



Considerations of resource availability in technology development strategies: The case study of photovoltaics

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ABSTRACT

Photovoltaic (PV) technologies have experienced considerable growth rates of up to 70% in the last years. This has been possible because of low total CO₂ emissions and a positive overall energy balance for PV. Several institutions have developed future scenarios which show an increase in global electricity demand from 17 000 TWh in 2005 to some 60 000 TWh by 2050. A significant part of this amount should be supplied by PV installations. Based on selected scenarios material demand is calculated for four different PV technologies: crystalline silicon (c-Si), amorphous silicon (a-Si) in tandem configuration, cadmium tellurium (CdTe) and copper indium gallium diselenide (CIGS). As these technologies use rare metals it is shown, that particular scenarios are unlikely to be realized because of supply constraints and scarcity phenomena. Critical materials are silver, tellurium and indium. We consider photovoltaics as an appropriate example for the implementation of resource availability considerations into technology development strategies.

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