The Three Pillars

for integrating objectives and instruments of energy-climate policy

Presentation to World Energy Council Conference

'What policy measures for energy transition in Europe?'

Paris, 24th April 2014

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Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

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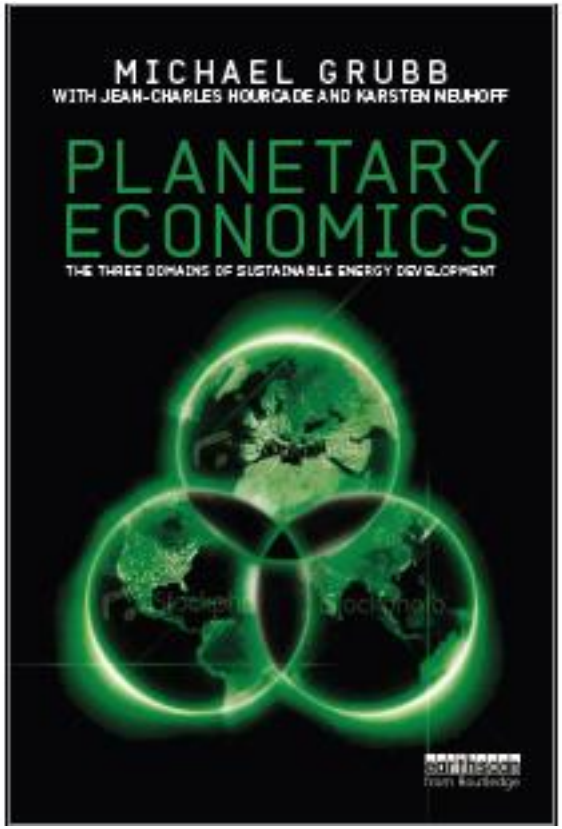
Drawing on the book *Planetary Economics:*

Energy, Climate Change and the Three Domains of Sustainable Development



- Uncomfortable challenge, curious context
- Three Domains of economic processes
- The Three Pillars of policy
- Structural problems of the EU ETS
- Structural solutions (1): ‘stabilisation’ mechanisms
- An integrated package

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An uncomfortable challenge

- A mega-problem of risk management under deep uncertainty
  - Not the primary science but the consequences
  - .. And how to value them, act, and coordinate response
- "The perfect moral storm", a "Super-Wicked" problem
- … "The biggest market failure in history" (Stern)

And we have not been doing very well globally ...

- "Current trends are at the high end of levels that had been projected … growing on average at 2.2%/yr since 2000"
- Energy debate dominated by bills, competitiveness & security
- … a planetary arena for the philosophies that led to the financial crisis ? And who will get the blame?

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

Prices Matter! – *but do not drive long-run energy bills*

National energy intensity approx inversely proportional to long-run prices
- across countries the % of GDP spent on energy is remarkably constant

