
RELAZIONE - DIBATTITO

TRANSIZIONE GREEN: a che punto siamo?

MERCOLEDÌ 21 FEBBRAIO - ore 21

Casa delle Associazioni e del Volontariato
Via Miramare 9, Milano - MM1 Sesto Marelli



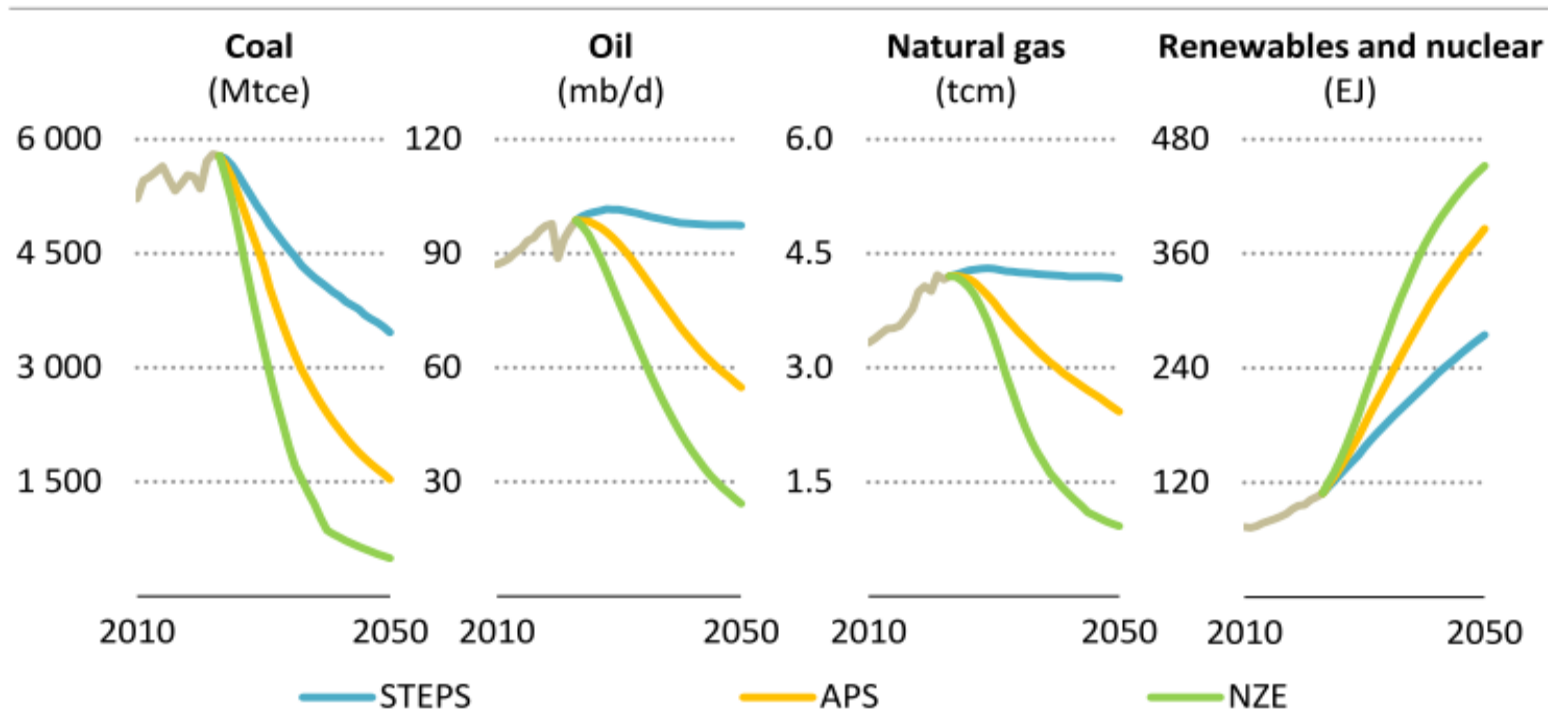
1. Definizione degli scenari IEA

- **STEPS (Stated Policies Scenario):** E' lo scenario che descrive l'evoluzione energetica mondiale sulla base delle politiche in atto
- **APS (Announced Pledge Scenario):** E' lo scenario che descrive l'evoluzione energetica mondiale se tutte le politiche e i target annunciati fossero centrati al 100% e nei tempi stabiliti
- **NZE (Net Zero Emission):** E' l'evoluzione ritenuta "necessaria" da IEA per riuscire a centrare l'obiettivo del contenimento dell'aumento della temperatura globale a 1,5°C

2. Domanda globale di energia

	2022	2030	2050
STEPS	<i>630 EJ</i>	<i>668 EJ</i>	<i>725 EJ</i>
APS	<i>630 EJ</i>	<i>628 EJ</i>	<i>623 EJ</i>
NZE	<i>630 EJ</i>	<i>573 EJ</i>	<i>541 EJ</i>

3. Domanda globale di energia per fonti energetiche e scenario



IEA. CC BY 4.0.

Low-emissions sources expand significantly and – for the first time – all fossil fuels peak and start to decline before 2030 in each scenario

Note: Mtce = million tonnes of coal equivalent; mb/d = million barrels per day; tcm = trillion cubic metres; EJ = exajoules.

4. Consumi energetici per scenario e per area

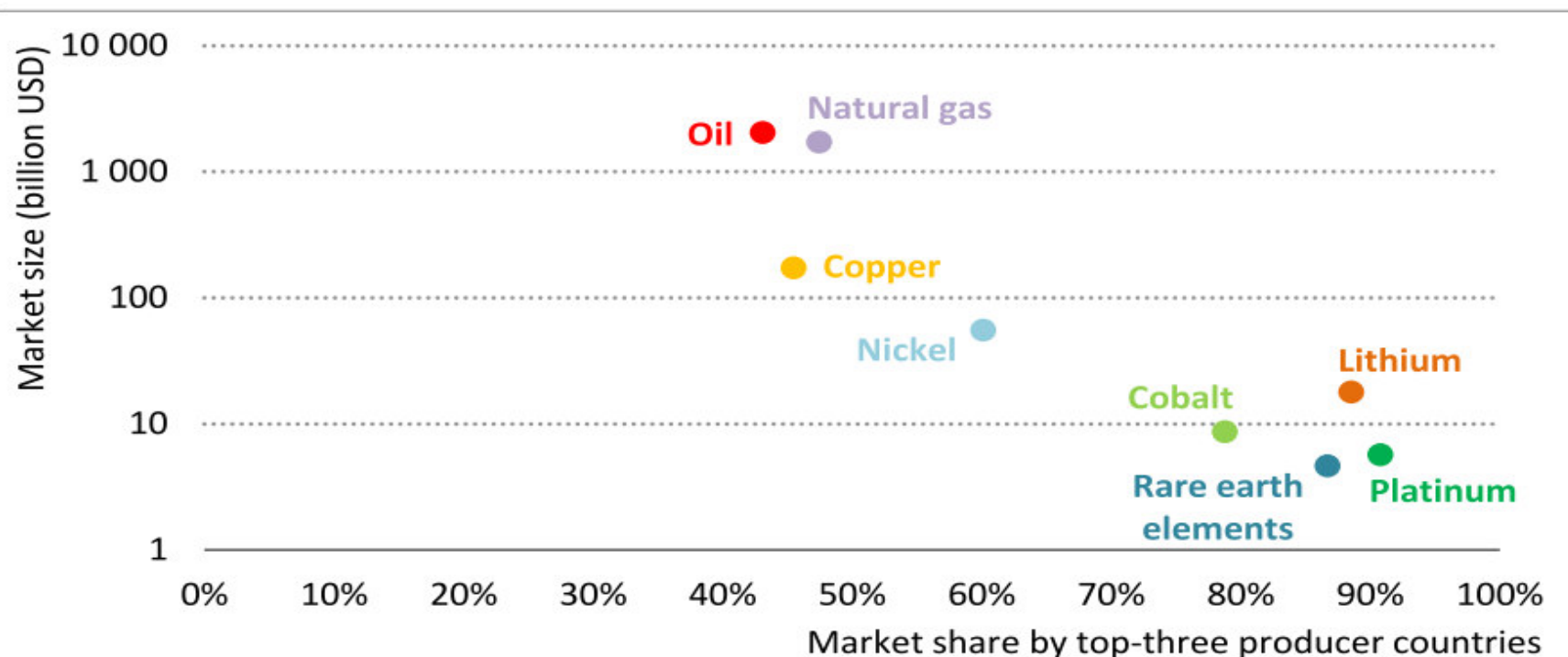


Table A.23: Total final consumption (EJ)

