

The Contribution of Advanced Renewable Transport Fuels to **Transport Decarbonisation** in 2030 and beyond

Case Sweden
Magnus Lindgren



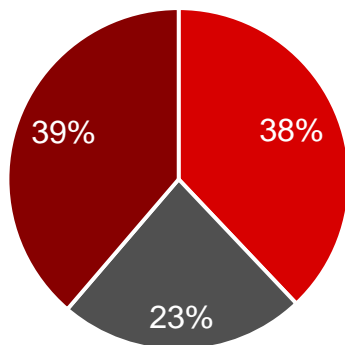


Sweden

- Larger than Finland, but still small
 - 447 000 km², 1 600 km from North to South
 - 63% is forest
 - 9% is lakes and rivers
 - Population approximately 10 million
 - 23 persons/km²
- Important industries for ART fuel
 - Forestry
 - Vehicle manufacturer
- Infrastructure
 - 225 000 km of roads (excluding forestry roads)
 - 15 000 km of railways

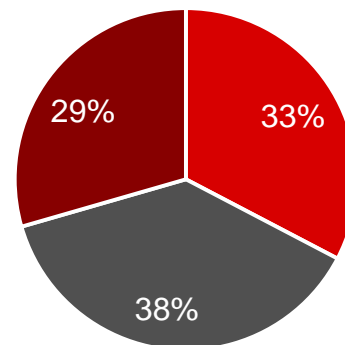
Energy consumption and GHG emissions

Energy consumption by sector 2017



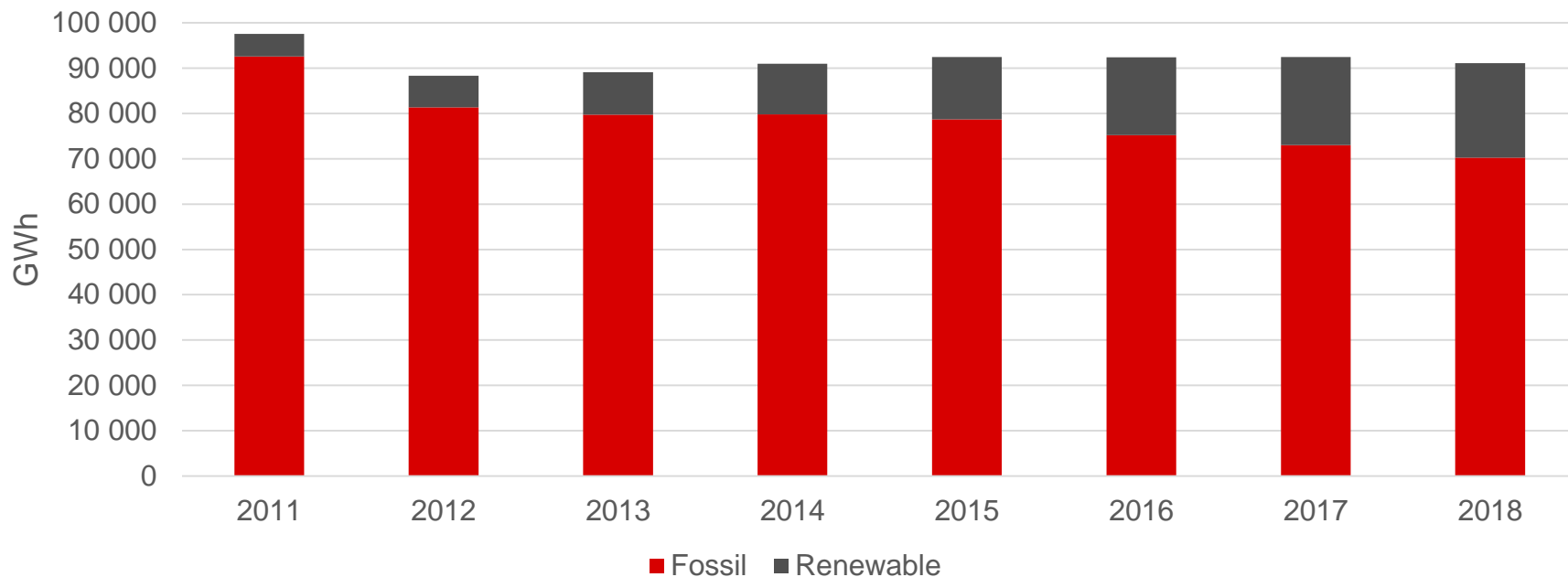
- Industry
- Domestic transport
- Dwelling, service and other

