Industry Dynamics in the Energy Transition

The Interrelation between Regional and Global Processes

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Overview

1. Challenges of the Energy Transition
2. Conceptual approaches to industry formation
3. Local market formation for PV in Germany
4. Globalization of industry structures
5. Outlook

1. Challenges of the Energy Transition

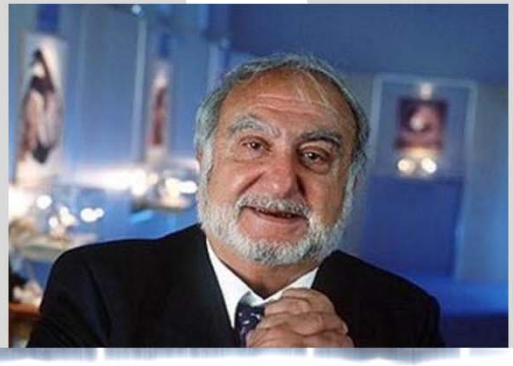
- Develop new industries: Nurture “hopeful monstrosities”
  - Lacking performance and cost competitiveness
  - High number of implementation barriers
- Transitioning the energy sectors: Overcome path dependencies
  - Resistance of incumbents: Sunk costs and disruptive innovations
  - Resistance of users: Perceptions and use patterns
- Long term orientation of policy: Beyond the four years cycle
  - Enable learning and institutional embedding
  - A challenge for cost-benefit analyses

➔ A major socio-technical transformation process is needed!