	Historical			Stated Policies		Announced Pledges	
	2010	2021	2022	2030	2050	2030	2050
World	382.7	436.2	442.4	482.0	535.8	451.0	429.0
North America	76.5	77.1	79.2	77.6	72.6	73.2	54.7
United States	63.8	64.9	66.4	64.3	58.1	60.8	44.1
Central and South America	19.2	20.2	21.0	23.7	29.4	22.5	23.8
Brazil	9.1	10.0	10.4	11.5	13.7	11.1	11.9
Europe	63.0	60.6	57.3	56.7	49.9	53.8	39.4
European Union	45.9	43.9	41.8	40.1	32.7	38.1	26.1
Africa	20.7	25.4	25.9	29.7	42.8	25.3	33.3
Middle East	19.3	23.7	24.6	29.4	39.9	28.2	35.9
Eurasia	23.6	28.4	28.5	29.1	31.3	27.9	26.9
Russia	19.0	23.4	23.4	22.9	23.2	22.1	19.8
Asia Pacific	145.3	187.7	190.9	216.2	242.8	201.2	193.2
China	76.3	106.1	106.9	116.4	112.9	110.2	90.5
India	19.0	27.4	29.3	38.0	55.7	33.4	43.3
Japan	14.1	12.0	12.0	11.0	9.3	10.5	7.5
Southeast Asia	16.1	19.2	19.8	24.7	33.8	23.0	27.0

5. Livello di concentrazione per l'estrazione delle commodities «verdi»

Figure 1.31 ▶ Average market size and level of geographical concentration for extraction of selected commodities, 2020-2022

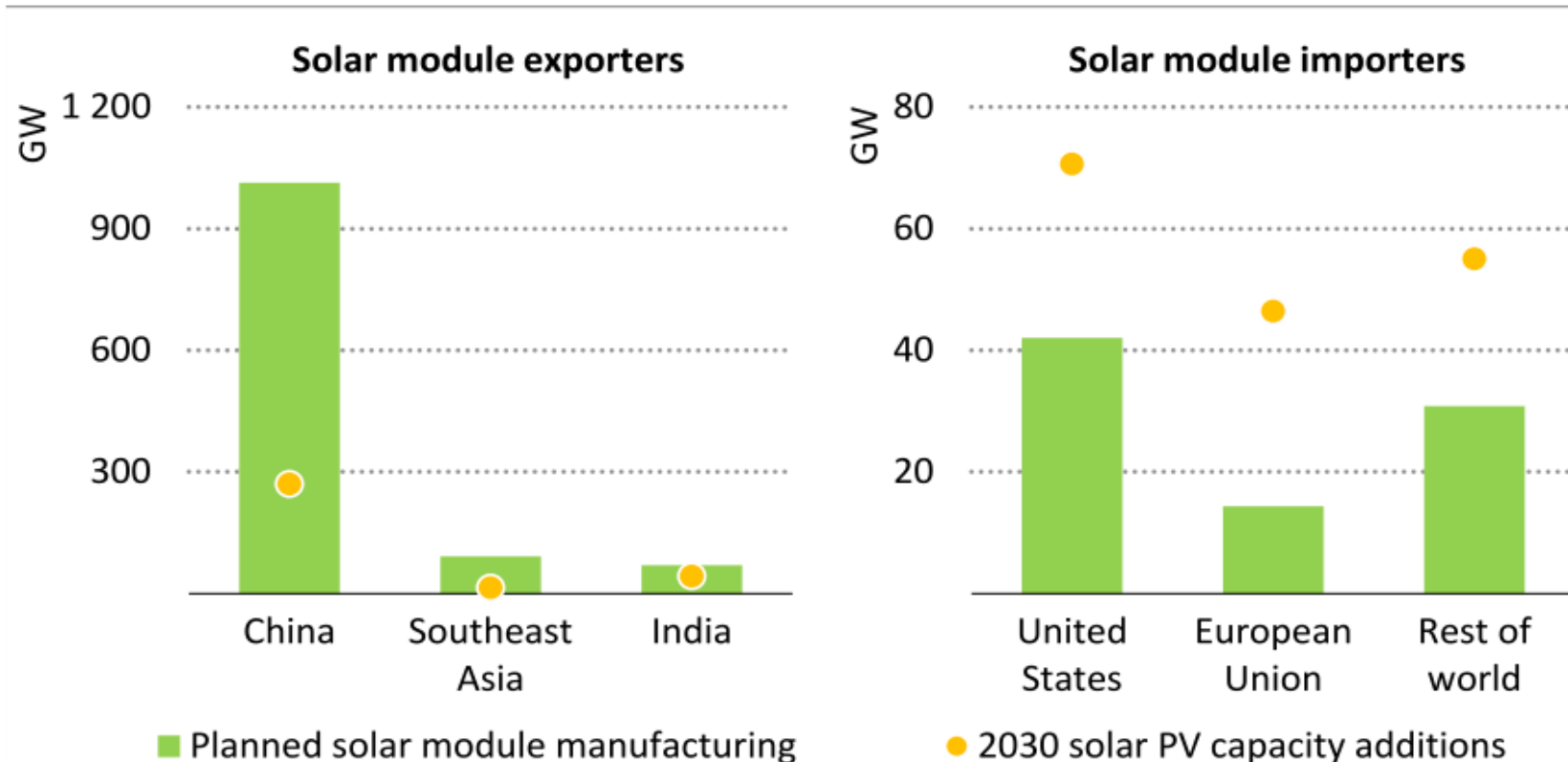


IEA. CC BY 4.0.

