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The case of local assembly of PV panels in Senegal

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## 5C. TRACK THEME 9: FOSTERING INNOVATION AND INDUSTRIAL DEVELOPMENT IN GLOBALIZED INNOVATION SYSTEMS: POLICY CHALLENGES IN A MULTIPOLAR WORLD ECONOMY (II)

### Niche development and upgrading in the PV value chain: The case of local assembly of PV panels in Senegal

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**KEYWORDS: Upgrading, Global Value Chain, Photovoltaic, Innovation system, Assembly factory**

#### 1. Relevance

The paper presents a case study of the enabling and constraining factors for establishing an assembly factory for PV panels in Senegal. Within the last 5-6 years the market for both small and large scale PV has rapidly increased in Sub Saharan Africa (SSA)(Hansen et. al., 2014, 2015) and to stimulate and to service these markets assembly factories for PV panels has been established in South Africa, Ethiopia, Kenya, Burkina Faso and Senegal. So far, no research analysing the enabling and constraining factors for this upgrading or innovation has been published, and the paper is therefore both original and relevant with respect to the object of research. Establishment of assembly factories in a developing country context can be conceptualised not only in terms of development of a niche in a local innovation system, but also as upgrading in the global PV value chain influenced by national and international innovation policies. By combining the multilevel perspective on technological transitions and the value chain approach in studying establishment of local PV assembly factories the paper is adopting recent approaches to studying innovation systems in developing countries, and it conforms with the wish from the organisers to integrate these approaches as expressed under Track theme 9.

#### 2. Research aim(s) and question(s)

The aim of the research is to understand the conditions for technological transition through upgrading in global value chains in developing countries and hence to contribute to insight on the effects of national innovation policies and on the opportunities for development of viable niches for green tech companies in SSA

The main research question is: What are the main enabling and constraining factors for upgrading in the PV value chain in terms of establishing and maintaining a local production of PV panels in Senegal

#### 3. Definitions

The global value chain (GVC) provides a framework with which to describe the full range of activities required to bring a product or service from conception, through the different phases of production, to delivery to the final consumers and end-users in the market (Kaplinsky and Morris, 2003)

The GVC literature defines upgrading in terms of process upgrading, product upgrading, functional upgrading and inter-chain upgrading (Humphrey and Schmitz, 2002), or as matching market standards (Bolwig et al., 2010)

A defining characteristic of niches is that they provide temporary 'protective space' or incubation rooms for development of innovations (Geels, 2002).

#### 4. Theoretical frameworks

In order to grasp the strong influence of international linkages in the development of a national innovation system in Senegal, the analysis will combine insights from the multilevel perspective on technological transitions (MLP) (Geels, 2002), and the global value chain framework (Gereffi, 1999; Humphrey and Schmitz, 2002; Gereffi et al., 2005).

#### 5. Empirical materials

This paper is based on 8 key interviews with main stakeholders related to the assembly factory. These interviews

include actors directly involved in the factory such as: (1-3) the main shareholder and owner of the factory, the former CEO and the former product head. Actors involved at the policy level such as: (4-6) the minister of Renewable Energy from 2010 to 2012, the head of the climate committee (COMNAC) from 2010 to 2013 and the head of the climate committee from 2013-2016. Finally, two interviews (7-8) were conducted with a civil society actor and an importer and distributor of PV panels

#### 6. Description of the methodologies

The interview persons were by actors in the energy sector identified as key actors in establishing a local niche for development of solar PV in Senegal. Five of the interviews were recorded and transcribed, while for the last 3 interviews, minutes were written immediately after the interview based on notes taken during the interview. Information from the interviews has been triangulated by information from the grey literature, such as reports to donors, consultancy reports, statistics, etc. and by information from newspapers and articles available on the internet. Last and not least, important information and conclusions have been discussed with individuals in the energy sector, with whom the author have had a longer term working relationship through projects in the energy and climate sector in Senegal and in the West African Region in the period from 2010-2016.

#### 7. Expected outcomes

The scientific outcomes are improved understanding of technological transitions and upgrading in LDCs.

The preliminary conclusions are that upgrading in the PV value chain is challenging because the comparative advantages of national assembly of solar PV are questionable compared to the importance of being well connected in the value chain. The case shows that: i) it is important to include strategic investors, who are already well established at different levels of the value-chain in order to get inputs at a competitive price and to get access to markets; ii) national capital investment in PV assembly had an impact on national policy development due to direct political connections and influence at high level and due to enthusiasm among local PV value chain actors, iii) that the timing for establishing the factory in this case was bad because of a number of factors such as: a) regional unrest that destroyed or delayed the regional markets, b) a significant reduction in sales prices due to changes in FIT in Europe, and c) that the policy environment was dramatically changed due to the fall of president Wade in 2012.

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