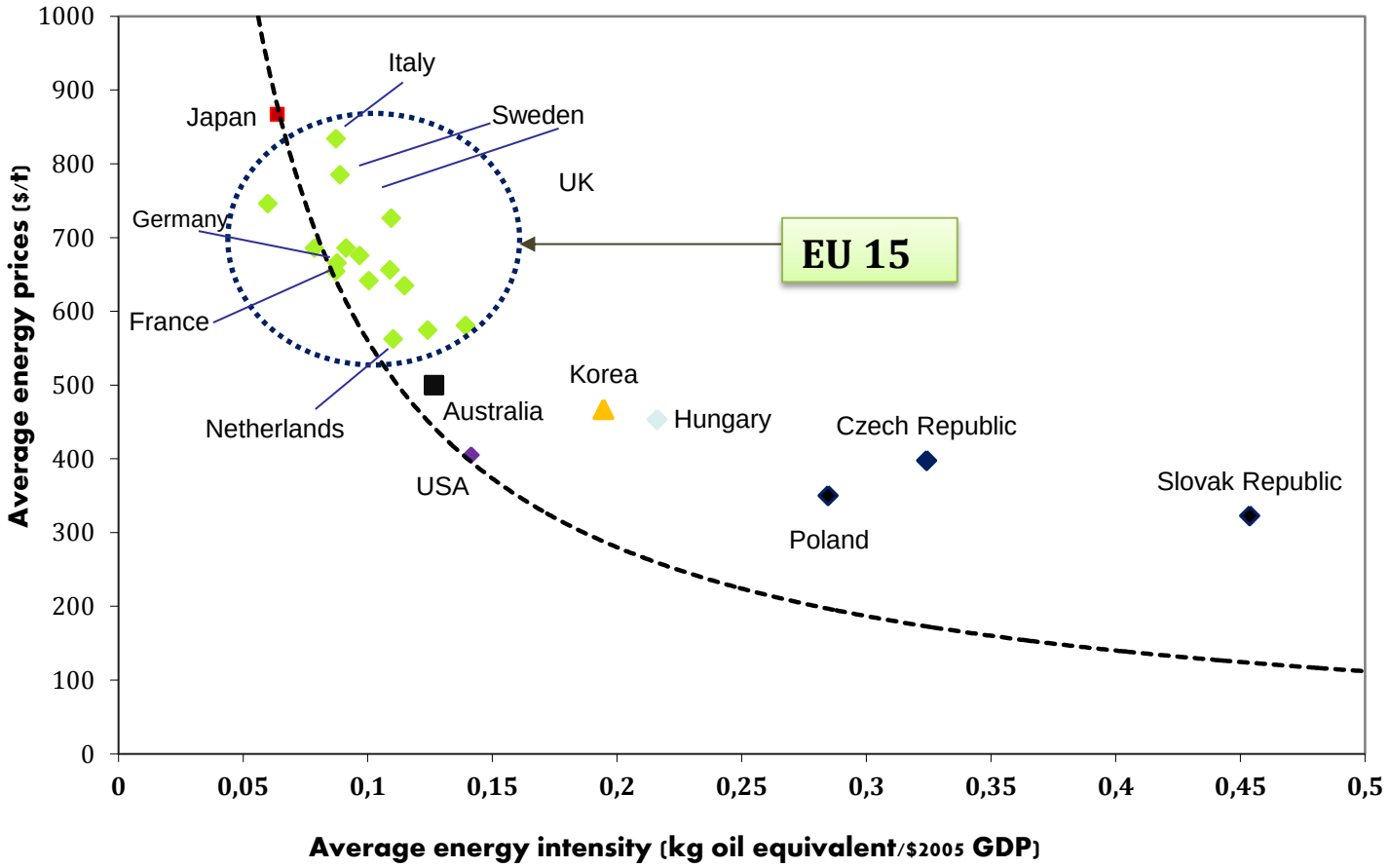

Figure 6-1 The most important diagram in energy economics
Note: The graph plots average energy intensity against average energy prices (1990-2005) for a range of prices. The dotted line shows the line of constant energy expenditure (intensity x price) per unit GDP over the period
Source: After Newbery (2003), with updated data from International Energy Agency and EU KLEMS

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

"Bashmakov's Constant"

- The proportion of national income spent on energy has remained surprisingly constant
  - for more than a century
  - for most countries
- *Despite* huge variations in energy prices (Bashmakov)

- This cannot be explained through the classical measures of in-country consumer price response (elasticities) but needs also to invoke:
  - **Energy efficiency** regulation and related policy responses
  - **Innovation** throughout energy supply and product chains

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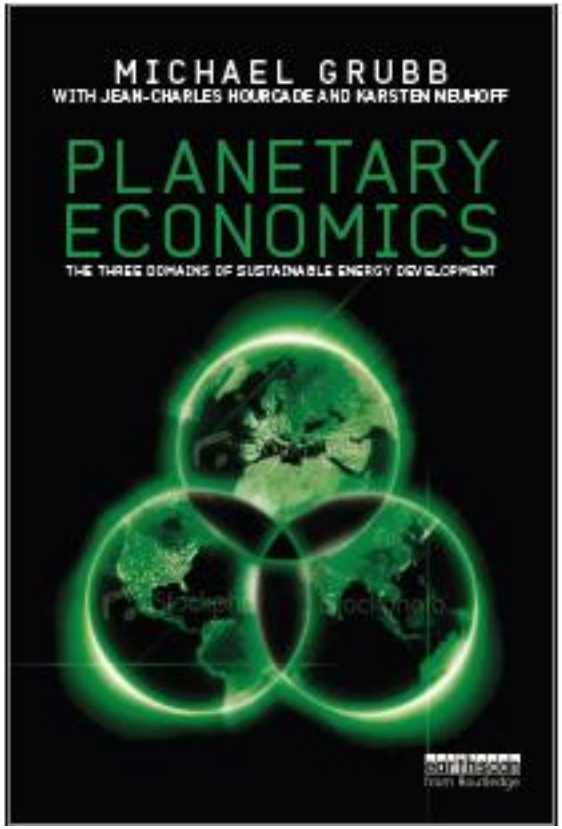

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‘Can only get stability through clear framework of thinking’
– which recognises multiples concerns *and* processes

Recognise Three Domains of economic behaviour that

- rest on **different fields of theory**
- apply at **different scales** of time and decisionmaker

