

What are the life cycle inventory data of commercial PV technologies?

In this report, we present life cycle inventory data of commercial PV technologies that are the basis for life cycle assessment. The data pertain to mono-and multi-crystalline silicon (Si), cadmium-telluride (CdTe), copper-indium-gallium-selenide (CIGS / CIS), and perovskite silicon tandem PV.

What is a life cycle inventory (LCI)?

The life cycle inventory (LCI) phase of life cycle assessment (LCA) involves data compilation of materials and energy inputs, and emissions and product outputs for the complete life cycle of the system from cradle to grave. These data are separately collected or modeled for the PV modules and the balance of system (BOS).

What is a life cycle inventory (LCA)?

The life cycle inventory phase of LCA involves data compilation of materials and energy inputs, and emissions and product outputs for the complete life cycle of the system under analysis. For PV LCA, these data are separately collected or modeled for the PV modules and the balance of system (BOS).

What is life cycle assessment (LCA)?

Life Cycle Assessment (LCA) is a structured, comprehensive method of quantifying material- and energy-flows and their associated impacts in the life cycles of products (i.e., goods and services).

What are life cycle inventories?

Life cycle inventories. Inventories of material and energy inputs over the PV system life cycle were sourced from recent literature, current industry practices, and empirical data gathering to represent modern technology.

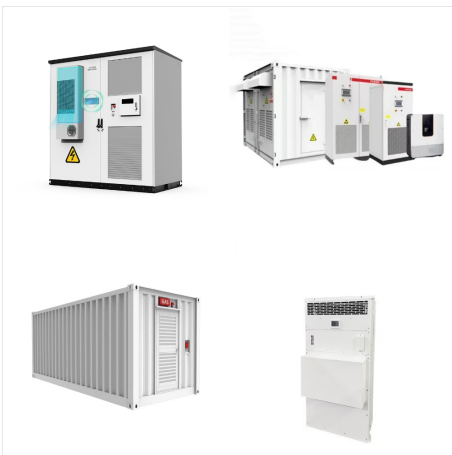
Which report provides an update of the life cycle inventory data?

This report provides an update of the life cycle inventory data in Section 5 of the previous report: V. Fthenakis, H. C. Kim, R. Frischknecht, M. Raugei, P. Sinha, M. Stucki, 2011, Life Cycle Inventories and Life Cycle Assessment of Photovoltaic Systems, International Energy Agency (IEA) PVPS Task 12, Report T12-02:2011.

LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



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This report presents the latest consensus LCA results among PV experts for five PV technologies: mono- and multi-crystalline Si, CdTe, CIGS, and HCPV. It also provides updated LCI data, PV ???

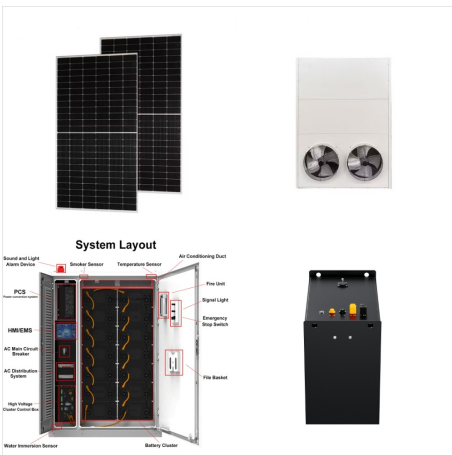


That is why the Life Cycle Inventory is typically illustrated with a flow model (image below). The flow model clearly shows the system and unit we are analyzing, and the inputs & outputs. The data within the model needs to be collected for all activities within the scope of our Life Cycle Assessment.

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Life Cycle Inventories and Life Cycle Assessment of Photovoltaic Systems, International Energy Agency (IEA) PVPS Task 12, Report T12-04:2015 2020: IEA-PVPS Report T12-19:2020 2021: Frischknecht, R. (Ed.) (2022). Environmental Life Cycle Assessment of Electricity from PV systems, 2021 data update. IEA-PVPS. Time Series Greenhouse Gas Emissions



This pioneering work employs the attributional and comparative life cycle assessment methodology to evaluate India's ambitious target of installing 100 GW of solar energy by 2022 and the FRELP method to study the circular economy prospects of the substantial PV waste it is expected to generate. Business as usual projections suggest that the intended ???



