

Smart Electrification with Renewables: Driving the Transformation of Energy Services

Presenter:

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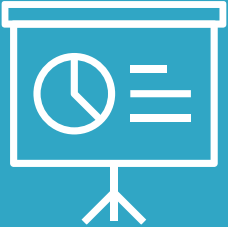
TUESDAY, 5 APRIL 2022 • 14:00-14:30 CET

SPEAKER



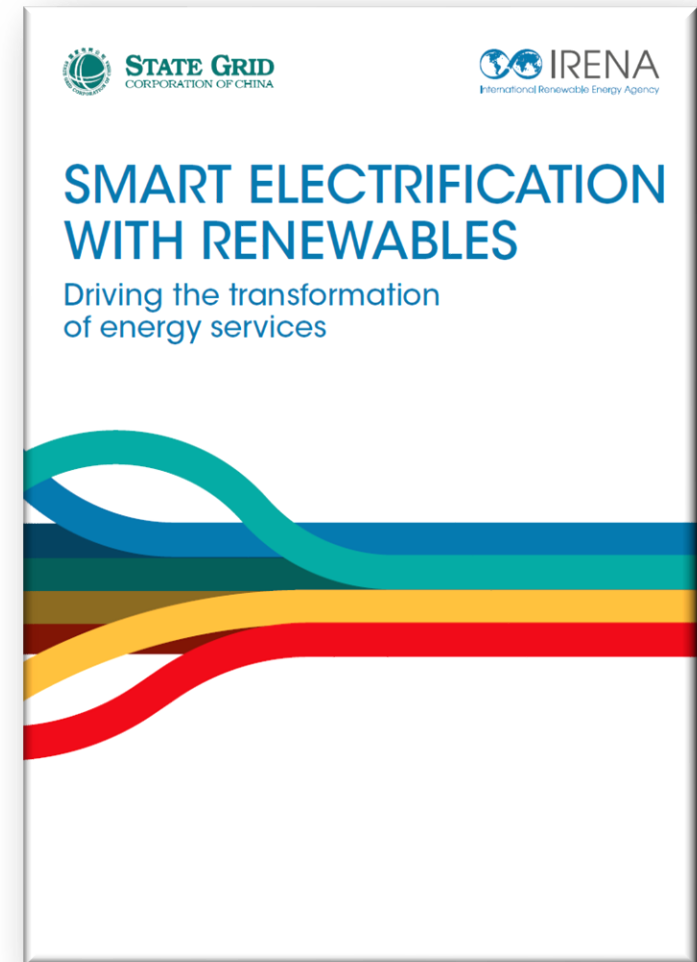
Daniel Russo

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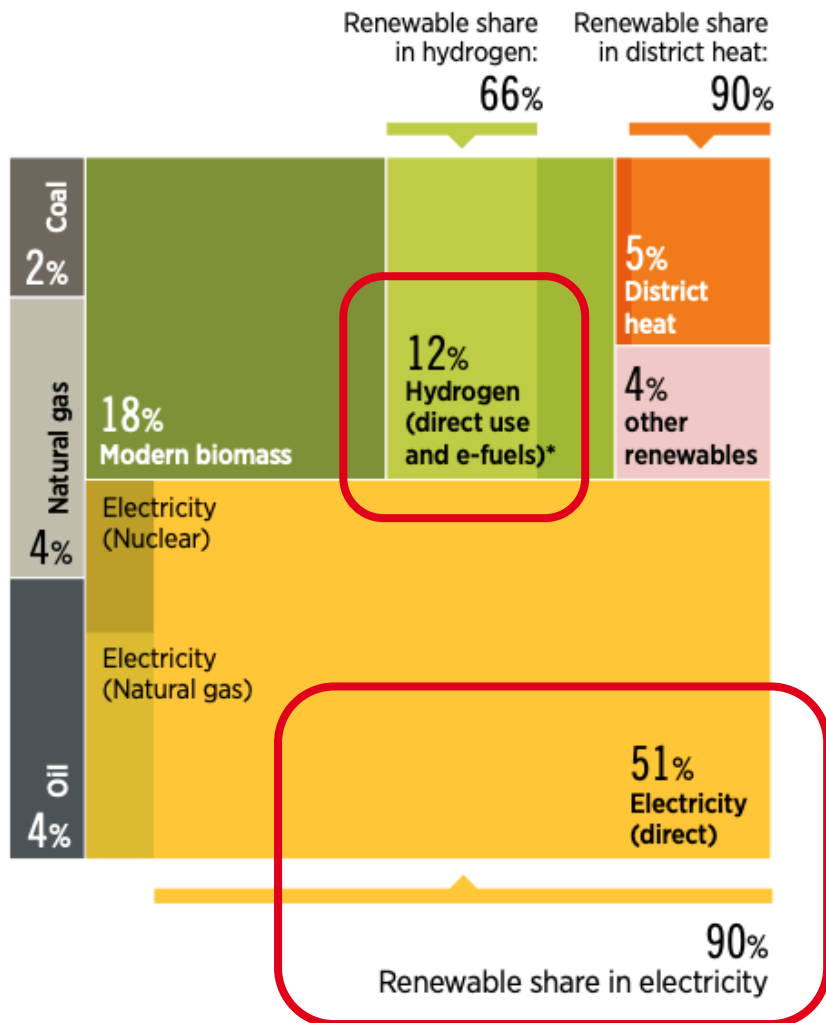
This report provides policy makers with a conceptual overview of the global transition to electrification with renewables. It examines recent trends in relevant technologies and innovations, sets out