TIME HORIZON

Behavioural and organisational

Neoclassical and welfare

Evolutionary and institutional

SOCIAL SCALE

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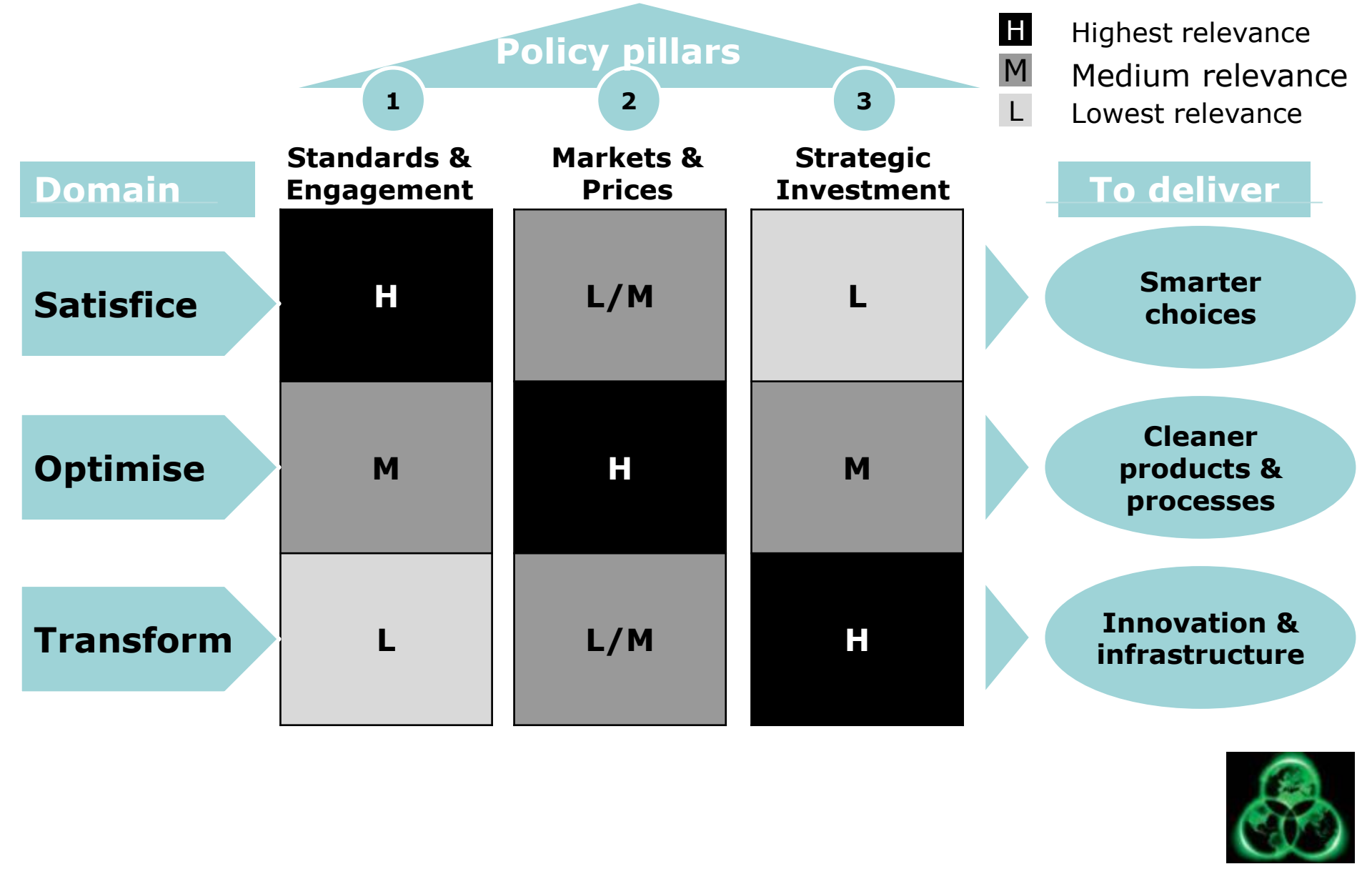
Solutions need to harness corresponding policy pillars based on the three domains, to transform energy systems



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Experience and theoretical reasoning on each pillar shows..

- There are multiple lines of evidence that in context of transforming the global energy system over a few decades, **all three domains are of comparable importance**
- Only approaches that integrate across all three domains have potential to generate ‘Green Growth’
- The dominant neoclassical ‘Second Domain’ theories emphasise instrument (pricing) that maximises political opposition unless it is nested in the complementary triad that also offers hope of containing energy bill impacts
- First and Third pillar policies can (and have) delivered multiple benefits, but ….

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

But no pillar on its own can credibly solve the problem – *nor offers a politically stable basis for policy*

- Energy efficiency policy on its own limited by:
  - Scale of intervention required
  - Growing scale satisficing behaviour
  - …. Leading to large Rebound effects
- Pricing on its own limited by:
  - Blunt nature of impacts First and Third Domain impacts
  - Rising political resistance to rising fuel bills
  - .. and competiveness concerns
- Innovation on its own limited by:
  - Lack of demand pull incentives
  - Scale & risks of investment costs
  - Political failures in absence of rising market feedbacks

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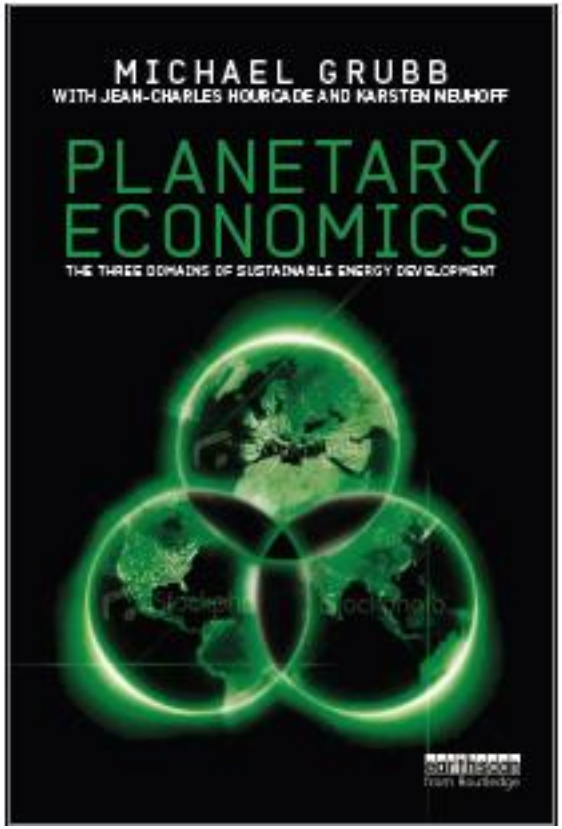

