

PVC product competitiveness

A total cost of ownership approach

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People, Planet, Prosperity

The vinyl industry's contribution to sustainability

Summary

- 1. Objectives and description**
- 2. The methodology**
- 3. The products**
 - 3.1 Windows profiles
 - 3.2 Outdoor pipes
 - 3.3 Flooring
- 4. Conclusions**

1. Objectives and description

The mission

Which are the **costs of using PVC** products compared to the most popular alternatives?

The scope

The investigation concerns:

- ✓ **window profiles**
- ✓ **outdoor pipes**
- ✓ **flooring**

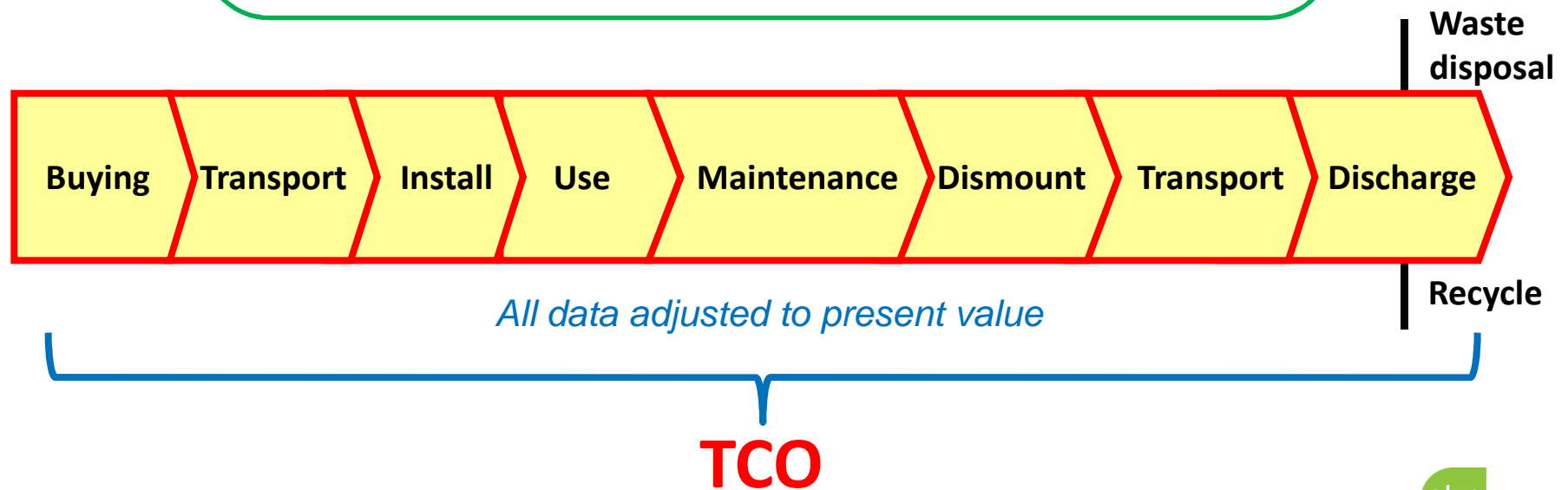
The countries

✓ **Germany**
✓ **Italy**
(North-South Europe represented)

2. The methodology

Total Cost of Ownership

- ✓ a “customer centric” analysis
- ✓ explains the difference between:
 - the **purchase price** of something
 - and its **long term cost**
- ✓ it is useful to **compare different products**