4.0 Life Cycle Inventory (LCI) 45
4.1 Life Cycle Input Energy (LCIE) 45
4.1.1 Cumulative Energy Demand (CED) 45
4.1.2 Embedded Energy 51
5. Life Cycle Assessments of Photovoltaic Systems in the APEC Region
I. Develop recommendation for report & guideline of economic and life cycle assessment of solar PV system for future development;

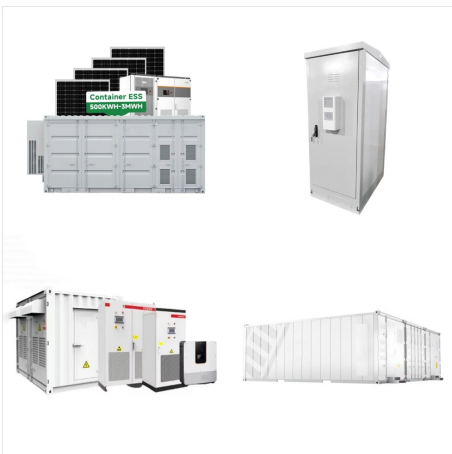
LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



IEA -PVPS -TASK 12 Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems i
INTERNATIONAL ENERGY AGENCY
PHOTOVOLTAIC POWER SYSTEMS
PROGRAMME Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems IEA PVPS
Task 12, Subtask 2.0, LCA Report IEA-PVPS
12-04:2015 January 2015 ISBN 978-3-906042-28-2



The components of the PV/hybrid energy system are the following: one 420 modules PV generator, seven three-phase grid-dependent inverters, three 1000 kW generators and one 500 kW generator. The ecoinvent database is used to model the life cycle inventory, and the IMPACT 2002+ methodology is used for the life cycle impact assessment.



Electricity generation is a key source to global emissions of greenhouse gases (GHG) and their related environmental impact. Sustainable development requires methods and tools to measure the environmental impacts of human activities for various products viz. goods, services, etc. Life-cycle analysis is an invaluable tool for evaluating the environmental profile of a product or ???

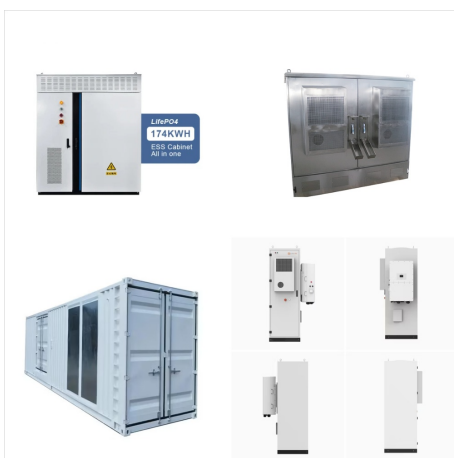
LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



Task 12 PV Sustainability ??? Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems 6 LIST OF TABLES Table 1: Examples of PV life cycle assessments Table 2: Bill of materials

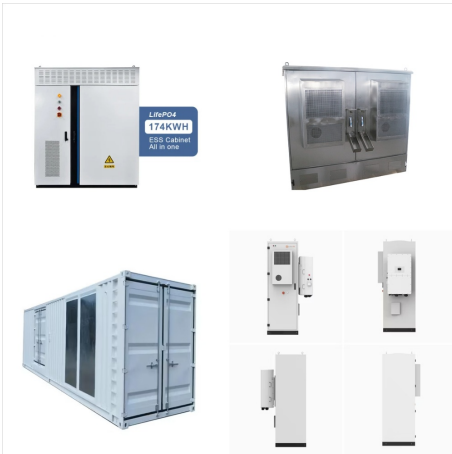


The present chapter is an overview about LCA (life-cycle assessment) of PV (photovoltaic) technology. Selected literature references are presented (based on certain criteria). A critical discussion is provided. The literature demonstrates that there are investigations for different types of PV technologies.



-3-907281-14-7 Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems . PHOTOVOLTAIC POWER SYSTEMS PROGRAMME Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems IEA PVPS Task 12: PV Sustainability Report IEA-PVPS T12-19:2020 December 2020 ISBN 978-3-907281-14-7 Operating Agents:

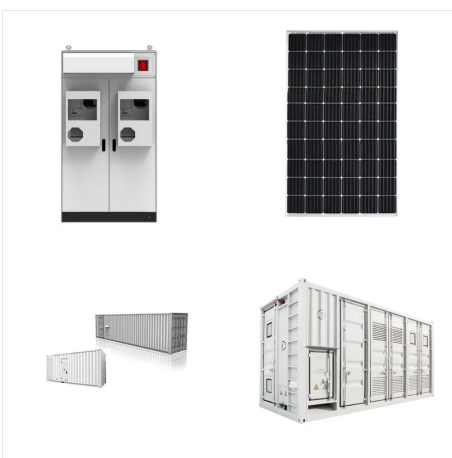
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Task 12's first objective focuses on employing Life Cycle Assessment (LCA) for detailing energy, material, and emission flows across PV life cycles, including human health assessments. The second objective involves advancing the circular economy for PV modules and system components through research and metric development.

