IRENA

International Renewable Energy Agency

Best practices in Member States to reach the renewable energy and energy efficiency targets

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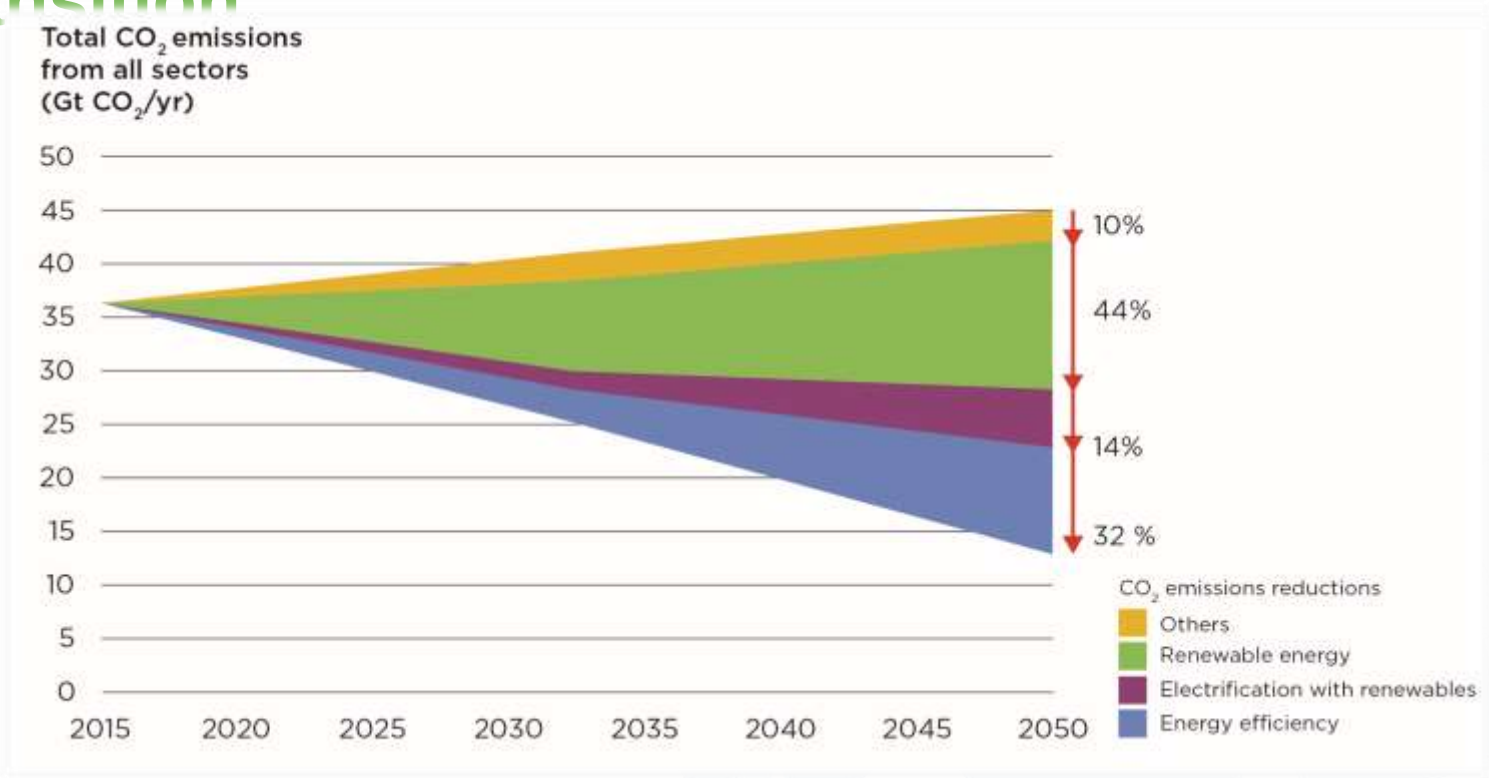
ITRE workshop Brussels 22 February