possible long-term pathways for electrification with renewables, and identifies priority actions to enable those pathways. Throughout the report, the underlying concern is how to achieve “smart electrification with renewables”, focusing on the potential synergies between increasing renewable power generation, electrification and digitalisation, and their deployment and more efficient use across end-use sectors – power, transport, industry and buildings.



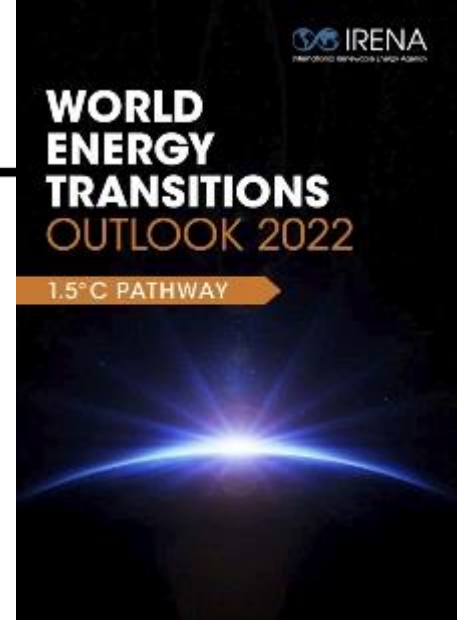
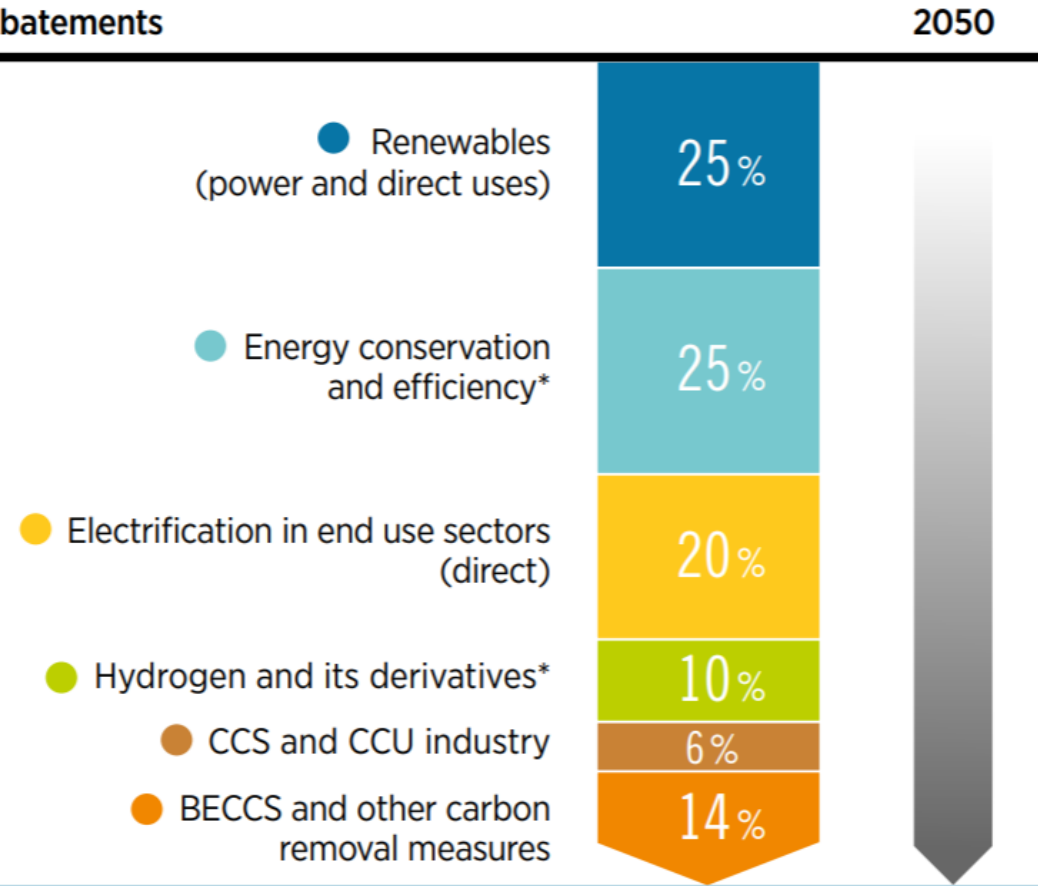
Energy mix of the future – IRENA net zero scenario