1. Challenges of the Energy transition

- Create new industries: lots of unsuccessful projects

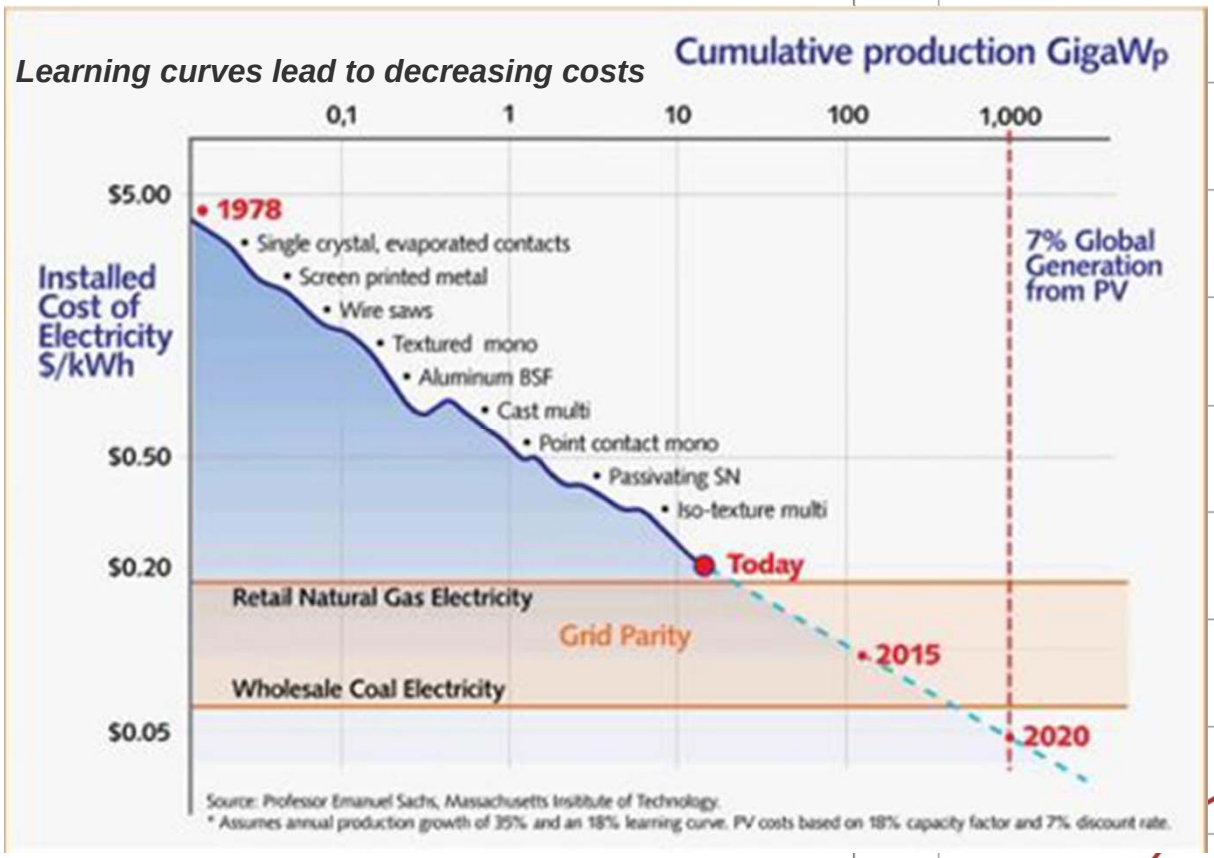
Territorial innovation system

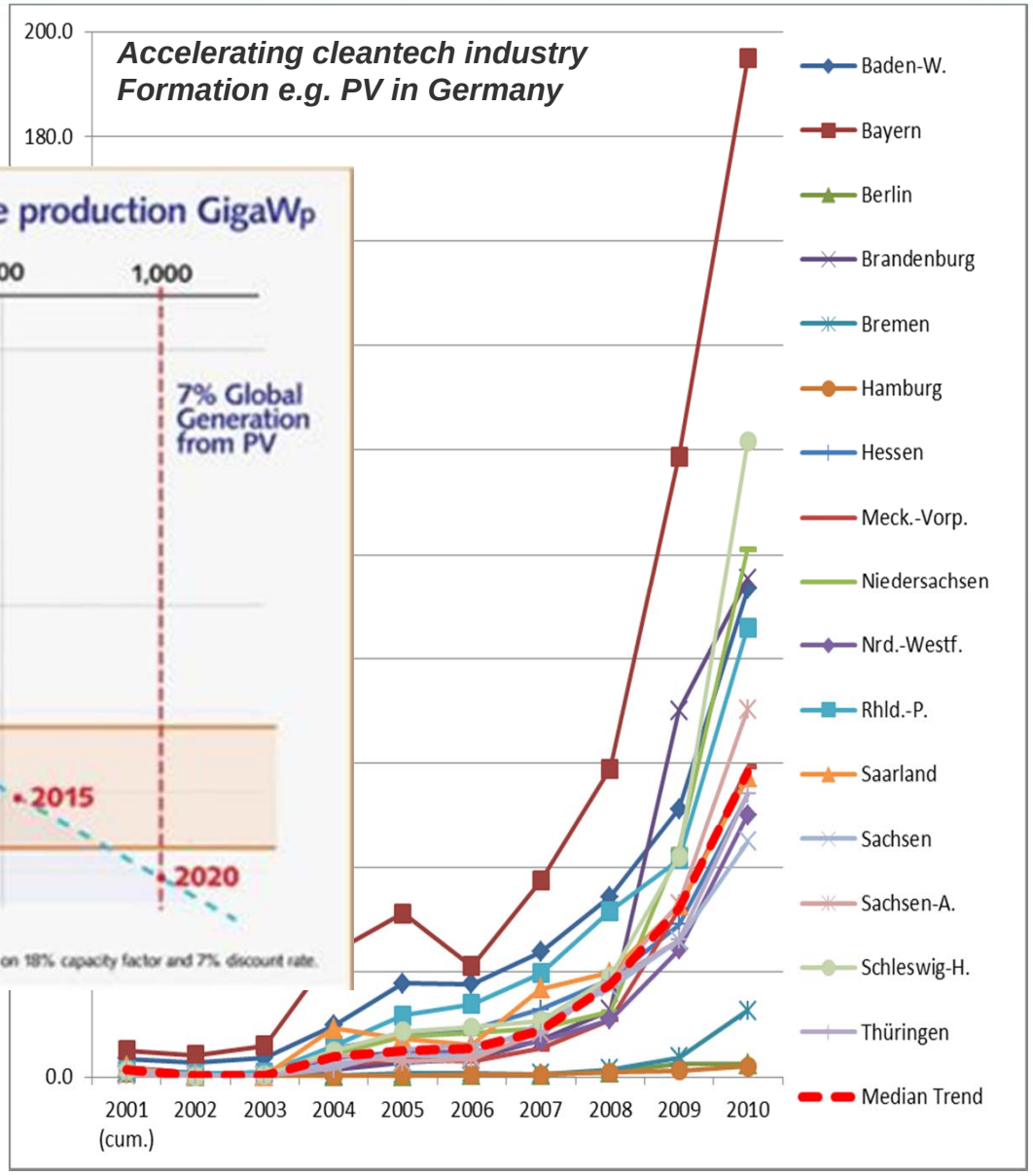


Technological innovation system