Markets for critical minerals are smaller and more concentrated than those for traditional hydrocarbon resources

6. Capacità manifatturiera di pannelli PV e investimenti pianificati al 2030

Figure 1.11 ▶ Planned solar module manufacturing capacity and solar PV capacity additions in the STEPS, 2030



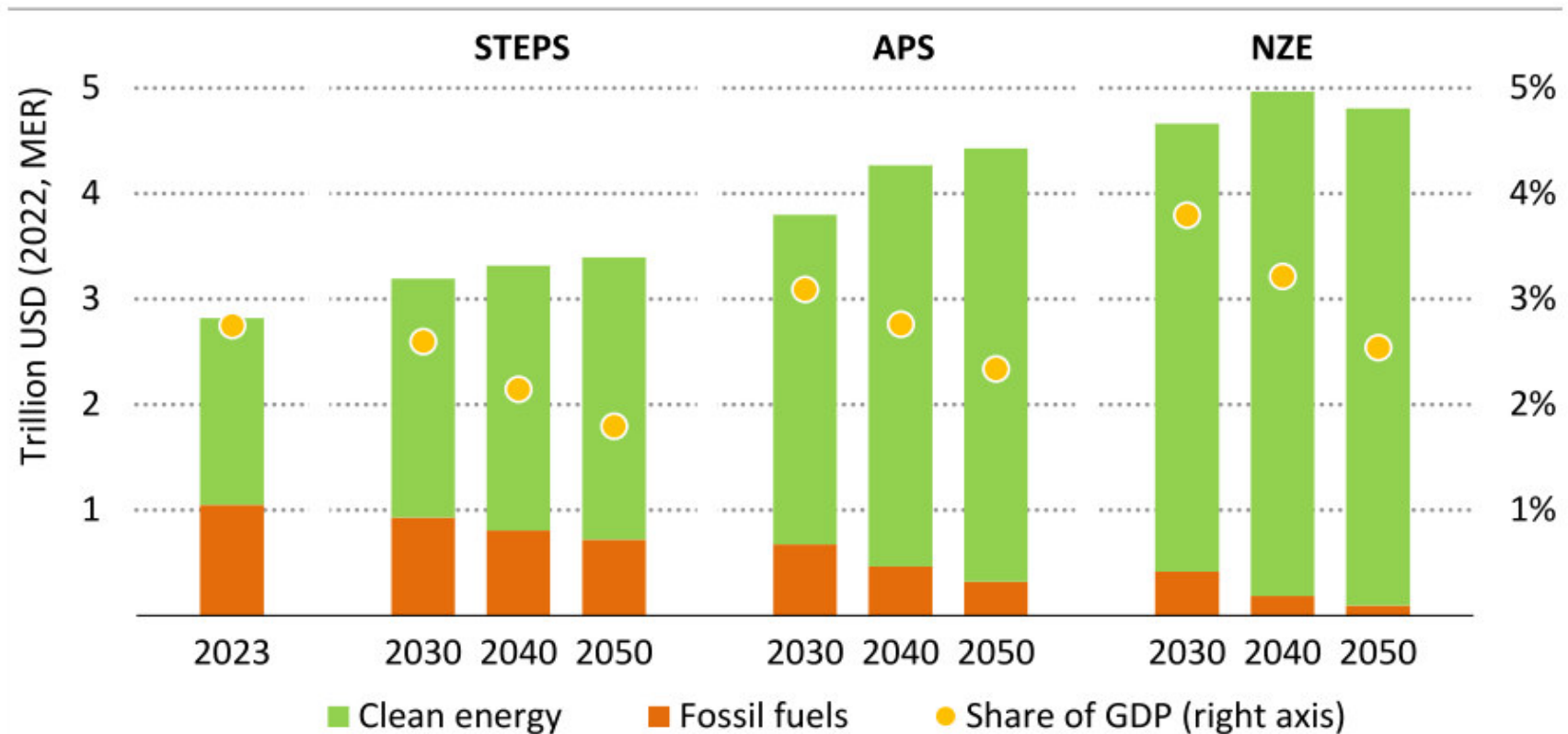
IEA. CC BY 4.0.

Solar manufacturing is set to expand in more than a dozen countries: China remains the largest exporter, while the European Union and United States remain the main importers

7. Investimenti totali in energia al 2030



Figure 1.19 ▶ Investment trends as share of global GDP by scenario, 2023-2050

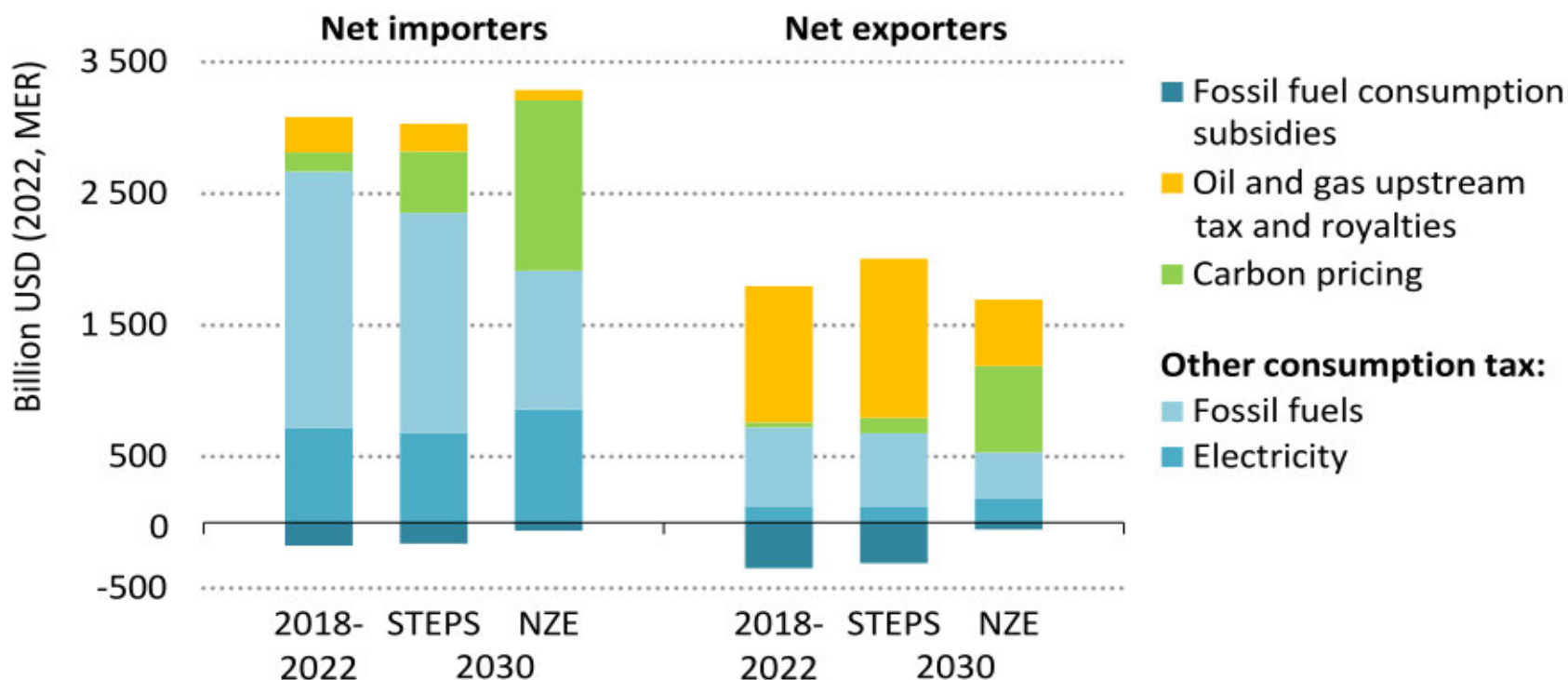


IEA. CC BY 4.0.

