Glass fiber
LCA
&
Environmental and health data sheet

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SAINT-GOBAIN
INSULATION

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Saint-Gobain today

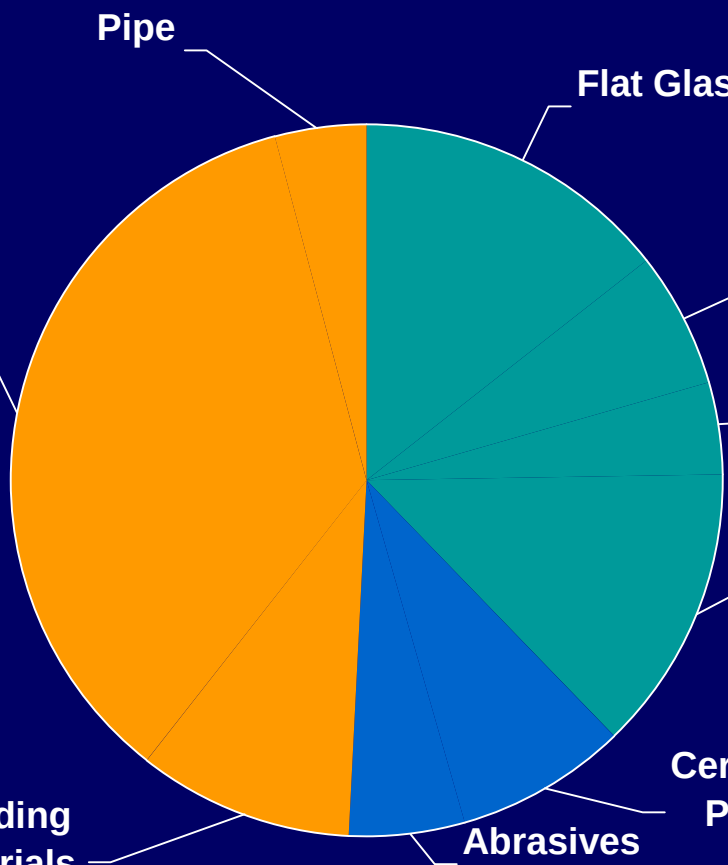
More than 1 400 consolidated companies in 47 countries

2001	€Mds
Net Sales	30.27
Net Income	1.04
Cash Flow (*)	2.67
Capital Expenditures	1.43