GHG emissions by sector 2017



- Industry
- Domestic transport
- Dwelling, service and other

Use of biofuel in road transport



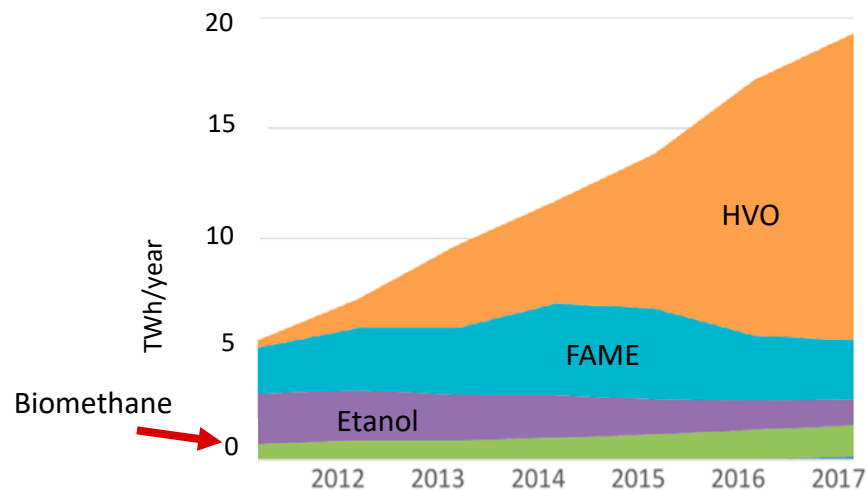
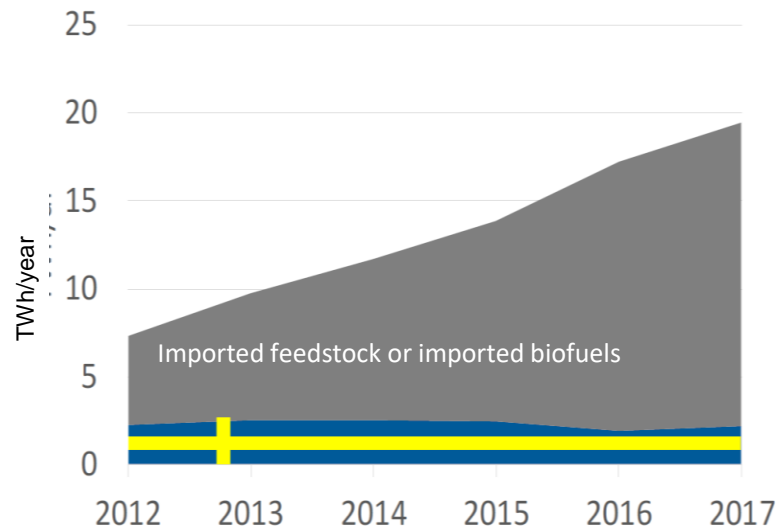
Road transport fuels (liquid and gaseous)

	Fossil	Biopetrol	HVO	FAME	Ethanol	Biomethane (GWh)	Renewable share (GWh/GWh)
Diesel MK1 (m ³)	4 432 695		1 008 537	316 225			23%
Bensin MK1 (m ³)	2 819 304	30 944			159 449		6,30%
HVO100 (m ³)			445 942				100%
FAME100 (m ³)				109 543			100%
E85 (m ³)	13 008				57 668		82%
Vehicle gas (GWh)	92					1 528	94%