1. Challenges of the Energy Transition

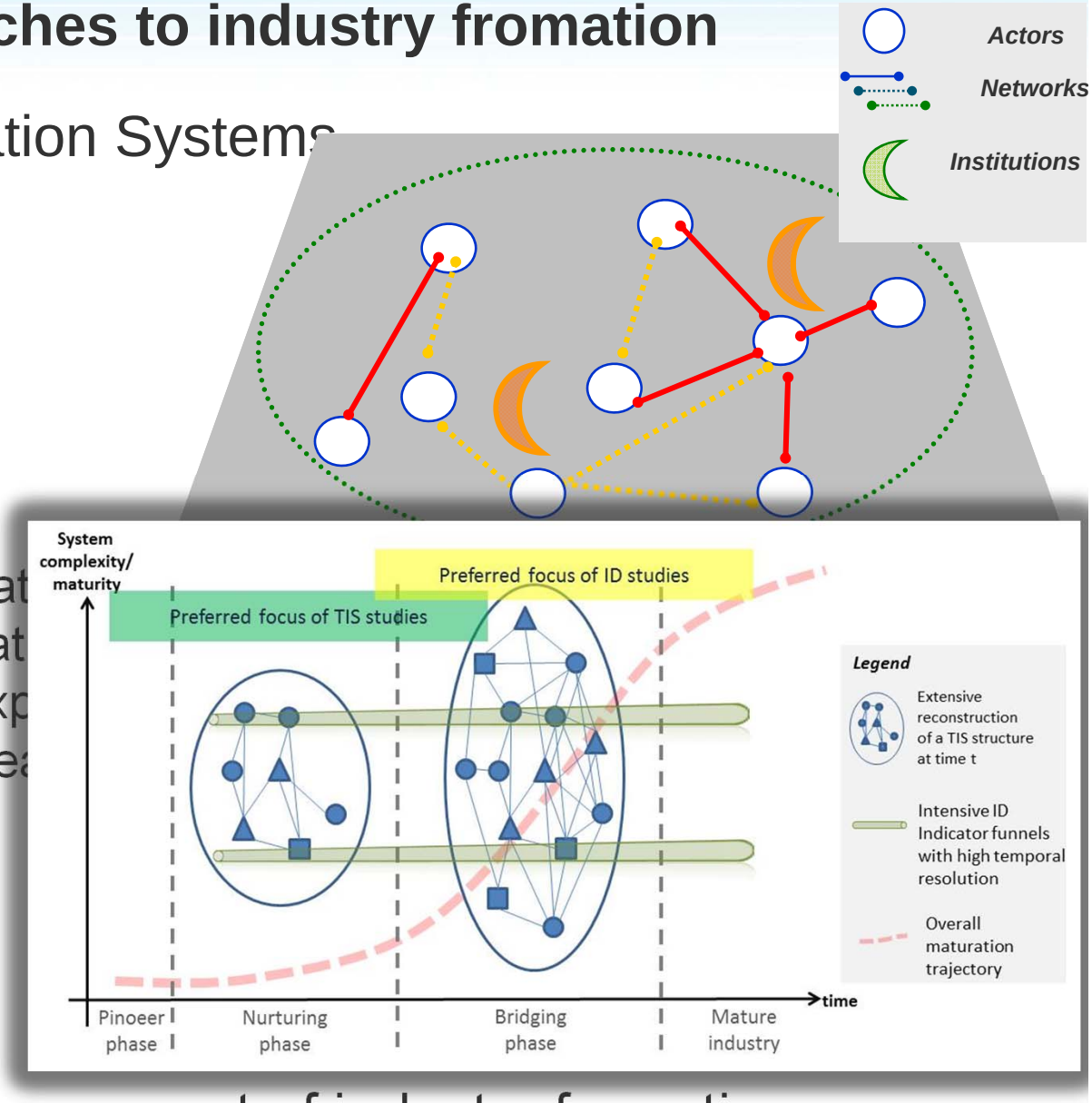
- Actual industry dynamics





2. Conceptual approaches to industry fromation

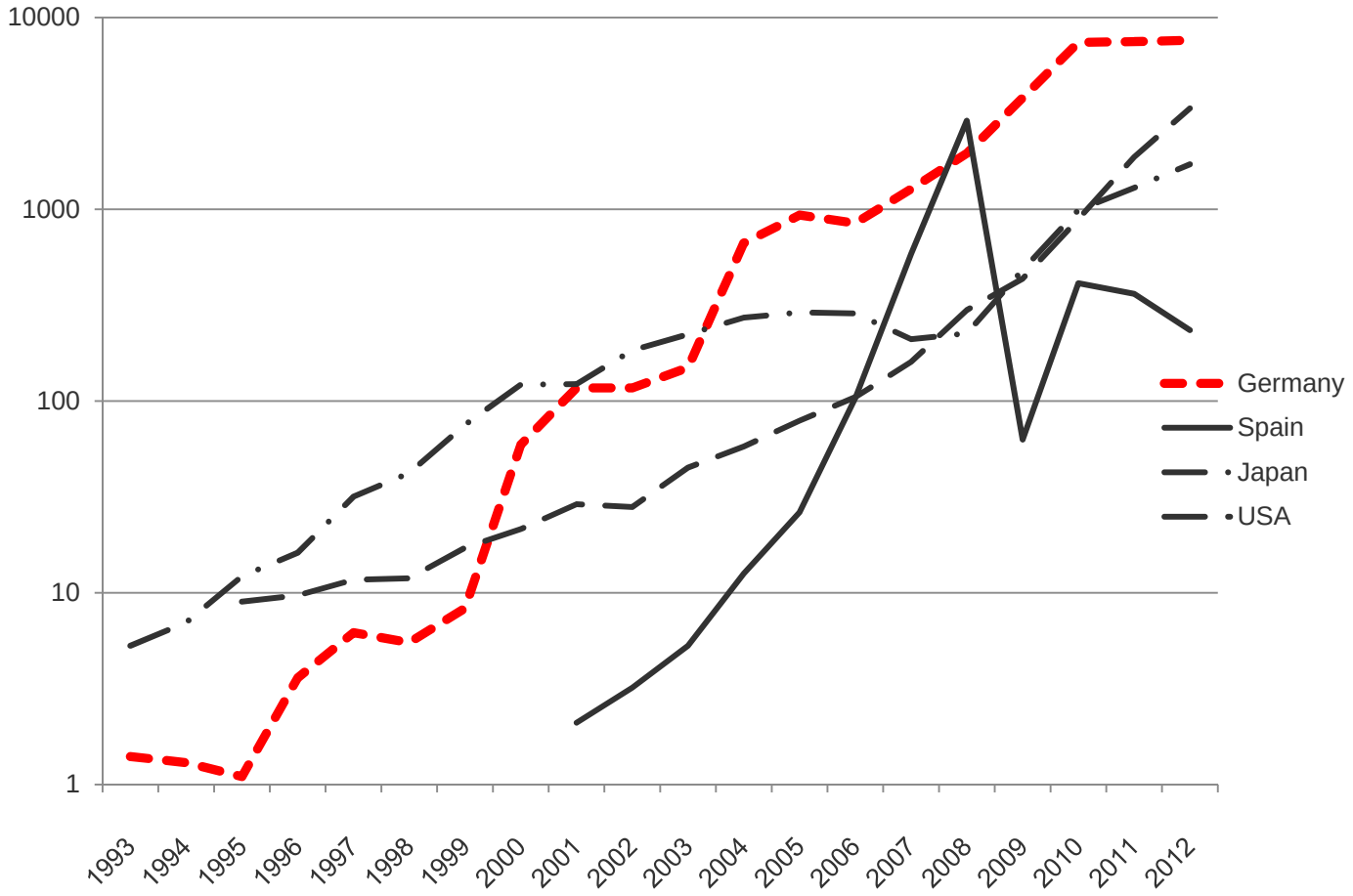
- Technological Innovation Systems
  - ➢ Structural analysis
    - Actors
    - Networks
    - Institutions
  - ➢ Functional analysis
    - Knowledge generat
    - Resource mobilizat
    - Entrepreneurial exp
    - Guidance of the se
    - Market formation
    - Legitimacy
  - ➢ Dynamics