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European CO2 pricing and Murphy's law: "If anything can go wrong, it will"

(a)

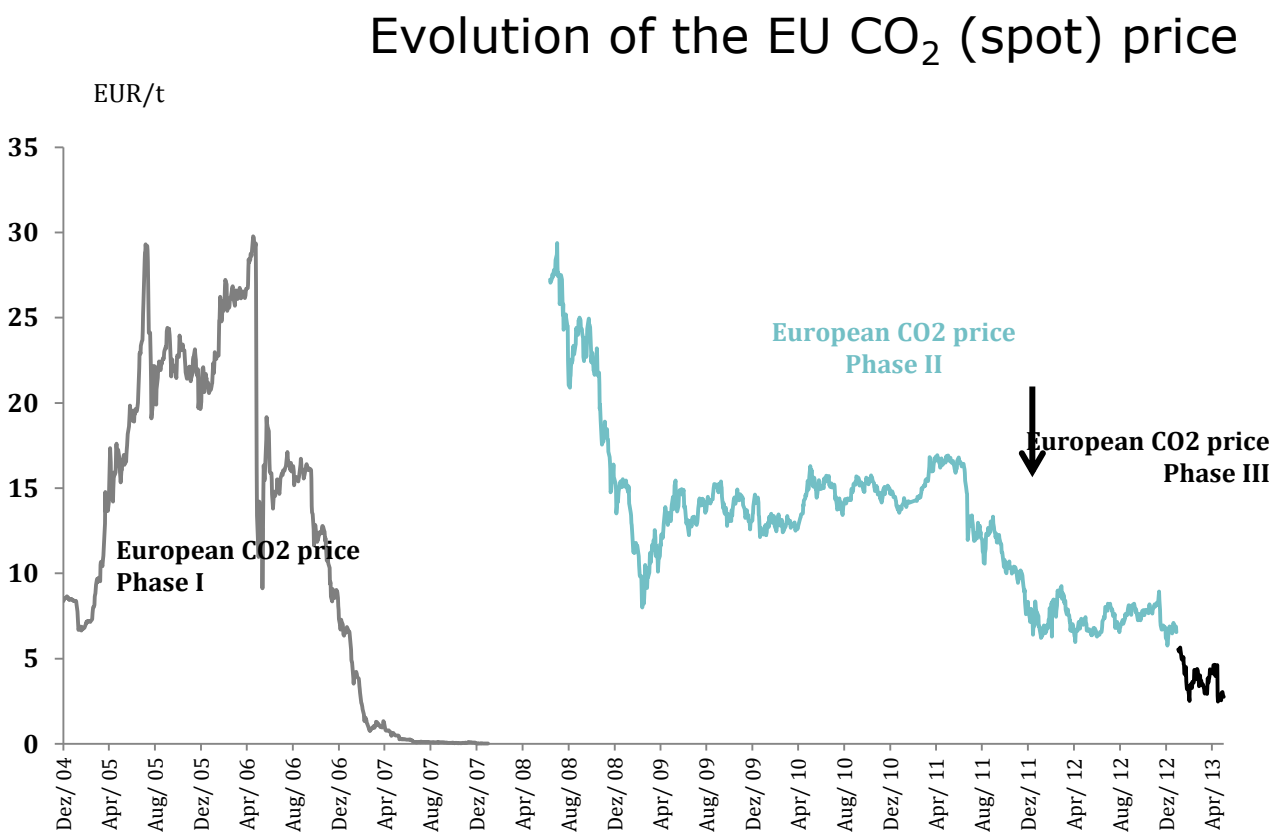

Fig.7.2 Evolution of European carbon and international offset prices
Data Source: European Climate Exchange