2050 - Where we need to be (1.5-S)

348 EJ Total Final Energy Consumption

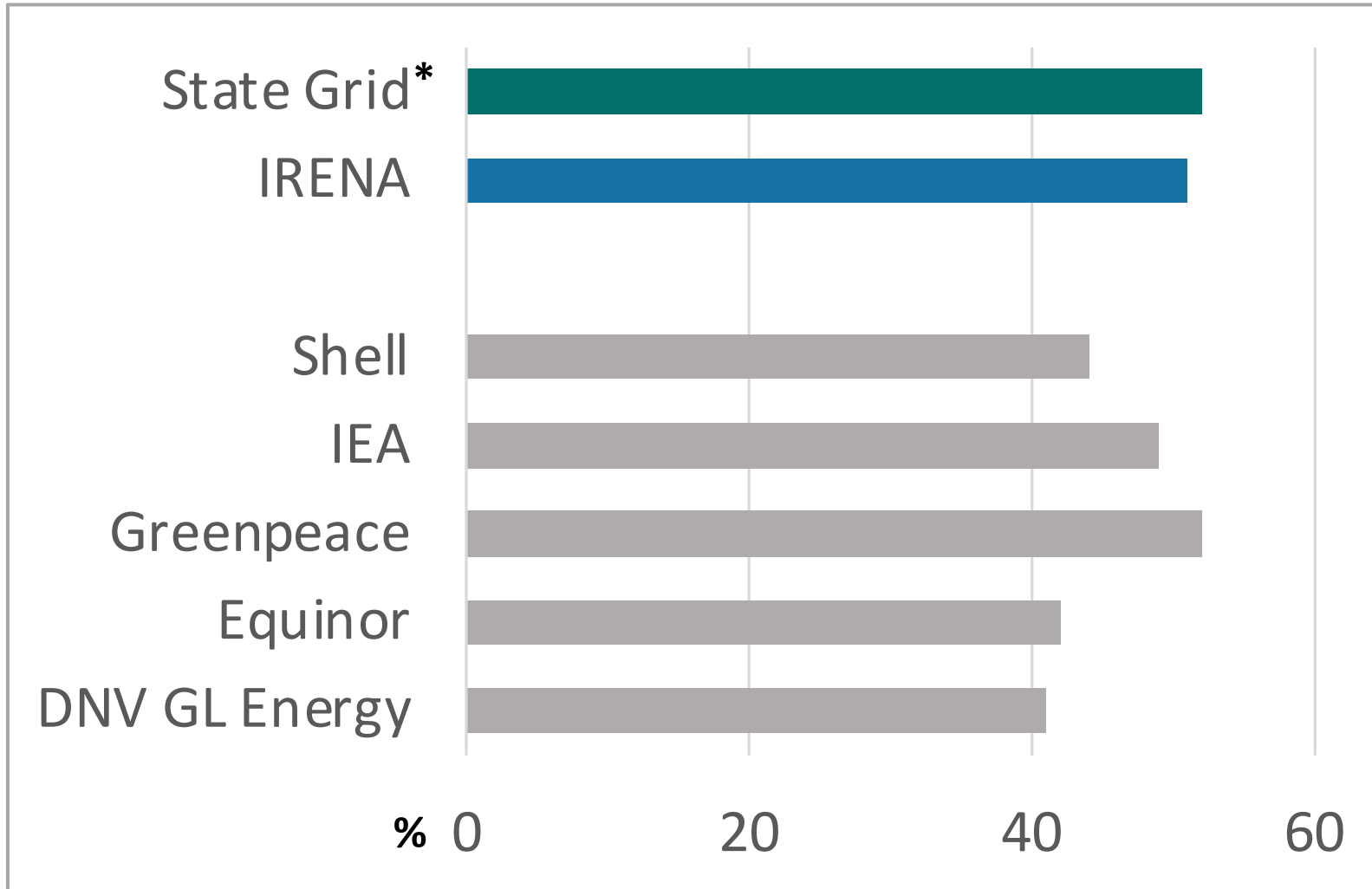


Abatements



-36.9
GtCO₂/yr