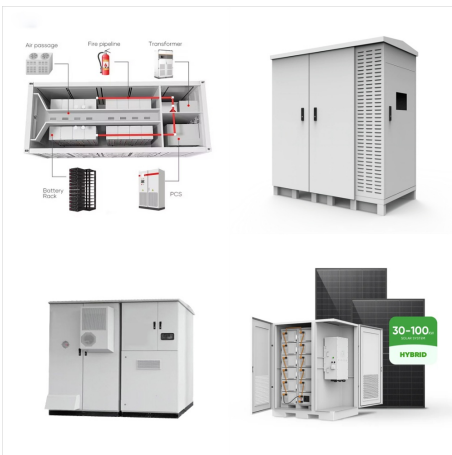


PDF | On Jan 1, 2011, V. Fthenakis and others published Life cycle inventories and life cycle assessment of photovoltaic systems | Find, read and cite all the research you need on ResearchGate

LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



2.1 Assessment Scope and Key Assumptions. The goal of the LCA study is to compare the global warming (GW) impact of PV systems with different PV module technologies taking into account the uncertainty sourced from the life cycle inventory (LCI) data used, considering 1 kWh as the functional unit.



Life cycle assessment (LCA) is a technique for assessing various aspects associated with development of a product and its potential impact throughout a product's life [4]. LCA stage includes definition of goal and scope, inventory analysis, impact assessment and interpretation of results as shown in Fig. 1 [5], [6], [7]. The goal and scope definition describes ???

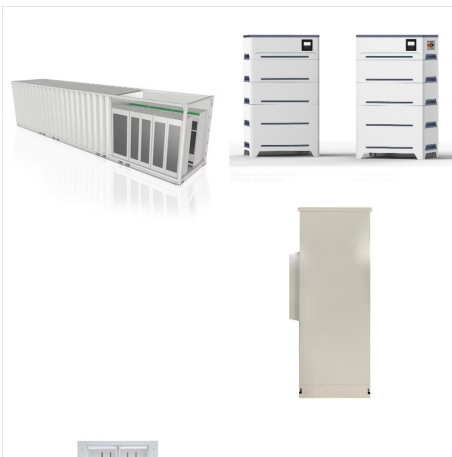


The emissions of criteria pollutants during the life cycle of a PV system are largely proportional to the amount of fossil fuel burned during its various phases, in particular, PV material processing and manufacturing; therefore, the emission profiles are close to those of the greenhouse-gas emissions (Fig. 6). Toxic gases and heavy metals can

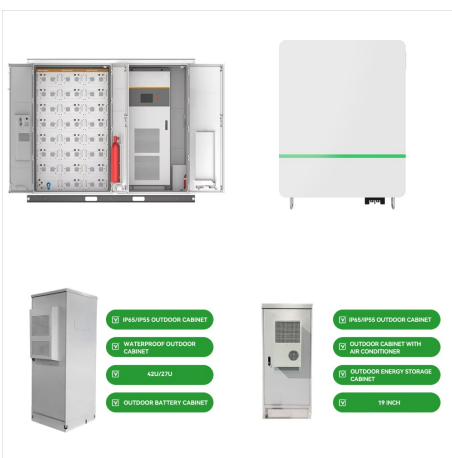
LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



The life-cycle cumulative energy demand (CED) [6] of a PV system is the sum total of the (renewable and nonrenewable) primary energy harvested from the geo-biosphere in order to supply the direct energy (eg, fuels and electricity) and material (eg, Si, metals and glass) inputs used in all its life-cycle stages (excluding the solar energy



N2 - Life Cycle Assessment (LCA) is a structured, comprehensive method of quantifying material- and energy-flows and their associated emissions caused in the life cycle 1 of goods and services. The ISO 14040 and 14044 standards provide the framework for LCA.



Most basic model of life cycle inventory modeling: an anthropogenic system with interventions to the environment, as inputs and outputs. (Fava et al. 1991, adapted) Basic model of life cycle inventory modeling: an anthropogenic system with interventions to the environment, distinguished in different types of flows. (Fava et al. 1991, adapted)

LIFE CYCLE INVENTORIES AND LIFE CYCLE ASSESSMENTS OF PHOTOVOLTAIC SYSTEMS



Task 12 PV Sustainability ??? Life Cycle Inventories and Life Cycle Assessments of Photovoltaic Systems What is IEA PVPS TCP? The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and ???



2.0 Life Cycle Assessment (LCA) 5 2.1 Life Cycle Inventory (LCI) 7 2.2 Life Cycle Impact Assessment (LCIA) 11 2.3 Framework 13 2.4 System Boundaries 16 2.5 Limitation and Problems 19 3.0 Life Cycle Cost Assessment (LCCA) 20 3.1 Life Cycle Cost (LCC) 20 3.2 Levelized Cost of Energy (LCOE) 22 3.3 Financial Supplementary Measures 23



Life cycle inventories and life cycle assessment of photovoltaic systems Life cycle inventories and life cycle assessment of photovoltaic systems. Vorschaubild nicht verf?gbar . Datum. 2015. Autor:innen. Frischknecht, Rolf . Itten, Ren? . Sinha, Parikhit .