A large increase in clean energy investment is projected in the APS and NZE Scenario, but fossil fuel investment declines and investment requirements as a share of GDP fall after 2030

8. Ricavi statali da energia (tassazione dei consumi, royalties ecc.)

Figure 1.25 ▷ Government revenue from energy production and consumption for net oil and gas importing and exporting regions by scenario

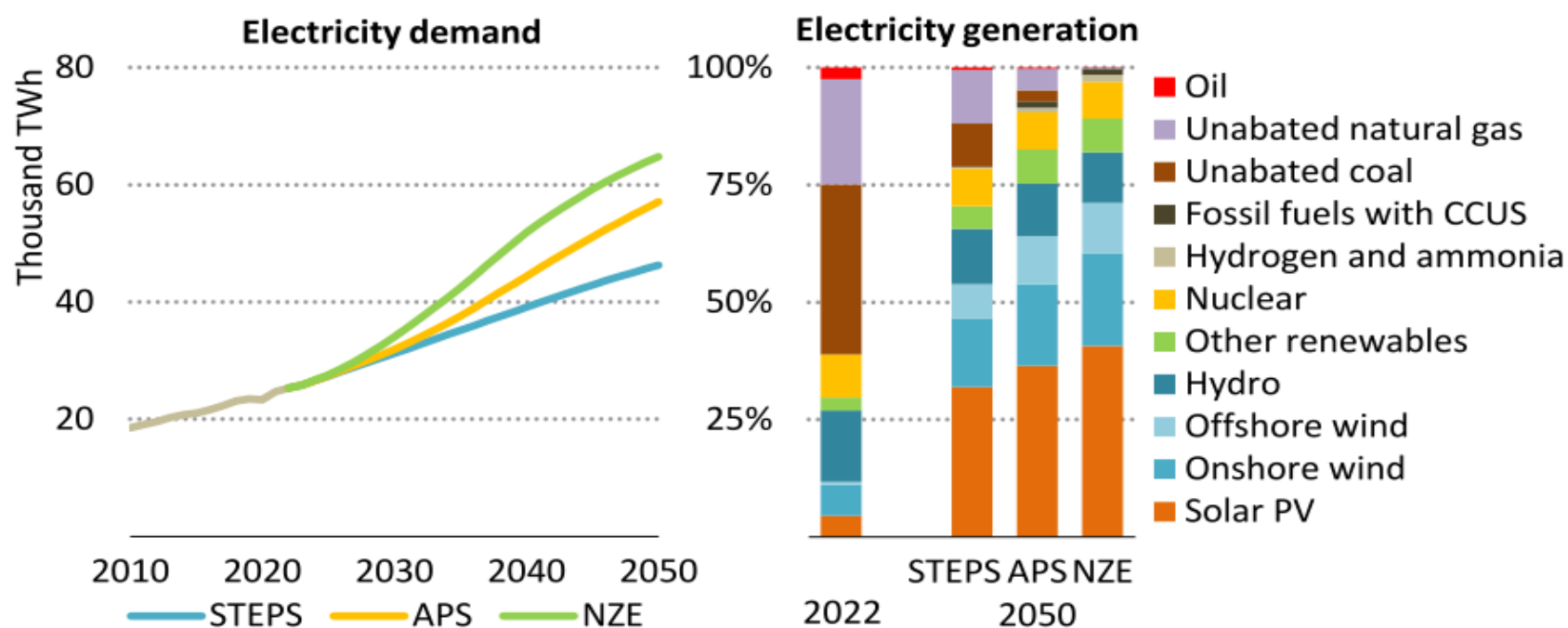


IEA. CC BY 4.0.

Carbon pricing revenues and lower subsidy burdens offset lower fossil fuel rents in exporting regions; for net importers, carbon revenue provides funds for clean energy initiatives

9. Andamento dei consumi elettrici per scenario

Figure 3.13 ▶ Global electricity demand, 2010-2050, and generation mix by scenario, 2022 and 2050



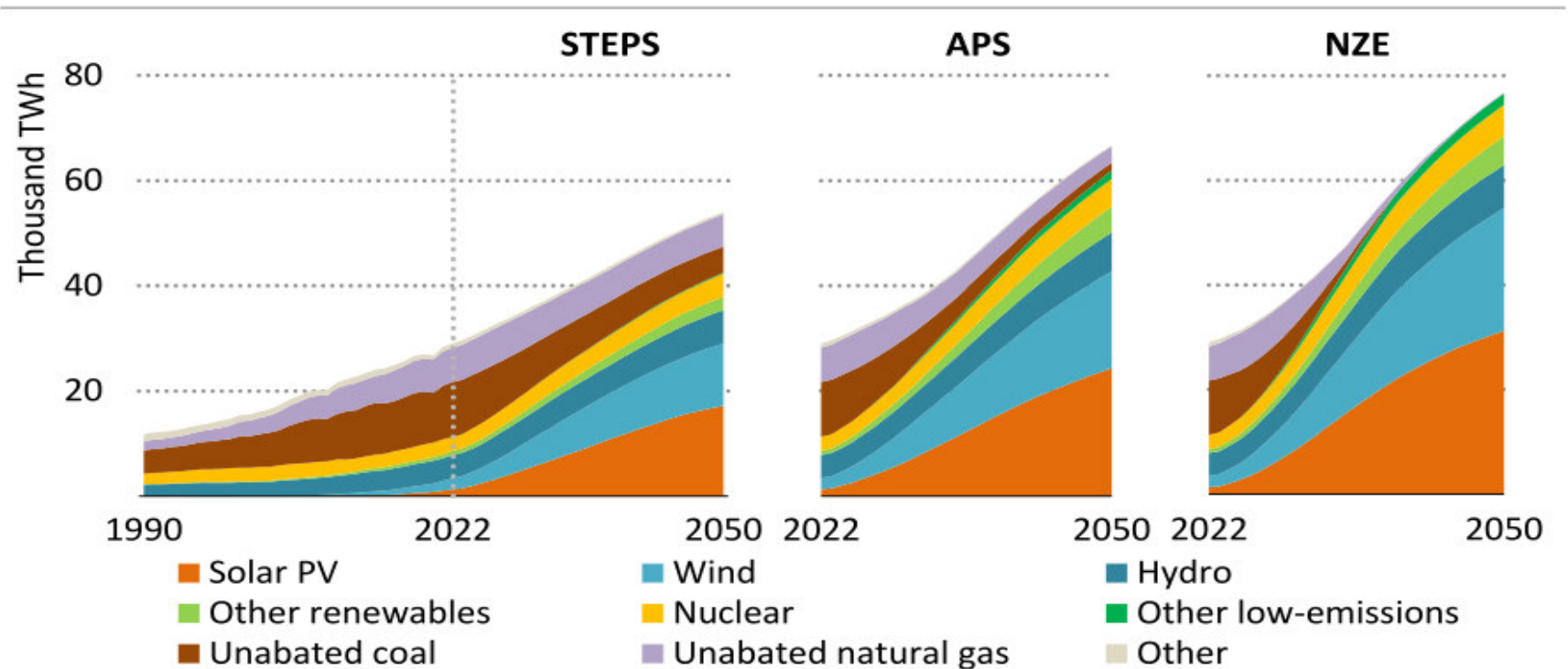
IEA. CC BY 4.0.

Electricity demand rises over 80% to more than 150% by 2050 across scenarios and is met increasingly by low-emissions sources at the expense of unabated coal and natural gas

Notes: TWh = terawatt-hours. Other renewables include bioenergy and renewable waste, geothermal, concentrating solar power and marine power.

10. Produzione globale di energia elettrica per fonte e scenario

Figure 3.15 ▶ Global electricity generation by source and scenario, 1990-2050



IEA. CC BY 4.0.

