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LETS 2050

ing mountains – y goals

ENERGY SYSTEMS STUDIES

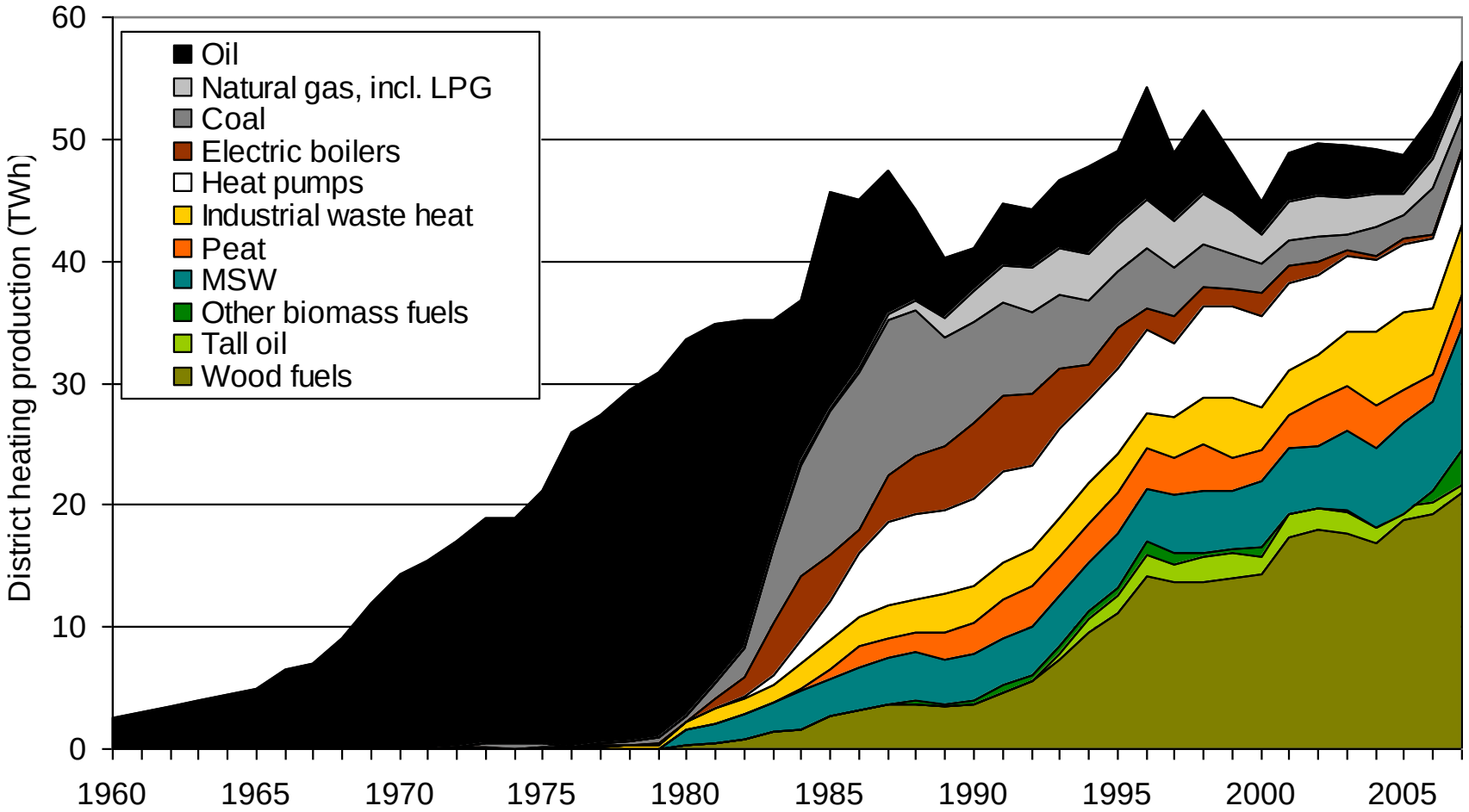
Decarbonisation outlook

- 2020: Doing pretty well?
- 2030: Transport in focus
- 2040: Industry prepared?