➔ Enables systemic assessment of industry formation

3. Local market formation for PV in Germany

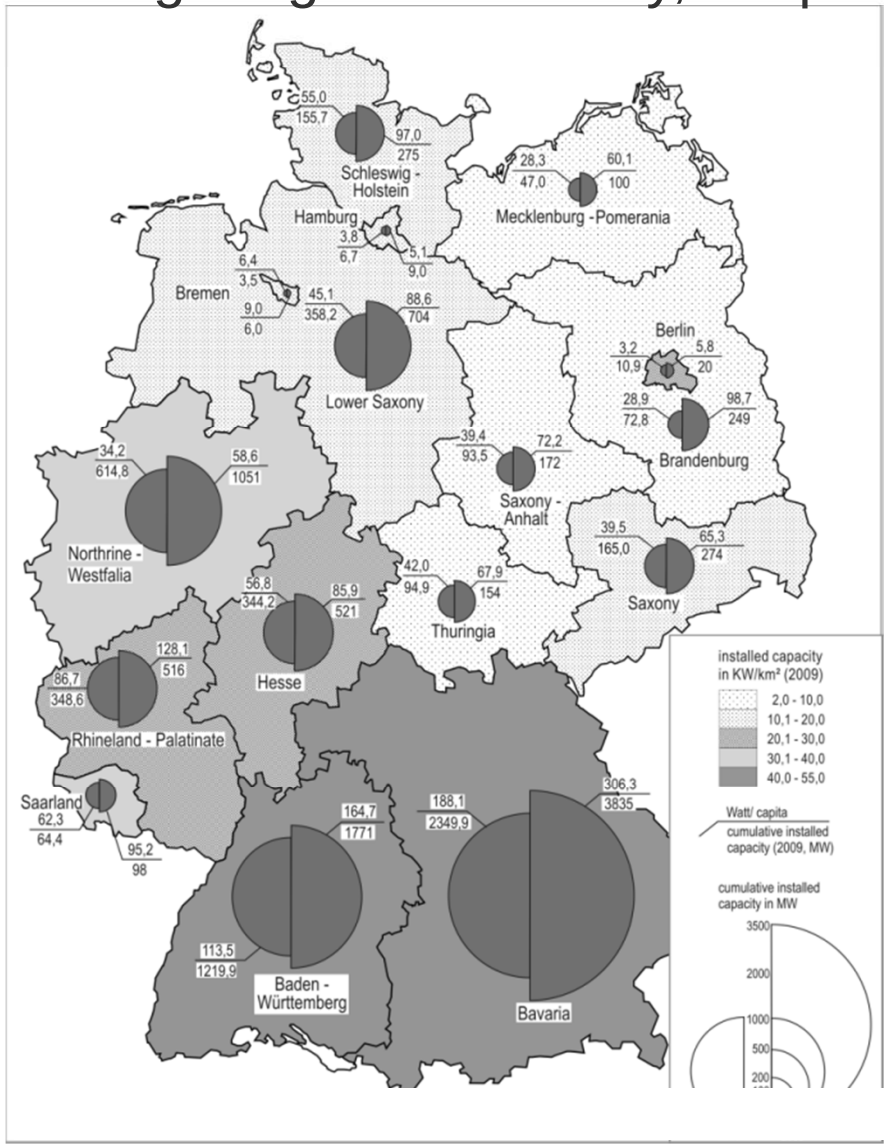
- The growth of PV markets globally

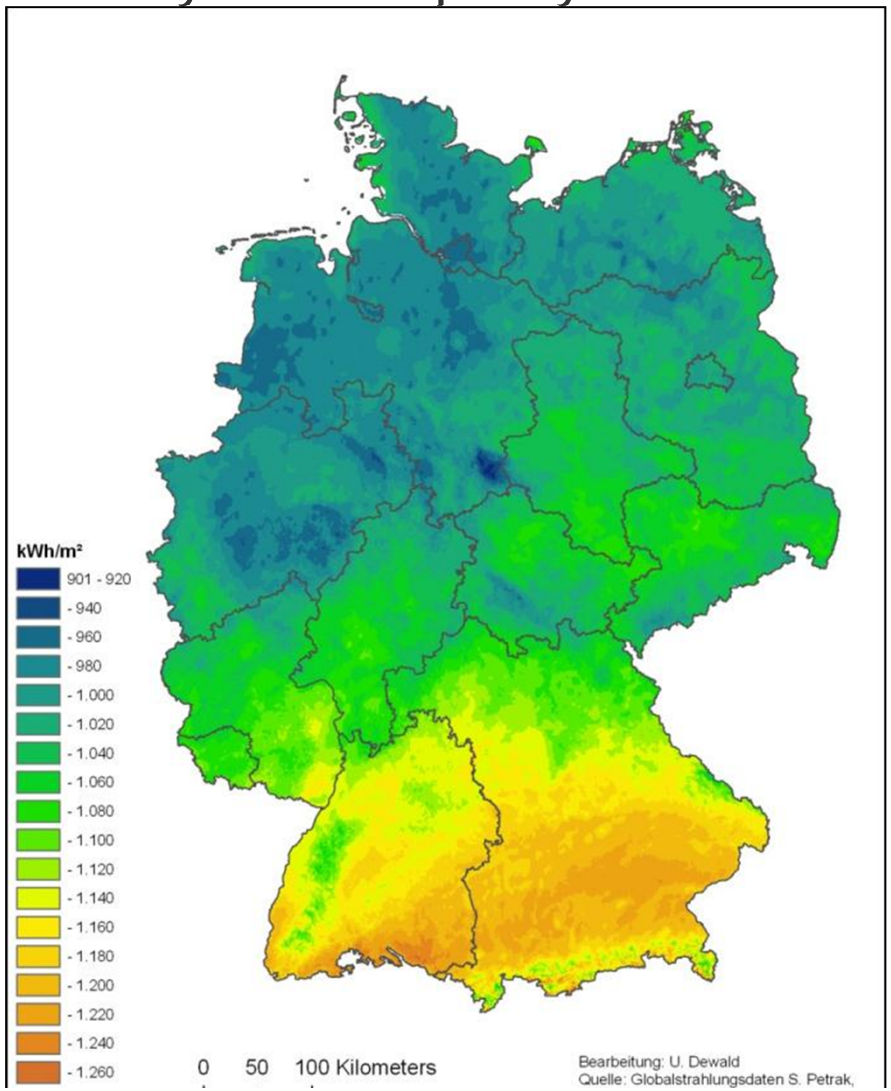


Yearly installed capacity (MWp, 1993-2010), logarithmic scale. ***Source: IEA-PVPS 2013***

