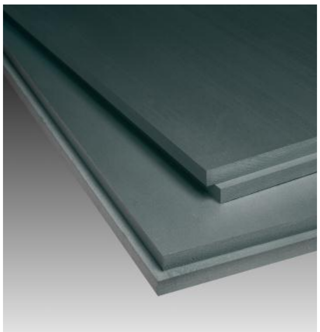
ENVIRONMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804

Owner of the Declaration	Dow Deutschland GmbH & Co.OHG
Publisher	Institut Bauen und Umwelt (IBU)
Programme holder	Institut Bauen und Umwelt (IBU)
Declaration number	EPD-DOW-2013111-E
Issue date	01/05/2013
Valid to	30/04/2018

XENERGY™ XPS extruded polystyrene foam insulation
Dow Deutschland GmbH & Co. OHG

www.bau-umwelt.com

Institut Bauen und Umwelt e.V.



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Building Solutions

1 General Information

Dow Deutschland GmbH & Co.OHG

Dow Building Solutions

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Rheinufer 108
D-53639 Königswinter

Declaration number

EPD-DOW-2013111-E

This declaration is based on the following product category rules:

Foam plastics, 12-2009

(PCR tested and approved by the independent expert committee)

Issue date

01/05/2013

Valid to

30/04/2018

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of SVA)

XENERGY™

Extruded polystyrene foam

Owner of the declaration

Dow Deutschland GmbH & Co. OHG
Dow Building Solutions
Am Kronberger Hang 4
D-65824 Schwalbach

Declared product/declared unit

XENERGY™ XPS extruded polystyrene foam insulation

Scope:

XENERGY extruded polystyrene foam (XPS) is a thermoplastic insulation foam which complies with DIN EN 13164 and is manufactured in the form of boards within a density range from 30 to 50 kg/m³. The boards are supplied in three different compressive strength levels from 100 to 700 kPa within a thickness range of 20 to 200 mm. The manufacturer is Dow with production facilities in Europe, particularly in Germany and Greece.
This declaration refers to 1 m² of extruded polystyrene foam board (XPS board) with a thickness of 100 mm, i.e. 0.1 m³ with a density of 35 kg/m³. This corresponds to the weighted average of the boards produced in both works in Greece and Germany.
The owner of the declaration is liable for the underlying information and verifications.

Verification

CEN standard DIN EN 15804 serves as the core PCR

Verification of the declaration and data EPD by an independent third party in compliance with ISO 14025

☐ internal ☒ external

Dr.-Ing. Ivo Mersiowsky
(Independent tester appointed by SVA)

2 Product

2.1 Product description

XENERGY extruded polystyrene foam (XPS) is a plastic foam insulating material which complies with DIN EN 13164and is produced in the form of boards within a density range of 30 to 50 kg/m³. To meet the needs of various applications the boards are supplied in different compressive strength levels from 150 to 700 kPa within a thickness range of 20 to 200 mm. The boards may have different surfaces (with extrusion skin, planed, grooved or thermally embossed) for different application areas. Xenergy boards are supplied with butt edge, shiplap and tongue-and-groove profiles.
The main ingredient is polystyrene; carbon dioxide in combination with process aids is used as a blowing agent.

2.2 Application

According to DIN 4108–10, application areas are thermal insulation of roofs, ceilings, walls, floor and perimeters with requirements of the physical properties:

- Perimeter insulation for the basement/foundation
- Perimeter insulation of the exterior cellar walls
- Inverted insulation for terrace roofs
- Floor insulation of floors including insulation of highly loaded industrial floors
- Insulation of thermal bridges for exterior walls Insulation of cavity walls
- ETICS
- Thermal insulation of ceilings in agricultural buildings
- Interior insulation of walls
- Interior insulation of ceilings
- Thermal insulation of pitched roofs above and below the rafters
- Core material for sandwich elements
- Insulation for building equipment and industrial installations (e.g. pipe insulation)