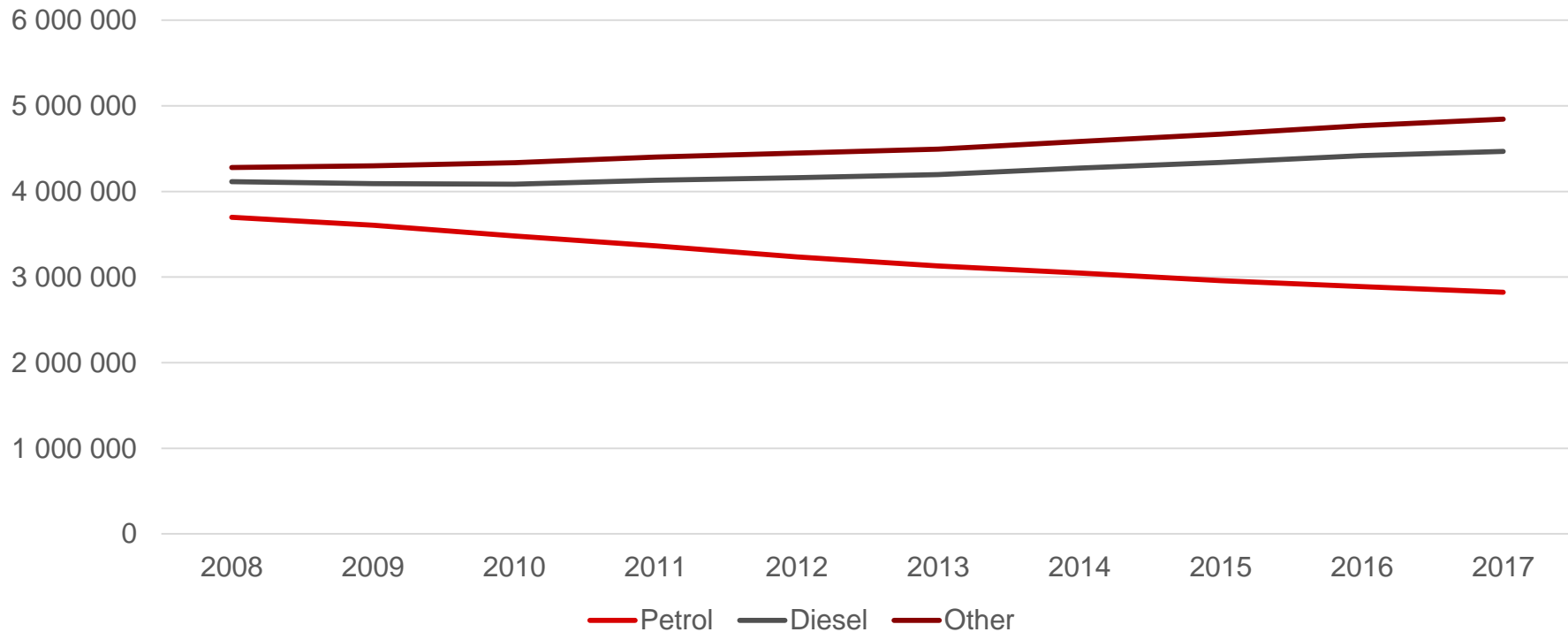
Total share 23%

Bioshare is high, but...