3. Local market formation for PV in Germany

- High regional diversity, despite nationally uniform policy

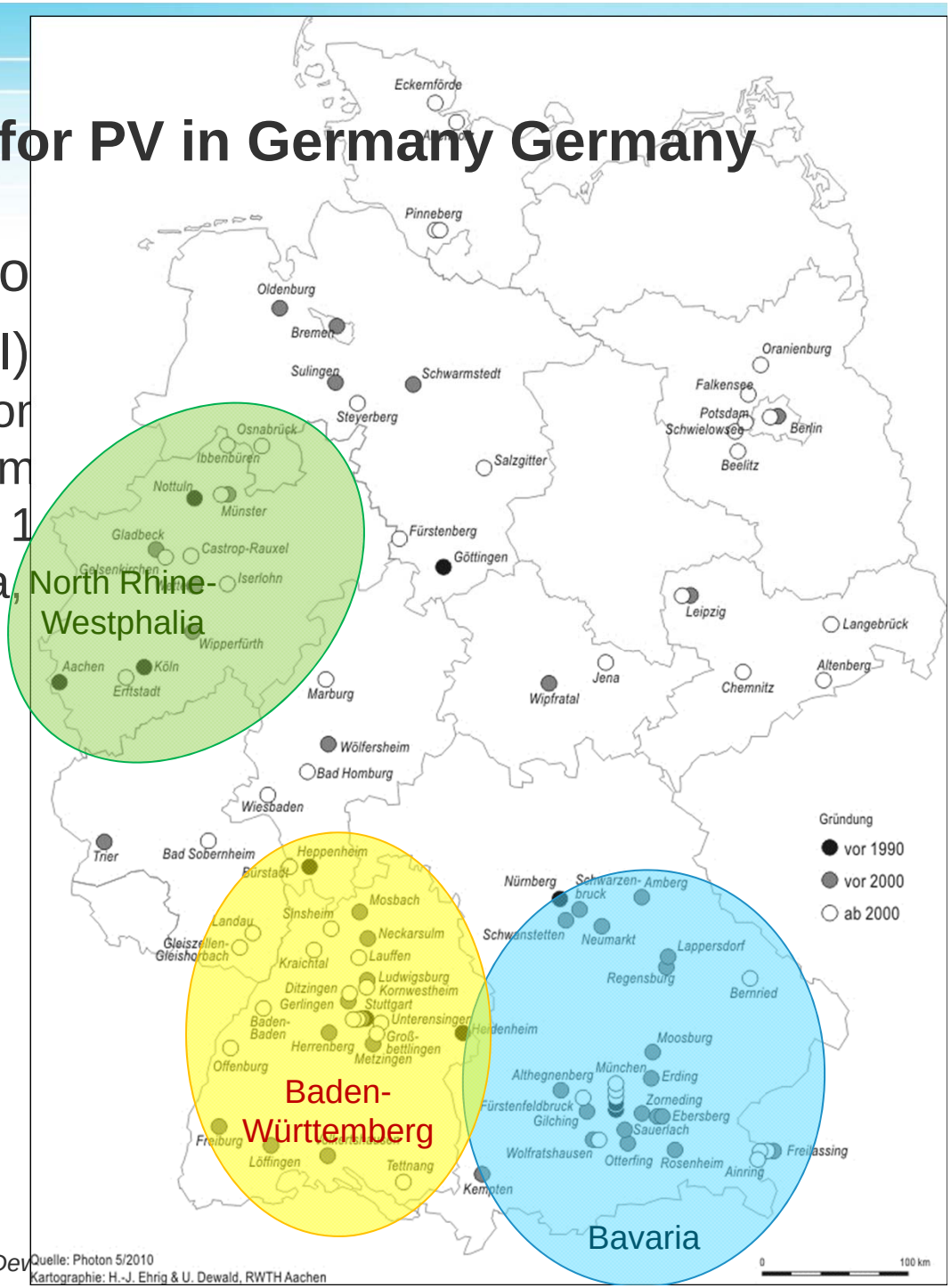




Source: Dewald 2012

3. Local market formation for PV in Germany Germany

- Local market formation pro
  - ➢ Solar civic initiatives (SCI)
    - Civil society regional pror
    - Strong local focus (comm
    - 330 identified (in 2008), 1
    - 75% (79/107) in Bavaria,



