



Sustainability Aspects for Terawatt-scale Photovoltaics

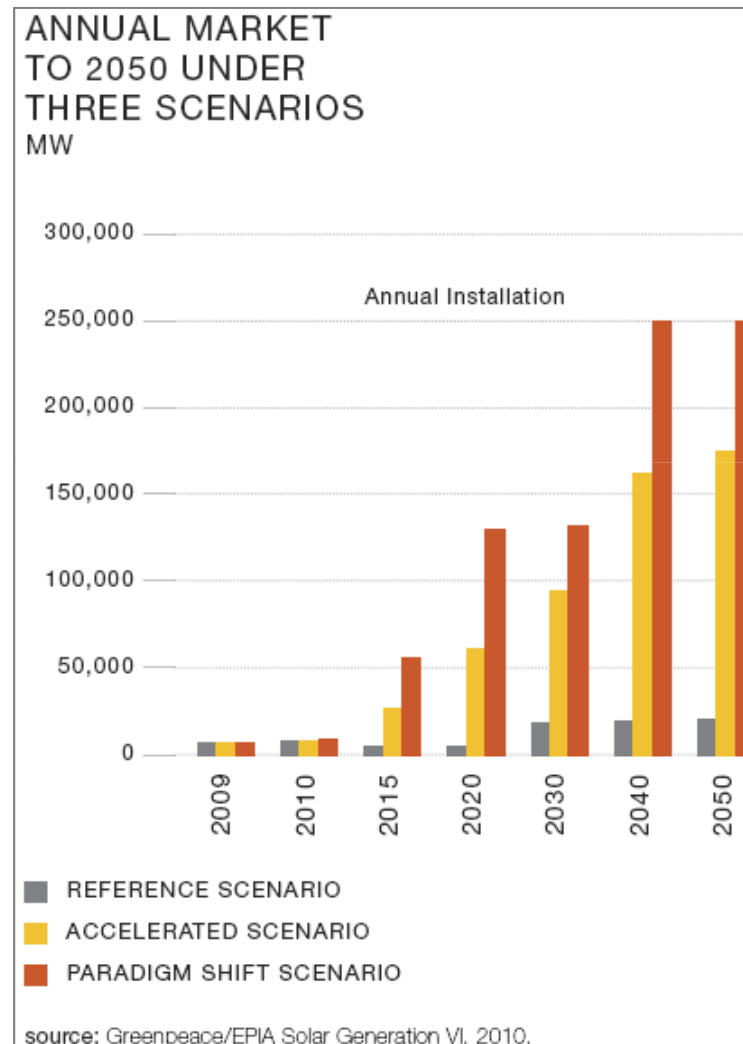
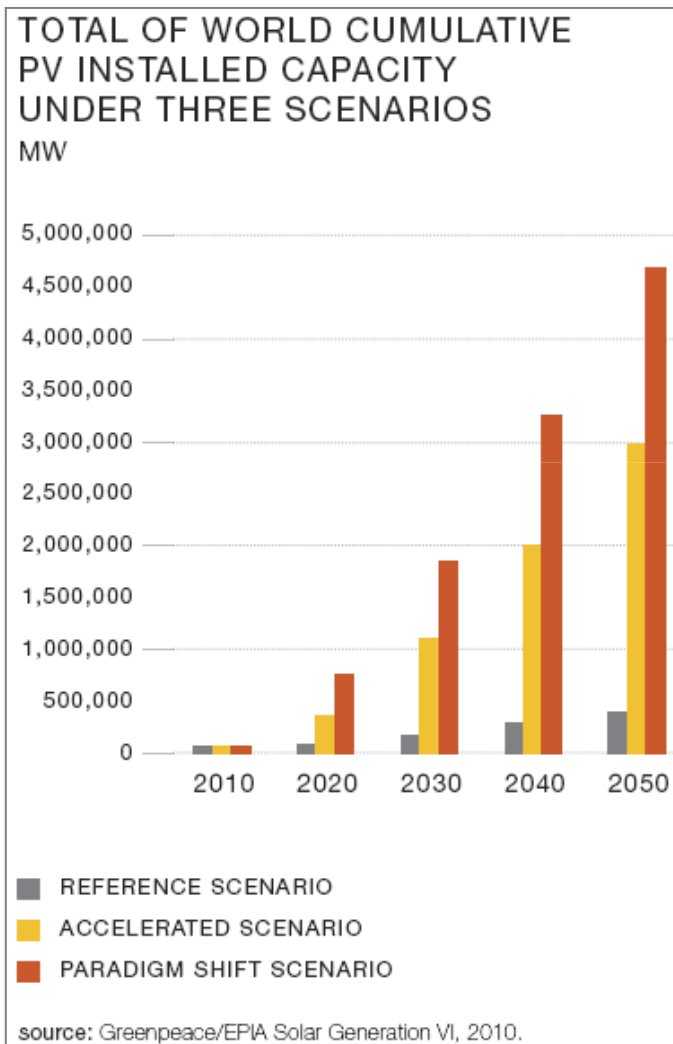
EUPVSEC26

