

# Life Cycle Assessment

## BS225M-TCVCN Solar Ready Meter socket



Supplemented by:	PEP PSR-0005-ed3.1-EN-2023 12 08	Drafting rules:	PEP PCR-ed4-EN-2021 09 06
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# ABB Purpose & Embedding Sustainability

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.

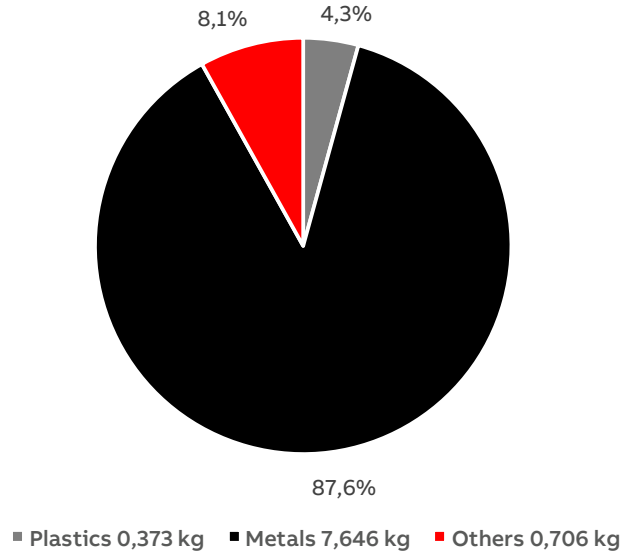


## General information

Reference product	BS225M-TCVCN Solar Ready Metersocket
Description of the product	The main function of the meter socket box is to provide electrical connection and to enclose the electrical meter installation on the exterior of a building.
Functional unit	To protect people from direct contact with live active parts and ensure the connection of an electrical meter in a single enclosure having the following dimensions 27 x 12 x 5 9/16 in., with rated current of 200 A and voltage 600 V, while protecting them against mechanical impacts (IK) and the penetration of solid objects and liquids (IP), according to the passive continuous use scenario, and for the reference service life of the product of 20 years.
Other products covered	N/A
Manufacturing address	ABB Electrification Canada Inc.



# Constituent Materials



Total weight of reference product and packaging

8,725

kg

Plastics as % of weight		Metals as % of weight		Others as % of weight	
Name	Weight%	Name	Weight%	Name	Weight%
PPE/PA	3,8	Steel	80,3	Wood	5,1
Styrene	0,2	Aluminium	5,2	Carton	2,9
Polypropylene	0,2	Copper	1,2	Paper	0,1
Other plastics	<0,1	Zinc	0,5		
		Brass	0,4		



## Additional Information

<b>Manufacturing</b>	The manufacturing stage includes the production of the meter socket from raw materials. The manufacturing location is in QC, Canada.
<b>Distribution</b>	The transport distance is considered as a weighted average distance from ABB factory to customers in Canada, which is an average of 1058 km by lorry. Packaging includes carton and reusable wood pallets.
<b>Installation</b>	During installation, the disposal of packaging were considered.
<b>Use</b>	Passive continuous use scenario was applied, and power loss was proportional to the rated current.
<b>End of life</b>	The default end of life scenario, 100% incineration without energy recovery, with assumption of 100 km transport to end of life scenario, was applied, in accordance with PEP guidelines.
<b>Benefits and loads beyond the system boundaries</b>	Benefits and loads beyond the system boundaries (Module D) have been considered. The Module D formula from PCR-ed4-EN-2021 09 06 was used.



## Environmental Impacts

Reference lifetime	20 years
Product category	Electrical switchgear and control gear solutions; Other Equipment
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	Use stage modelled using average energy datasets in Canada.
Geographical representativeness	Datasets used are representative of Canada; good quality geographical representativeness
Technological representativeness	Technological representativeness is of excellent quality, using primary data of energy consumption from manufacturing location.
Software and database used	SimaPro 9.6.0.1, Ecoinvent 3.10
<b>Energy model used</b>	
Manufacturing	Electricity, medium voltage {CA-QC}  market for electricity, medium voltage   Cut-off, U
Installation	No energy consumption occur during the installation stage.
Use	Electricity, low voltage {CA}  market group for electricity, low voltage   Cut-off, U
End of life	No energy consumption during the end of life stage.

BS225M-TCVCN Solar Ready Metersocket is a new product belonging to the BS series of Metersockets without circuit breakers. The PEP Ecopassport has already been published for this family of Metersockets with the code ABBG-00711-V01.01-EN and can be found at the link. For products covered by this PEP, the environmental impact for each life cycle stage can be obtained by multiplying the value of the indicator for the PEP reference product by the extrapolation factors provided in the PEP.