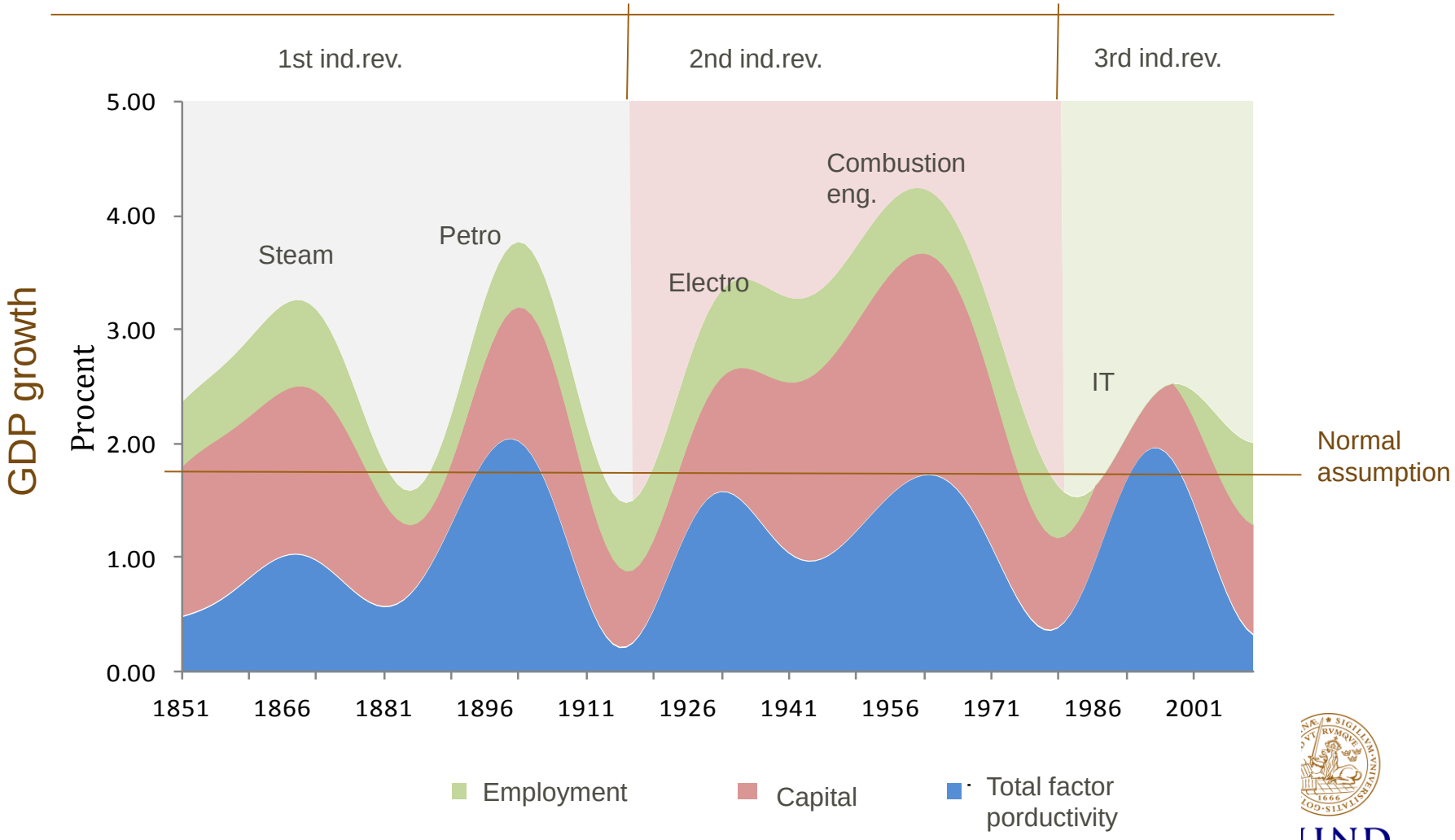
2020 targets OK but then? Specific challenges:

