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Application of LCC-CO_2 Tool

Example: Flourescent Lamps

08.10.2013, Kuala Lumpur

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Data Requirements – Fluorescent Lamps

- Selection of product alternatives
- Life-time (in years)
- Purchase prices (per unit)
- Installation & maintenance costs
- Usage profile (hours per day or hours per year)
- Power consumption (W)
- Luminous Flux (lm)
- Luminous Efficiacy (lm/W)
- Energy Consumption (kWh/ h or kWh/ year)

Product alternatives

Incandescent Bulb

Halogen Lamp

Compact Flourescent Lamp

LED

Single Socket Flourescent Lamps

Linear Flourescent Lamps

Comparable alternatives

Incandescent Bulb	CFL	LED	Lumens
15 W	5 W	2 W	90
25 W	8 W	3 W	250
40 W	13 W	5 W	450
60 W	16 W	8 W	800
75 W	24 W	12 W	1110
100 W	36 W	15 W	1600
150 W	50 W	24 W	2600

Example of data for calculation of LCC & CO_2

	Units	CFL	LED	Bulb
Purchase price	€	9,2	46,2	0,5
Maintenance Costs	€	0	0	0
Maintenance Costs	€/year	0	0	0
Installation Costs	€	100	100	100
Luminous flux	lumen	800	800	800
Power Demand	W	16	8	60
Hourse of operation	h/year	1000	1000	1000
Energy consumption	kWh/year	16	8	60
Energy price	€/kWh	0,12	0,12	0,12
Energy costs	€/year	1,92	0,96	7,2
Discount rate	%	2,78		
Inflation rate	%	2,3		
Price increase rate energy	%	5,56		

Alternatively, look for product data on efficient & inefficient products under:

- http://www.topten.eu/
- http://www.ecotopten.de
- Local Websites (e.g. http://www.philips.com.my)
- Your own data, if available

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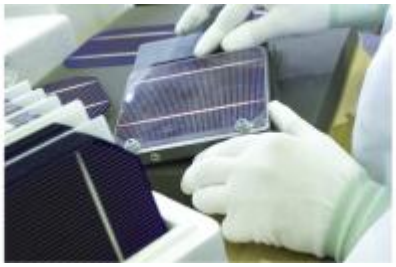
Application of LCC-CO_2 Tool

Example: Air-Conditioners

08.10.2013, Kuala Lumpur



www.oeko.de

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Data Requirements – Air-Conditioners

- Selection of a product
- Life-time (in years)
- Purchase prices (per unit)
- Installation & maintenance costs
- Usage profile (hours per day or hours per year)
- Cooling capacity (W or kW)
- Power input cooling (W)
- Energy Consumption (kWh/ year)
- SEER/ EER – Cooling efficiency
- SCOP/ COP – Heating efficiency
- Optional: Extra points for selecting climate-friendly cooling agent
- Optional: Extra points for split variable speed (inverter) air-conditioner (more efficient than products that operate under full load)

Example of products

Outdoor & indoor units of split air-conditioners

Mobile split air-conditioners

Single duct air-conditioner

Double duct

Through the window

Pictures: www.topten.eu

www.oeko.de

BAT in EU

Air conditioner type	EER: BAT in EU	COP: BAT in EU
Split < 4kW, variable speed	6	6.13
Multi split, variable speed	5.09	5.06
Split > 4kW, variable speed	4.52	4.79
Mobile split	3.26	3.67
Double duct	3.22	
Single duct	3.06 / 3.59 (water evaporation)	

Source: www.topten.eu; May 2012

Refrigerant

Refrigerant	GWP
~~R22 (HCFC)~~	1700
R407C (HFC)	1653
R410A (HFC)	1725
HFOs	around 4
R290 (Propane)	3
CO_2	1

Example of data for calculation of LCC & CO_2

	Units	Efficient	Inefficient
Purchase price	€	2500	1800
Maintenance cost	€	712	712
Maintenance cost	€/a	47,47	47,47
Installation cost	€	500	500
Cooling capacity	kW	3,5	3,5
Power input cooling (ON)	W	500	1100
Hours of operation (ON)	h/a	1600	1600
Power Standby	W	1	3
Hours of operation (Standby)	h/a	1600	1600
Energy Consumption	kWh/a	801,6	1764,8
Energy price	€/kWh	0,292	0,292
Energy costs	€/a	234,0672	515,3216
Life time	Years	15	15
Discount rate	%	2,78	
Inflation rate	%	2,3	
Price increase rate energy	%	5,56	