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

Real-world experience has confirmed the wisdom … with added twists

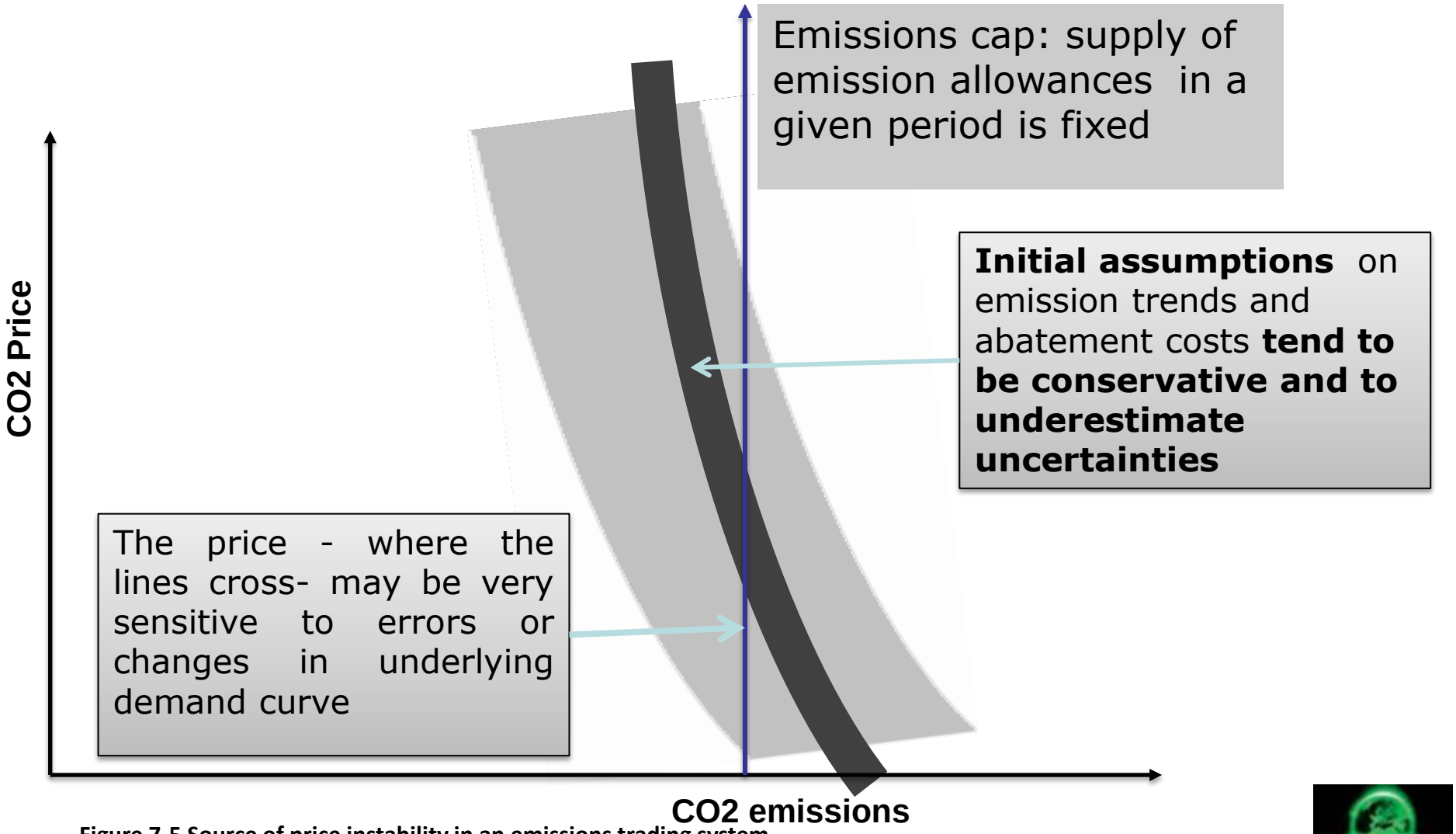

Figure 7-5 Source of price instability in an emissions trading system

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

Emissions banking supposed to be answer .. but is only stable within a certain range, otherwise *amplifies* risks

