Energy Transitions and the Creation of New Industries in Lagging Regions

Robert Pollock
Model of Local Industrial Evolution (Martin, 2010)

Constraining environment for the emergence of new technologies and industries

- Preformation Phase
  - Preexisting local economic and technological structures, knowledges, and competences

- Path Creation Phase
  - Purposive or intentional experimentation and competition among agents leads to the local emergence of new path

- Path Development Phase
  - Emergence and development of local increasing returns and network externalities assists the development of the path

Enabling environment for the creation and emergence of new technologies and industries

Path as Movement to Stable State
- Reinforcement of selected technologies and increasing rigidification of associated structures, networks, and knowledges of firms

Path as Dynamic Process
- Conversion, layering, and recombinant effects lead to incremental, path-dependent evolution and renewal of a local industry or technology

Local Industrial or Technological Stasis

Adaptation and Mutation of a Local Industry or Technology
Research Focus

• Regional industrial path creation in a multi-actor and multi-scalar context

• Institutions in enabling or constraining regional industrial path creation ("the missing link")

• Technological change and disruptive transition

• Lessons for policy

• Offshore Wind
### What are institutions?

<table>
<thead>
<tr>
<th>Institutional Regime Type</th>
<th>Nature of the Systems</th>
<th>Institutional Expressions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Environment</td>
<td>Formal Conventions</td>
<td>Structure of rules and regulations, mostly enforced</td>
</tr>
<tr>
<td></td>
<td>Informal Conventions</td>
<td>Customs, norms, cognitive paradigms and social routines</td>
</tr>
<tr>
<td>Institutional Arrangements</td>
<td>Organisational Forms</td>
<td>Firms, government bodies, higher education, research bodies, etc</td>
</tr>
</tbody>
</table>
Regional Industrial Path Creation: Analytical Framework

Disruptive transition → Multi-scalar institutional enabling & constraining environment → Agentic Interplay of Regional Industrial Path Creation → Scale and character of regional industrial path
“GREEN RUSH: The renewable-energy industry is heading for Glasgow

Rundown ports on the east coast are wooing foreign firms in the hope of becoming suppliers to the burgeoning offshore renewable industry. Unlikely as it might seem, the biggest long-term winner from this green rush might be Glasgow (due to its research).

Siemens, a German conglomerate, announced plans (for) a wind-turbine factory in Hull, a dingy city in Yorkshire.”
Primary Research

Interviewees by seniority

- CEO, Principal / Vice-chancellor & Ministerial: 3
- Senior Director & Directors: 13
- Senior Manager & Managers: 25
- Executive: 8

Interviewees by geography and actor type

- Glasgow: Firm (7), Non-firm state (3), Non-firm research (2)
- Humber: Firm (8), Non-firm state (2), Non-firm research (1)
- Wider national context: Firm (4), Non-firm state (2), Non-firm research (2)
Differing Episodes of Path Creation

**KEY**

<table>
<thead>
<tr>
<th></th>
<th>Glasgow Path Emergence</th>
<th>2006-2009</th>
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<tbody>
<tr>
<td>G1</td>
<td>Humberside Path Emergence</td>
<td>2006-2011</td>
</tr>
<tr>
<td>G2</td>
<td>Glasgow Path Development</td>
<td>2009-2013</td>
</tr>
<tr>
<td>H2</td>
<td>Humberside Path Development</td>
<td>2011-2014</td>
</tr>
<tr>
<td>G3</td>
<td>Glasgow Path Realisation</td>
<td>2013-end 2015</td>
</tr>
<tr>
<td>H3</td>
<td>Humberside Path Realisation</td>
<td>2014-end 2015</td>
</tr>
</tbody>
</table>

**Diagram**

- **G1**: Glasgow Path Emergence (2006-2009)
- **G2**: Glasgow Path Development (2009-2013)
- **G3**: Glasgow Path Realisation (2013-end 2015)
- **H1**: Humberside Path Emergence (2006-2011)
- **H2**: Humberside Path Development (2011-2014)
- **H3**: Humberside Path Realisation (2014-end 2015)

**Graph**

- **Glasgow**
- **Humberside**

**Axes**

- **Y-axis**: Direct path employment
- **X-axis**: Time

**Legend**

- **Glasgow**
- **Humberside**
## INSTITUTIONS AS TRIGGERS AND BRAKES ON PATH CREATING ACTOR AGENCY