3. The products



Window profiles

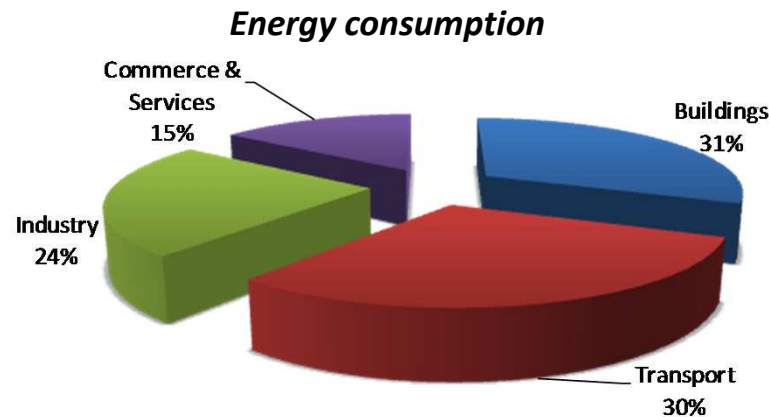
Outdoor pipes

Flooring

3. 1 Windows profiles

Key issues

- EU climate package 20-20-20 focus on the energy efficiency and the environmental impacts of products.
- In 2010 EU27 countries, buildings are the biggest consumer of energy.
➔ a tangible opportunity to save heating consumption.
- Windows profiles can play an important role reducing energy losses.
- Windows figures: turnover: 8,8 bln € in Germany, 4,8 bln € in Italy.
- PVC market share: 57% Germany, 18% Italy.

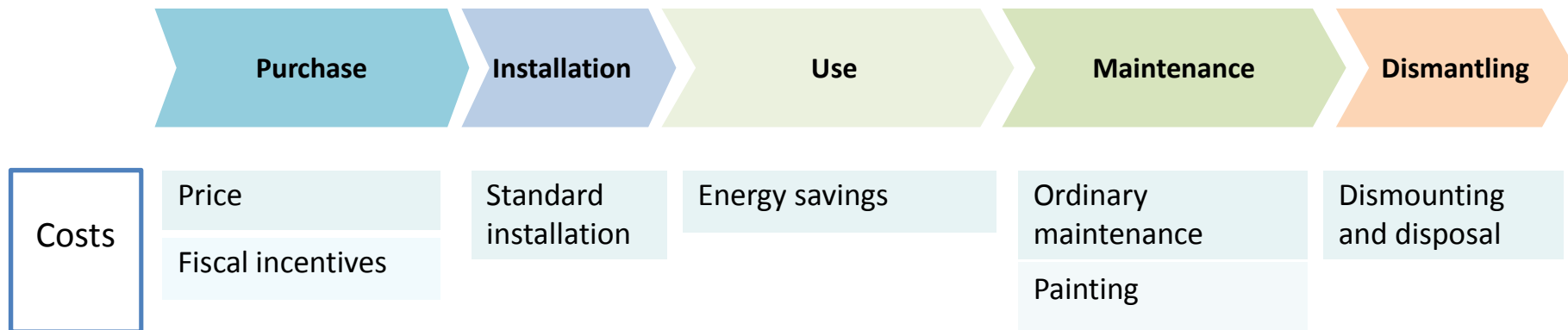


Source: Eurostat

3. 1 Windows profiles

Assumptions

The conceptual framework for windows



- The final users are individuals clients.
- Functional Unit: 130 x 130 cm (Germany), 123 x 148 cm (Italy).
- All the calculations have been expressed in € per square metre.
- The planning period is fixed at 30 years.
- VAT (19% in Germany and 20% in Italy) is accounted as non deductible cost.

3. 1 Windows profiles

The results

Discounted cash flows

€/sqm	GERMANY			ITALY			
	PVC	WOOD	ALUMINIUM	PVC	WOOD		ALUMINIUM
					TYPE 1	TYPE 2	
Net market price	-124	-154	-266	-160	-203	-335	-306
VAT	-24	-29	-51	-32	-41	-67	-61
Installation cost	-74	-74	-74	-46	-46	-46	-46
VAT	-14	-14	-14	-9	-9	-9	-9
Total initial investment	-235	-271	-404	-248	-299	-457	-423
Maintenance	-47	-94	-47	-39	-78	-78	-39
VAT	-9	-18	-9	-8	-16	-16	-8
Total maintenance	-56	-112	-56	-47	-94	-94	-47
Total Cash Outflows	-291	-383	-460	-294	-393	-551	-469
Total Energy Savings	784	784	784	548	548	548	548
Net Present Value	493	401	324	253	155	-3	78
Pay Back Period (years)	8	9	14	12	17	30	24

Minimum
TCO

Minimum
TCO

3. 1 Windows profiles

Conclusions

Net savings are always positive: investing in new windows creates value.