- Bioenergy and land-use governance
- The power system: Nordic power island, exporter or green battery?
  - Integration, new production and T&D planning and investment, electrification and data centres, grid codes, storage technologies, hydro goal conflicts, etc…
- Transport sector
  - Technical fix versus travel patterns, biofuels, electrofuels (power-to-gas or liquids), high mitigation costs
- Basic industries in the green power island?
  - Electrification and flexible demand, but no zero-vision, unexplored, and international competition, leakage

The transition in Swedish space heating



Long run economic cycles of growth



Source: N.G Andersson and Karpestam 2012

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A fundamental conflict of ideas

- **One perspective:** The state should only intervene if there is a market failure (e.g. environmental costs, lack of R&D and information) to correct and improve the market to make it more efficient.
  - Economy-wide market based technology neutral policy instruments for CO_2 are efficient.
- **Another perspective:** The state has an important role in governing and driving the transition to sustainable energy and transport systems and the long-term restructuring of society.
  - Multi-objective long term sequential policy strategies for sustainable cities/transport/industry.

Source: Kronsell, Hildingsson och Khan, 2012

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Snapshots from IPCC WGIII SPM

Among other methods, economic evaluation is commonly used to inform climate policy design. Practical tools for economic assessment include cost-benefit analysis, cost-effectiveness analysis, multi-criteria analysis and expected utility theory [2.5]. The limitations of these tools are well-documented [3.5]. Ethical theories based on social welfare functions imply that distributional

Climate policy intersects with other societal goals creating the possibility of co-benefits or adverse side-effects. These intersections, if well-managed, can strengthen the basis for undertaking climate action. Mitigation and adaptation can positively or negatively influence the achievement of other societal goals, such as those related to human health, food security, biodiversity, local environmental quality, energy access, livelihoods, and equitable sustainable development; and vice versa, policies toward other societal goals can influence the achievement of mitigation and adaptation objectives [4.2, 4.3, 4.4, 4.5, 4.6, 4.8]. These influences can be substantial, although sometimes difficult to quantify, especially in welfare terms [3.6.3]. This multi-objective perspective is important in part because it helps to identify areas where support for policies that advance multiple goals will be robust [1.2.1, 4.2, 4.8, 6.6.1].

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Snapshots from IPCC WGIII SPM Sectoral chapters

Mitigation strategies, when associated with non-climate policies at all government levels, can help decouple transport GHG emissions from economic growth in all regions (*medium confidence*). These strategies can help reduce travel demand, incentivise freight businesses to reduce the carbon intensity of their logistical systems and induce modal shifts, as well as provide co-benefits including improved access and mobility, better health and safety, greater energy security, and cost and time savings (*medium evidence, high agreement*). [8.7, 8.10]

Mitigation options in urban areas vary by urbanization trajectories and are expected to be most effective when policy instruments are bundled (*robust evidence, high agreement*). Infrastructure and urban form are strongly interlinked, and lock-in patterns of land use, transport choice, housing, and behaviour. Effective mitigation strategies involve packages of mutually reinforcing policies, including co-locating high residential with high employment densities, achieving high diversity and integration of land uses, increasing accessibility and investing in public transport and other demand management measures. [8.4, 12.3, 12.4, 12.5, 12.6]

