

Carbon Lock-in

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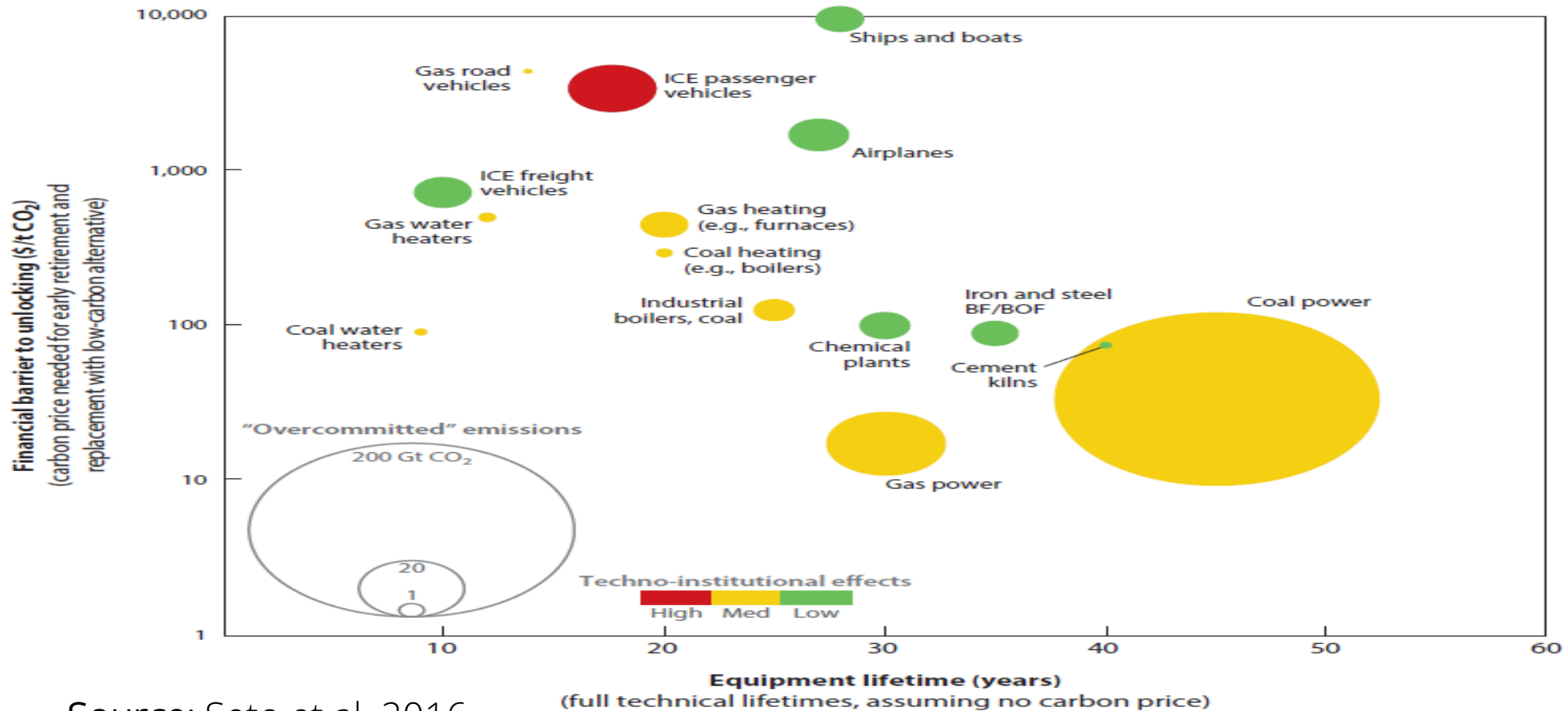
What is it?

- Despite the existence and increasing viability of low emissions alternatives, emissions mitigation is still occurring too slowly. Why?
- Unruh (2000) pioneered the concept of carbon lock-in: an inertia brought about by the interactions between technologies/infrastructures, institutions and behaviours that limits the pace of change regarding emissions.
- Standard accounts related to “new institutional economics” and insights from evolutionary economics. This project is primarily focused upon the institutional dimensions of the process.

Dimensions of carbon lock-in

- Infrastructure/Technology:
 - Energy demand can be locked in large incremental investments like roads and other built infrastructure.
 - These can determine energy demand for decades.
 - Buildings and spatial organisation can lock-in transport choices, travel habits, housing choices etc.
 - Long lived fossil fuel infrastructure and distribution systems inhibit efforts to reduce the carbon intensity of the energy we use.
 - Expensive infrastructure like pipelines, refineries also dependent on fossil fuel use, and not readily deployable for other purposes.
 - Owners of these assets likely to resist efforts, this lock-in suits them!

Lock-in for different types of infrastructure



Source: Seto et al. 2016

Dimensions of carbon lock-in

- Behaviour:
 - Sometimes framed as an incentive problem/free rider problem.
 - Habit formation/avoidance of risk.
 - Beliefs about climate change.
 - Structured behaviour – we are socially embedded and this frames our choices – through social norms, institutions, technologies etc.
 - Common example of dominance of bicycle prior to take off of car.
 - Potential link between inequality (as measured in 90/10 ratios rather than GINI) possibly attributable to status consumption a la Veblen (Ref, 2019).
 - Consistent with observed inequalities in lifestyle emissions by wealth and income.