The BS225M-TCVCN Solar Ready Metersocket is not covered by this PEP, but it meets all the requirements to be considered part of a homogeneous family of Metersockets (it has the same main functionality and product standards and similar manufacturing technology). For this reason, the environmental impact listed below has been calculated in alignment with the extrapolation rules taken from PEP ABBG-00711-V01.01-EN.

# Common base of mandatory indicators

## Environmental impact indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits	
GWP	Total	kg CO2 eq.	5,90E+02	5,20E+01	8,18E-01	1,27E+00	5,30E+02	6,12E+00	-2,90E+01
	Fossil	kg CO2 eq.	5,62E+02	5,48E+01	8,18E-01	2,65E-02	5,00E+02	6,08E+00	-2,93E+01
	Biogenic	kg CO2 eq.	3,21E+00	-3,00E+00	-9,70E-05	1,24E+00	4,94E+00	2,86E-02	3,53E-01
	Luluc	kg CO2 eq.	2,53E+01	1,66E-01	2,37E-04	6,76E-06	2,51E+01	4,13E-03	-3,49E-02
ODP	kg CFC-11 eq.	3,76E-06	4,64E-07	1,18E-08	3,36E-10	3,23E-06	4,74E-08	-1,86E-07	
AP	H+ eq.	2,64E+00	4,84E-01	1,48E-03	1,82E-04	2,13E+00	3,01E-02	-1,70E-01	
EP	Freshwater	kg P eq.	4,78E-01	2,63E-02	4,76E-05	5,11E-06	4,50E-01	2,13E-03	-9,06E-03
	Marine	kg N eq.	4,80E-01	8,37E-02	3,01E-04	9,13E-05	3,89E-01	6,89E-03	-3,42E-02
	Terrestrial	mol N eq.	4,24E+00	9,11E-01	3,24E-03	8,40E-04	3,27E+00	5,70E-02	-3,75E-01
POCP	kg NMVOC eq.	1,53E+00	2,74E-01	2,02E-03	2,23E-04	1,23E+00	2,12E-02	-1,16E-01	
ADP	Minerals & metals	kg SB eq.	9,63E-03	2,69E-03	2,41E-06	5,47E-08	6,88E-03	7,04E-05	-3,99E-04
	Fossil	MJ	9,04E+03	3,09E+02	7,77E-01	4,18E-02	8,71E+03	2,74E+01	-1,85E+02
WDP	req. depr.	1,26E+02	1,48E+01	3,61E-02	1,43E-02	1,09E+02	3,08E+00	-6,30E+00	

## Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	7,43E+03	1,10E+02	9,40E-02	5,61E-03	7,32E+03	5,37E+00	-2,43E+01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,43E+03	1,10E+02	9,40E-02	5,61E-03	7,32E+03	5,37E+00	-2,43E+01
PENRE	MJ	9,04E+03	3,09E+02	7,77E-01	4,18E-02	8,71E+03	2,74E+01	-1,85E+02
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	9,04E+03	3,09E+02	7,77E-01	4,18E-02	8,71E+03	2,74E+01	-1,85E+02

## Use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	5,54E+01	5,91E-01	1,12E-03	4,84E-04	5,47E+01	7,66E-02	-1,87E-01

## Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	3,49E-02	7,94E-03	8,07E-05	2,00E-06	2,55E-02	1,45E-03	-4,06E-03
N-HWD	kg	6,69E+01	3,18E+00	8,25E-03	8,95E-03	5,52E+01	8,46E+00	-1,11E+00
RWD	kg	1,88E-01	4,34E-04	1,31E-06	6,89E-08	1,87E-01	7,37E-05	-1,61E-04

## Common base of mandatory indicators

### Output flow indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
CfRu	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MfR	kg	6,62E+00	5,25E-01	0,00E+00	0,00E+00	0,00E+00	6,10E+00	0,00E+00
MfER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