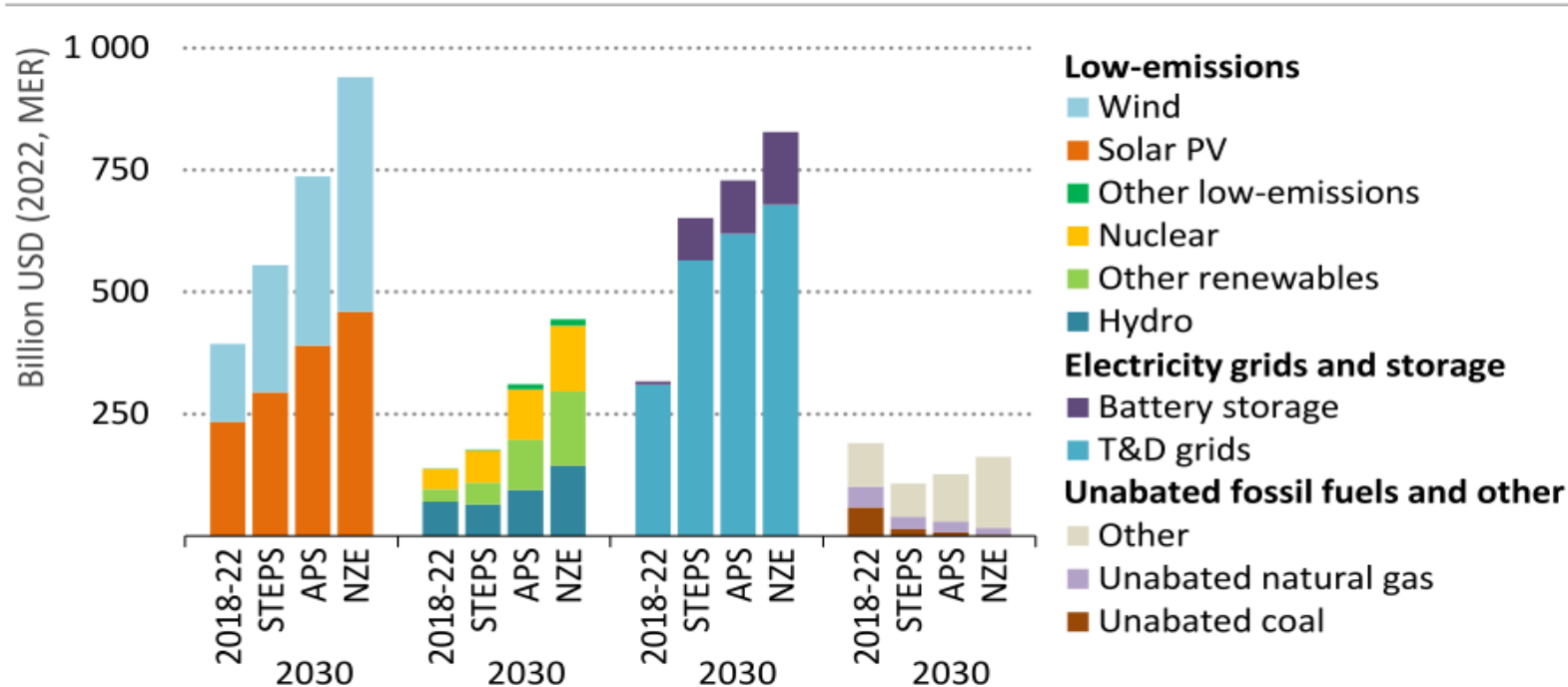
Renewables outpace electricity demand growth to 2030 in the STEPS, leading to a peak in coal-fired power in the near term though announced pledges call for faster declines

Notes: TWh = terawatt-hours. Other low-emissions include fossil fuels with CCUS, hydrogen and ammonia.

11. Investimenti globali nel settore elettrico



Figure 3.18 ▶ Average annual global investment in the power sector by type and scenario, 2018-2022 and 2030



IEA. CC BY 4.0.

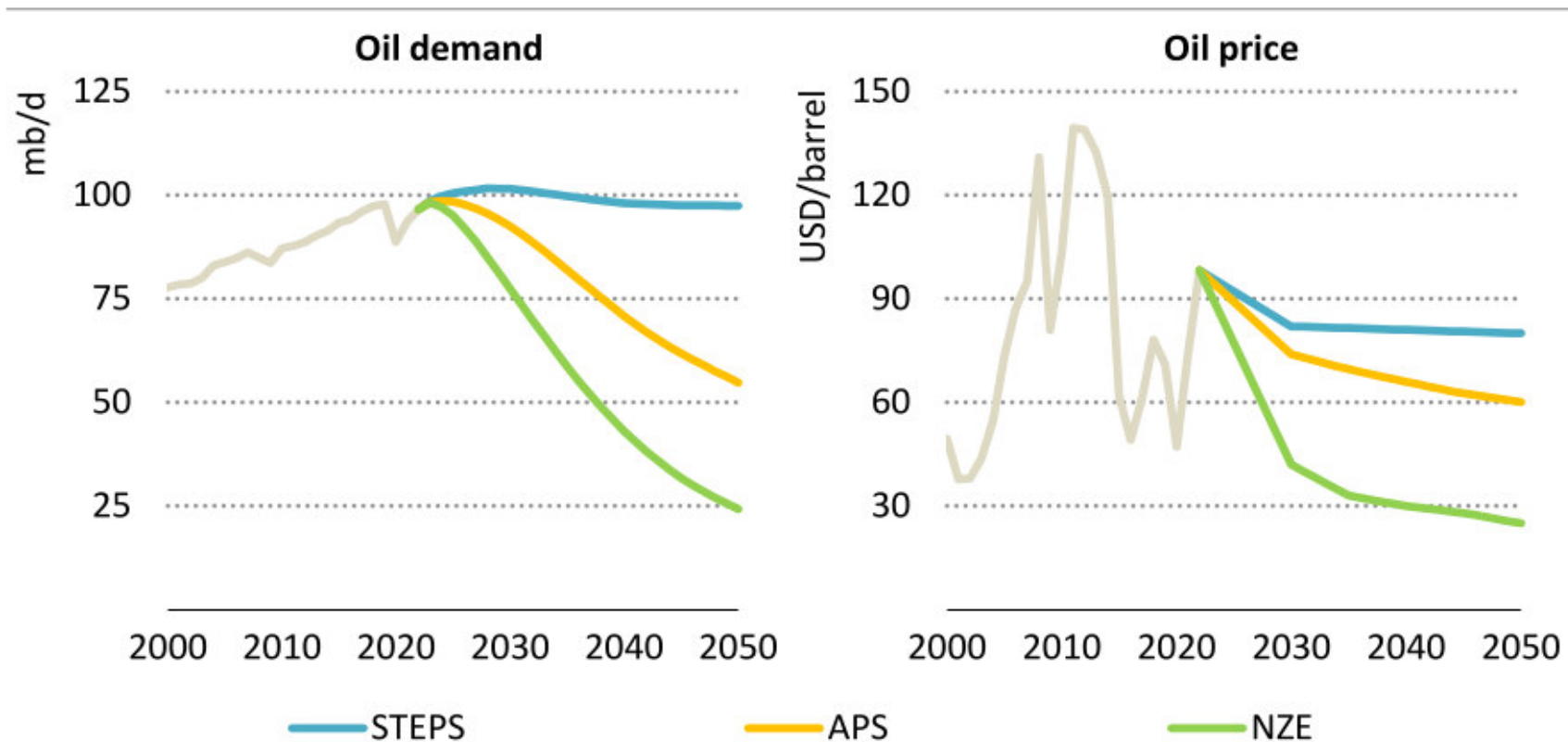
Power sector investment rises by 50% to 2030 in the STEPS, 90% in the APS, mainly due to higher spending on solar PV, wind, grids and storage, but the NZE Scenario calls for more

Notes: MER = market exchange rate; T&D = transmission and distribution. Other low-emissions include fossil fuels with CCUS, hydrogen and ammonia.