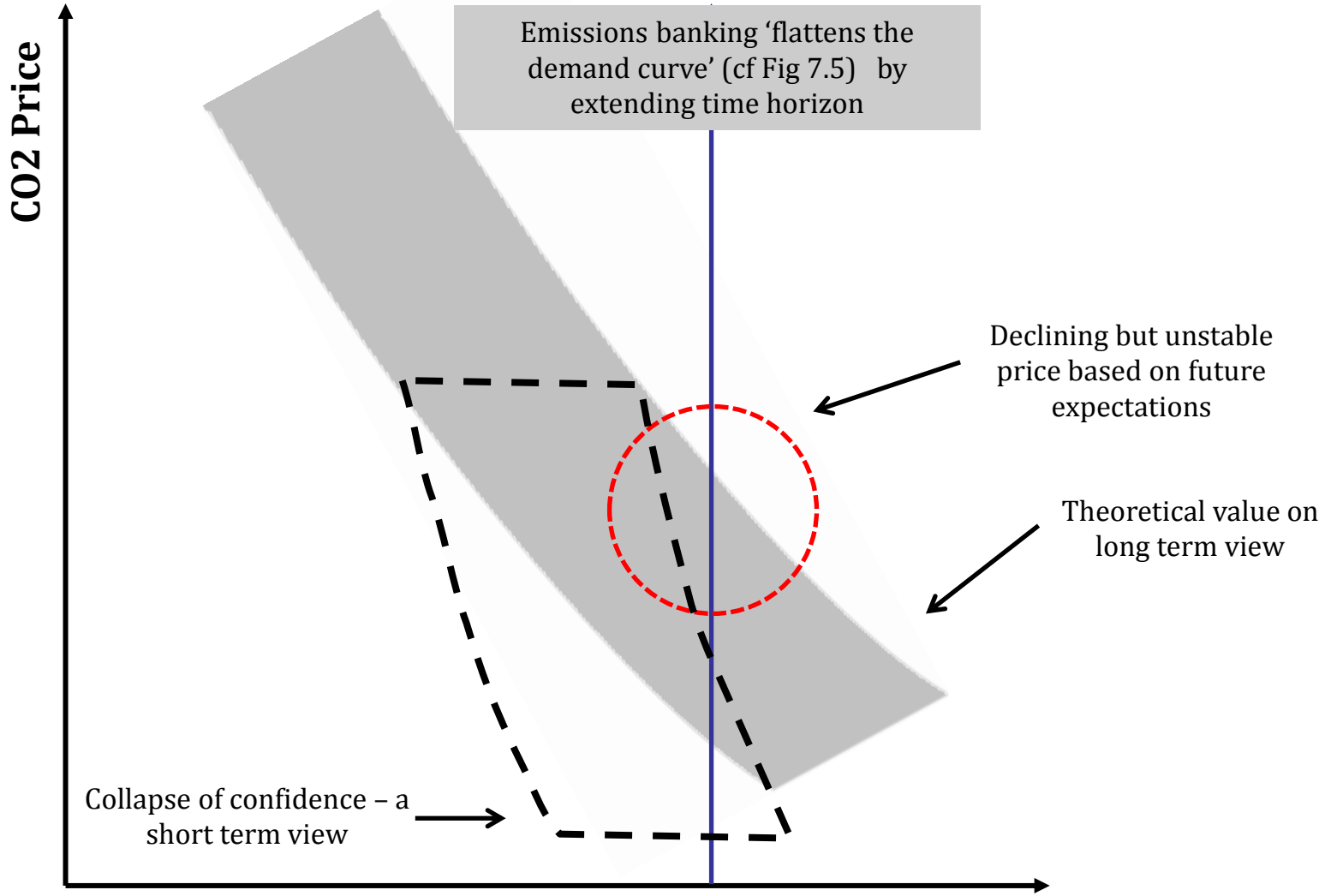

Figure 7-7 a. Impact of emissions banking on carbon price in emissions trading system

Source: Grubb, Hourcade, and Neuhoff. (2014): *Planetary Economics: energy, climate change and the three domains of sustainable development.* Routledge

And introducing other policy pillars can *amplify* the difficulties … [IEA 2011]

- ‘Reduces the space’ for the carbon price
- Increases the *net* uncertainty and hence volatility

- Whilst with a fixed cap:
  - No-one can effectively budget for use of the carbon revenues
  - Energy efficiency programmes ‘do not save carbon’
  - Successful innovation / strategic deployment programmes
    - risk exacerbating their own downside investor risks
    - have no identifiable ‘sunset’ timescales because the caron price is too fundamentally uncertain

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Price stabilisation mechanisms therefore essential for credibility – *and also for linkages to other domains*