Electrification of final consumption in 2050



Renewables share in the power sector by 2050

68%

90%

74%

88%

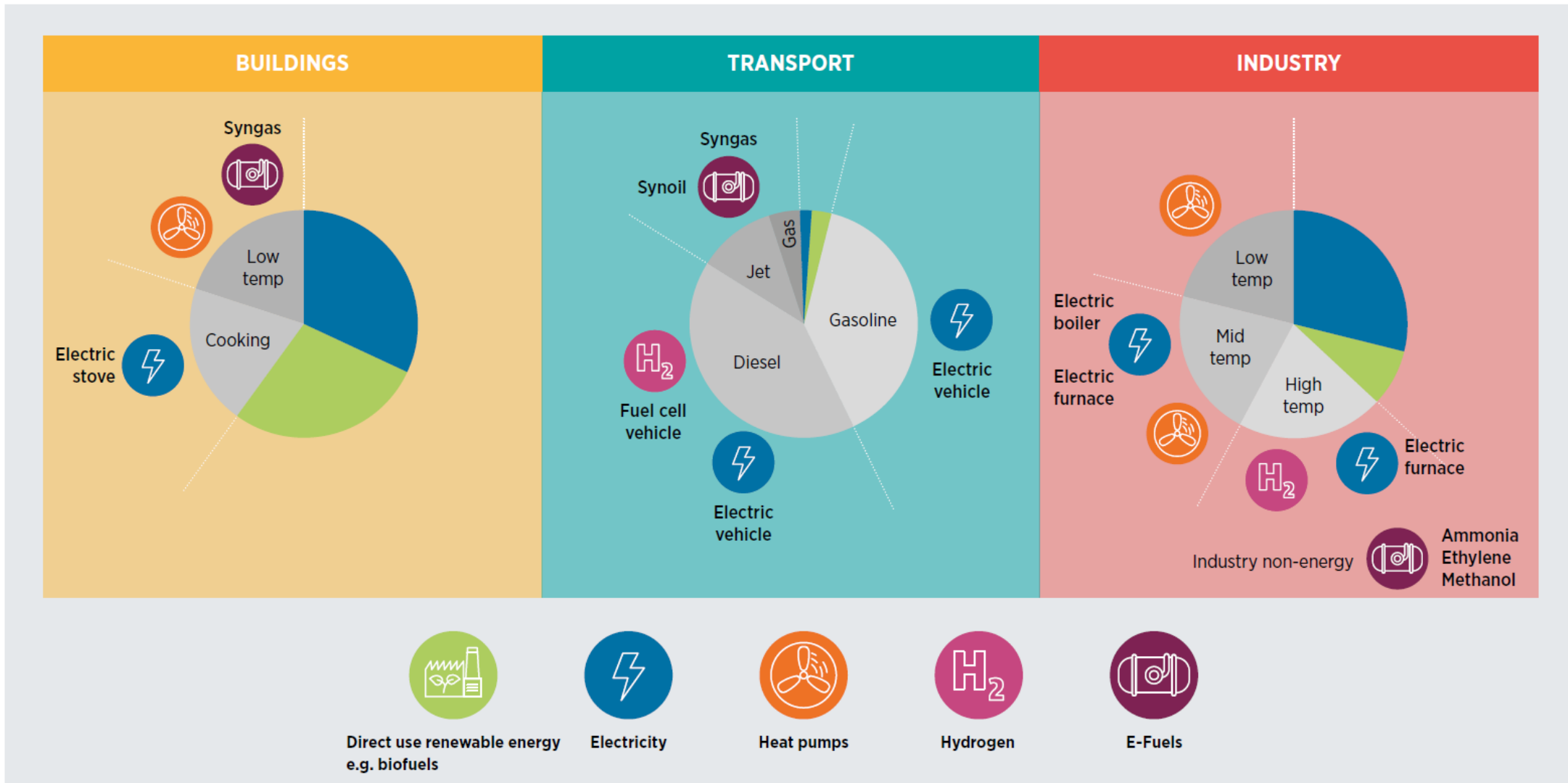
92%

72%

78%

* Analysis is limited to China only

