Swedish Industrial Roadmaps

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Since I had not prepared any slides I have transferred my notes to slides.
• Sweden several roadmaps
  – Prepared by companies, industrial sectors, industrial associations, academies and organizations
• Same goal net-zero emission of GHG 2040 or 2045
• Same conclusions
• Focus on large sources of emission
  – About 1/3 of Swedish emissions from industry.
  – About 2/3 of these from four sectors: iron/steel, cement, plastics/chemical and refineries
• All roadmaps reach the same conclusion, four pillars
  – Biomass (availability?)
  – Electrification (power? when and where? power quality?)
  – CCUS
  – Hydrogen from electrolysis

  – Not energy efficiency – new technologies
• Iron/steel
  – Reduce iron ore with hydrogen
  – Heat treatment with electricity and biomass (direct or indirect)
• Cement
  – CCS
  – Electrification of kiln
• Plastics
  – Recycling (pyrolysis, not mechanical grinding)
  – CCUS and hydrogen
  – Biomass
• Refineries
  – CCUS and hydrogen
  – Biomass
• Cost: 1-5% increase for end-users/consumer

• But, rate of investment must increase 25-60%/p.a.

• Swedish governmental support programme "Industriklivet" ("industrial stride")
  – Long term support 2018-2040
  – 300 million SEK/p.a. (roughly 30 M€/p.a.)
  – Other programmes support to R&D, "Industriklivet" also investment