12. La domanda di petrolio secondo i tre scenari



Figure 3.19 ▶ Global oil demand and crude oil price by scenario, 2000-2050

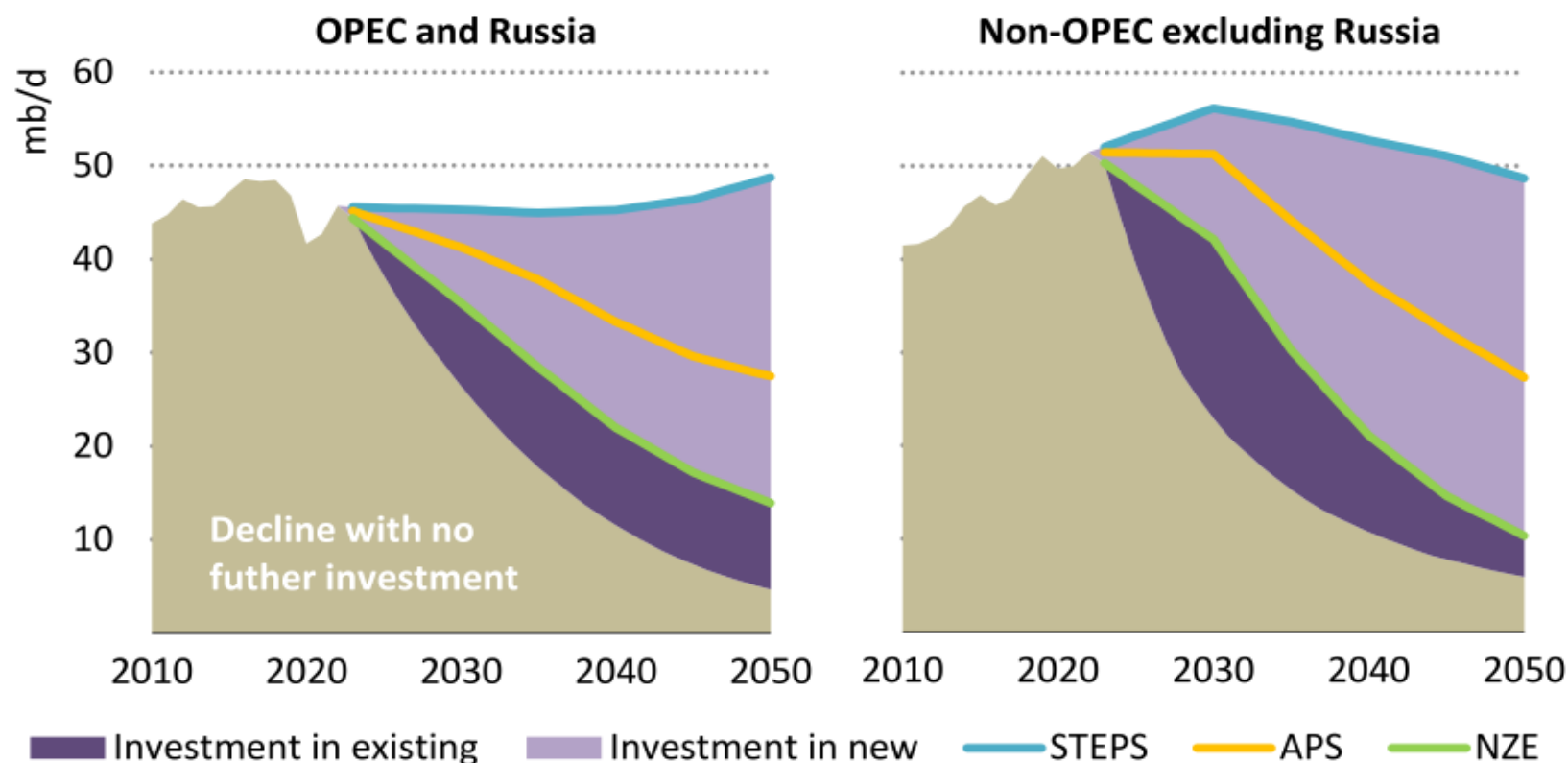


IEA. CC BY 4.0.

*Oil demand and prices peak in the late-2020s in the STEPS;
there are much sharper declines in both the APS and NZE Scenario*

13. Gli investimenti e la produzione di greggio nei tre scenari

Figure 3.21 ▶ Oil production by OPEC and Russia and other non-OPEC producers by scenario, 2010-2050



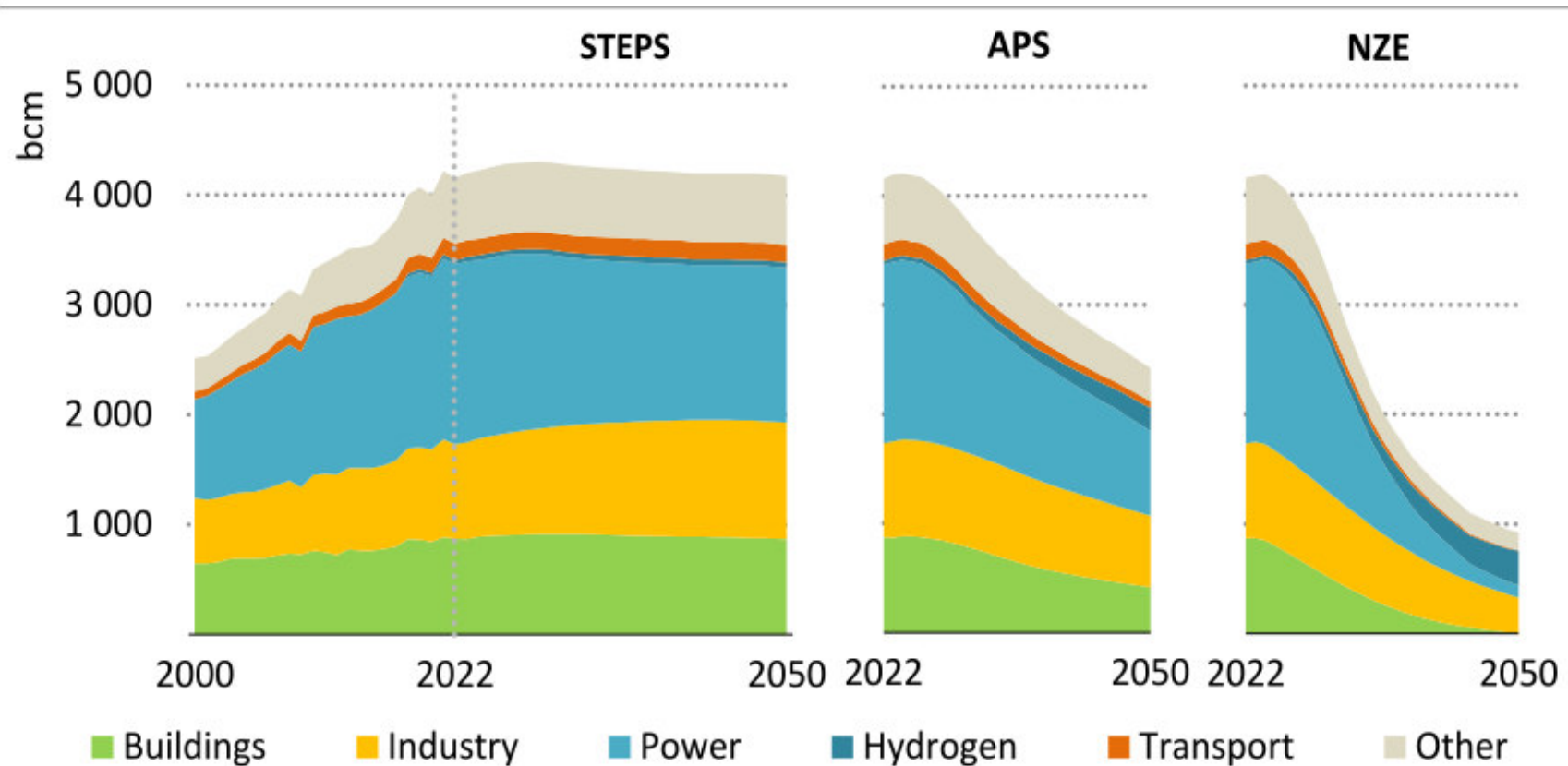
IEA. CC BY 4.0.