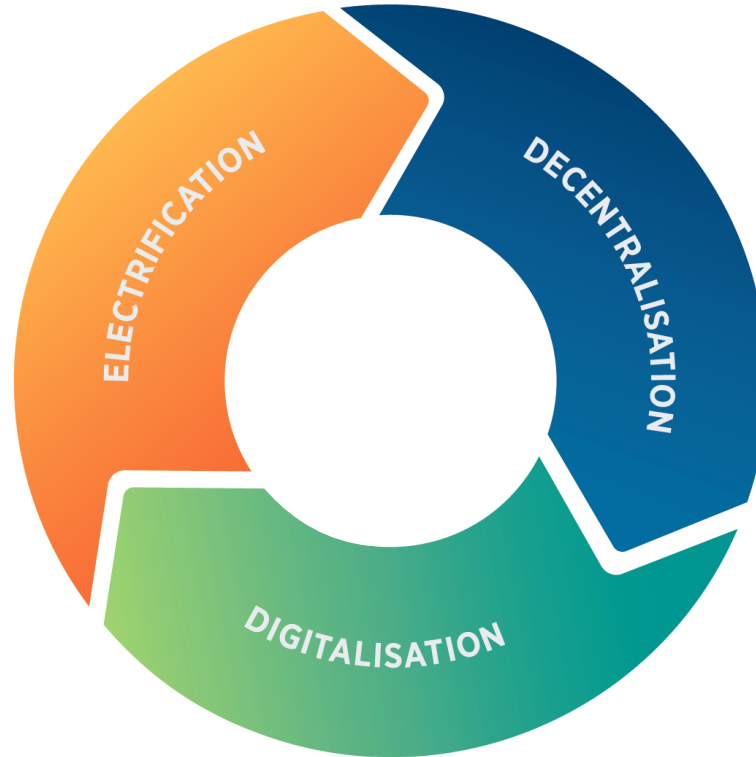
Potential electrification options are getting more attention



What is smart electrification with renewables?

