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# The Green Decarbonised State and Industrial Governance

Roger Hildingsson, Annica Kronsell and Jamil Khan

## Decarbonising energy-intensive natural-resource based industry (ENRI)?

### Key characteristics of ENRIs:

- Large-scale technological systems (lock-in)
- Capital intensive w. long-term investments
- Scale-intensive industries (Pavitt 1984):
  - Economies of scale, large-size firms, cost-cutting
  - Process innovation, in-house, often incremental

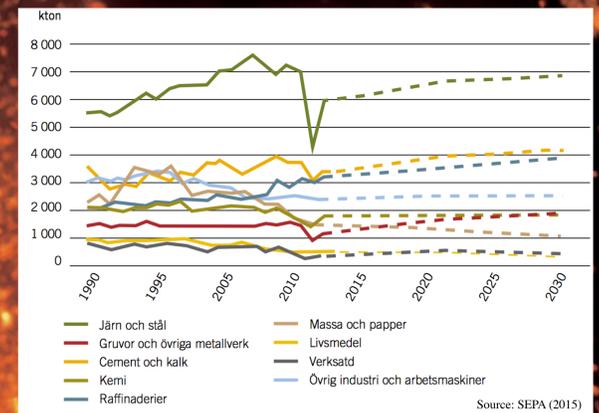
### Industrial GHG emissions:

- Industrial combustion ↓
- Industrial processes ↑

Table 9.1 Historical emissions 1990–2011 and projected emissions of greenhouse gases 2011–2030 per sector (Mt CO<sub>2</sub>-equivalent)

Sector	1990	2011	1990–2011	1990–2030
Energy (heat and electricity)	22.3	15.5	-30%	-36%
Transport	19.3	20.0	+4%	-3%
Combustion in manufacturing industry	12.1	9.5	-21%	-17%
Industrial processes	6.3	6.7	+6%	-2%
Other (agriculture, waste)	12.7	9.8	-23%	-35%
Total emissions	72.8	61.4	-16%	-21%

Source: SweGov (2013a: 27, 39)



Source: SEPA (2015)

### 'Basic' industry:

- Iron & Steel
- Mining
- Pulp & Paper
- Petrochemicals
- Cement

### Decarbonisation few co-benefits for ENRIs:

- Weak opportunity structures
- Inertia due to lock-in and sunk costs
- Key to national economies/ToT
  - exports and jobs
  - regional economy
  - identity ('basic industry')
- Politically protected, largely unregulated

### Research objectives

In this paper, our objective is to explore the role of the green state in governing industrial decarbonisation. In a case study of the Swedish ENRIs, based on historical-institutional analysis and interviews, we raise the following research question:

- How has the Swedish state been engaged in industrial governance directed towards decarbonisation?

### The green state and industrial governance

Evidence suggests advanced welfare states hold more capacity and legitimacy to intervene in the economy in response to environmental change (Meadowcroft 2012, Duit 2016). Green state theory emphasise how the economic imperative of the modern state conflicts with ecological concerns, however lacks a proper account of industrial policy (Bäckstrand & Kronsell 2015). Innovation studies focus on green innovation but to a limited extent in process technologies. In transition studies, regime actors such as ENRIs are seen as incumbents resisting change. However, for industrial transformation ENRIs are key change actors along with state actors exercising their entrepreneurial role to promote technological change and to support industrial development and renewal (Mazzucato 2013).

### Key findings

In Sweden, ENRIs have a privileged position in the economy and have traditionally been protected from international competition by e.g. exemptions from environmental policies and energy taxes.

Climate governance of ENRIs is dominated by market-based policies that provide incentives for efficiency improvements but are insufficient to support green transitions and industrial transformation.

Innovation policy has not engaged with industrial process innovation in the ENRI sectors despite the need for technological change, e.g. in green process technologies.

Decarbonisation of the ENRI sectors call for more active state intervention and new forms of strategic (green) industrial policy to achieve long-term climate policy objectives.

Industry actors anticipate the state having a pivotal role in governing industrial decarbonisation in terms of both technology push and market pull policies, incl. risk sharing and investment support for scaling up demonstration and commercialising low-carbon technologies and systems.