



DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
STEEL COMMITTEE

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PRESENT AND FUTURE CO₂ EMISSIONS IN THE IRON AND STEEL INDUSTRY

Presentation by Dolf Gielen, Senior Analyst, International Energy Agency. Steel Committee meeting 7-8 November 2006.

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Present and Future CO₂ Emissions in the Iron and Steel Industry

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Topics

- The CO₂ emissions challenge
- The ETP scenarios
- The IEA G8 activities

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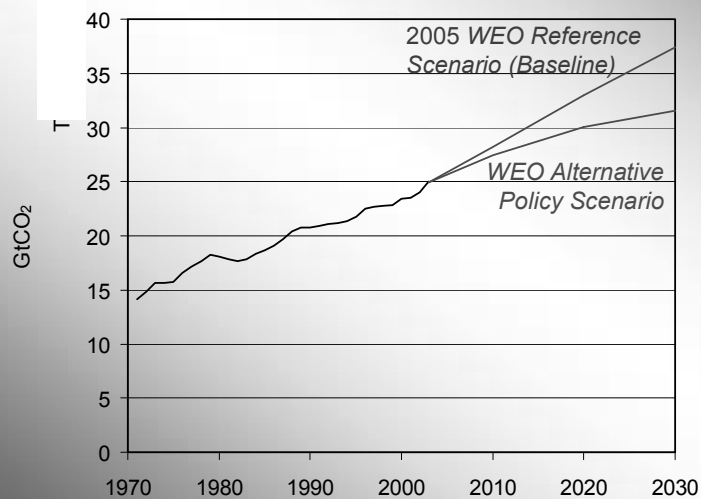
The CO₂ emissions challenge

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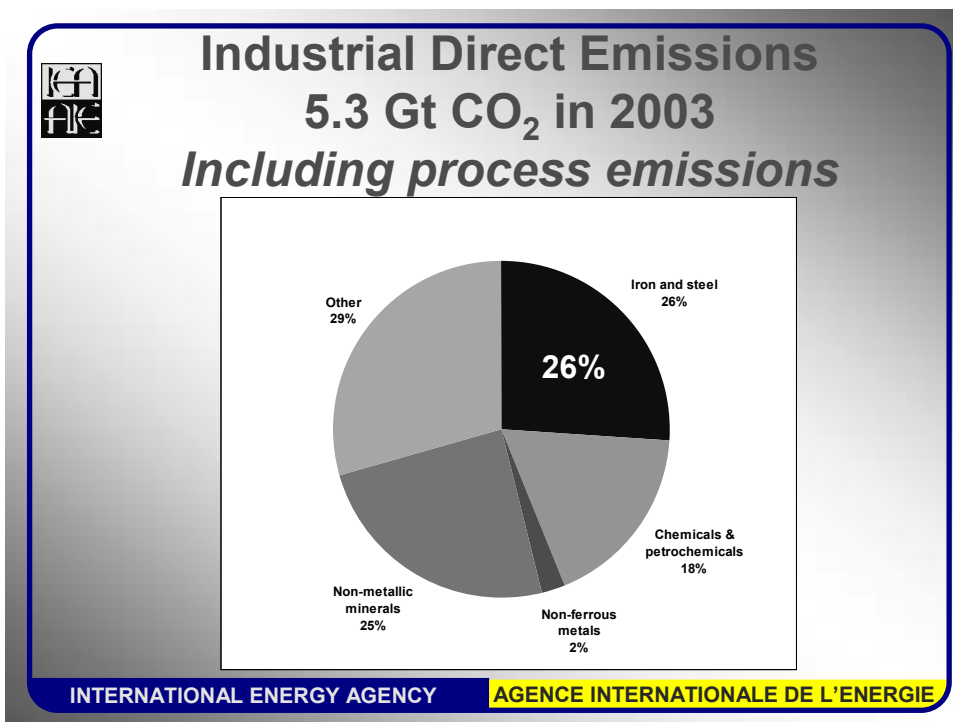
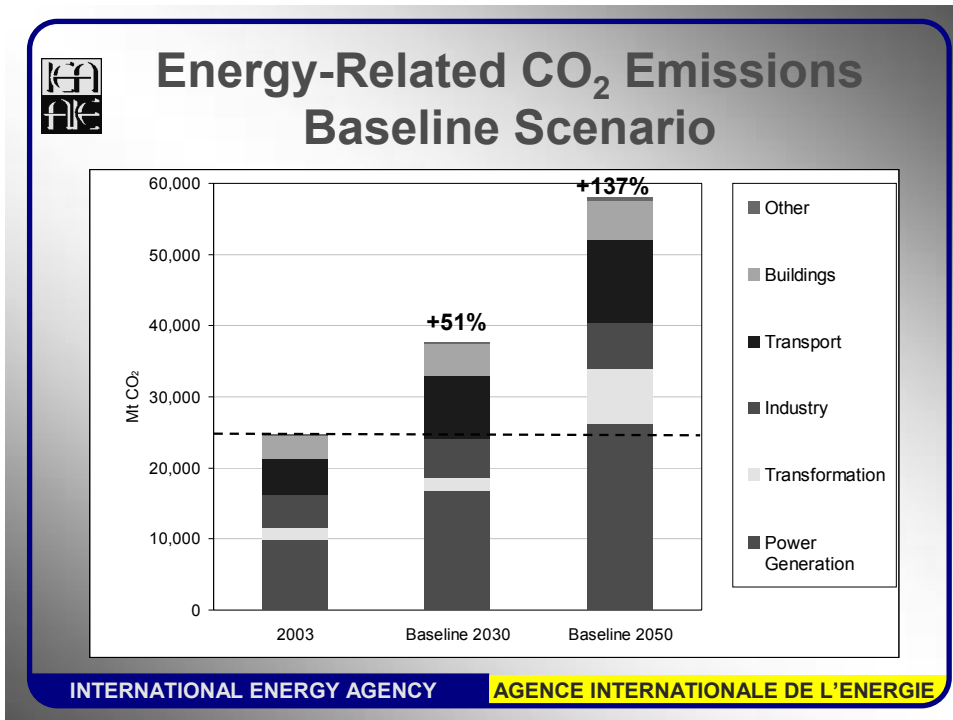