Alternatively, look for product data on efficient & inefficient products under:

- http://www.top10.cn/english.html
- http://www.topten.eu/
- Local websites (e.g. http://www.panasonic.com/my)
- Your own data, if available

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Application of LCC-CO_2 Tool

Example: Refrigerators

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Data Requirements – Air-Conditioners

- Selection of a product
- Life-time (in years)
- Purchase prices (per unit)
- Installation & maintenance costs
- Usage profile (hours per year)
- Dimensions (H X W X D)
- Total Net Volume (L)
- Power Consumption (W)
- Energy Consumption (kWh/ year)
- Optional: Extra points for selecting climate-friendly cooling agent

Example of products

Chest Freezers

Free-Standing One-Door

Free-Standing Two-Door

Inbuilt without freezer

Inbuilt One-Door

Inbuilt Two-Door

Pictures: www.topten.eu

www.oeko.de

Example of data for calculation of LCC & CO_2

	Units	Efficient	Inefficient
Purchase price	€	839	599
Maintenance Costs	€/a	5,5	5,5
Installation Costs	€	50	50
Dimensions	(H X W X D) cm	161x60x65	154x60x64
Net Volume (Refrigerator/ Freezer)	Litres/ Litres	190/67	189/69
Energy Efficiency Class		A+++	A+
Energy Consumption	kWh/ year	132	323
Energy Price	€/ kWh	0,12	0,12
Energy Costs	€/ year	15,84	38,76
Life-Time	Years	14	14
Discount rate	%	2,78	
Inflation rate	%	2,3	
Price increase rate energy	%	5,56	

Alternatively, look for product data on efficient & inefficient products under:

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- http://www.topten.eu/
- http://www.ecotopten.de
- Local Websites (e.g. http://www.panasonic.com/my)
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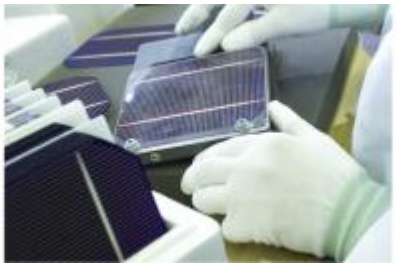
Application of LCC-CO_2 Tool

Example: Office Equipment with Print Function

09.10.2013, Kuala Lumpur



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Data Requirements – Office Equipment with print function

- Selection of a product
- Life-time (in years)
- Purchase prices (per unit)
- Installation & maintenance costs
- Paper demand (per year)
- Toner demand (pieces per year)
- Paper costs (per sheer or per Rim)
- Toner costs (per piece)
- Usage profile (hours per day, week, year)
- Total Net Volume (L)
- Energy Consumption (kWh/ day, week, year)

Example of products

ENERGY STAR v 1.1 qualified MFDs

Include	☐ Direct Thermal	☐ Ink Jet	☐ Solid Ink
	☐ Dye Sublimation	☐ Electrophotography*	☐ Thermal Transfer
	☐ High Performance Ink Jet		
	☐ Print	☐ Copy	☐ Fax ☐ Scan
	☐ Colour	☐ Monochrome	
	☐ Standard size	☐ Large size	
	☐ Duplex capable (as standard feature)		

Source: www.eu-energystar.org

Example of data for calculation of LCC & CO_2

	Units	Efficient	Inefficient
Purchase price	€	641	549
Maintenance Costs	€/a	120	120
Installation Costs	€/ unit	50	50
Speed monochrome	ipm	45	45
Colour monochrome	ipm	40	40
Paper demand	Sheets/ year	37500	37500
Toner demand	Pieces/ year	4	6
Paper costs	€/ sheet	0,012	0,012
Paper costs	€/ year	450	450
Toner costs	€/ piece	133	133
Toner costs	€/ year	532	798
Energy Price	€/ kWh	0,12	0,12
Energy demand	kWh/ week	145	190
Life-Time	Years	5	5
Discount rate	%	2,78	
Inflation rate	%	2,3	
Price increase rate energy	%	5,56	

Alternatively, look for product data on efficient & inefficient products under:

- http://www.top10.cn/english.html
- http://www.topten.eu/
- http://www.eu-energystar.org/en/database/?cmd=selectform;table=mfd
- Local Websites (e.g. http://www.canon.com/my)
- Your own data, if available

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