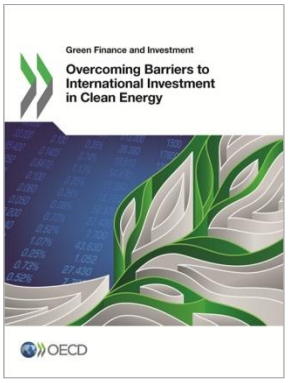
INVESTMENT Insights



Overcoming barriers to international investment in clean energy

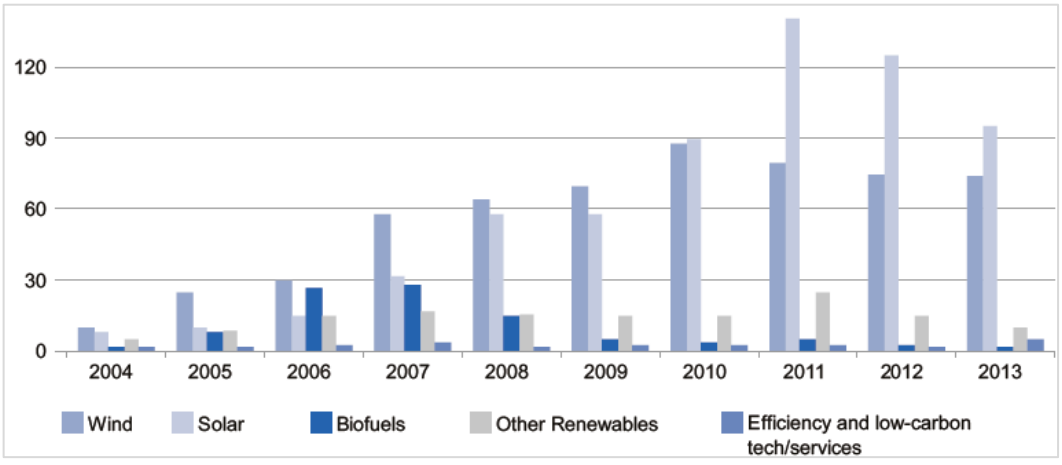
Geraldine Ang

Recognising the role of clean energy in addressing climate change and economic growth-related objectives[1], policy makers have provided significant policy support to its deployment over the past decade.[2] Globally, renewable-energy subsidies amounted to USD 121 billion in 2013.[3] At least 138 countries had implemented renewable-energy support policies as of early 2014.[4] Until the global financial crisis, many countries also supported clean energy through trade and investment liberalisation.

This article summarises key findings from a new OECD report on Overcoming Barriers to International Investment in Clean Energy.

The results were impressive. New investment in clean energy increased six-fold between 2004 and 2011, reaching USD 279 billion in 2011.[5] Solar and wind energy have received the largest share of new investment flows – USD 150 billion and USD 100 billion respectively in 2014 (see figure 1 for 2004-13 flows). International trade and greenfield FDI have strongly contributed to the growth of the solar- and wind-energy sectors. As a result, both industries – and especially solar photovoltaic (PV) energy – have been increasingly relying on Global Value Chains (GVCs).

Figure 1. G20 investment in clean energy by sector, 2004-13 (USD billion)



Source: The Pew Charitable Trusts (2014), "Who's Winning the Clean Energy Race? 2013"; Data from Bloomberg New Energy Finance (BNEF).

The success of early government support for clean-energy investment owes a lot to the principle of non-discrimination. Governments generally did not discriminate between foreign and domestic investors and maintained open trade regimes for intermediate inputs or finished products.

Government support takes a wrong turn

Governments have increasingly implemented green industrial policies to protect domestic PV and wind-turbine manufacturers, especially after the 2008 financial crisis, as a means to support domestic growth and employment.

Local-content requirements in particular became particularly prevalent. These typically require solar or wind developers to source a specific share of jobs, components or costs locally to be eligible for policy support or public tenders. Such requirements have been designed or implemented in solar and wind energy in at least 21 countries, including 16 OECD countries and emerging economies, mostly since 2009. Governments have set such requirements to achieve policy goals such as supporting domestic industries, creating local jobs and promoting exports and technology transfer.

In addition to setting LCRs, governments have also pursued such objectives through: granting preferential access to financing; improving export performance of PV and wind turbines through targeted measures; and setting technical barriers.[6]

The use of LCRs has led to five disputes at the WTO since 2010. Other policy-related distortions have given rise to a proliferation in trade disputes and retaliatory trade remedies[7] – mostly by developed countries, but increasingly from emerging economies.