*New oil projects are needed in the STEPS and APS, but not in the NZE Scenario;
OPEC and Russia take a larger share of the market in the NZE Scenario*

14. Previsioni sulla domanda di gas naturale



Figure 3.23 ▶ Global natural gas demand by scenario, 2000-2050



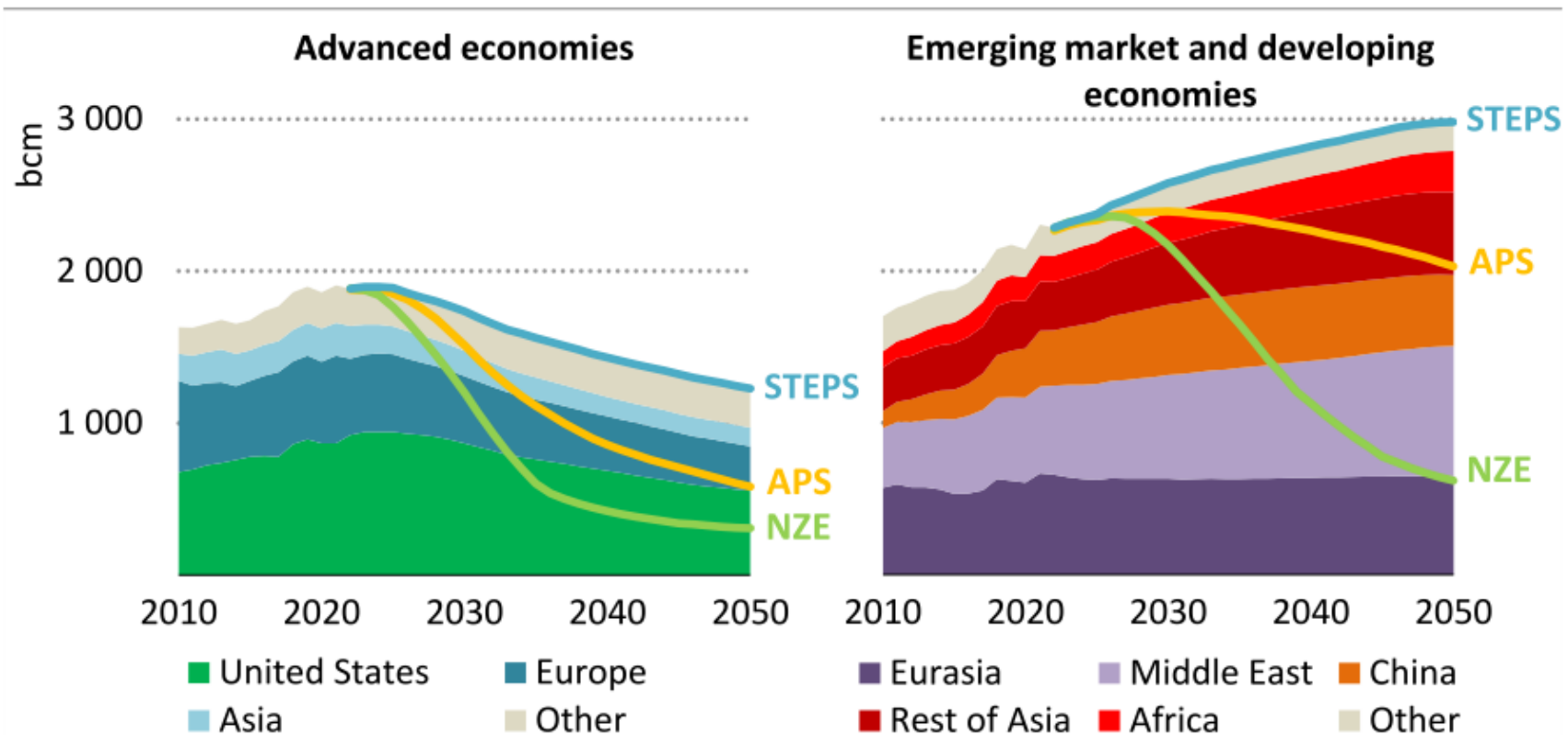
IEA. CC BY 4.0.

Each scenario projects an end to growth for gas; future prospects depend largely on the pace and scale of growth in clean power, electrification and efficiency improvements.

15. Domanda di gas per regioni e per scenario



Figure 3.24 ▶ Natural gas demand by region and scenario, 2010-2050



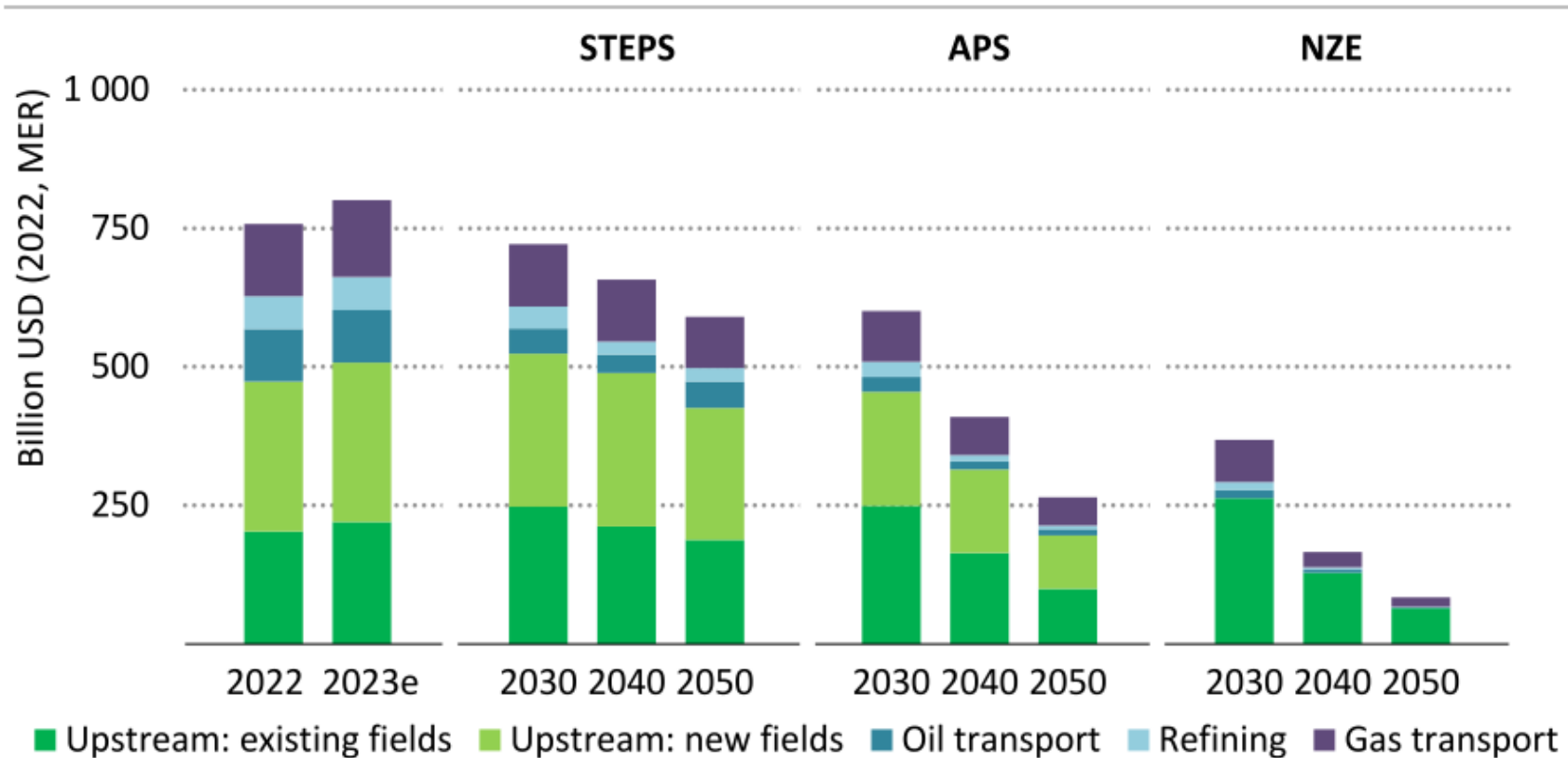
IEA. CC BY 4.0.