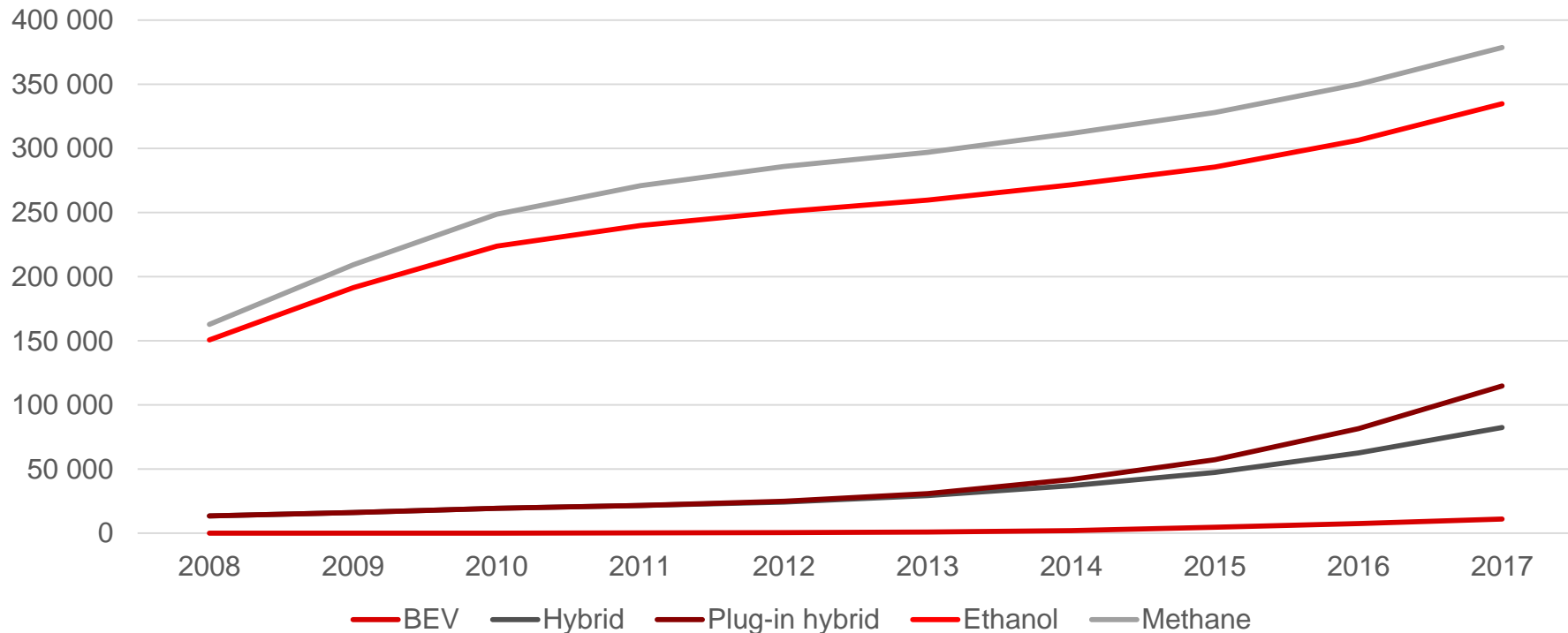
- Very high share of imported fuels/feedstock
- High use of bioenergy need high volumes of sustainable feedstock, for example from forestry or waste
- Small reduction in biofuels use in 2018