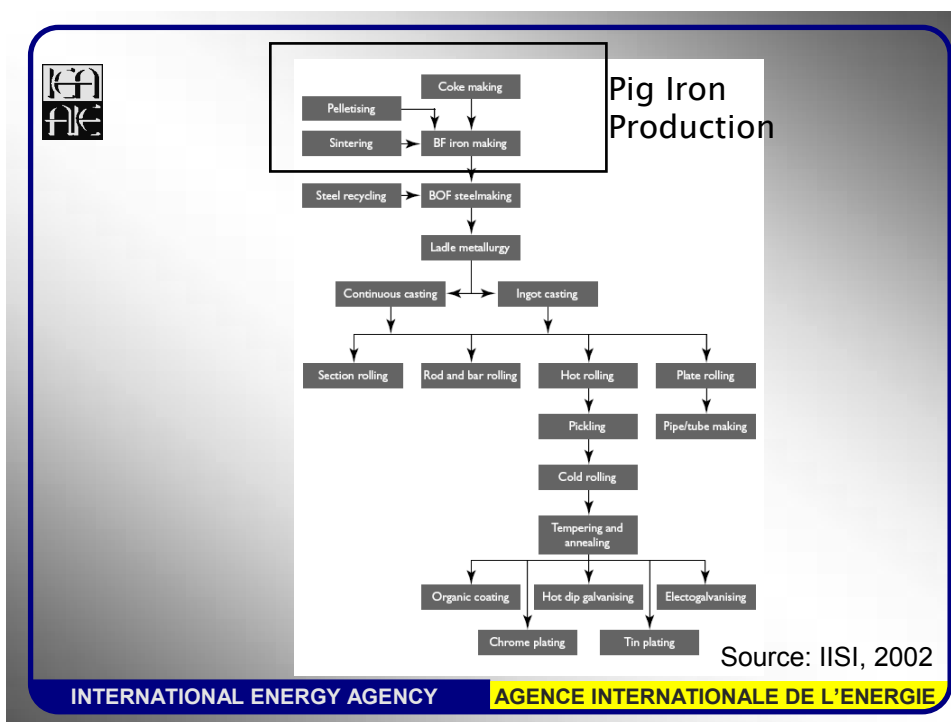
Global CO₂ emissions from fossil fuel use