2.3 Technical data

Declared thermal conductivity [W/(mK)] according to DIN EN 12667 & DIN EN 12939	**0.030 – 0.032**
Deformation according to DIN EN 1605 [%] Load 40 kPa; 70°C	**≤ 5**
Compressive strength or stress [kPa] at 10% deflection as per DIN EN 826	**100 – 700**
Elasticity module [kPa] as per DIN EN 826	**10,000 – 40,000**
Tensile strength [kPa] as per DIN EN 1607	**100 – 600**
Compressive creep (50 years, 2% deflection) and long term compressive strength [kPa] as per DIN EN 1606	**Up to 250**
Water absorption after diffusion [Vol.-%] as per DIN EN 12088	**≤ 3**
Water vapour transmission μ [-] as per DIN EN 12086	**50 – 250**
Freeze-thaw resistance (maximum water uptake) in [Vol.-%] as per DIN EN 12091	**≤ 1**
Dimensional stability 70°C, 90% r.F. as per DIN EN 1604 [%]	**≤ 5**
Fire performance as per DIN EN 13501-1	**Euro class E**
Acoustic property	**Not relevant for XPS**

2.4 Placing on the market /Application rules

Manufacture and CE marking as per product standard DIN EN 13164. Application following building inspection approval of the DIBt for Xenergy :

- Z-23.15-1476 (product approval)
- Z-23.33-1882 (approval for use as perimeter insulation against pressing water)
- Z-23.31-1881 (approval for the inverted roof thermal insulation system)

The production facilities involved in data collection for this EPD are certified to ISO 9001 and ISO 14001.

2.5 Delivery status

Length: 1000 – 3000 mm/ width: 600 mm/ thickness: 20 – 200 mm

2.6 Base materials/Ancillary materials

The main material used is general purpose polystyrene (GPPS) [CAS 9003-53-6] with 90 to 95 weight %. This is foamed with the help of a blowing agent with approx. 8 weight %. The foaming agent consists of carbon dioxide [CAS 124-38-9] and halogen-free Co-blowing agents.
The flame retardant hexabromcyclododecane (HBCD) [CAS 25637-99-4] is used as an additive. HBCD will be replaced by a polymeric flame retardant by August 2015 at the latest. Pigment (carbon particles) less than 6% and other additives (such as processing aids) less than 1% are also added to the XENERGY extrusion process. Polystyrene and the co-blowing agents are manufactured from oil and natural gas. GPPS is transported by road or via pipeline from the production site to the XPS manufacturing plants. CO_2 is produced as a by-product from various processes and is available in unlimited quantities.

2.7 Manufacture

XENERGY is manufactured in a continuous extrusion process with electricity as the main energy source. Polystyrene granules are melted together with the additives in the extruder under high pressure. The blowing agents are injected into the melted mass and dissolved in it. The melted mass is extruded through a flat die. The drop in pressure causes the polystyrene to foam and cool down to solidify. An endless board of homogenous closed-cell polystyrene foam is produced. This is cooled further and then cut to dimensions, trimmed, the surface modified if necessary and packed in 4- or 6-sided polyethylene film bags and piled up on pallets. Board thicknesses of 20 to 200 mm can be produced by using different extruding dies.
More than 99% of the XPS from production trimmings and production waste is recycled directly back into the production facilities to manufacture XPS. Polystyrene is a thermoplastic material and can therefore be recycled easily and economically by melting it.

2.8 Environment and health during manufacturing

No measures beyond those already specified in the national work protection regulations are necessary in any of the production steps to protect the health of staff during the manufacture of XPS.
Dow has engaged since 2006 in the SECURE (Self-Enforced Control of Use to Reduce Emissions) programme including a Code of Good Practice to commit to a safe use of HBCD.

2.9 Product processing/Installation

Handling recommendations are described in brochures, application literature and product data sheets. These can be obtained directly from Dow Deutschland GmbH & Co. OHG or via the Internet.
Work and environmental protection measures during product installation are described in the safety data sheets. No special personal protection is necessary for handling XENERGY. XPS construction waste which accumulates as cuttings on the construction site should be collected separately and disposed of professionally.

2.10 Packaging

The packaging consists of polyethylene film which should be collected separately and sent for professional disposal. Polyethylene can then be recycled.

2.11 Condition of use

The base material used is inert and water resistant when installed which means that the insulating performance and also the mechanical properties remain unchanged during the entire period of use.

2.12 Environment and health during use

During use, no effect is expected from the XPS on the environment or the user’s health if XENERGY is used appropriately.
Environment: XENERGY is not in direct contact with the environment in the aforementioned applications (except in perimeter insulation). As a flame retardant it contains HBCD, a compound which is classified as “substance of very high concern” in the European Regulation REACH. The HBCD is integrated into the polymer matrix of XPS. HBCD will no longer be used as from August 2015 at the latest and will be replaced by a polymeric flame retardant.
Health: in most applications, XENERGY is not in direct contact with indoor air. There are no known detrimental effects for health when XENERGY is used for interior insulation.