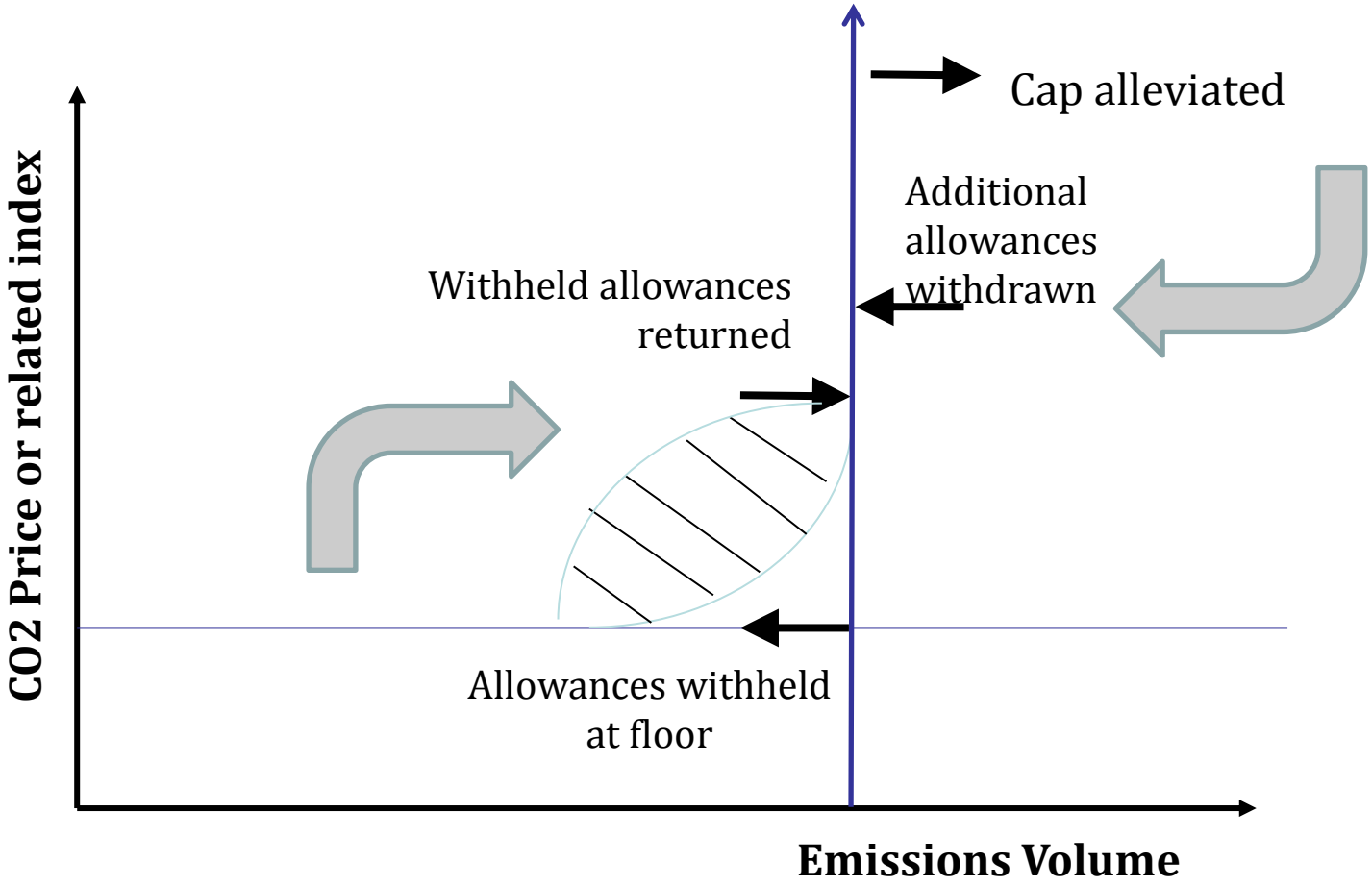

Figure 7-8 Steadying mechanisms for emissions trading systems

Note: The Figure illustrates mechanisms to help emissions cap-and-trade systems deal with deep uncertainties , so as to maintain a reasonable balance of price and quantity objectives. The mechanisms are most simply illustrated with respect to price floors and ceilings, in which case the shaded area indicates the likely region of price and quantity for a system with substantial surplus allowances. However the same principle could apply to other 'threshold' triggers, for example based on the level of cumulative surplus.

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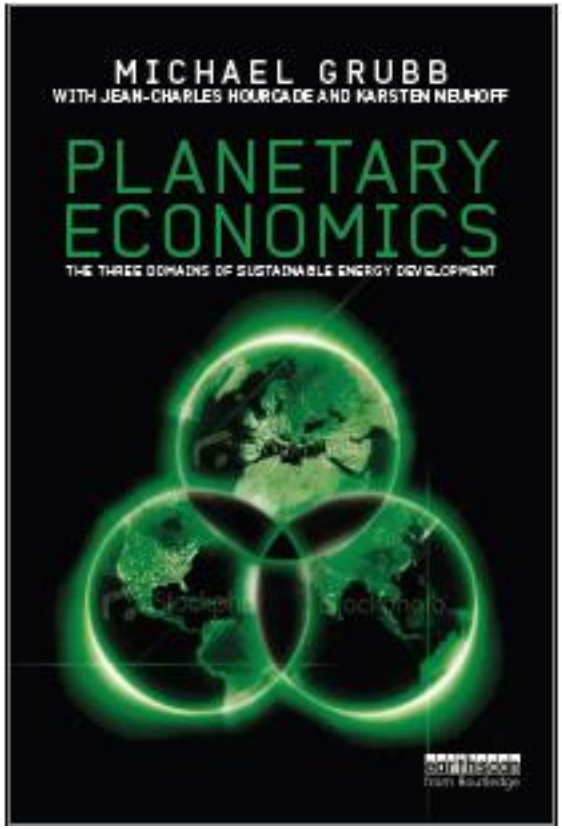