RE & EE Synergies – the cornerstones of energy transition

#REmap

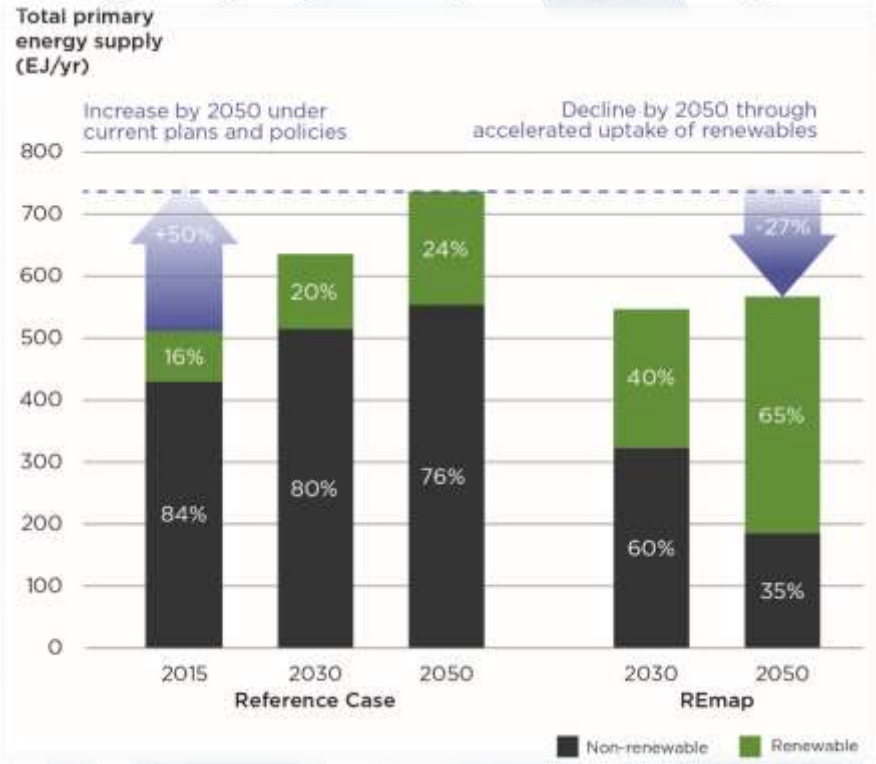


Source: IRENA, 2017

- Renewables would account for half of total emission reductions in 2050, with another 45% coming from increased energy efficiency and electrification with renewables.

RE & EE – A need for global action

- Renewable energy would make up two-thirds of the energy mix by 2050 in REmap case, up from just one-quarter in Reference Case
- This requires an increase in the renewables' share of 1.4% per year, a seven-fold acceleration
- TPES would decrease from over 700 EJ to around today's level the result of both energy efficiency and RE power/electrification
- GDP nearly triples and energy use is flat – intensity improvement 2.6%/yr – a doubling



Source: IRENA, 2017

Renewable Energy Prospects for the European Union

February 2018

- Aim:
  - Identify options to meet and potentially exceed the proposed 27% renewables target for 2030
  - Assess the aggregated impact of national renewable energy plans
  - Assess the role of renewables in long-term decarbonisation
- Insights
  - Doubling the RE share is feasible between now and 2030 to 34% RE share
  - This is cost neutral
  - RE technology improvements in recent years are the driver for greater potential
  - Accelerating renewable deployment will be key for Europe to be in line with Paris Agreement
  - Substantial economic and social benefits