Applied import tariffs and *de jure,* regulatory restrictions on FDI, such as limits on foreign ownership, remain relatively low in solar PV and wind energy.

What has been the impact of local-content (LCRs) requirements on investment in clean energy?

The report on ***Overcoming Barriers to International Investment in Clean Energy*** provides empirical evidences on the impact of LCRs on clean-energy investment, drawing on a new econometric analysis. While feed-in tariff (FiT) policies help attract international investment, LCRs in solar PV and wind energy mitigate the effectiveness of FiTs and have a detrimental effect on international investment flows.[8] This effect is measured based on cross-border investment flows in solar-PV and wind power generation between 2000 and 2011.[9] The estimated detrimental effect of LCRs is even slightly stronger when considering total investments (both international and domestic). This finding suggests that the

negative effect on international investment flows is not compensated by any positive impacts on domestic investment.

In addition, according to results from a new 2014 OECD Investor Survey, LCRs stood out as the main policy impediment for international investors in solar-PV and wind energy (table 2).

Table 1. Percentage of international investors from different segments of the solar and wind-energy value chains who identified LCRs as an impediment in the 2014 OECD Investor Survey

Solar PV energy		Wind energy	
Upstream and midstream	Downstream	Upstream or midstream	Downstream
75%	**73%**	**70%**	**72%**

Source: OECD 2014 Investor Survey on "Achieving a Level Playing Field for International Investment in Clean Energy"; Based on a sample of 42 international investor respondents. The results include responses from 8 international investors who operate across upstream, midstream and downstream segments.

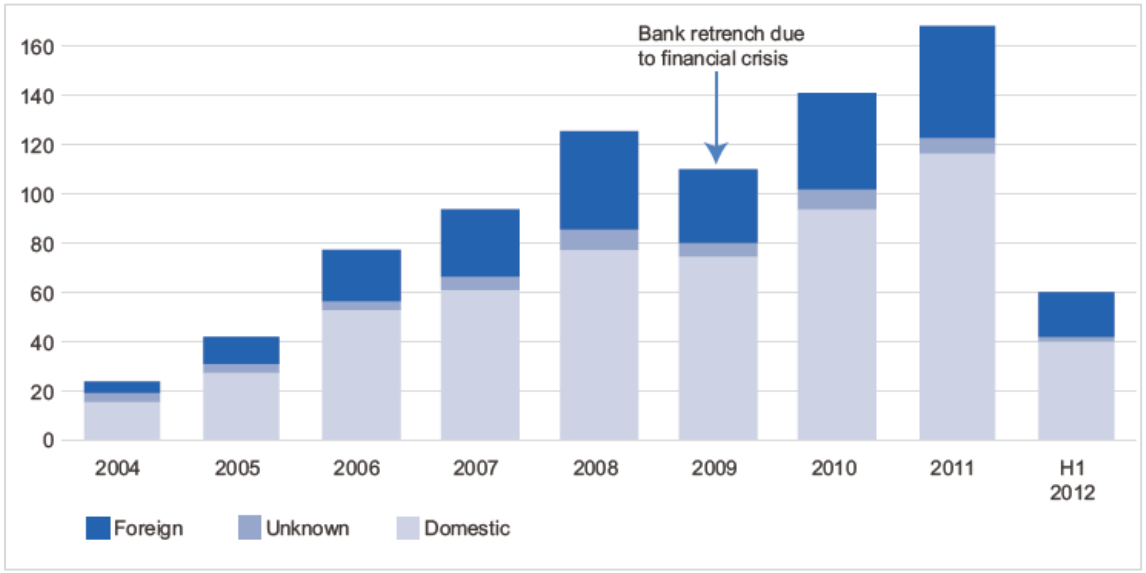
Several recent country experiences with LCRs in solar and wind energy suggest that:

- LCRs can raise the costs of downstream activities in the value chain, such as clean energy-based electricity generation, because they mandate the use of higher-cost domestic inputs.
- LCRs may not have been effective in several countries in generating domestic employment and added value across the solar and wind-energy value chains . This is particularly true in countries without sufficient domestic market size, manufacturing capability or local technical expertise.
- Removing LCRs helps support technology transfer and innovation.

Why can the clean-energy success story turn sour due to local-content requirements?

International investment accounts for an important share of clean-energy investment. Between 2004 and the first half of 2012, international investment has represented about one-third of asset finance[10] investment of utility-scale clean energy projects (figure 2).