Dewald/Truffer:Market formation in TIS. ***Industry & Innovation*** *2011; Dev*

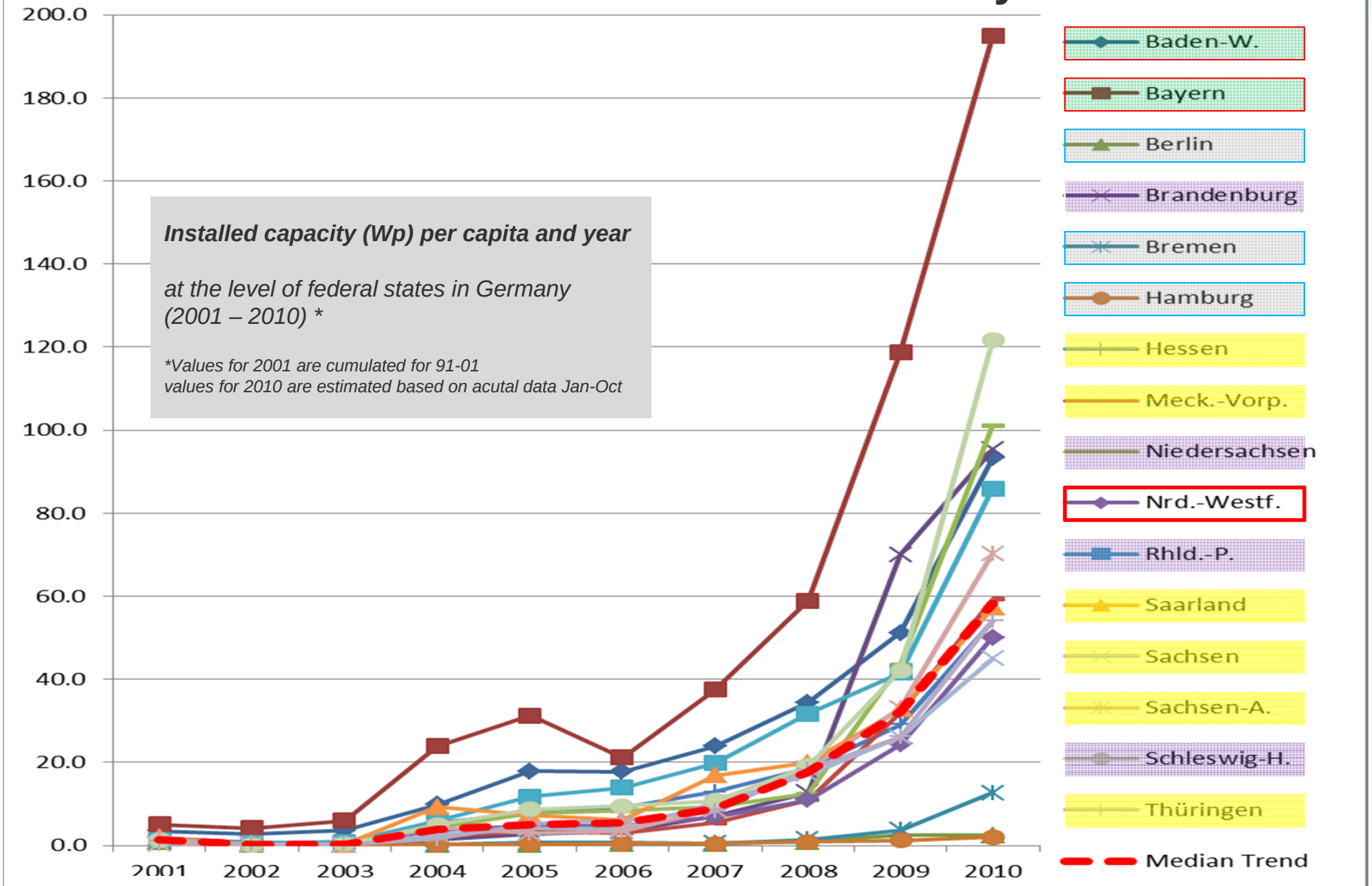
3. Local market formation for PV in Germany

- Local market formation processes (1992-2010)
  - ➢ Solar civic initiatives (SCI) as system intermediaries
    - Civil society regional promotion networks (incl. professionals, …)
    - Strong local focus (communal level)
    - 330 identified (in 2008), 107 responded to survey
    - 75% (79/107) in Bavaria, Baden-Würtemberg, NRW
  - ➢ Contribution of SCI to TIS formation
    - Building Business Networks (later companies and agencies)
    - Preference formation among customers (fairs, P&D programs)
    - Experimenting with local cost covering tariffs
    - Political mobilization Citizen-users in local context

➔ Building and aligning the elements of a TIS on a local scale

Dewald/Truffer:Market formation in TIS. ***Industry & Innovation*** *2011; Dewald/Truffer:The local sources of market formation.* ***European Planning Studies*** *2012*

3. Local market formation for PV in Germany



Dewald/Truffer:The local sources of market formation. ***European Planning Studies*** *2012*

4. Globalization of industry structure

- Early success of industry formation
  - ➢ German industry develops on par with the growing market
- Later global competition
  - ➢ Production capacity buildup in China → overcapacities and shake out
- Dwindling political support
  - ➢ Tax payers' money for Chinese firms
  - ➢ No innovation effect…