New end-use technologies

Pervasive shift to electricity across sectors



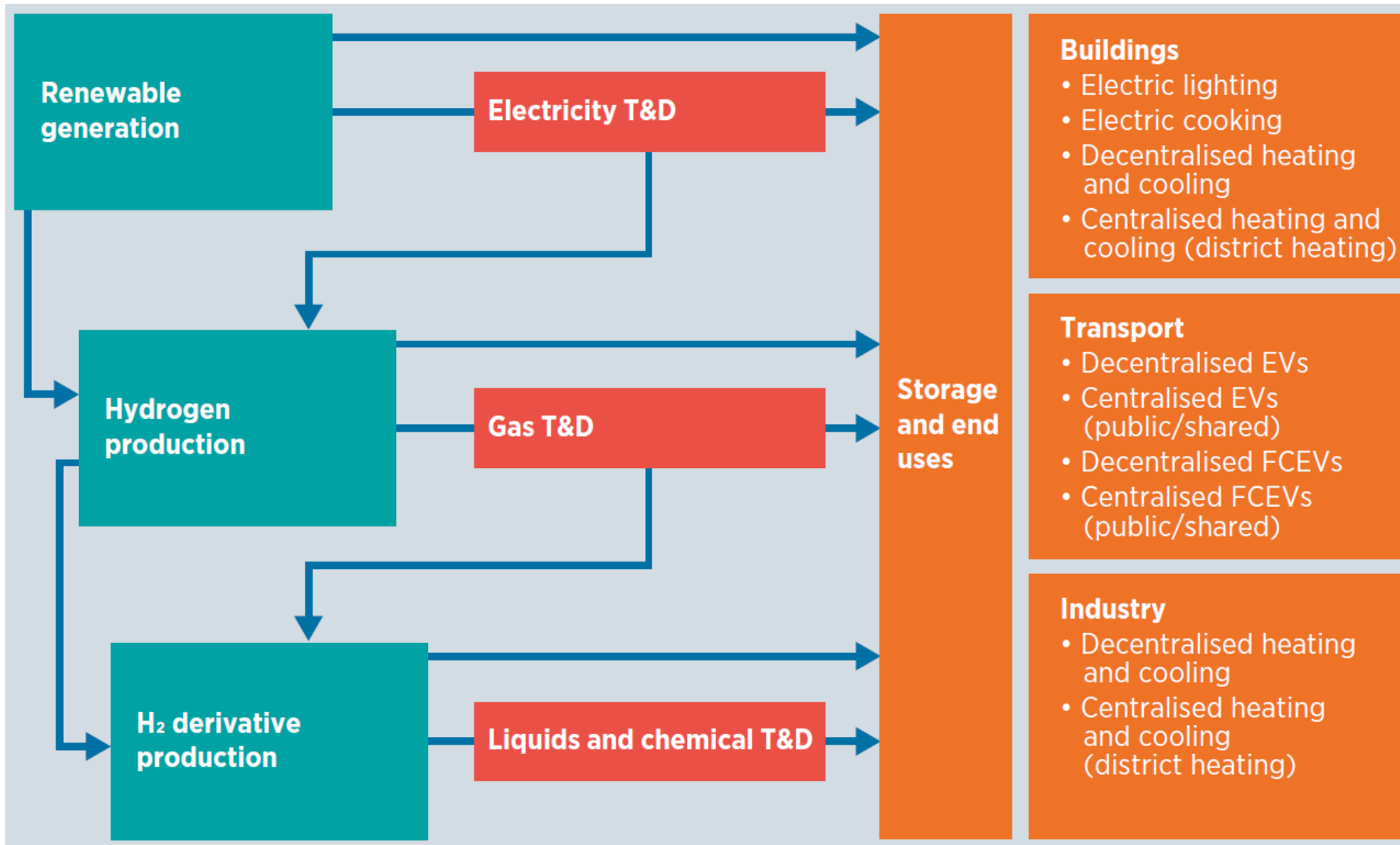
Renewables are lowest-cost

Different spatial and temporal availability

New digital technologies

Offering efficiency across sectors, space and time

However, choosing optimal electrification pathways requires an understanding of the full infrastructure landscape...