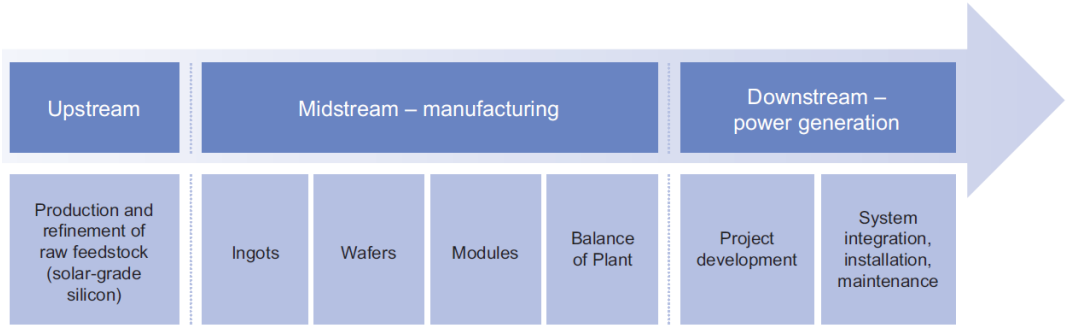
Figure 2. Global asset finance investment in green energy by origin of investor 2004 – first half of 2012 (USD billion)



Source: BNEF, 2013.

The solar PV and wind energy sectors in particular are increasingly global; Domestic solar-PV and wind-power generation relies on an increasing share of imported intermediate inputs, especially in the PV sector. This is consistent with a broader trend in which the emergence of global value chains has led to a growing specialisation in specific activities and segments of value chains. More than 70% of global trade is in intermediate goods and services and in capital goods.[11] As a result, policy restrictions such as LCRs can hinder the profitability of downstream power producers by raising the cost of inputs, or reducing overall demand as costs are passed through to consumers.

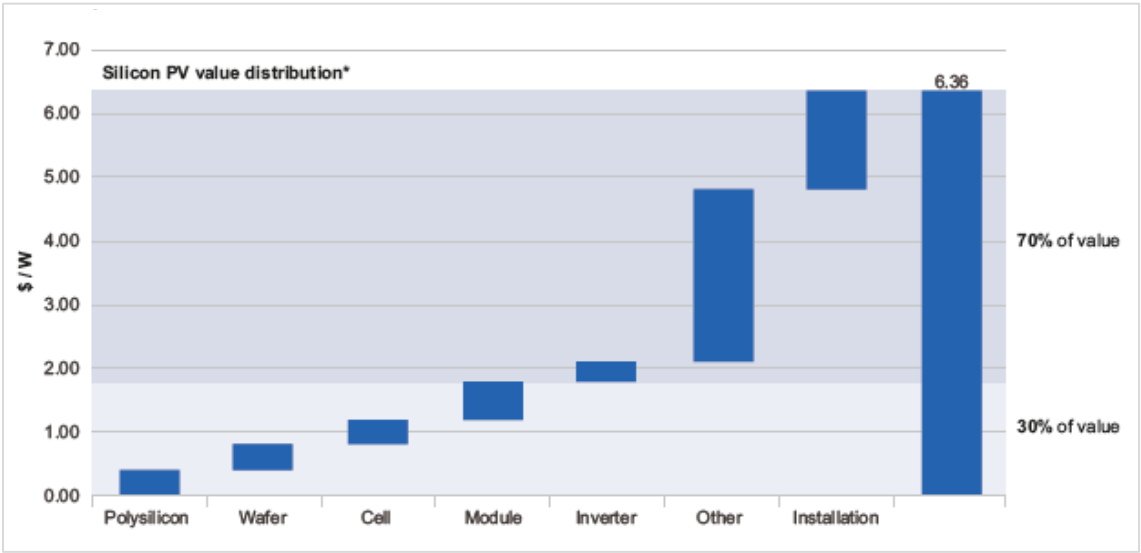
Figure 3. Overview of the solar-PV energy value chain (Crystalline silicon technology)



Source: OECD 2015, Overcoming Barriers to International Investment in Clean Energy, OECD Publishing, Paris. http://doi.org/10.1787/9789264227064-en.