172 000 Employees

(*) Excl. Capital gains

Breakdown of Sales



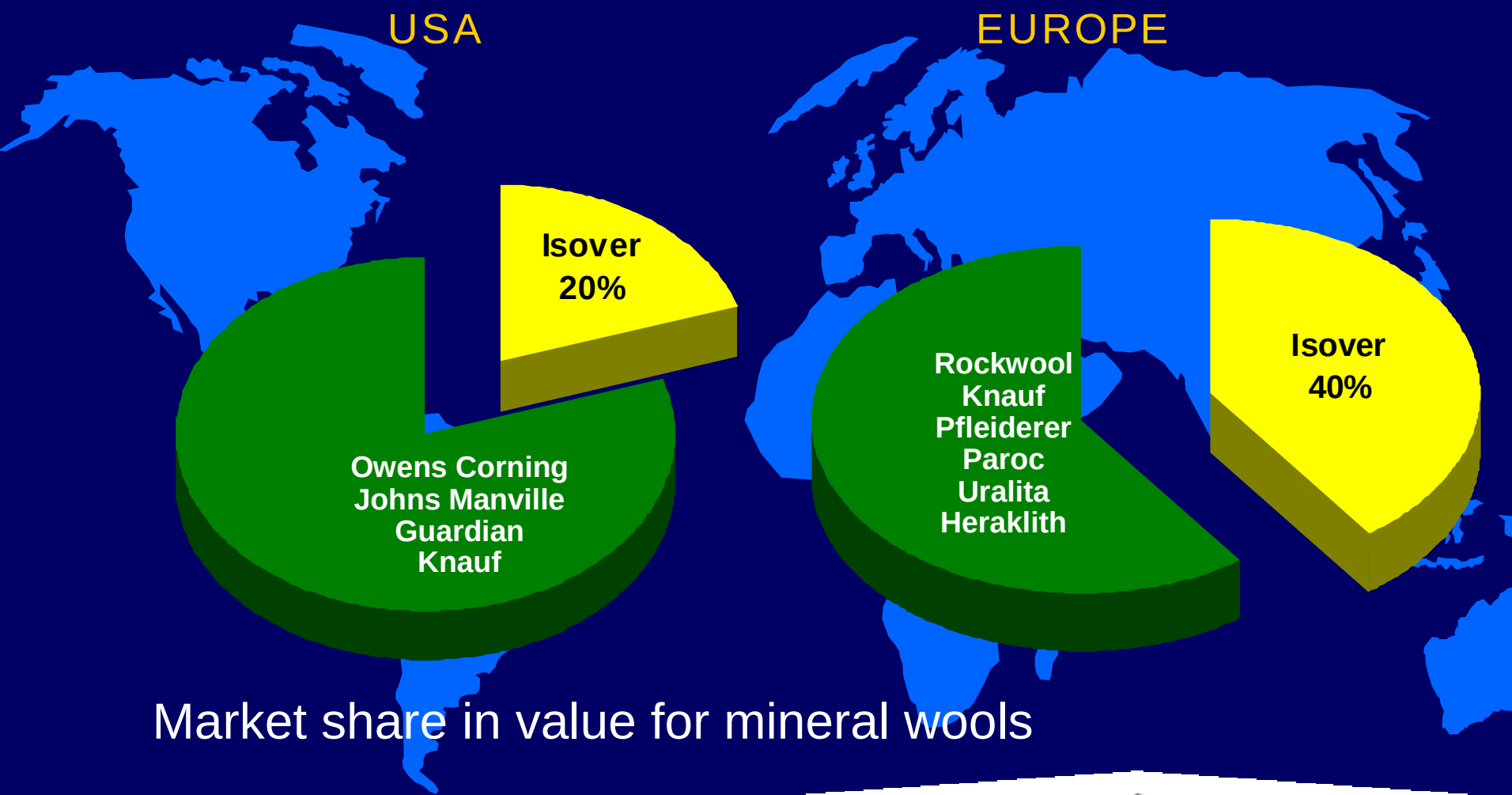
Glass 38,5%

Housing products 49,5%

High Performance Materials 12%

2002 figures (pro forma)

Isover n°1 world producer



Market share in value for mineral wools

Key Figures

9,000 employees worldwide: 1,500 in Scandinavian and Nordic countries, 1,200 in France, 1,500 in Germany and nearly 1,500 in the USA

38 consolidated companies and **6** licencees

36 plants

Net Sales (Insulation + Reinforcement):
3,25 billion EUR

Insulation **World leader**

History (1/2)

- ***1990 : EU Environmental labelling for insulation products***
  - *→First LCA done by Saint-Gobain for 12 European products*
- ***1994 : LCA for building materials***
  - *→French producers of building materials (AIMCC) create a working group*
- ***1996 : French HQE association***
  - *→Created to promote the High environmental Quality of buildings*

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History (2/2)

- ***2001 : AFNOR standard XP P 01 010-1***
  - ➔*To harmonize requirements from architects and other building's stakeholders*
  - ➔*Environmental and health data sheets for building materials*
- ***2003 : AFNOR standard XP P 01 020***
  - ➔*Environmental and sanitary characteristics of buildings*
- **2003 : first complete Environmental & Health data sheets**

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AFNOR experimental standards

- ***Environmental quality of construction products (XP 01 010)***
  - → *Information concerning the environmental characteristics of construction products*
    - *Part 1: Methodology and model of data declaration (April 2001)*
    - *Part 2: Framework for exploiting the environmental characteristics for application to a given construction work (May 2002)*
- ***Environmental and sanitary characteristics of buildings (draft – September 2003?)***

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AFNOR XP 01 010, Part 1

- ***To provide objective information and to be used to assess the impacts of construction products.***
  - → *Covers all stages of life cycle.*
  - → *The data*
    - *shall be qualified and explained*
    - *have to be representative, shall go with by an indication of accuracy and, in any case, the source had to be provided.*
  - → *Defines the functional unit*
  - → *Defines the mass cut-off rule for inputs*
  - → *Proposes rules for modification of scenarios*

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AFNOR XP 01 010, Part 2

- ***To characterize the contribution of products to environmental impacts of a given construction work.***
  - → *Indicates what information shall be retrieved from first part of standard.*
  - → *Main impacts are quantified*
  - → *Contribution of the product to health risk management,*
  - → *Resistance to biocides, thermal shocks, organoleptic properties, fitness for contact with drinking water*
  - → *Contribution of the product to comfort*

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How LCA have been done by Saint-Gobain Isover?