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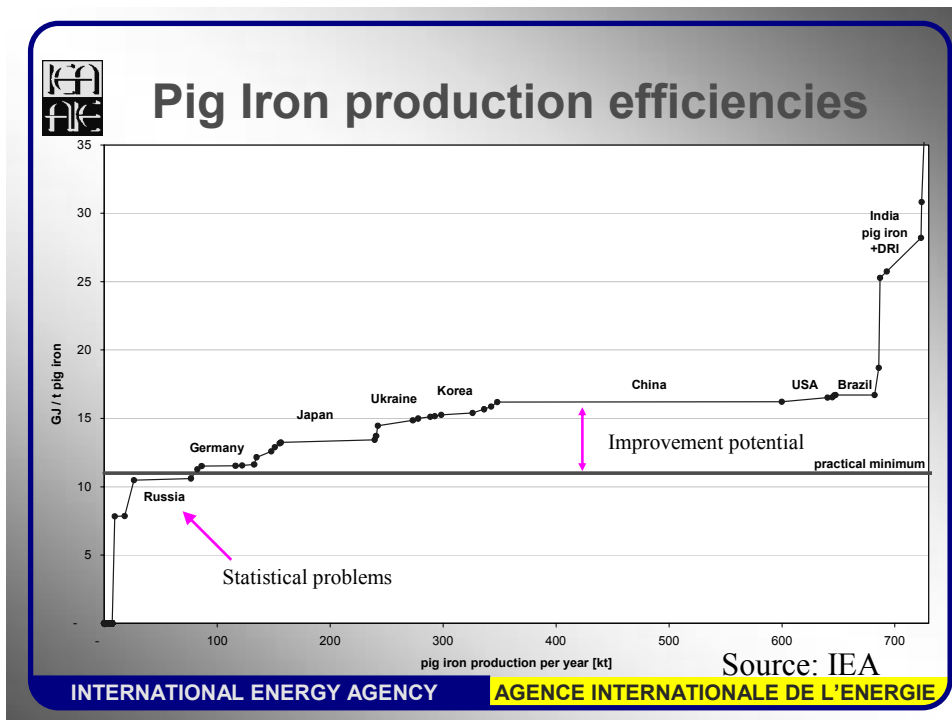




Country Focus – Pig Iron 17 countries

	Production [Mt/yr]	Share [%]	Cumulative [%]
China	251.9	35.1	35.1
Japan	83	11.6	46.7
Russia	50.3	7.0	53.7
United States	40.6	5.7	59.3
Brazil	34.6	4.8	64.1
Ukraine	31.1	4.3	68.5
Germany	30.0	4.2	72.7
Korea	27.6	3.8	76.5
India	25.1	3.5	80.0
France	13.2	1.8	81.8
Italy	10.6	1.5	83.3
Taiwan	10.4	1.4	84.8
United Kingdom	10.2	1.4	86.2
Canada	8.8	1.2	87.4
Belgium-Luxembourg	8.2	1.1	88.6
Poland	6.4	0.9	89.5
South Africa	6.0	0.8	90.3
Other	69.8	0.1	100.0
World	717.7	100.0	100.0