Considering the solar PV and wind-energy value chains also highlights the relative importance of downstream activities in terms of value added, local jobs and investment. In the solar PV sector in particular, manufacturing activities represent only 18-24% of total jobs, as per recent estimates in the United States and worldwide. At least 50% of solar-PV jobs and value added are located in downstream activities. As a result, the desired positive impact of LCRs on local job creation and value added in midstream industries tends to be undermined by indirect negative effects on employment and value addition in downstream segments of the value chains. In addition, investment in downstream activities and infrastructure assets represents the bulk of total clean-energy investment. Globally, manufacturing equipment represented only 6% of new investment in renewable energy in 2013.[12] Measures targeting the manufacturing sector, such as LCRs, reduce total investment across the domestic solar PV and wind energy value chains by increasing input costs for downstream segments.

Figure 4. More than half of generated value lies downstream of module production



Sources: Natural Resources Defence Council (NRDC) (2012), *Laying the Foundation for a Bright Future: Assessing Progress Under Phase 1 of India's National Solar Mission,* Interim Report, April 2012; quoting GTM Research, 2011; European Photovoltaic Industry Association (EPIA) and Greenpeace, 2006, 2011; Rutovitz and Atherton, 2009; The Solar Foundation, 2011; Based on unsubsidised value chain analysis of U.S. silicon PV market. The results find roughly similar value distribution for thin-film technologies.

With the rise of global value chains in the solar-PV and wind-energy sectors, segments of value chains that account for a small share of value added (such as manufacturing) tend to be concentrated in a smaller number of countries. As such, national policies that restrict trade and investment in these segments, such as LCRs, can have disproportionately large cross-border effects.[13]

Policy conclusions

Early government support for investment in clean energy produced rapid results, and did not differentiate between domestic and foreign investment. Evidence suggests, however, that the use of LCRs creates distortions that have been detrimental to the solar-PV and wind-energy sectors.

Governments clearly should consider alternatives to LCRs to support their domestic solar-PV and wind-power industries. Policy options that would not restrict international trade and investment include:

- Well-targeted support to research and development (R&D) and innovation in solar and wind-power technologies
- Training programmes and promotion measures to build technological skills and local capability.
- Well-designed and predictable incentive measures (such as feed-in tariffs with no LCRs attached to them); and
- More effective carbon pricing instruments (such as carbon taxes and tradable permits).

Creating a stable and predictable policy environment for both domestic and international investment in clean-energy generation is critical, as emphasised in the OECD *Policy Guidance for Investment in Clean Energy Infrastructure.*[14] Supporting open, competitive and demand-driven solar-PV and wind-energy sectors would help sustain the trend towards cost reductions and make renewable energy more competitive vis-à-vis fossil-fuel energy. This, in turn, would reduce the cost of policy support to clean energy. Evidence-based analysis is needed to improve the coherence of clean-energy support policies and reduce their cost. International co-operation is also needed to align trade and investment policy in clean energy, including to responding to the escalation of local-content requirements.

The time is right for governments to address policy misalignments across the clean-energy value chains, and to ensure their climate change, energy, trade and investment policy are consistent and coherent, in order to support the cost-effective transition to a low-carbon economy. ■

For more information about the OECD report ***Overcoming Barriers to International Investment in Clean Energy***, please visit:

www.oecd.org/daf/inv/investment-policy/clean-energy-infrastructure.htm

Notes

[1] International investment in clean energy needs to be scaled up significantly in the coming years to contribute to mitigating climate change. The IEA estimates that to be on course for a low carbon future, cumulative investment in low-carbon energy supply and energy efficiency will need to reach USD 53 trillion by 2035. That is only 10% more than the USD 48 trillion that would likely be invested in any case in the energy sector under a "business-as-usual" scenario. Investing in clean energy also creates economic opportunities for developed and developing countries, including: facilitating cost-effective access to decentralised energy in rural and remote areas; reducing local air pollution; and stimulating innovation and technology transfer through international trade and investment. In addition, fossil-fuel subsidy reform can improve the balance of payments and energy security for fossil-fuel importing countries. It also can relieve pressure on national budgets in countries that subsidise fossil fuels.

[2] "Clean energy" as defined here includes the following sectors: electricity generation from renewable energy sources (i.e. solar, wind, small and large hydroelectric, geothermal, marine, biomass and waste-to- power plants), energy-efficient technologies such as smart grids, and carbon capture and storage (CCS) technologies.

[3] IEA (2014), *World Energy Outlook 2014,* OECD/IEA Publishing, Paris.

[4] REN21 (2014), *Renewables 2014: Global Status Report,* Renewable Energy Policy Network for the 21st Century.