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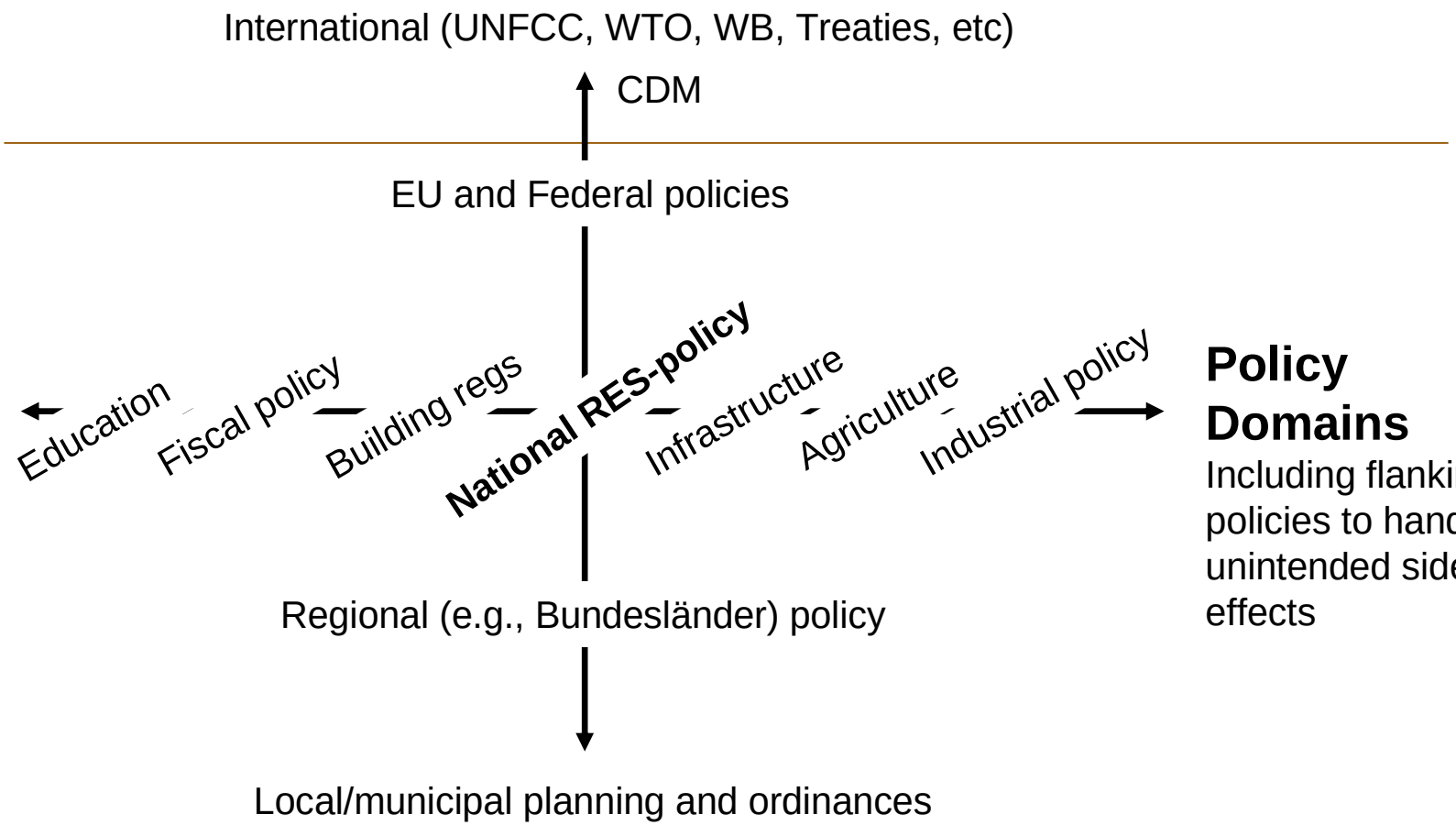
Snapshots from IPCC WGIII SPM Policy chapters

Since AR4, there has been an increased focus on policies designed to integrate multiple objectives, increase co-benefits and reduce adverse side-effects (*high confidence*). Governments often explicitly reference co-benefits in climate and sectoral plans and strategies. The scientific literature has sought to assess the size of co-benefits (see Section SPM.4.1) and the greater political feasibility and durability of policies that have large co-benefits and small adverse side-effects. [4.8, 5.7, 6.6, 13.2, 15.2] Despite the growing attention in policymaking and the scientific literature since AR4, the analytical and empirical underpinnings for understanding many of the interactive effects are under-developed [1.2, 3.6.3, 4.2, 4.8, 5.7, 6.6].