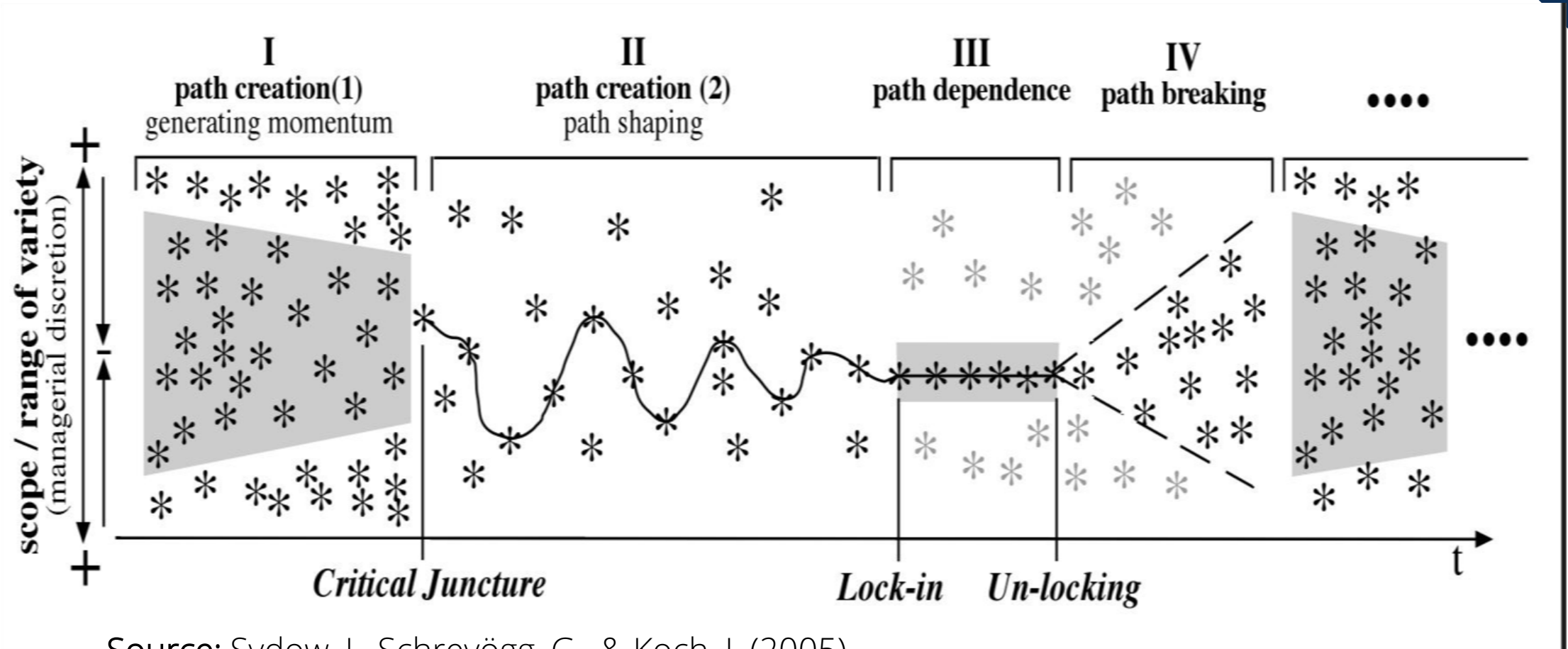
Dimensions of carbon lock-in

- Institutions:
 - Institutions are made to “lock-in” outcomes.
 - This is the subject of contest by social actors who act to shape institutions which reproduce or change a status quo.
 - The extent of institutional carbon lock-in is related to the degree to which actors who benefit from the prevailing carbon successfully contest alternatives.
 - Powerful actors can be further strengthened by these institutional arrangements, increasing their ability to shape subsequent outcomes.
 - States may face direct/indirect pressure from these arrangements which bias states to certain outcomes.
 - Institutions co-evolve with other dimensions: technology, economic, political etc. and produce iterative dynamics which favour reproduction of existing arrangements over significant changes.

Path Dependency and institutions

- Path dependency:
 - Carbon lock-in seen as a specific case of path dependency: events (deliberate and contingent) can shape pathways by progressively narrowing the course of action open to actors (Mahoney 2000).
- Path dependency particularly significant in historical institutionalist analyses: institutions as key sites influencing ideas and expressions of power (Thelen and Steinmo, 1992).
- Sydow, Schreyögg and Koch (2009) propose a three phase model of the process:
 - Initial choice
 - Path creation
 - Lock-in

Path Dependency and institutions



Source: Sydow, J., Schreyögg, G., & Koch, J. (2005)

Institutional change

- Mahoney (2000) points out that different theories of institutional continuity/reproduction have implications for change:
 - Utilitarian explanation– competition and learning by actors.
 - Functionalist explanation – likely requires some external shock.
 - Elite explanations – challenge to existing power relations.
 - Legitimation – alternative frames
- Endogenous vs exogenous change explanations:
 - Punctuated equilibrium in which critical periods disrupt longer periods of stasis.
 - Mahoney and Thelen (2012) argue this can obscure continuous endogenous change, contests over the interpretation/enforcement of rules. These gradual changes can lead to transformational shifts.

Questions raised

- Ireland's climate laggard status to date may be related to significant lock-in issues.
- Is this abetted by institutional configurations which privilege carbon intensive activity?
- What wider political economic forces may structure these configurations? Who is shaping this dispensation?