### Other indicators

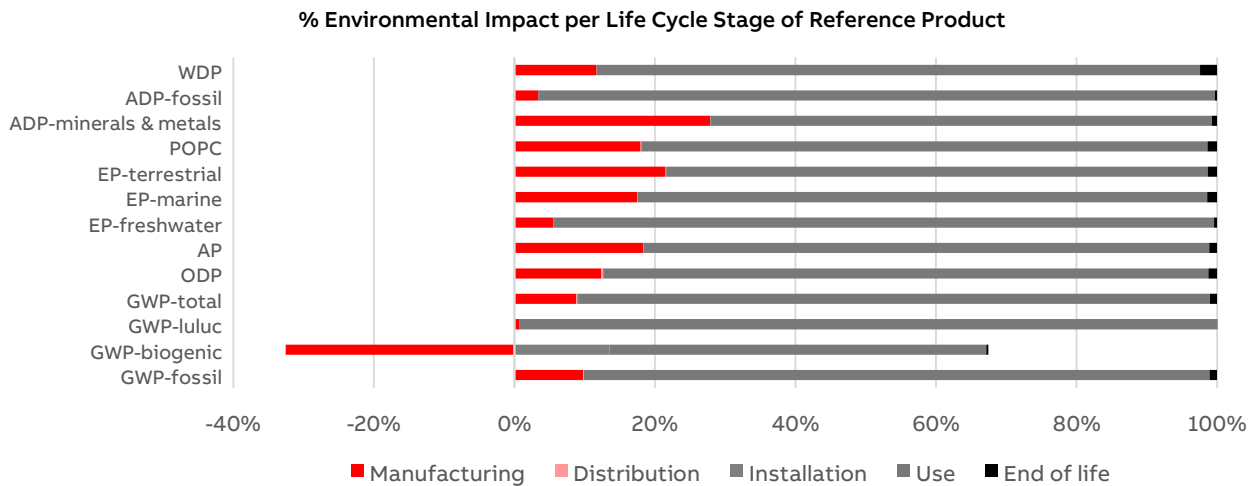
Indicator	Unit	Total
Biogenic Carbon	Product Packaging	kg of C kg of C
		9,61E-04 5,32E-01

### Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	1,65E+04	4,19E+02	8,71E-01	4,74E-02	1,60E+04	3,27E+01	-2,10E+02
Efp	Dise inc	1,38E-05	4,25E-06	6,35E-08	2,21E-09	8,84E-06	6,34E-07	-2,34E-06
IrHH	kBq U-235 eq	5,96E+02	1,69E+00	5,37E-03	2,74E-04	5,94E+02	3,02E-01	-6,45E-01
ETX FW	CTUe	4,13E+03	1,22E+03	3,17E+00	7,57E-01	2,67E+03	2,43E+02	-5,81E+02
HTX CE	CTUh	3,41E-06	2,16E-06	3,59E-09	2,88E-10	1,20E-06	5,31E-08	-1,54E-06
HTX N-CE	CTUh	1,15E-05	2,54E-06	1,00E-08	2,32E-09	8,18E-06	8,14E-07	-5,36E-07
IrLS	Pt	-8,70E+02	3,24E+02	9,41E-01	5,08E-02	-1,22E+03	2,05E+01	-9,82E+01



## Results summary and interpretation



The indicator that attracts most of the attention is the global warming potential (GWP) expressed in CO<sub>2</sub> emission equivalent. Majority of this impact (89.8%) comes from the use stage, due to the passive continuous power loss proportional to the rated current. The second biggest contributor (8.8%) is the manufacturing stage, which includes the production of raw materials and their further processing into the final product. The remaining life cycle stages have negligible impact.

The impact coming from the use stage has the greatest contribution to each environmental impact indicator. For each environmental indicator, it exceeds at least 70%. This suggests that actions taken to reduce energy losses during use stage could be beneficial from an environmental point of view.

It's worth noticing that GWP-biogenic indicator obtains negative values during the manufacturing stage. It's because of use of carton boxes and wooden pallets as packaging, which contain biogenic carbon. Biogenic CO<sub>2</sub> sequestered in these materials during manufacturing stage is then release again to the atmosphere during the waste treatment processing, included at the installation stage (aligned with -1/+1 approach).

# Glossary

## Environmental impact Indicators

GWP-total	Global Warming Potential total (Climate change)
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential
EP-freshwater	Eutrophication potential - freshwater compartment
EP-marine	Eutrophication potential - fraction of nutrients reachin marine end compartment
EP-terrestrial	Eutrophication potential - Accumulated Exceedance
POCP	Tropospheric ozone creation potential
ADP-minerals & metals	Abiotic Depletion for non-fossil resources potential
ADP-fossil	Abiotic Depletion for fossil resources potential
WDP	Water deprivation potential

## Resource indicators

PENRE	Use of non-renewable primary energy excluding renewable primary energy resources used as raw material
PENRM	Use of non-renewable primary energy resources used as raw material
PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw material.
PERM	Use of renewable primary energy resources used as raw material
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)

Secondary materials, water and energy resources		Waste category indicators	
SM	Use of secondary materials	HWD	Hazardous waste disposed
RSF	Use of renewable secondary fuels	N-HWD	Non-hazardous waste disposed
NRSF	Use of non-renewable secondary fuels	RWD	Radioactive waste disposed
FW	Net use of fresh water		
Output flow indicators		Optional indicators	
CfRu	Components for re-use	Tot PE	Total use of primary energy during the life cycle
MfR	Materials for recycling	Efp	Emissions of Fine particles
MfER	Materials for energy recovery	IrHH	Ionizing radiation, human health
EE	Exported Energy	ETX FW	Ecotoxicity, freshwater
		HTX CE	Human toxicity, carcinogenic effects
		HTX N-CE	Human toxicity, non-carcinogenic effects
		IrLS	Impact related to Land use / soil quality