Sector-specific policies have been more widely used than economy-wide policies (*medium evidence, high agreement*). Although most economic theory suggests that economy-wide policies for the singular objective of mitigation would be more cost-effective than sector-specific policies, since AR4 a growing number of studies has demonstrated that administrative and political barriers may make economy-wide policies harder to design and implement than sector-specific policies. The latter may be better suited to address barriers or market failures specific to certain sectors, and may be bundled in packages of complementary policies. [6.3.6.5, 8.10, 9.10, 10.10, 15.2, 15.5, 15.8, 15.9]

Technology policy complements other mitigation policies (*high confidence*). Technology policy includes technology-push (e.g., publicly funded R&D) and demand-pull (e.g., governmental procurement programmes). Such policies address market failures related to innovation and technology diffusion. [3.11, 15.6] Technology support policies have promoted substantial innovation and diffusion of new technologies, but the cost-effectiveness of such policies is often difficult to assess [2.6.5, 7.12, 9.10]. Nevertheless, program evaluation data can provide empirical evidence on the relative effectiveness of different policies and can assist with policy design [15.6.5].



Multiple (jurisdictional) levels

Jurisdictions in different policy domains may be at different levels (tax is typically national and permits/planning is local). An important flanking policy is for handling unsustainable land/biomass-use.

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A reflection on policy evaluation

DG-Energy official, 2011:

PS an interesting question is the extent to which the different approaches are in competition, complementary or simply additional to each other. Does the promotion of fuel efficient or electric cars undermine efforts to get people to walk, cycling or use public transport? Debates seem to be carried out in terms of competition between policies, while my sense from a policy perspective is that the problems are so difficult and our knowledge about 'what works' so limited that it makes sense to try to implement several different solutions simultaneously.

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Technology, institutions, and multiple goals: a need for broad transition strategies

- New/better transport fuels and vehicles through technology, innovation and deployment policies
- Changes in travel patterns, choice of travel mode, acceptance for e-mobility, distance work
- Policy packages to ”nudge” towards more sustainable patterns (taxes, congestion charges, parking fees…)
- Planning approaches e.g., integrated planning, economic evaluation tools, ”four step” principle (demand, efficiency, minor and major investment)
- Policy paradigms e.g., accessibility instead of mobility, and consideration of long term goals
- Visions and missions: from Road Administration that builds roads to Transport Administration that builds society

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Governance approaches
Provide clear and stable direction

- Develop long term innovation and industrial development policies aimed at preparing for deep emission reductions post 2020 and 2030. Selected areas can be targeted, winners picked.
- Explore and develop mechanisms for greater transparency, participation and monitoring of policy in a transition context.
- Reconsider whether existing administrative structures, organisations and jurisdictions in government are well suited to govern the transition. Mechanisms for coordination between levels, sectors and different policy domains. Scenarios as mechanisms for learning and strategizing about policy, as well as for policy integration?
- Create new pathways and long term lock-in situations that are consistent with low carbon transitions. Stable investment conditions. Some countries consider climate legislation.

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Long term transition strategies: implications for evaluation

- Must go beyond and complement short term cost-efficiency and effectiveness assessments.
- Requires broad and encompassing multi-objective evaluation frameworks for understanding combined and sequential effects of several policy instruments.
- Requires attention to multiple dimensions (e.g., technical, social, economic), multiple levels (e.g. international, national, local) as well as policy conflicts, coherence and integration across policy domains, and include policy formation processes in a transition context.
- The following speakers will explain exactly how.

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Thank you

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