[5] Investment then declined in 2012 as a result of excess capacity, declining prices and reductions in public support, leading to market consolidation

[6] Such as divergent national standards (i.e. national standards that differ from international standards) in wind energy.

[7] Since 2010, countries have imposed nine anti-dumping (AD) and seven countervailing duties (CVD) on products associated with solar-PV or wind energy, and launched 24 WTO AD and CVD investigations (excluding trade disputes linked to upstream production of raw materials; updated as of August 2014). Trade remedies include: anti-dumping duties (i.e. duties levied on imported commodities, which can be equal to the dumping margin) and countervailing duties (i.e. additional levies imposed on imported goods to offset subsidies provided to producers or exporters by the government of the exporting country), which are authorised under the World Trade Organization (WTO) rules to defend domestic producers against the alleged use of unfair dumping or actionable subsidies.

[8] FiT policies include FiTs or a FiT premiums (or bonuses). The study does not consider LCRs attached to a loan or a tender.

[9] This analysis uses the Bloomberg New Energy finance (BNEF) database to construct measures of international (i.e. cross-border) investment flows, including inflows and outflows. From this database, the OECD extracts 4 601 bilateral flows that: originate from 72 different countries and flow to 64 countries (representing most countries with a FiT policy); span the 2000-2011 time period; and cover investment in wind and solar PV power generation. The current lack of corresponding data on the domestic framework conditions prevents extending the time period beyond 2011.

[10] As defined by BNEF (2012), asset finance for investment in renewable energy includes electricity generation and biofuels production assets that meet the following size criteria: 1MW or larger for biomass and waste, geothermal, solar and wind-energy generation; 1-50 MW for hydroelectric projects, any size for marine-energy projects, and 1m litres per year or greater for biofuel projects. The financing of carbon capture and storage and energy-smart technologies, along with M&A and refinancing deals are excluded.

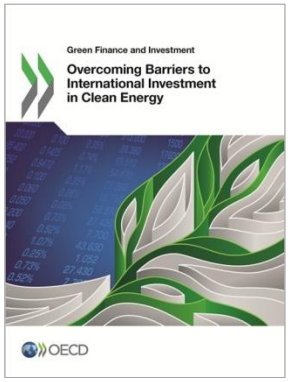
[11] OECD, WTO and World Bank Group (2014), *Global Value Chains: Challenges, Opportunities and Implications for Policy,* Report prepared for submission to the G20 Trade Ministers Meeting Sydney, Australia, 19 July 2014.

[12] I.e. USD 12 billion out of USD 214 billion; Frankfurt School-UNEP Centre (FS-UNEP) and BNEF (2014), *Global Trends in Renewable Energy Investment 2014*, Frankfurt School of Finance & Management.

[13] OECD, WTO and World Bank Group (2014), *Global Value Chains: Challenges, Opportunities and Implications for Policy,* Report prepared for submission to the G20 Trade Ministers Meeting Sydney, Australia, 19 July 2014.

[14] OECD (2015), *Policy Guidance for Investment in Clean Energy Infrastructure: Expanding Access to Clean Energy for Green Growth and Development,* OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264212664-en.

INVESTMENT Insights



OECD Publishing
9 June 2015

Overcoming Barriers to International Investment in Clean Energy

The perceived potential of clean energy to support employment in the post-crisis recovery context has led several OECD and emerging economies to design green industrial policies aimed at protecting domestic manufacturers, notably through local-content requirements (LCRs). These typically require solar or wind developers to source a specific share of jobs, components or costs locally. Such requirements have been designed or implemented in the solar- and wind-energy sectors in at least 21 countries, including 16 OECD countries and emerging economies, mostly since 2009.

Empirical evidence gathered in this report shows however that LCRs have actually hindered international investment across the solar PV and wind-energy value chains, by increasing the cost of inputs for downstream activities. This report also takes stock of other measures that can restrict international investment in solar PV and wind energy, such as trade remedies and technical barriers. This report provides policy makers with evidence-based analysis to guide their decisions in designing clean-energy support policies.

For more information about this report, please visit:
www.oecd.org/daf/inv/investment-policy/clean-energy-infrastructure.htm

© OECD 2015. Investment Insights may be reproduced with appropriate source attribution. Investment Insights is a publication of the OECD's Investment Division. The opinions expressed and arguments employed herein are those of the author and do not necessarily reflect the official views of the Organisation or of the governments of its member countries. This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. This report describes research by the author and is published to stimulate discussion. The currency used is US dollars unless otherwise stated. Find out more about our work at www.oecd.org/daf/investment.