PVC windows

PVC has the lowest initial price, the fastest returns, and the higher net present value over 30 years lifecycle.

- ✓ Spending 1 € in a PVC windows generates on average 2 € back.
- ✓ PVC is the **best investment** compared to the alternatives not only for the initial price, but also considering the overall economic performance.

Pay back period (Germany):

- ✓ for PVC is 8 years;
- ✓ for wood and aluminium is 9 and 14.

Also in warmer countries PVC has the best pay back period: in Italy 12 years.

3. The products

Window profiles



Outdoor pipes

Flooring

3.2 Outdoor pipes

Key issues

- Germany and Italy: similar infrastructure index for mains; different for sewers.

	MAIN		SEWER	
	km	m/per capita	km	m/per capita
D	145.000	6,07	486.000	5,90
IT	294.000	6,19	500.000	3,06

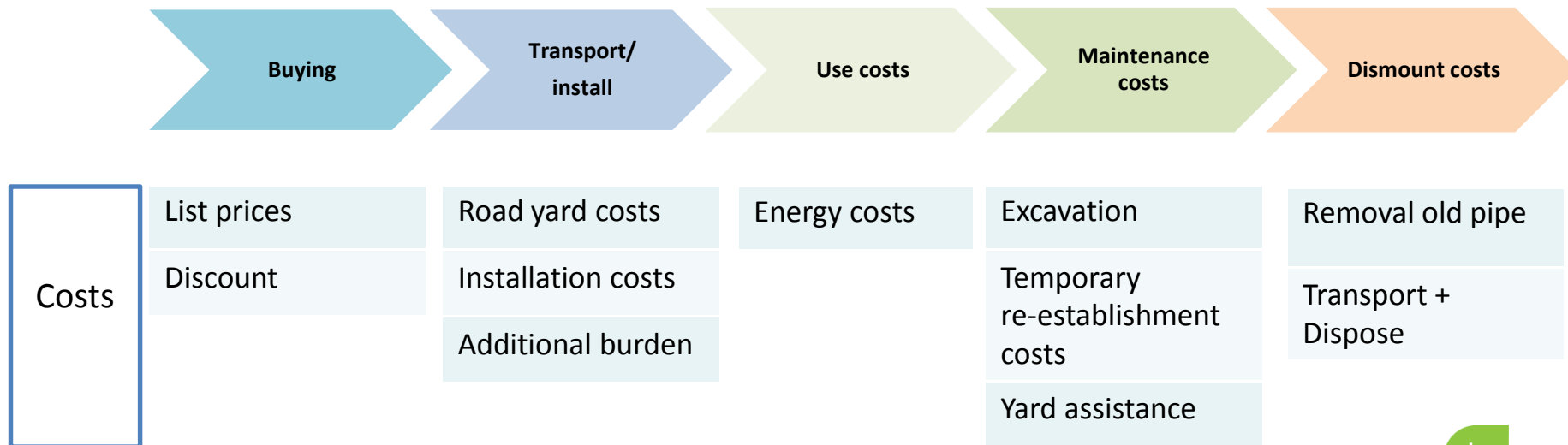
- Water networks:
 - In Germany: Iron/cast Iron (more than 55%); plastic (30%), concrete 10%.
 - In Italy: steel/iron (60%), plastics (20%); asbestos cement-concrete (16%).
- Planned investments:
 - Germany: 58 €/bIn € will be invested by 2020 to repair the sewage system.
 - Italy: 20 €/bIn; by 2020 30.000 km of mains; 12.000 km of sewerage to be installed.

3.2 Outdoor pipes

Assumptions

- The analysis considers drinking water (pressure pipes) and sewage (gravity pipes) made of different materials.
- The final users are the local utilities.
- The planning period assumed is 50 years.