Choices in end-use technology will have important impacts on infrastructure requirements in previous stages

*Including 'vehicles' in shipping and aviation

The latest literature presents a growing consensus around general principles for least cost system-wide electrification

- 1. Conservation and efficiency first**
- 2. Maximise direct-electrification with renewables where options exist**
- 3. Make intelligent use of indirect electrification (H₂ and E-fuel) advantages in energy-dense end uses and system-wide flexibility**

Why? A simplified rule-of-thumb

Least amount of renewable capacity needed

Most amount of renewable capacity needed

Smart electrification strategies are key for infrastructure efficiency and least-cost transition



Better managing demand to meet RE supply

Expanding and valuing grid services

Expanding opportunities for electrification

- Smart charging
- Smart heating and cooling
- Seasonal thermal storage
- Seasonal hydrogen storage

- Plug-in vehicles (batteries)
- Aggregators providing ancillary services
- Hydrogen electrolysers

- Strategic siting of hydrogen production
- Co-location of industrial production

Planning

Recognise that electrification tomorrow requires investment in infrastructure today – electrical and digital

Market design

Address the need to shape or create proactive markets that deliver flexibility and economic incentives

Societal focus

Reflect the needs and wishes of consumers and communities

Transport

Take advantage of EV-VRE synergies and advance niche R&D to electrify other modes

Buildings

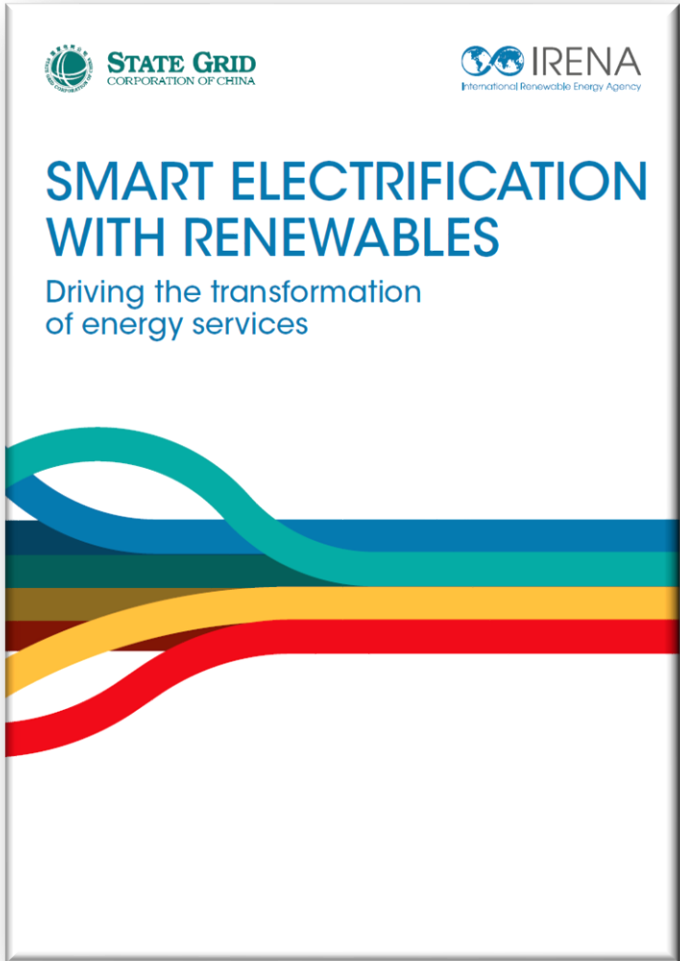
Exploit existing solutions by introducing standards, codes and regulation to speed up and scale up deployment

Industry

Push sector-specific R&D and demonstration, with a long-term global perspective

H₂ and E-fuels

Understand their long-term roles and Economics



**Thank you for your
attention!**



Q & A
10 min

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