The RE-SUPPLY project aimed to provide insight into the elements of the supply chains which are presently or can in the future evolve as critical constraints in further large-scale deployment of on- and offshore wind and solar photovoltaic.

The objectives of the study were twofold:

- **Risk assessment:** identify potential bottlenecks in the supply chain of wind and PV and assess their criticality and timelines for occurrence.
- **Risk management:** identify suitable mitigation strategies and recommend specific actions at policy and industry levels.

**PROJECT DELIVERABLES**

Report: Securing the Supply Chain for Wind and Solar Energy (RE-SUPPLY), Franz Lehner (E4tech), Ankur Rastogi (Avalon), Subhabrata Sengupta (Avalon), François Vuille (E4tech), Sabine Ziem (E4tech), November 2012

**PRESENTED AT:**

European Energy Wind Association, Brussels, 14-17 March 2011.
Renewable Energy World Europe, Milan, 7-9 June 2011; International Conference on Ocean, Offshore and Arctic Engineering, Rotterdam, 19-23 June 2011
Policy Book published by Earthscan, expected December 2012

**PROJECT EXECUTION**

Implementing E4tech (UK/France), Avalon Consulting (India)
Project Period: October 2011 – November 2012
Project Steering Group: Michael Paunescu, Natural Resources Canada (Chair); Georgina Grenon (France); Henriette Schweizerhof (BMU Germany); Stefan Nowak (IEA PVPS); Cash Fitzpatrick, Jim Ahligrimm (both DOE USA); Sascha van Rooijen (Ecofys) for IEA-RETD
Operating Agent
Operating Agent: David de Jager (Ecofys).

More information and downloadable report at WWW.IEA-RETD.ORG
Report Findings and Conclusions

25 BOTTLENECKS, INCLUDING SHOWSTOPPERS: the RE-SUPPLY analysis identified 25 bottlenecks across the wind and PV sectors, of which several are likely to severely constrain the deployment of these renewable energy technologies in the short to medium term if no adequate mitigation measures are undertaken at policy and industry level.

SHOWSTOPPERS FOR SOLAR PV: if no pro-active mitigation steps are taken, shortages of indium and silver are very likely to be showstoppers for the development of the PV technologies using these materials in the medium term, with the first effects probably felt from 2015. It will therefore be important that policy makers increase support for PV recycling and recovery, and enhance R&D into alternative cell materials. For industry it is important to focus R&D efforts on cell designs and manufacturing processes that reduce the dependency on critical metals, and evolve towards recycling-friendly cell and panel designs, and develop recycling technologies. Other highly critical bottlenecks which are likely to affect the large-scale deployment of PV, if solutions cannot be found, are grid capacity limitations, technical grid connection barriers and administrative and regulatory bottlenecks. Regulations to ease PV connection and enforce the upgrading of grids at fair return on investment are needed, in conjunction with widespread smart grid infrastructure.

OFFSHORE WIND CONFRONTED WITH MANY MORE BOTTLENECKS THAN ONSHORE WIND: due to the tougher environment and larger turbine sizes, the deployment of offshore wind appears much more vulnerable to supply chain bottlenecks than onshore wind, with several constraints affecting mostly, if not exclusively, offshore development (shortage of carbon fibre, lack of skilled personnel, shortage of vessels and port infrastructure). One of the most important solutions to tackle the highly critical bottlenecks in the wind supply chain are clear and long-term support policies that would de-risk the high capital investment required to expand supply chain capacity, e.g. investments in port infrastructure can only be attracted with long-term perspectives for offshore wind energy installations and O&M activities. Permitting and grid integration difficulties for new projects are also identified as highly critical constraints preventing large-scale deployment of wind energy. These type of barriers are in need of policy makers who create regulatory systems that match their ambitions for wind energy deployment. It is important for industry to continue to develop alternative designs to reduce the need for carbon fibre and rare earth materials.

BOTTLENECKS APPEAR IN THE NEXT 2 TO 6 YEARS: almost all wind and PV bottlenecks could appear within a two to six year timeframe, regardless of their nature. Some are actually already being felt today, such as the lack of skilled human resources. Now is the time to act, therefore, since many of the mitigating actions involve long lead times.

THE IMPACT OF ALL BOTTLENECKS CAN LARGELY BE MITIGATED WITH APPROPRIATE COMBINATIONS OF INDUSTRY AND POLICY MEASURES – 137 RECOMMENDED ACTIONS ARE PRESENTED IN THE RE-SUPPLY REPORT: the impact and the likelihood of occurrence of almost all of the bottlenecks identified can be reduced significantly, if not eliminated, by mitigating activities. While supply-demand imbalances can mostly be mitigated through robust long-term policies that aim at securing demand, most constraints on raw materials can be resolved by switching to alternative, more abundant materials. The RE-SUPPLY report recommends 137 actions that principally require industry or policy makers, and to a lesser extent NGOs, to take steps in the short term. Immediate steps range from carefully monitoring potential problems, to strengthening existing efforts, or initiating new activities.

REPORT CONTENT

1. Introduction
2. Project background and objectives
3. Approach and methodology (includes identification of bottlenecks, assessment of critically, bottleneck severity against deployment scenarios, interviews, mitigation strategies, recommendations)
4. Securing the supply chain of wind power
5. Securing the supply chain of solar photovoltaics (PV)
6. Financing of Offshore
7. Conclusions and recommendations
8. Appendices

ABOUT IEA-RETD

IEA-RETD is an Implementing Agreement under the International Energy Agency. RETD stands for “Renewable Energy Technology Deployment”. IEA-RETD is a policy-focused, technology cross-cutting platform that brings together the experience and best practices of some of the world’s leading countries in renewable energy with the expertise of renowned consulting firms and academia. Its mission is to accelerate the large scale deployment of renewable energies. Currently nine countries cooperate under this cooperation framework: Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, Norway and the United Kingdom. The Operating Agent of the IEA-RETD is David de Jager (Ecofys).

More information and downloadable report at WWW.IEA-RETD.ORG