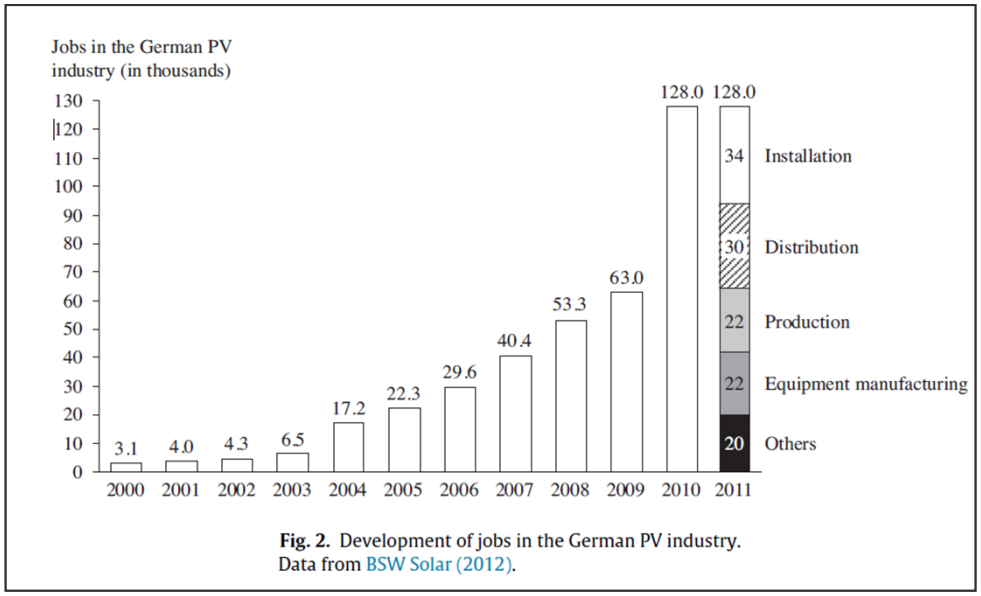


Fig. 2. Development of jobs in the German PV industry.
Data from BSW Solar (2012).

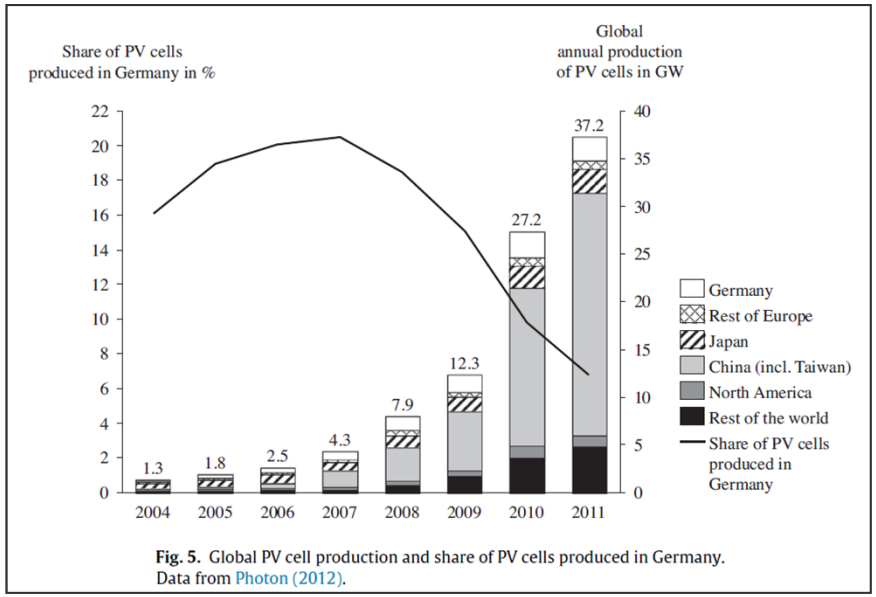


Fig. 5. Global PV cell production and share of PV cells produced in Germany.
Data from Photon (2012).

Illustrations from Hoppmann, Huenteler and Girod (in press) in Research Policy

5. Outlook

- Lessons for Transition Policies
  - ➢ Take advantage of local ingenuity
  - ➢ Anticipate globalization dynamics in industry formation
  - ➢ Think in the long term (i.e. 20 years)
  - ➔ Do we need global institutions to evade the innovators dilemma?

- Contributions from industry dynamics and innovation studies
  - ➢ Conceptually: Better understand different phases of industry formation
  - ➢ Empirically: Emerging economies as new “transition contexts”
  - ➢ Policies: combine regional initiatives and global coordination

➔ We need a perspective of «global change» in terms of industry dynamics !