2.13 Reference service life

The durability of XENERGY is as long as the lifetime of the building in which it is used. This is due to the superior mechanical and water resistance properties of this product.

2.14 Extraordinary effects

Fire

The fire behaviour of XENERGY is defined within the general building inspection approvals. XENERGY products fulfil the requirements of Class E as per standard DIN EN 13501-1 (corresponds to the building inspection denomination of “normal flammability”).

Water

When used appropriately, XENERGY is chemically neutral, not water-soluble and emits no water-soluble substances which could cause the pollution of ground water, rivers and oceans.

Mechanical destruction

2.15 Re-use phase

Re-use: if the full re-use potential of XPS insulation products is to be exploited the insulation boards should as far as possible be laid in such a way that they can be removed again with little or no damage: non-adhesive systems, separating layers between the insulation and concrete and mechanical fixings.

On inverted roofs, extruded polystyrene foam boards are installed loose laid and can therefore be removed from the roof without damage and laid again on another roof. With an existing conventional flat roof, the XPS insulation boards can stay in place if a “plus roof” is to result from upgrading the insulation.

Further use: dismantled, re-usable XPS insulation boards recovered from mechanically fixed applications can, for example, be used for insulating cellar walls or as non-load bearing floor panels.

Recycling and recovery: Recycling of XPS foam – and therefore also XENERGY products – consisting of production trimmings and production waste – has worked for many years and is a standard practice. These manufacturing scraps are recycled directly in the production facilities for producing XPS.

Clean material from building site offcuts and breakages can be recycled. Under certain circumstances it is also possible to manufacture new insulation boards using recycled material.

2.16 Disposal

Waste code as per European waste catalogue / List of Waste Materials Directive (/AVV/):
17 06 04 insulation material with the exception of that which falls under 17 06 01 and 17 06 03.

2.17 Further information

See Chapter 7: Requisite evidence.

3 LCA: Calculation rules

3.1 Declared unit

This declaration refers to 1 m² of extruded polystyrene foam board (XPS board) 100 mm thick, i.e. 0.1 m^3 with a density of 35 kg/m^3.

The following conversion is to be used when calculating environmental indicators and inventory parameters for XPS products of a different gross density:

$$I_{adap} = I_{ref} * \frac{\rho_{adap}}{\rho_{ref}} * \frac{d_{adap}}{d_{ref}}$$

I_{adap} – Adapted environmental indicator or environmental inventory parameter

I_{ref} – Environmental indicator or environmental inventory parameter for a density of 35 kg/m^3

ρ_{adap} – Adapted density

ρ_{ref} – Reference density of 35 kg/m^3

d_{adap} – Adapted board thickness

d_{ref} – Reference board thickness (100mm)

3.2 System boundary

Type of the EPD: cradle to gate with options
The LCA examines the following points of the life cycle:

- Production of raw materials and energy (A1)
- Manufacture of polystyrene foam (A3)
- Manufacture of packaging (A3)
- Transports (raw materials to manufacturer, products to building site, waste to EoL) (A2, A4, C2)
- The emissions of the process aids and the Co foaming agents from the manufacturing process (A3) are examined.
- Thermal re-use or disposal of the product (C3 or C4)
- Emissions and pollution as a result of disposal of packaging are attributed to module A5.
- Credits as a result of disposal of packaging are attributed to module D.
- Energy savings which result from the application of XPS foam are specific to each application case and are not part of this LCA.

3.3 Estimates and assumptions

An estimate is used for the environmental profile of the manufacture of the flame retardant. The environmental contamination of the CO2 process aid originates exclusively from the electricity requirement for compression and transport on the assumption that CO2 occurs as a waste or co-product of other industrial processes and thus no environmental contamination occurs in the upstream chain.

3.4 Cut-off criteria

All data from operating data collection, i.e. all source materials used according to the formulation (inc. the additives), the thermal energy used, the internal fuel and electricity consumption, all direct production waste and also all available emission measurements are accounted for in the balance sheet. Assumptions as to transport expenses are made for the raw material polystyrene, all further pre-products and also the product XPS. Material and energy streams with a share of less than 1% are also accounted for. It can be assumed that the disregarded processes would each have contributed less than 5% to the impact categories included. The manufacture of the necessary machines and plant is disregarded.