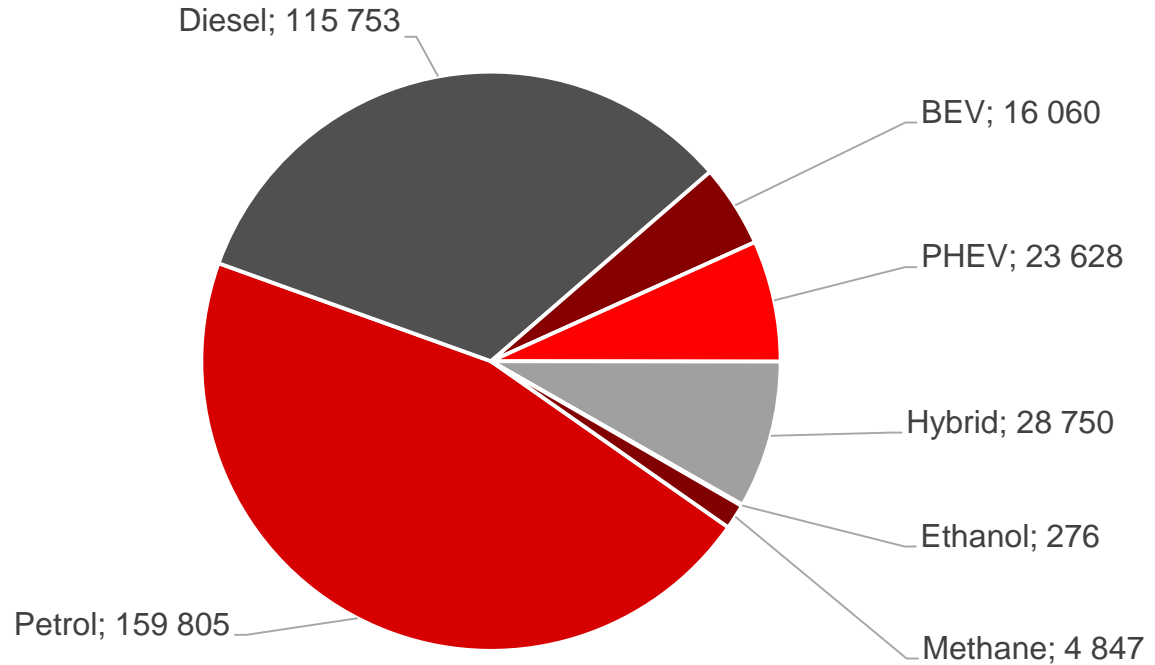
Number of passenger vehicles by fuel



Number of passenger vehicles by other fuel



New registration October 2018- October 2019

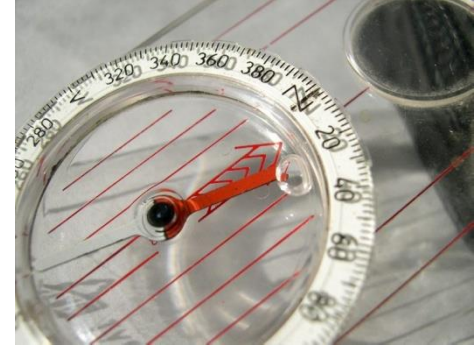


Example: Ethanol

- Annual sales of E85 vehicles in Sweden
 - 2008: 57 900 vehicles
 - Last 12 months: 276
- Why this change in just 10 years?
 - Political measures
 - Pumping act
 - Environmental cars subsidy
 - Reduced annual vehicle tax
 - Free parking
 - No congestion fee
 - Tax exemption on E85
 - Challenges
 - Fuel standard (sulphate)
 - Emission requirements
 - Durability
 - Food, Feed, Fuel

Swedish Climate policies

- Paris agreement
- Sweden will become one of the world's first fossil-free welfare countries
- Climate law
 - reduction of emission of CO₂ from domestic transport with at least 70% by 2030 compared with 2010
 - No net emission of CO₂ by 2045



Three principles to reduce the emissions from the transport sector

1. Transport efficient society
2. Efficient vehicles and operation
3. Renewable energy



Example of measures: Fuels

- Tax exemption for pure biofuels
 - Both CO₂ and Energy tax exemptions or reductions
 - Only valid until end of 2020 (EU state aid rules)
 - Tax reduction is adjusted twice a year
- Reduction obligation
 - 2021: 21% CO₂ reduction for diesel and 4,2% for petrol
 - Tentative obligation by 2030: 30%
 - Penalty: Up to €700/ton CO₂