- **In collaboration with Ecobilan SA (PriceWaterHouseCooper)**
- **At the same time as other French producers**
  - → Belonging to the French association of Glass fibers and rock wool producers : FILMM
- **Data sources**
  - → Isover LCA, 1993
  - → Ecobilan SA databases
  - → Saint-Gobain Isover plants
  - → Suppliers
- **Tools**
  - → TEAM software from Ecobilan SA
  - → DEAM software from Ecobilan SA
    - Specific software to generate table which can be directly used in the E&H data sheets

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Functional unit

- **Quantity of product and, if necessary, complementary products and distribution packing contained in FU on basis of Typical Life Duration of 50 years.**
- **100 m² of glass fiber roll which main function is thermal insulation (roof insulation):**
  - → 220 kg of glass fiber
  - → 6.4 kg of Kraft paper
  - → 6.5 kg of asphalt
  - → 2.0 kg of polypropylene veil
  - → 0.5 kg of hot melt glue
- **Packaging**
  - → 5 kg of polyethylene

These values can not be used as such. The complete data sheet must be requested

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Hypothesis (1/2)

- **Final product transportation**
  - → 223 km by truck (22.4 t), returning empty at 96%
- **Waste on building site**
  - → None
- **End of life**
  - → To landfill
- **Electricity**
  - → French model for production
  - → European model for all other stages of the LCA
- **Input and output**
  - → 99.8% have been taken into account

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Hypothesis (2/2)

❑ Energy savings during use (done by TRIBU Energie)

	Surface (m^2)	Thermal characteristics	Electricity saved (kWh elec)	Natural gas saved (kWh PCI)
Insulated roof	100	R = 5	2 995	3 161
Insulated walls	85	R = 2	2 278	2 402
Double glazing	15	U = 2,9	571	601
Floor	100	R = 1,94	1 968	2 075
Laminated floor	100	R = 1,05	1 874	1 976

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LCA results

Contribution to environmental impacts (1/3)

- **Energy resource consumption**
  - → Total primary energy : 10 180 MJ/FU
    - Renewable energy : 842 MJ/FU
    - Non-renewable energy : 9 338 MJ/FU
- **Consumption of non-energy resources**

  200 kg/ FU
- **Water consumption**

  4.3 m^3/FU

These values can not be used as such. The complete data sheet must be requested

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LCA results

Contribution to environmental impacts (2/3)

- **Solid waste**
  - → Improved — 0.27 kg/FU
  - → Eliminated
    - Hazardous waste — 1.5 kg/FU
    - Non-hazardous waste — 248 kg/FU
    - Inert waste — 83 kg/FU
    - Radioactive waste — 0.072 kg/FU
- **Climate change**

500 kg eq CO2/FU

These values can not be used as such. The complete data sheet must be requested

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LCA results

Contribution to environmental impacts (3/3)

- **Atmospheric acidification**

  1.15 kg eq SO2/FU

- **Air pollution**

  316 150 m^3/FU

- **Water pollution**

  9 000 m^3/FU

- **Formation of photochemical ozone**

  150 kg eq ethylene/FU

- **Soil pollution**

  does not apply

- **Destruction of the stratospheric ozone layer**

  does not apply

- **Biodiversity modification**

  does not apply

These values can not be used as such. The complete data sheet must be requested

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LCA results

Savings versus impacts : some examples

- **Total primary energy**
  - → - 1 123 565 MJ/FU — 110 times the impact
- **Climate change**
  - → - 161 766 kg eq CO_2 — 323 times the impact
- **Hazardous waste**
  - → - 111 kg/FU — 74 times the impact
- **Water consumption**
  - → 160 m^3 — 38 times the impact

These values can not be used as such. The complete data sheet must be requested

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What next?

- **E&H data sheets are or will be soon available for the main building materials**
  - → For the main Isover products, by the end of 2003
- **They will be certified by external auditor**
- **Comparison between products must be done very carefully**
  - → Hypothesis are not always the same
  - → Functional units have to be the same!

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Thank you
for your attention

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