3.5 Background data

Data on the use of material and energetic resources and also transport distances were provided by Dow. Background data has been taken from the GaBi 6 database.

3.6 Data quality

Modelling of the XENERGY products is based on company manufacturing data from 2010. The last audit of the relevant background data records in the GaBi 6 database took place less than 4 years ago. All data records used originate from the GaBi 6 databases and are therefore consistent.

3.7 Period under review

Manufacturing data from 2010 serves as a data basis.

3.8 Allocation

Electricity and heat consumption for the production of XENERGY in both plants in Greece and Germany was allocated by means of the production volume. No allocations were used for manufacturing. A multi-input allocation with a credit for electricity and thermal energy according to the simple credit method is deployed for the incineration of the packaging. The credits from the disposal of packaging are credited in module D.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to DIN EN 15804 and the building context, respectively the product-specific performance characteristics, are taken into account.

4 LCA: Scenarios and further technical information

The following technical information forms the basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment.

Transport to the building site (A4)

Litres of fuel (diesel) Euro 4 truck:	25.2 l/100 km
Capacity utilisation (including empty runs):	10%
Gross density of products transported:	30-50 kg/m³
Capacity utilisation volume factor:	95%

Installation into the building (A5)

Transport to building site:	400 km (Greece); 500 km (Germany)
Material loss:	disregarded
VOC in the air:	none

Transport to EoL (C2):
Transport for thermal recycling or disposal: 100 km

Waste management (C3):
Since XENERGY collection and recycling quotas can vary greatly depending on the type of installation and the country, two scenarios are presented in the assessment which permits individual calculation of the actual waste management:

1.) 100 % thermal recycling including credit for electricity and heat
2.) 100 % disposal

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5 LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)																
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport to construction site	Installation in building	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ Demolition	Transport	Waste processing	Disposal	Reuse, Recovery or Recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA: ENVIRONMENTAL IMPACT: 0.1 m³ XENERGY™: Scenario 1 & 2									
		Production	Transport to site	Installation	Transport to EoL	100% thermal recycling (Scenario1)		100% disposal (Scenario 2)	
	Unit	**A1-A3**	**A4**	**A5**	**C2**	**C3**	**D**	**C4**	**D**
GWP	[kg CO_2-Äq.]	1.02E+01	4.17E-01	2.25E-01	9.59E-02	1.18E+01	-8.19E+00	2.01E-01	-1.18E-01
ODP	[kg CFC11-Äq.]	1.63E-09	7.28E-12	9.18E-13	1.68E-12	4.82E-11	-8.06E-10	3.75E-11	-4.39E-09
AP	[kg SO_2-Äq.]	3.78E-02	2.01E-03	1.45E-05	4.63E-04	7.61E-04	-4.15E-02	2.98E-04	-2.80E-04
EP	[kg PO_4^{3-}-Äq.]	2.23E-03	4.68E-04	2.73E-06	1.08E-04	1.43E-04	-1.27E-03	4.57E-05	-1.92E-05
POCP	[kg Ethen Äq.]	7.93E-03	-6.74E-04	1.69E-06	-1.55E-04	8.84E-05	-2.36E-03	7.75E-05	-2.34E-05
ADPE	[kg Sb Äq.]	3.60E-06	1.55E-08	9.90E-10	3.58E-09	5.19E-08	-5.45E-07	1.75E-08	-9.21E-09
ADPF	[MJ]	2.86E+02	5.77E+00	2.67E-02	1.33E+00	1.40E+00	-1.08E+02	6.84E-01	-2.00E+00
Key	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources								