The conceptual framework for pipes



3.2 Outdoor pipes

The results

an example: **MAINS - Italy**

Present total cost of ownership over 50 years (€/m)

	PVC		PE		DUCTILE IRON	
	S	XL	S	XL	S	XL
Buying	2,74	107,63	3,01	148,46	16,91	130,04
Installation	59,65	160,45	64,47	173,43	73,59	193,54
Old pipes dismantling	10,98	37,81	10,98	37,81	13,98	39,71
Use	25,49	25,49	25,31	25,31	30,99	30,99
Maintenance	0,17	0,46	0,17	0,46	0,24	0,74
TCO	99,03	331,85	103,94	385,48	135,71	395,02
%	Minimum TCO		+9,1%		+26,3%	

For each material the analysis considers different diameters: Small (80-90), Medium (150-180), Large (250-315), Extra Large (500-630).

3.2 Outdoor pipes

The results

an example: SEWER - Germany

Present total cost of ownership over 50 years (€/m)

	PVC		PE corrugated		CLAY		CONCRETE	
	M	XL	M	XL	M	XL	M	XL
Buying	11,1	46,9	13,8	54,8	54,8	168,0	11,1	28,4
Installation	165,0	352,3	165,0	352,3	304,5	537,3	304,5	537,3
Old pipes dismantling	20,0	42,6	20,0	42,6	24,9	42,8	24,9	42,8
Maintenance	0,5	1,1	0,5	1,1	1,2	2,1	1,2	2,1
TCO	196,6	442,9	199,3	450,8	385,4	750,1	341,7	610,5
%	Minimum TCO		+1,4%		+73,6%		+48,9%	

For each material the analysis considers different diameters: Small (100-125), Medium (300-315), Large (450-500), Extra Large (500-630), Extra Extra Large (800).

3.2 Outdoor pipes

Conclusions

- **The TCO of plastics is the lowest among the other materials**
- **Drinking water networks:**
 - PVC pipes are the best TCO performer. In Italy and Germany, for example, PE is on average more expensive (+9%, +12%), as well as ductile iron (+26%,+19%).
- **Sewerage:**
 - Germany: PVC pipes are the best TCO performer.
 - Italy: corrugated PE pipes are the best TCO performer. PVC is on average 6% more expensive, clay +65%, cement +52% .
- The major cost is **installation**, including road yard, material handling, laying and additional/administrative burdens.
- In Italy and Germany the **initial capital investment** in pipes ranges from 2%- 3% of TCO up to 30%-35%, as diameter grows.

3. The products

Window profiles

Outdoor pipes

Flooring



3.3 Flooring

Key issues

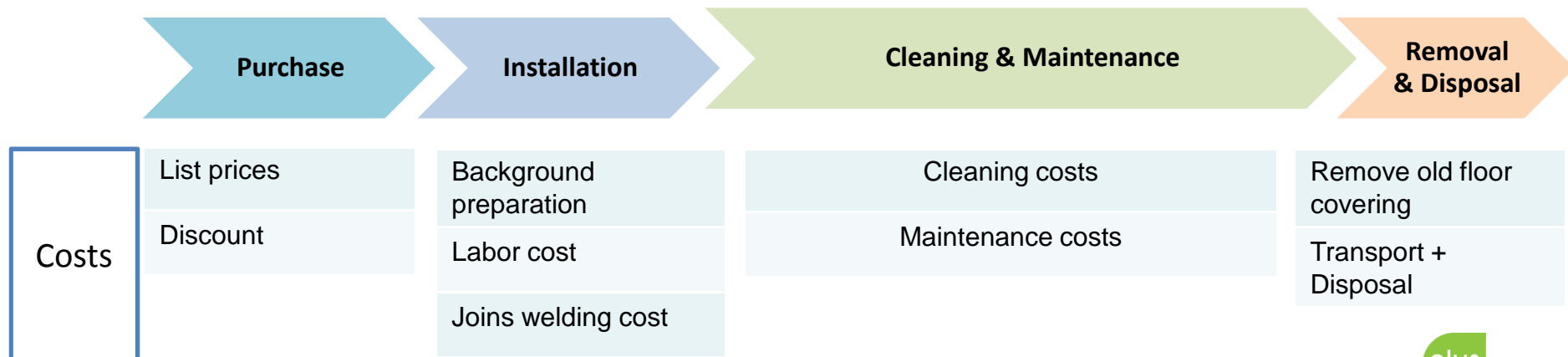
- Resilient floors have major applications in public buildings and infrastructures.
- In Germany market share of resilient flooring is 18%; carpets have the highest: 35%.
- In Italy resilient floor has 6% of the market; ceramic is the most used material: 74%.
- Both in Germany and in Italy PVC is the material most used: 75% and 80%.
- After PVC, the second material used is linoleum in Germany and rubber in Italy.
- There are many types of products (materials) and different applications (types of use). These are categorized by some international generally accepted principles (EN 685).