The EU can double its current share of renewables by 2030 cost effectively

IRENA analysis

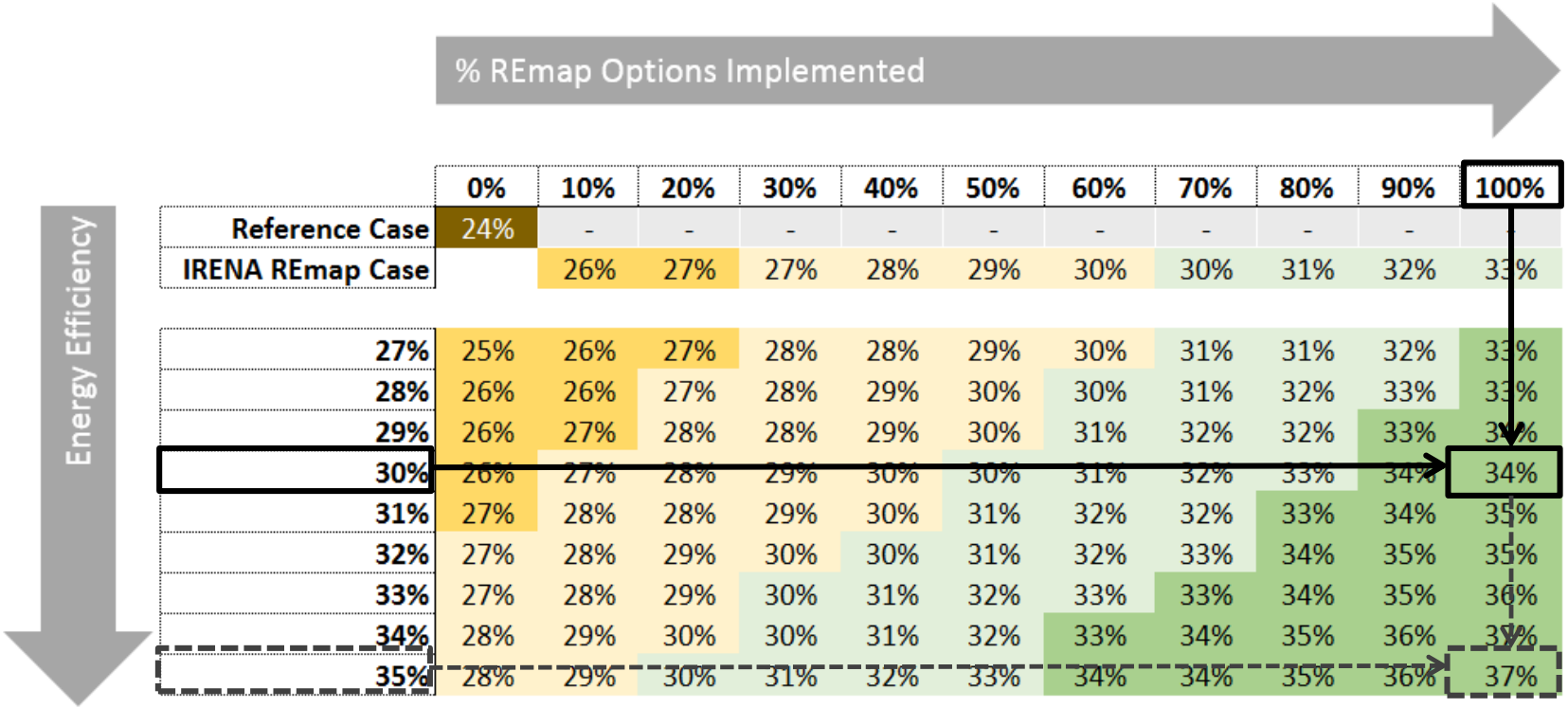
Strong cost savings
- Wind power
- Solar power
- Solar thermal in buildings
- Hydro power
- Geothermal power

Moderate cost savings
- Heat pumps
- Electric vehicles
- Biodiesel
- Geothermal district heating
- Solar thermal in industry

Additional cost
- Biomass in industry
- Conventional bioethanol
- Biomass in power and district heat
- Advanced bioethanol
- Biokerosene

#REmap

Higher energy efficiency gains result in higher RE shares for the same amount of renewable energy



	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reference Case	24%	-	-	-	-	-	-	-	-	-	-
IRENA REmap Case		26%	27%	27%	28%	29%	30%	30%	31%	32%	33%
27%	25%	26%	27%	28%	28%	29%	30%	31%	31%	32%	33%
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35%	28%	29%	30%	31%	32%	33%	34%	34%	35%	36%	37%