RESULTS OF THE LCA: RESOURCE USE: 0.1 m³ XENERGY™: Scenario 1 & 2									
		Production	Transport to site	Installation	Transport to EoL	100% thermal recycling (Scenario1)		100% disposal (Scenario 2)	
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**C2**	**C3**	**D**	**C4**	**D**
PERE	[MJ]	5.07E+00	-	-	-	-	-	-	-
PERM	[MJ]	0	-	-	-	-	-	-	-
PERT	[MJ]	5.07E+00	2.26E-01	2.03E-03	5.21E-02	1.07E-01	-6.05E+00	5.07E-02	-1.43E-01
PENRE	[MJ]	1.46E+02	-	-	-	-	-	-	-
PENRM	[MJ]	1.40E+02	-	-	-	-	-	-	-
PENRT	[MJ]	2.86E+02	5.77E+00	2.67E-02	1.33E+00	1.40E+00	-1.08E+02	6.84E-01	-2.00E+00
SM	[kg]	-	-	-	-	-	-	-	-
RSF	[MJ]	2.77E-03	3.65E-05	1.05E-06	8.40E-06	5.5E-05	-1.47E-03	1.20E-03	-2.75E-05
NRSF	[MJ]	2.91E-02	3.82E-04	1.04E-05	8.79E-05	5.48E-04	-1.54E-02	2.84E-03	-2.88E-04
FW	[m³]	5.69E-02	2.51E-04	4.28E-04	5.78E-05	2.24E-02	-2.59E-02	-1.29E-03	-4.02E-04
Key	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources ; SM = Use of secondary material; RSF = Use of renewable secondary fuels ; NRSF = Use of non-renewable secondary fuels ; FW = Use of net fresh water								

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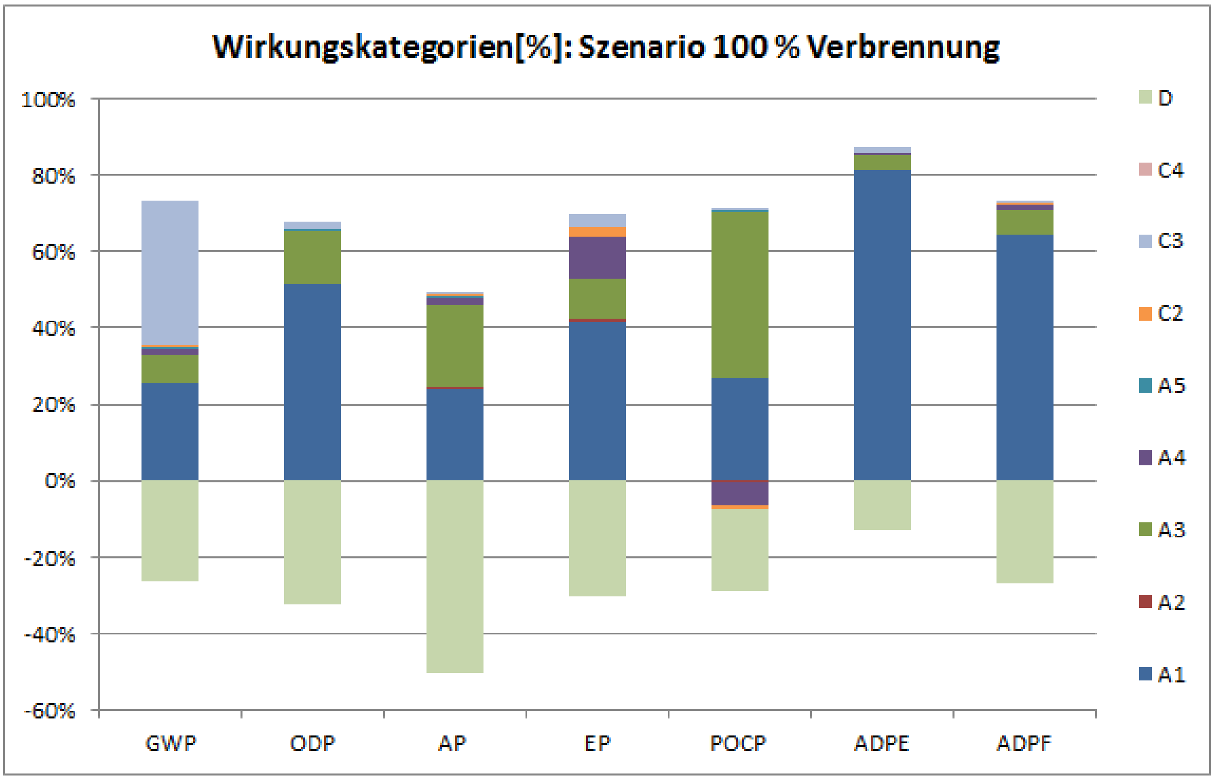
RESULTS OF THE LCA: OUTPUT FLOWS AND WASTE CATEGORIES: 0.1 m³ XENERGY: Scenario 1 & 2									
		Production	Transport to site	Installation	Transport to EoL	100% thermal recycling (Scenario1)		100% disposal (Scenario 2)	
	Unit	A1-A3	A4	A5	C2	C3	D	C4	D
HWD	[kg]	3.29E-03	0	1.99E-04	0	1.04E-02	0	4.88E-04	0
NHWD	[kg]	4.46E-02	8.12E-03	7.49E-04	1.72E-04	1.09E-03	0	3.46E+00	0
RWD	[kg]	3.01E-03	8.03E-06	1.74E-06	1.85E-06	9.16E-05	-2.24E-03	1.22E-05	-1.26E-04
CRU	[kg]	-	-	-	-	-	-	-	-
MFR	[kg]	-	-	-	-	-	-	-	-
MER	[kg]	-	-	-	-	-	-	-	-
EE [Strom]	[MJ]	0	0	0	0	0	1.86E+01	0	3.49E-01
EE [Dampf]	[MJ]	0	0	0	0	0	5.09E+01	0	9.50E-01
Key	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy source								