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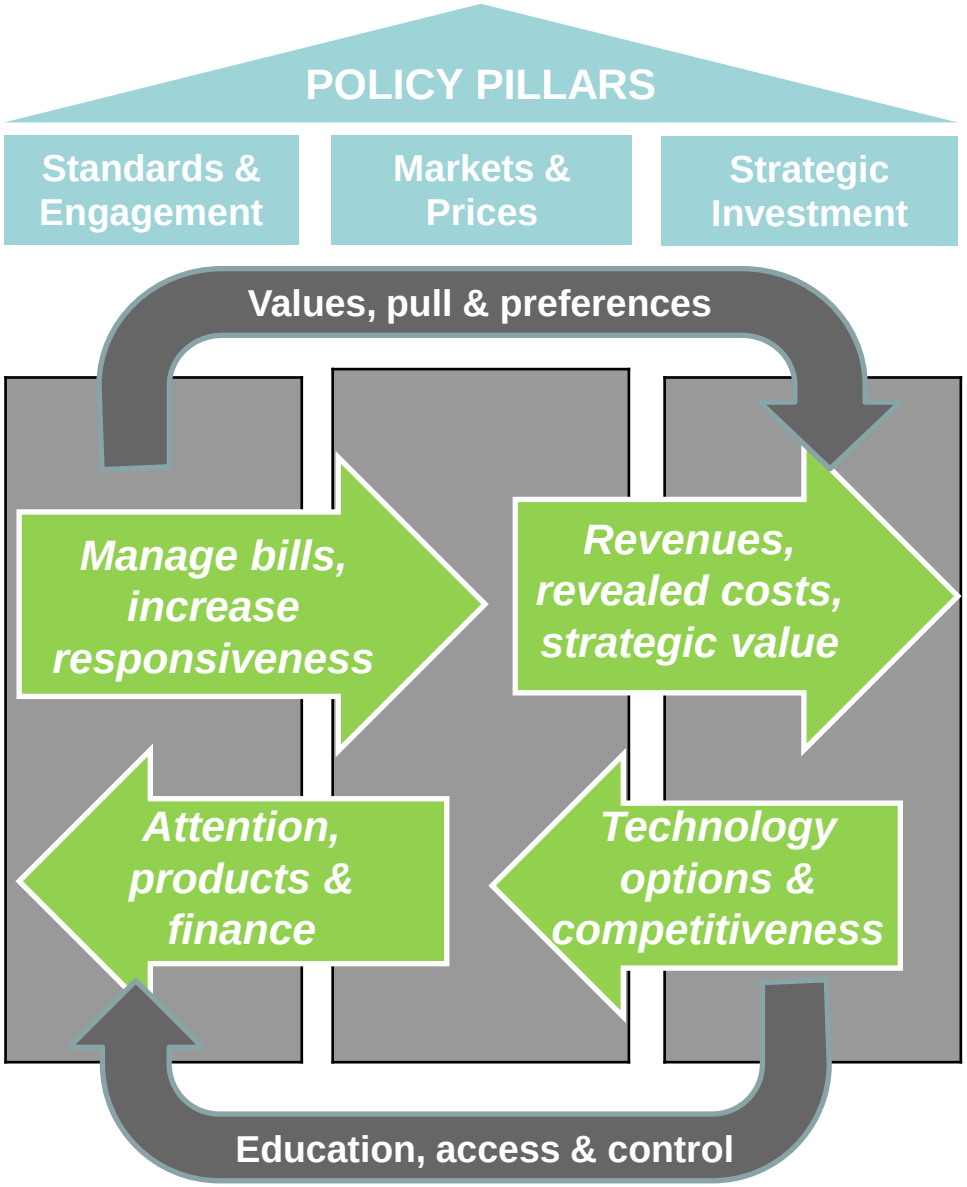
Changing course requires a sustained package - the key is to integrate and synergise across all three domains



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If the message is fully embodied …. A potential 'First among Equals?'

- A rising **base** carbon price is an instrument that *could* contribute across *all* domains:

  I. Attention effect and funding for 1st Domain responses

  – rising steadily enables efficiency to keep pace and stop much rise in *total bills*

  II. Price differential will steadily reduce use of coal in power generation, and help to move renewables on from transitional subsidies into mainstream market

  III. Facilitates increased investment stability and funding for innovation, infrastructure and tech transfer programmes

- Embedding in an international agreement would enhance stability and credibility

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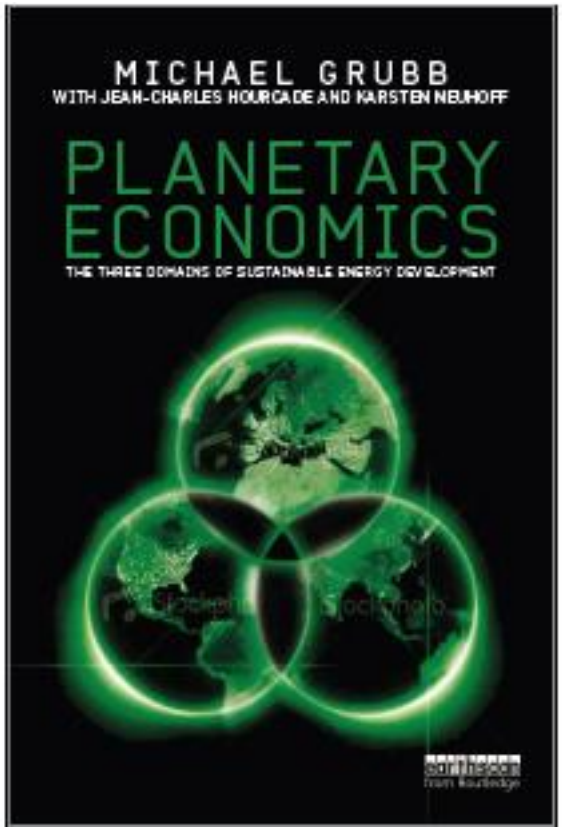

1. **Introduction: Trapped?**
2. **The Three Domains**

Pillar 1

- **Standards and engagement *for* smarter choice**
- 3: Energy and Emissions – Technologies and Systems
- 4: Why so wasteful?
- 5: Tried and Tested – Four Decades of Energy Efficiency Policy

Pillar II

- **Markets and pricing *for* cleaner products and processes**
- 6: Pricing Pollution – of Truth and Taxes
- 7: Cap-and-trade & offsets: from idea to practice
- 8: Who's hit? Handling the distributional impacts of carbon pricing

Pillar III

- **Investment and incentives for innovation and infrastructure**
- 9: Pushing further, pulling deeper
- 10: Transforming systems
- 11: The dark matter of economic growth

12. **Conclusions: Changing Course**

See www.climatestrategies.org/events/2014-events/book.html for information and pdf of full book presentation materials.

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