8 September 2011

Hamburg, Germany

Parallel Event, EUPVSEC26, 8 September 2011

From GWs to TWs



From GWs to TWs



Year	2010 [GW]	2020 [GW]	2030 [GW]	2050 [GW]
Greenpeace* (reference scenario)	14	80	184	420
Greenpeace* ([r]evolution scenario)	18	355	1,036	2,968
Greenpeace* (advanced scenario)	21	439	1,330	4,318
IEA Reference Scenario	10	30	< 60	non competitive
IEA ACT Map	22	80	130	600
IEA Blue Map	27	130	230	1,150
IEA PV Technology Roadmap	27	210	870	3,155

* 2010 values are extrapolated as only 2007 and 2015 values are given

Sustainability: a *multi-dimensional concept*



- **Supply chain security**
- **Cradle-to-cradle approach**
- **Low (zero, or positive) impact:**
 - **manufacturing**
 - **installation**
 - **operation**
 - **decommissioning**
- **Public acceptance**
- **More**

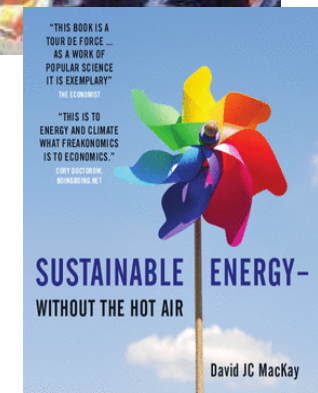
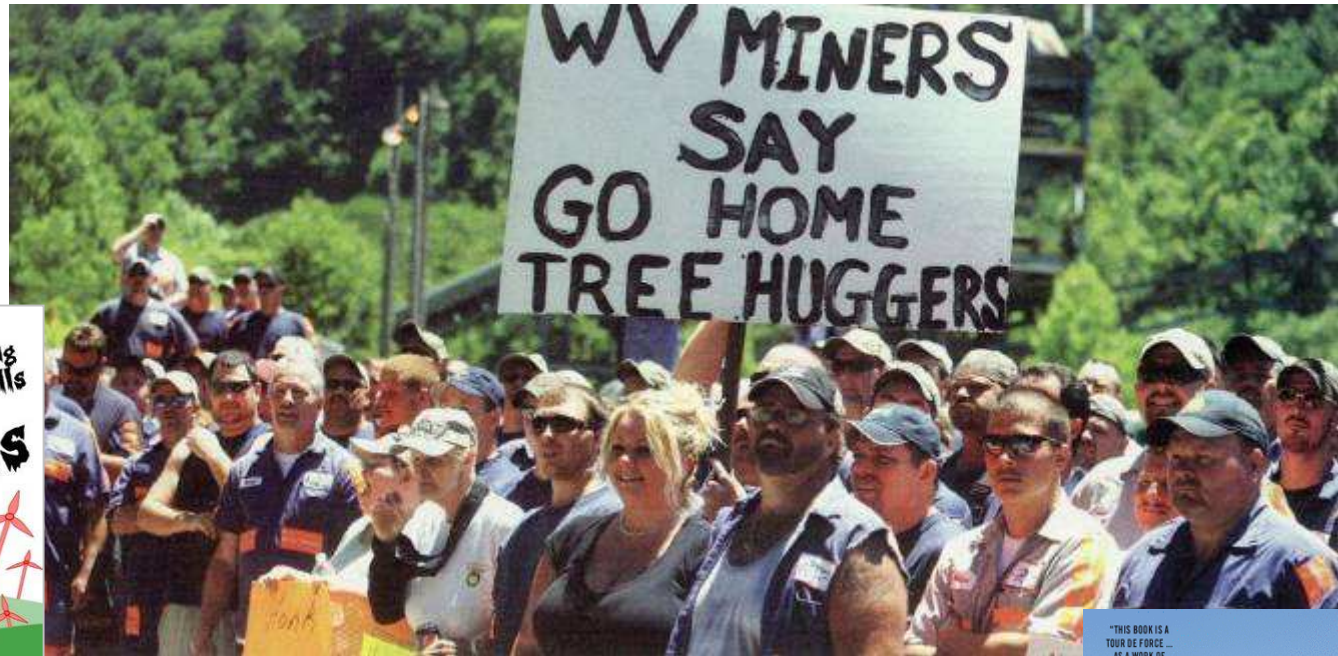
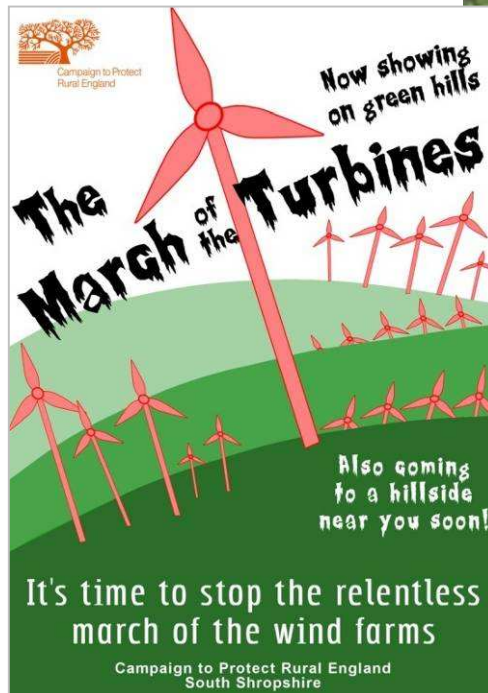
Public acceptance: *not to be taken for granted*