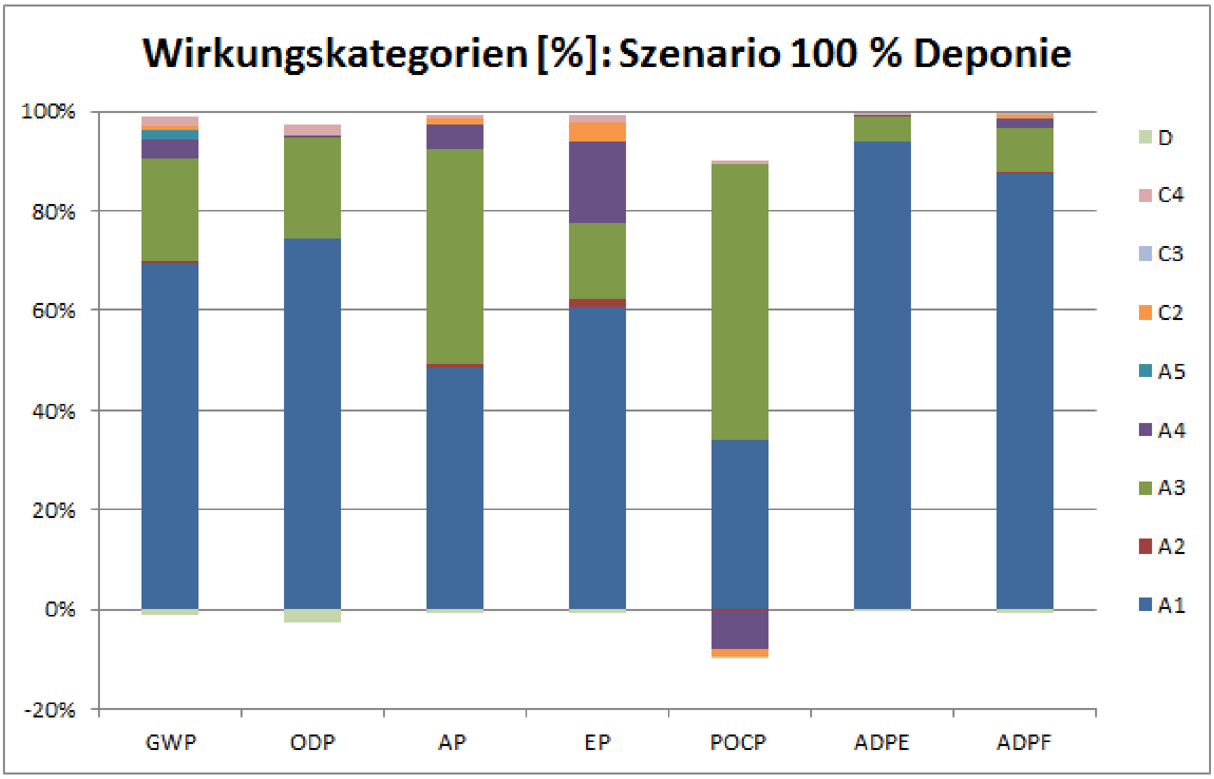
6 LCA: Interpretation

The following bar graphs show the most important influencing factors on important impact and material assessments.