### Multi-scalar Institutional Environment

<table>
<thead>
<tr>
<th>Scale</th>
<th>ENERGY TRIGGERS</th>
<th>ENERGY BRAKES</th>
<th>INDUSTRIAL TRIGGERS</th>
<th>INDUSTRIAL BRAKES</th>
<th>SPATIAL TRIGGERS</th>
<th>SPATIAL BRAKES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter / EU</td>
<td>UNFCCC 1992 to ‘15</td>
<td>Ongoing absence of overarching EU Energy Policy</td>
<td>EC White Paper ‘97</td>
<td>Consolidation of EU supply chain due to changing EU and state regulatory frameworks</td>
<td>Cohesion Report ‘07 onwards</td>
<td>Consolidation of EU supply chain due to changing regulatory frameworks</td>
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<td></td>
<td>EU Energy Directive ‘09 with binding targets</td>
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<td>Blue Growth ‘12</td>
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<td>INTERREG</td>
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<td></td>
<td>Climate Change Act ‘08</td>
<td>CfD subsidy ‘14/’15</td>
<td>Offshore Wind Ind. Strategy ‘13</td>
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<td>RDAS ‘98 to ‘10</td>
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<td></td>
<td>ROCs subsidy ‘02 &amp; ‘09</td>
<td>DECC “reset” ‘15</td>
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<td>COREs and EZs, ‘12</td>
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<td>Renewable Energy Roadmap ‘11</td>
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<td>Devolved (Scotland)</td>
<td>ROCs (Scotland) ‘02</td>
<td>ROCs (Scotland) closure ‘15</td>
<td>Eco. Strategy ‘07</td>
<td></td>
<td>Crown Estate Scottish Leasing Round ‘09</td>
<td>Wind farm planning delays</td>
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<td></td>
<td>Climate Change Act ‘09</td>
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<td>OW Ind Group ‘09</td>
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<td>Marine Scotland ‘11</td>
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<tr>
<td></td>
<td>Route Map ‘09</td>
<td></td>
<td>OW Route Map &amp; NRIP ‘10</td>
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<tr>
<td>Regional</td>
<td>Various local government energy transition and efficiency policies</td>
<td></td>
<td>Scot Gov OW Team est. in Glasgow ‘09</td>
<td>Planning approvals for regional asset valorisation</td>
<td>Planning grants &amp; support</td>
<td>Intrag regional competition on Humberside</td>
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<td></td>
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<td></td>
<td>OREC established in Glasgow ‘13</td>
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<td>Hull OAIC, ‘15</td>
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</table>
The Limits of Endogenous Models: Regional Innovation Systems

- Glasgow had pronounced RIS, Humberside did not – yet both had muted effect on regional path creation
- Causal power of respective RIS circumscribed by broader sectoral / technological evolution
- Extra-regional institutions mediated timing, scale & nature of this broader evolution (disruptive transition)
- Regional path creation exposed as a contingent, reflexive by-product of this broader process
- RIS theory requires further accommodation of extra-regional institutions and wider technological dynamics
- Implications for other endogenous models e.g. smart specialisation, regional institutional thickness / capacity
Multi-scalar Institutional Synchronisation

Multi-scalar institutional synchronicity

Regional path of limited scale with sectoral influence, exhibiting characteristics of a strategic node (restricted de-locking)

Regional path of magnitude and sectoral influence, exhibiting prominent characteristics of a cluster (pronounced de-locking)

Regional path of limited scale and sectoral influence, exhibiting characteristics of a supply chain node (negligible de-locking)

Regional path of magnitude with limited sectoral influence, exhibiting limited cluster characteristics (restricted de-locking)

Firm diversity
Potential Alternate Outcomes of Enhanced Institutional Synchronisation - Humberside

- Actual path trajectory (exhibiting historic characteristics of regional economy)
- Counterfactual trajectory 1 - notable supply chain co-location
- Counterfactual trajectory 2 - "Super Cluster"
Potential Alternate Outcomes of Enhanced Institutional Synchronisation - Glasgow

- Actual path trajectory (exhibiting historic characteristics of regional economy)
- Counterfactual trajectory 1 - "Global R&D Hub" (a niche)
- Counterfactual trajectory 2 - "Global R&D Hub" with manufacturing
Lessons for Policy

- Disruptive transition offers substantial opportunities for path creation in lagging regions
- Path creation is a fluid and open process with many potential outcomes (there are constant choices)
- Scale of regional asset valorisation (incl. latent assets) conditioned by scale of fusion with novelty/innovation
- Limits to endogenous growth models for lagging regions need integrated with policies which transplant power, novelty/innovation & investment
- Institutional synchronisation is vital; state institutions must be ceaselessly coordinated & focused (role for a new state actor: the system builder)
- N.B. policies can engender new regional industrial paths which replicate deficiencies of established regional industrial base
Thanks

To the team at CURDS, especially Professor Danny MacKinnon and Dr Stuart Dawley

And also everyone else who contributed to my research, particularly my interviewees