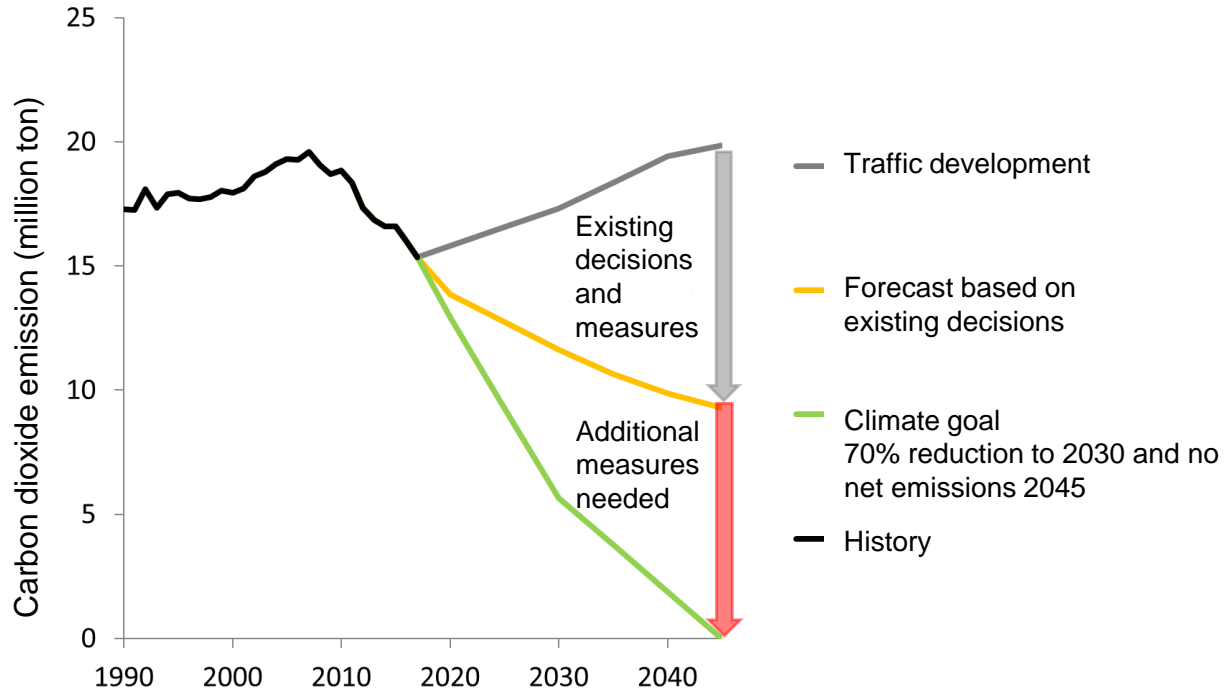
Example of measures: Vehicles

- Bonus Malus for vehicles
 - Purchase premium for cars with CO2 emissions below 60g/km
 - 10 000 SEK at 60 g/km
 - 60 000 SEK at 0 g/km
 - CNG/CBG fixed bonus of 10 000 SEK
 - Increase tax for 3 years for cars with CO2 emissions above 95 g/km
 - 95-140: 82 SEK/g
 - >140: 107 SEK/g
 - Normal tax: 22 SEK/g
 - CNG/CBG and ethanol cars are exempted from malus

Example of measures: Others

- Pumping act
 - All points of sales of petrol or diesel must provide at least one renewable fuel
 - If total sales exceed 1 000 m³
 - Supplemented with investment support for other technologies than ethanol
- Investment support
 - Climate investment program for any investment that reduce CO₂ emissions
 - Climate stride for climate investment at local level
 - Public procurement of environmental friendly vehicles

Need for additional measures



Summary

- Ambitious climate targets
 - No net emissions of CO2 by 2045
 - 70% reduction of CO2 emission for domestic transport by 2030
- High share of biofuel in transport sector
 - Import dependent
- Parallel measures needed
 - Renewable energy
 - Efficient vehicles and operation
 - Transport efficient society

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More information: <https://iea-amf.org/content/news/TD-WS>

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