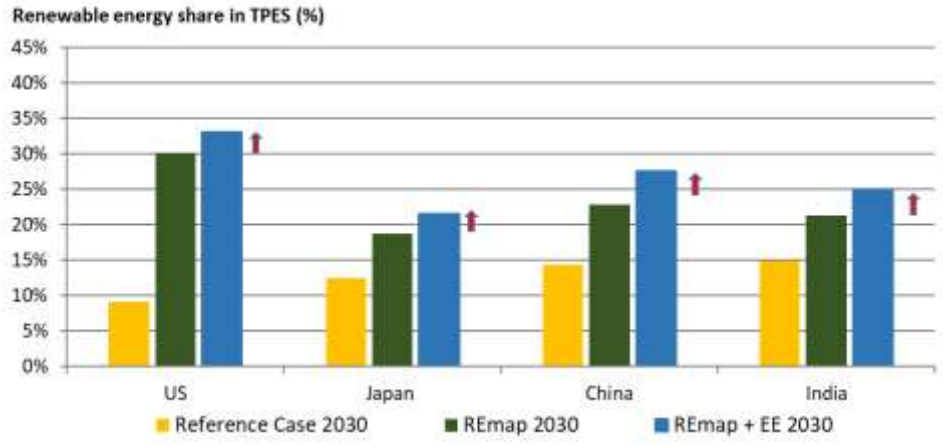
Energy Efficiency gains result in higher RE shares

Example Germany

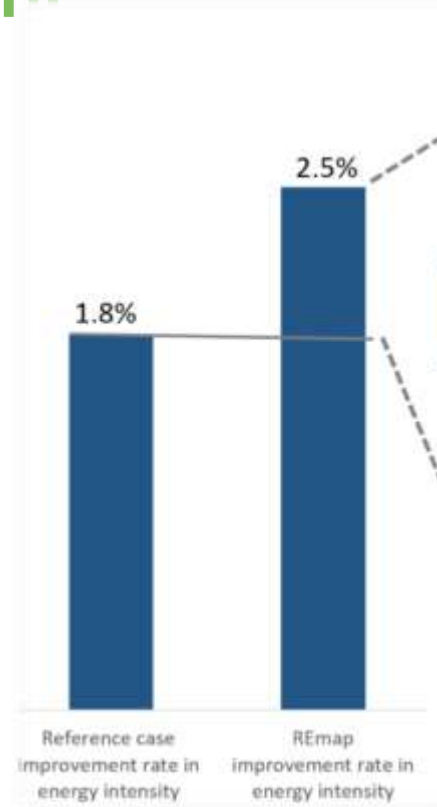
	Base year 2010	Reference Case 2030	EE 2030	REmap 2030	REmap +EE 2030	TECH 2030
Renewable energy share (% of TFEC)	10.4	25.9	27.7	35.6	38.4	43.7
Annual rate of energy intensity improvement 2010–30 (%/yr)	1.8 (1990–10)[a]	2.6	3.0	2.8	3.2	3.4

- Germany:
  - RE results in increase in annual EI improvement from 2.8% to 3.2%
  - EE results in increase in RE share from around 35.6% to 38.4%

- Similar effects seen in China, India, Japan and USA with on average a 10-15% increase in RE share resulting from increased EE



Renewable Energy contributes to Energy Efficiency improvement



Contributors to energy intensity reduction

Renewable Energy	**24%**
RE - heating/fuels	4%
RE - power	4%
RE electrification in transport	22%
Power for elect. & CCS	-6%
Energy Efficiency	**76%**
EE - heating/fuels	53%
EE - power	22%
CCS penalty	-1%
Structural changes	2%

- Energy intensity improvements need to increase to 2.5% per year by 2030 and continue around this level until 2050.
- One-quarter of EI improvement is the result of RE technologies

Practical examples of EE and RE synergies

- Solar, wind, hydropower, marine – efficiency gain factor 1.5-3 compared to conventional fossil and nuclear power generation

- Sector coupling offers efficiency opportunities
  - Electromobility and renewable power – efficiency gain factor 2-3 compared to gasoline/diesel ICE
  - Heat pumps and renewable power – efficiency gain factor 2-4 compared to condensing gas boiler

- Not all renewables result in efficiency gains, statistical definitions play an important role and don't make a difference in real life

THANK YOU

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