The dominant influence of pre-product manufacturing (A1) is reflected in most impact categories with ratios between 24% for the acidification potential (AP) and 81% in relation to the potential for the abiotic depletion of non-fossil resources (ADP Elementary). The manufacture of the polystyrene granulate, which makes up over 90% of the XENERGY weight, contributes most to the environmental impacts (in relation to module A1: > 80% in all categories except ADP Elementary, where the manufacture of the HBCD flame retardant has a large influence). The extrusion process (A3) plays an important role in the photochemical ozone formation potential (POCP: 51%) and in the acidification potential (21%). The influence of the POCP can be attributed above all to emissions of the Co blowing agent isobutane. The electricity requirement of the extrusion process has a significant effect on the acidification potential as especially the Greek electricity mix has a high proportion of lignite. The transports to the building site have a clear effect on the eutrophication potential (11%) as well as the POCP (-7%). The nitrogen monoxide emissions which are emitted by combustion engines have a reducing effect on the POCP. The thermal treatment at end of life (C3) contributes greatly to the GWP (38%). In the case of the GWP, the waste incineration emissions exceed the credits which accrue from this thermal treatment by approximately 12 %. With the acidification potential (AP), the thermal treatment leads to high credits, as especially sulphur dioxide emissions from electricity produced from coal (lignite) are avoided.

The primary energy requirement consists almost exclusively of non-renewable primary energy (PENRT). The main portion of the non-renewable primary energy requirement is caused by the manufacture of the pre-products. This is explained by the fact that the pre-products are made almost exclusively of fossil raw materials (especially polystyrene), which are mostly energy-intensive to manufacture. The energy supplies mainly used are therefore natural gas and oil. The electricity requirement of the extrusion process (A3) contributes approximately 6-9% to the primary energy requirement depending on the scenario. The influence of lignite becomes apparent due to its high share of the Greek electricity mix. The primary energy requirement of the 100% recycling disposal scenario is reduced by approximately 30% due to the thermal recycling at end of life.



In contrast to the thermal treatment, no credits are generated by disposal at end of life as XENERGY is taken to waste sites for inert materials together with construction waste. In return, disposal also causes no emissions.

The absolute values of modules A1-C2 do not differ from the first scenario; however, the percental shares are different due to the missing combustion emissions and credits.

7 Requisite evidence

7.1 VOC emissions

(Test of product emissions as per the AgBB/DIBt-method XENERGY™ extruded polystyrene foam (May 2012, Eurofins Product Testing, Denmark)

Name and suffix	Value	Unit
AgBB results overview (28 days)		
TVOC (C6 - C16)	< 50	µg/m³
Total SVOC (C16 - C22)	< 5	µg/m³
R (dimensionless)	<0.05	-
VOC without NIK	< 5	µg/m³
Carcinogens	No traces	µg/m³

7.2 Leaching performance

Leaching behaviour is not relevant for Xenergy.

8 References

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Product category rules for construction products Part B: Requirements of the EPD for foam plastic insulation materials 10-2012)

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ISO 14025

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DIN EN 1604

DIN EN 1604:2013-05: Thermal insulating products for building applications – Determination of dimensional stability under specified temperature and humidity conditions; German version EN 1604:2013

DIN EN 1605

DIN EN 1605:2013-05: Thermal insulating products for building applications – Determination of deformation under specified compressive load and temperature conditions; German version EN 1605:2013

DIN EN 1606

2013-05: Thermal insulating products for building applications – Determination of compressive creep; German version 1606:2013

DIN EN 1607

2013-05 Thermal insulating products for building applications – Determination of tensile strength perpendicular to face; German version EN 1607:2013

DIN EN 12086

2013-06: Thermal insulation products for building applications – Determination of water vapour transmission properties; German version EN 12086:2013

DIN EN 12088

2013-06: Thermal insulation products for building applications – Determination of long-term water absorption by diffusion; German version EN 12088:2013

DIN EN 12091

2013-06: Thermal insulation products for building applications – Determination of freeze-thaw resistance; German version EN 12091:2013

DIN EN 826

2013-05: Thermal insulation products for building applications – Determination of compression behaviour; German version EN 826:2013

DIN EN 15804

2012-04, Sustainability of construction works – environmental product declarations – Core rules for the product category of construction products; German version EN 15804:2012

DIN EN 13501-1

2010-01: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests; German version EN 13501 – 1:2007+A1:2009

DIN EN 12667

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Approvals

Z-23.15-1476 (product approval)

Z-23.33-1882 (Approval for the application as perimeter insulation against pressing water)

Z-23.31-1881 (Approval for the inverted roof thermal insulation system)

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