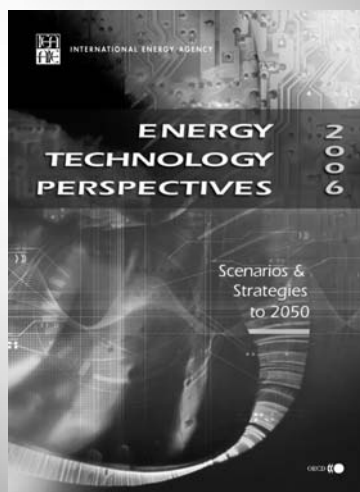
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- ### Options for CO₂ Reduction in Iron & Steel
- Energy Efficiency (existing technology)
 - New energy efficient technology
 - Fuel switching (gas-DRI, waste plastic, charcoal, electricity)
 - CO₂ Capture and Storage (CCS)
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The ETP2006 Scenarios



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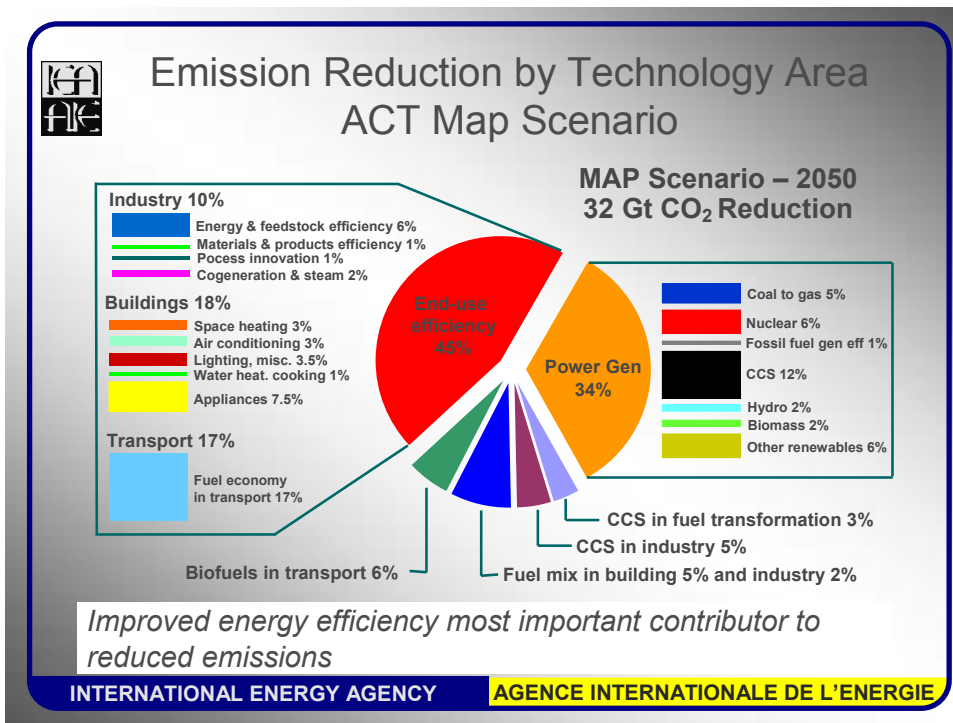
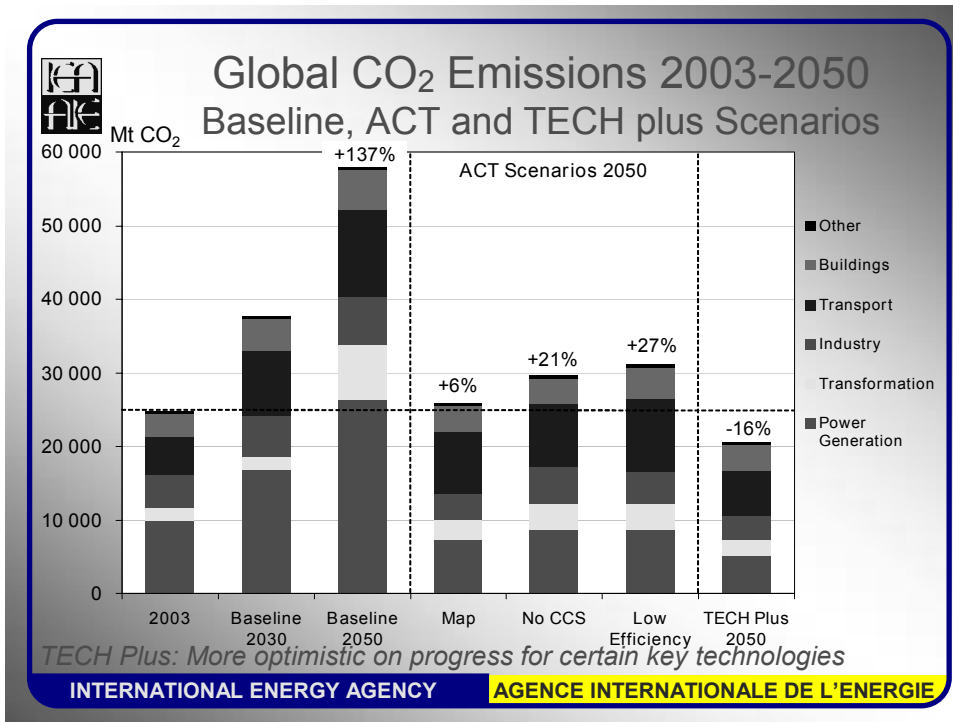