3.3 Flooring

Assumptions

- The analysis compares different types of resilient floors in two scenarios:
 - light-to-medium traffic: offices, meeting rooms, shops, classrooms;
 - heavy traffic areas: hallways, entrances, receptions and waiting rooms.
- The final users are companies, shops, hotels, offices, ...
- The life time is 20 years.

The conceptual framework for flooring



3.3 Flooring

The results

an example: Germany, Light-to-medium traffic areas

	Initial Cost Material	Overall Maintenance cost	TCO life span	Yearly total cost	
	A	D	E=A+D	F=E/B	
Top Vinyl Flooring 2 mm – Sheets - PUR	22,50 €	- €	22,50 €	1,13 €	
Standard Rubber Flooring 2 mm - Sheets	24,54 €	21,46 €	46,00 €	2,30 €	+104%
Standard PVC Flooring 2 mm - Sheets	15,85 €	50,29 €	66,14 €	3,31 €	+194%
Linoleum 2,5 mm	21,47 €	50,29 €	71,76 €	3,59 €	+219%

3.3 Flooring

The results

an example: Italy, Heavy traffic areas

	Initial Cost Material	Overall Maintenance cost	TCO life span	Yearly total cost	
	A	D	E=A+D	F=E/B	
Top Vinyl flooring 2 mm – Sheets -	30,90 €	- €	30,90 €	1,55 €	
Top Rubber flooring 2 mm - Sheets	37,00 €	- €	37,00 €	1,85 €	+20%
Mid-end Vinyl flooring 2 mm - Sheets	19,03 €	72,83 €	91,86 €	4,59 €	+197%
Standard Rubber flooring 2 mm - Sheets	23,10 €	72,83 €	95,93 €	4,80 €	+210%
Standard Vinyl flooring 2 mm - Sheets	13,40 €	105,22 €	118,62 €	5,93€	+284%
Linoleum 2,5 mm - Sheets	19,29 €	105,22 €	124,51 €	6,23 €	+303%

3.3 Flooring

Conclusions

- Products with **different properties** can be **suitable for the same applications**.
- The **lowest purchase, not** necessarily **the lowest TCO**.
- The materials with the **lowest purchase costs** have an **higher life cycle costs** compared to others due to higher maintenance requirements.
- How buyers can **save money?**
 - ✓ **Comparing the full costs** over the product **life time** of purchasing, installing, using and maintaining alternative products.
- For heavy traffic, **cleaning and maintenance costs can account up to 92%** of the total cost of ownership if low-end PVC and rubber floors are installed.
- The high-end floorings have the lowest maintenance cost per square meter, and therefore the lowest total cost of ownership.

4. Conclusions

- The analysis compares **all the costs along the life of a product** of different materials, not only the buying one.
- For all the products (windows, pipes and flooring) PVC results the material having the lowest TCO and the shortest pay back period.
 - ✓ **Windows.** PVC has the lowest purchase cost, the fastest returns and the shortest pay back time: Germany 8 years, Italy 12 years.
 - ✓ **Pipes**
 - ✓ **Drinking water.** Both in Germany and in Italy PVC is the best TCO performer and has the lowest initial cost.
 - ✓ **Sewerage.** In Germany PVC is the best TCO performer; In Italy corrugated PE and PVC are close, < Clay and Concrete.
 - ✓ **Flooring.** Vinyl is the best TCO performer. PVC has the lowest initial cost and the lowest TCO over life span.

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