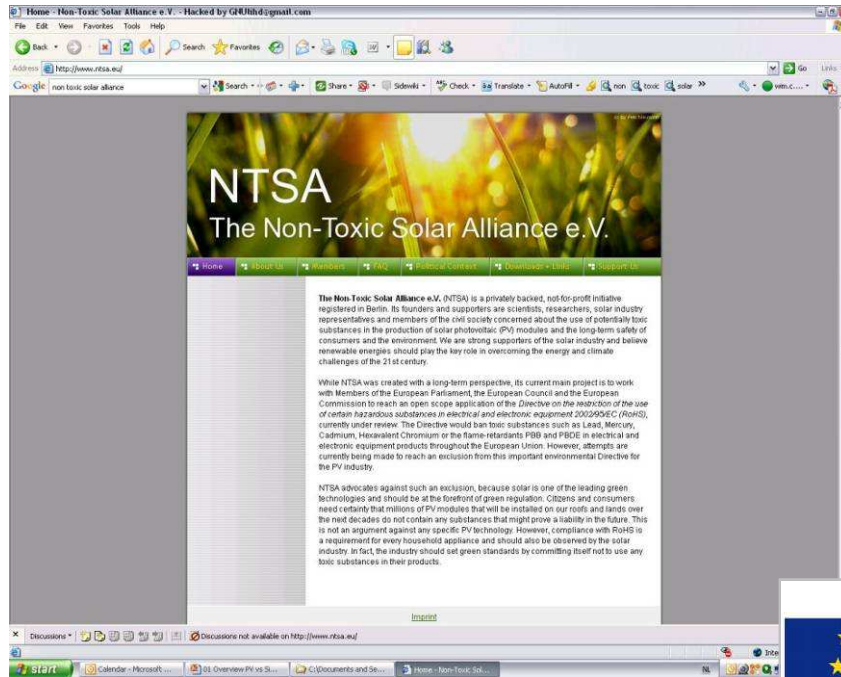
Courtesy
Michael
Marčák

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Public acceptance: *not to be taken for granted*



Sustainability: a hot (heated) debate



PhotoVoltaic
TECHNOLOGY PLATFORM

Photovoltaic technologies: the benefits of diversity

Photovoltaic (PV) solar cells and modules convert sunlight into electricity. A wafer-based as well as thin-film technologies are already commercially available and more are under development in laboratories and in pilot production. As a result, the technology as a whole is very robust. For instance, prices have come down considerably over the last 30 years and they are expected to show the same trend for decades to come.

Today's program



- **Ecofactories and PV manufacturing**
 - Klaus Eberhardt, M+W Group

- **Solar parks and their influence on biodiversity**
 - Andreas Wade, First Solar

- **Materials challenges for TW-scale PV**
 - Peter Rigby, Umicore

- **Sustainability of PV: quantifiable in external costs?**
 - Carol Olson, ECN

- **Panel discussion**

Panel discussion: *Major challenges for sustainable TW-scale PV*



- **What is the biggest challenge of all?**
- **Market incentives should be coupled to the availability of a sustainability analysis**
- **Solar power plants should get special incentives to be built on land of lower ecological value**

Panel discussion: *Major challenges for sustainable TW-scale PV*



- **External costs should be included in the definition(s) and discussions of grid parity**
- **Will sustainability requirements have significant impact on cost reduction at system and LCoE levels?**