Scenario Analysis

- Scenarios analysed:
 - ◆ Baseline Scenario
 - ◆ Accelerated Technology Scenarios (ACT)
 - ◆ TECH Plus scenario
- ACT and TECH Plus scenarios:
 - ◆ Analyse the impact from R&D, Demonstration and Deployment measures
 - ◆ Incentives equivalent to 25 \$/tonne CO₂ for low-carbon technologies implemented world-wide from 2030 and on
 - ◆ Individual scenarios differ in terms of assumptions for key technology areas

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Iron & Steel Assumptions

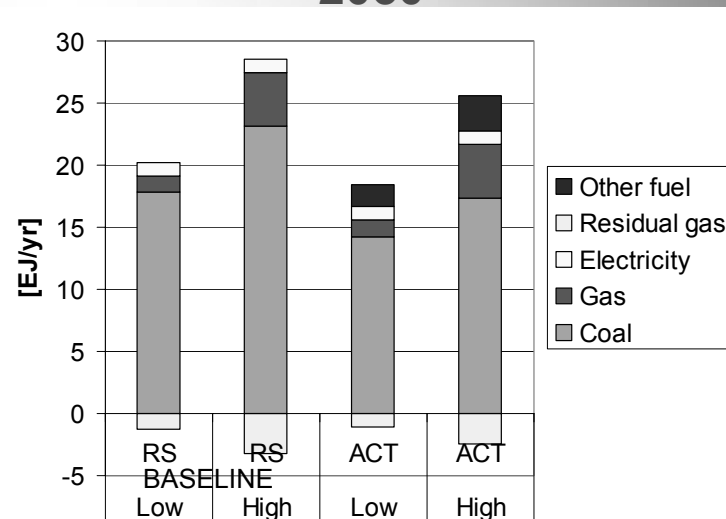
- Steel production 2050: +50% to + 100%
- Baseline efficiency gain 20%
- Smelt reduction increases to 100-250 Mt iron/yr by 2050
- Combined smelt reduction-DRI production increases to 90-150 Mt/yr
- Gas-DRI increases to 120-390 Mt/yr
- Scrap-EAF increases to 530-630 Mt/yr
- Electricity CO₂ intensity constant 200 kg/GJ

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Energy Demand, ACT Scenario, 2050



