savings
Residential	GJ	21,532	10,550	10,982	51%
	Btu	20.41	10.00	10.41	51%
Commercial	GJ	8,662	7,069	1,593	18%
	Btu	8.21	6.70	1.51	18%
Residential & Commercial	GJ	30,194	17,619	12,575	42%
	Btu	28.62	16.70	11.91	42%

(Source: «Green and Competitive: Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products» by Energy Conservation Management, Inc., et al, June 1996.)

Table 2 illustrates the potential for reducing carbon dioxide emissions (CO₂) if all American homes were to be insulated to the Council of American Building Official's 1992 Model Energy Code, a recognised minimum energy efficiency code in the United States.

		Carbon Dioxide Million Tonnes & Billion Pounds	
		Existing	Additional Potential
Residential	Million Tonnes	612	113
	Billion Pounds	1,347	249.2
Commercial	Million Tonnes	96	16.4
	Billion Pounds	211	36.1
Industrial	Million Tonnes	Not calculated	3.7
	Billion Pounds	Not calculated	8.2
TOTAL	Million Tonnes	708	133
	Billion Pounds	1,558	293.5

(Source: «Green and Competitive: Energy, Environmental, and Economic Benefits of Fiber Glass and Mineral Wool Insulation Products» by Energy Conservation Management, Inc., et al, June 1996.)

¹ Millions of Giga Joules, 10¹⁵ J.

Similarly for Europe, households account for a quarter of the CO₂ emissions; with space heating accounting for 60-80% of these emissions. As illustrated in **Table 3**, there is an annual saving potential of approximately 310 million tonnes of heating-related CO₂ emissions in Europe which could be realised by the application of state-of-the-art thermal insulation.

Possible reduction of CO ₂ emissions caused by heating by means of better building insulation					
EURIMA Countries	Actual emissions million t		Possible reduction		
	Total	Heating	Million t	% Total	% Heating
Austria	—	21	10	—	48
Belgium	112	33	22	20	67
Denmark	64	12	3	5	25
Finland	65	12	1	2	8
France	280	55	36	13	65
Germany	743	150	100	13	67
Ireland	27	7	5	18	71
Italy	360	36	18	5	50
Netherlands	167	40	27	16	68
Norway	35	3	1	3	33
Spain	186	27	13	7	50
Sweden	93	20	2	2	10
Switzerland	42	17	11	26	65
Turkey	186	69	17	9	25
UK	542	75	37	7	49
TOTAL	(~3,000)	(~600)	(~310)	(~10)	(~50)

(Source: «Thermal Insulation Means Environmental Protection», Study by the European Insulation Manufacturers Association, EURIMA, 1990.)

If one calculates the potential for improved insulation in the buildings sector alone in Europe and the United States, a reduction of 450 million tonnes of CO₂ is attainable on an annual basis.

Additional emissions reductions can also be realised through the use of thermal insulation in Mexico. According to an assessment of industrial savings from insulation conducted by the Mexican Petroleum Institute, the equivalent of 8 million barrels of oil could be saved annually if Mexican industrial plants were insulated according to the existing Industrial Insulation Code. The net result of effective use of thermal insulation in Mexican industrial facilities would be a 2.6% reduction in the usage of fossil fuels; in turn reducing emissions of contaminant gases by 2 million tonnes per year.

Further significant savings are also evident in the residential and commercial sectors. The Mexican Federation of Engineering Colleges estimated savings in fuel consumption between 5.3 and 13.2 million barrels of oil equivalent, if residential and commercial buildings were insulated as specified in each code as applicable to each building type. This will have the effect of eliminating between 2 and 5 million tonnes of CO₂ emissions into the atmosphere.

Table 4 illustrates projected yearly savings based on recommended energy codes in Mexico.

**Projected Yearly Savings in Energy and CO₂ Emissions
Insulating as per Codes Recommended Practices**

	Barrels of Oil Eq.	Tonnes of CO ₂
Industry ¹	8,080,471	2,000,000
Buildings (Best Case) ²	13,230,288	5,000,000
Buildings (Worst Case) ²	5,267,201	2,000,000

(Source: ¹ Industrial Insulation Code based on an assessment by the Mexican Petroleum Institute; ² Commercial and Residential Codes as proposed and supported by an assessment by the Federation of Engineering Colleges.)