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ACT Scenario Trends

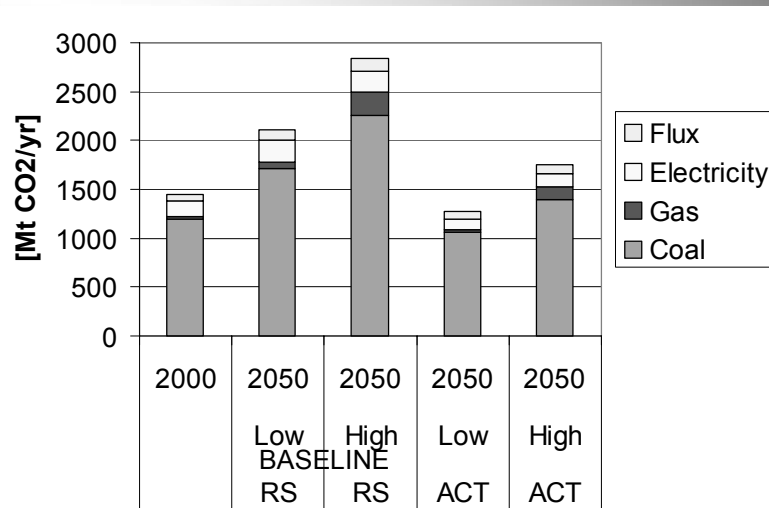
- 10% additional efficiency gain compared to Reference Scenario
- 5-10% other fuels
- 20-25% lower coal demand
- Electricity CO₂ intensity halves

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CO₂ Emissions, 2050

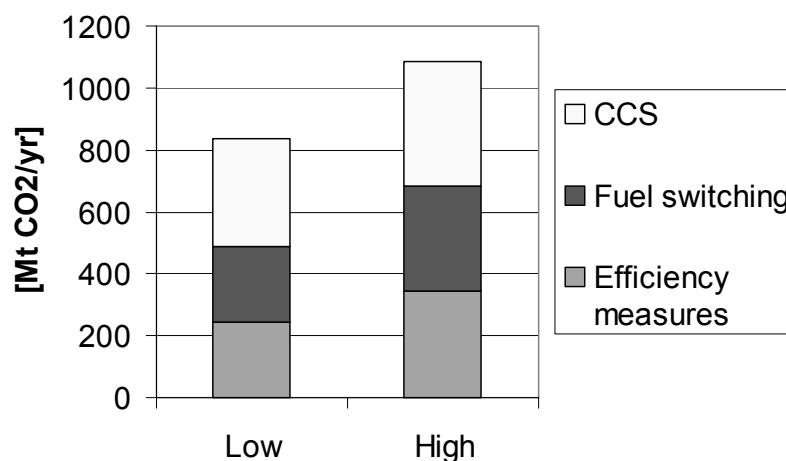


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Emission reduction, 2050



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Emission Reduction Technologies

- Blast Furnace + CCS: 300 Mt CO₂
- DRI + CCS: 50-100 Mt CO₂
- Energy efficiency (BF-BOF route + smelt reduction): 250-350 Mt CO₂
- Increased use of waste plastic, charcoal, gas-DRI etc.: 225-300 Mt CO₂


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The IEA G8 Activities

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G8 Gleneagles Communiqué

- July 2005 under UK Chairmanship
- Launched a Dialogue on Climate Change, Clean Energy and Sustainable Development
 - ◆ intended to engage other significant energy consumers, including five major developing countries (Brazil, China, India, Mexico and South Africa – the “plus 5”) who were invited to attend the Summit.
- Enabled a Gleneagles Plan of Action (GPA)
 - ◆ Tasked the IEA to carry out several activities and studies

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Industry Task

- Indicators publication – April 2007(input for the German G8 summit)
- Efficiency potential analysis – End 2007 (input for the Japanese G8 summit)
- Close collaboration with industry: IAI, ICFPA, IFA, IISI, WBCSD, WEF
- Close collaboration with other entities: AP6, IPCC, UN-FAO, etc.
- Close cooperation with Implementing Agreements (IETS, IEA GHG, ETSAP etc.)

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Upcoming Publication

- Title: *Indicators for Industrial Energy Efficiency and CO₂ Emissions*
- Iron and Steel is one of the focal areas
- In close cooperation with IISI & its member companies
- Analysis on a country level
- No benchmarking
- Try to find a balance between methodology and data


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Thank you

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