In Australia, households account for 16% of all CO₂ emissions with space heating/cooling accounting for 25% of these emissions. As detailed in **Table 5**, there exists an annual saving potential of approximately 3 million tonnes of heating/cooling related CO₂ emissions in Australia which could be realised by introducing thermal insulation.

Potential Reduction of CO₂ emissions via increased domestic building insulation: Australia				
Actual emissions million t		Possible reduction		
Total	Heating/Cooling	Million t	% Total	% Heating/Cooling
32	8	3	11	40

(Source: University of New South Wales, Cost/Benefit Study of Insulation of Residential Buildings in NSW: Options Paper, November 1993 ISBN 16279/02.

Energy & Housing Conference and Exhibition, 3-5 March 1994, page 210, Table 1, ANZEC 1990, End Use Energy CO₂ Residential Appliances, Alan Pears)

Justification for Use of Thermal Insulation

One main advantage of thermal insulation is that it represents proven technology combined with a well established manufacturing base and sound installation techniques. The use of thermal insulation represents good business practice; and is a prime example of a «no regrets» policy which employs a technology that pays for itself in terms of reduced energy costs and increased environmental benefits. In addition, the benefits from insulation far outweigh the cost of production with a ratio of energy savings to energy investment of 12 to 1 per year. This means that for every Joule or Btu invested in the manufacture of thermal insulation, 12 Joules or Btu in energy saving is realised in every year of service.

Despite the many and considerable benefits that accrue, there are a number of challenges in providing adequate levels of thermal insulation -none of them however are of a technical nature. First, many decision makers are poorly informed about the benefits of improved insulation and are thus often short of immediately available funds for capital investment. Second, in many countries, building energy codes or regulations are not efficient and often only apply to new constructions or, in some cases, there are no energy codes at all. Third, building codes are frequently poorly enforced. Finally, most homes represent existing house stock, and insufficient attention is paid to thermal insulation needs when renovating the dwellings.

All these challenges can be remedied by the application of available insulation technology, the implementation of good standards, economic analyses and incentives. The Kyoto Conference can agree binding commitments by industrialised countries in the following areas:

- quantitative CO₂ reductions for the next decade in respect of space heating and cooling;
- the establishment of ongoing education campaigns for purchasers of new and existing homes, as well as for the financial community;
- the implementation of appropriate building energy codes which recognise the environmental benefits of energy reduction for both new construction and renovation work;
- the enforcement of building energy codes;
- the provision of tax incentives for energy efficiency capital investment directed towards first-time home buyers.

Feasibility

The manufacturing and installation processes of insulation are well known, and at once require no expensive research. More intensive use of thermal insulation can begin today, giving immediate and long-lasting results for the entire lifetime of a building. The use of thermal insulation has no negative impact on the competitiveness of national industry. In fact, insulation has a positive effect on the balance of payment.

Financial implications

The proper use of thermal insulation for new buildings as well as the retro-fitting of existing buildings increases their value. As such, thermal insulation represents a capital gain for the home or building owner. As for public costs, little is required from the public purse other than tax incentives, which will obviously be limited.

Joint implementation

High on the agenda for the Kyoto negotiations is the joint implementation of the Treaty. In this respect, the Kyoto Conference presents a valuable opportunity for thermal insulation. The quality of building stock in Central and Eastern Europe is poor, much of which is in need of improvement and considerable renovation. Joint implementation by the EU together with Central and Eastern Europe can be targeted towards thermal insulation with relative ease. Similarly, the opportunity exists for joint implementation by the United States and other nations.

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NAIMA	(North American Insulation Manufacturers Association)
FARIMA	(Fibreglass and Rockwool Insulation Manufacturers Association of Australia Inc.)
AMFATAFM	(Asociación Mexicana de Fabricantes de Aislamientos Térmicos y Acústicos de Fibras Minerales, A.C.)
CAMMVFM	(Canadian Association of Man Made Vitreous Fibre Manufacturers)
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