Natural gas demand declines in advanced economies in each scenario; in emerging market and developing economies the difference between scenario outcomes is larger

16. Investimenti nell'Oil&Gas per scenario



Figure 3.22 ▶ Global oil and natural gas investment by scenario, 2022-2050



IEA. CC BY 4.0.

Oil and gas investment is expected to increase in 2023 and to be similar to 2030 levels in the STEPS; it is much higher than the levels needed in the APS and NZE Scenario

17. Produzione e domanda di carbone per scenario

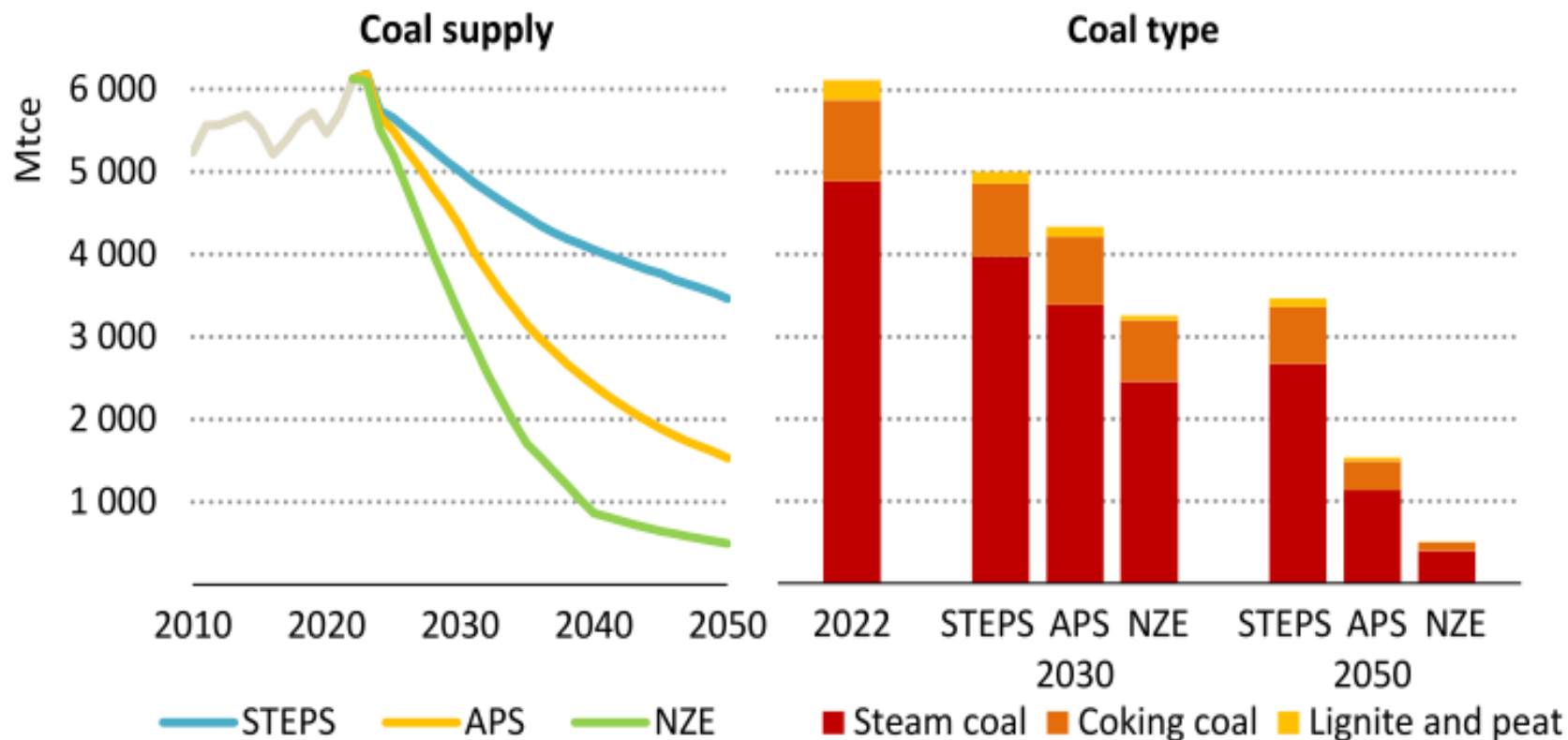


Table 3.7 ▶ Global coal demand, production and trade by scenario (Mtce)

	2010	2022	STEPS		APS		NZE	
			2030	2050	2030	2050	2030	2050
World coal demand	5 218	5 807	5 007	3 465	4 377	1 530	3 257	499
Power	3 108	3 769	3 030	1 799	2 578	843	1852	240
Industry	1 688	1 614	1 642	1 463	1 457	647	1 239	234
Other sectors	422	424	335	203	302	41	167	26
<i>of which abated with CCUS</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>1%</i>	<i>0%</i>	<i>25%</i>	<i>3%</i>	<i>81%</i>
Advanced economies	1 585	1 018	509	245	367	95	266	63
Emerging market and developing economies	3 633	4 789	4 498	3 221	3 970	1 435	2 991	436
World coal production	5 235	6 122	5 007	3 465	4 337	1 530	3 257	499
Steam coal	4 069	4 888	3 974	2 669	3 388	1 135	2 457	397
Coking coal	866	988	886	691	830	350	739	100
Peat and lignite	300	246	146	105	120	45	60	2
Advanced economies	1 512	1 075	650	468	500	199	381	95
Emerging market and developing economies	3 723	5 047	4 357	2 998	3 837	1 331	2 876	404

18. Produzione di carbone per scenario

Figure 3.28 ▶ Global coal supply and type by scenario



IEA. CC BY 4.0.

Coal production falls by nearly 45% between 2022 and 2050 in the STEPS, 75% in the APS and over 90% in the NZE Scenario; coking coal supply declines much less than steam coal

19. Costi produzione energia elettrica per tecnologie

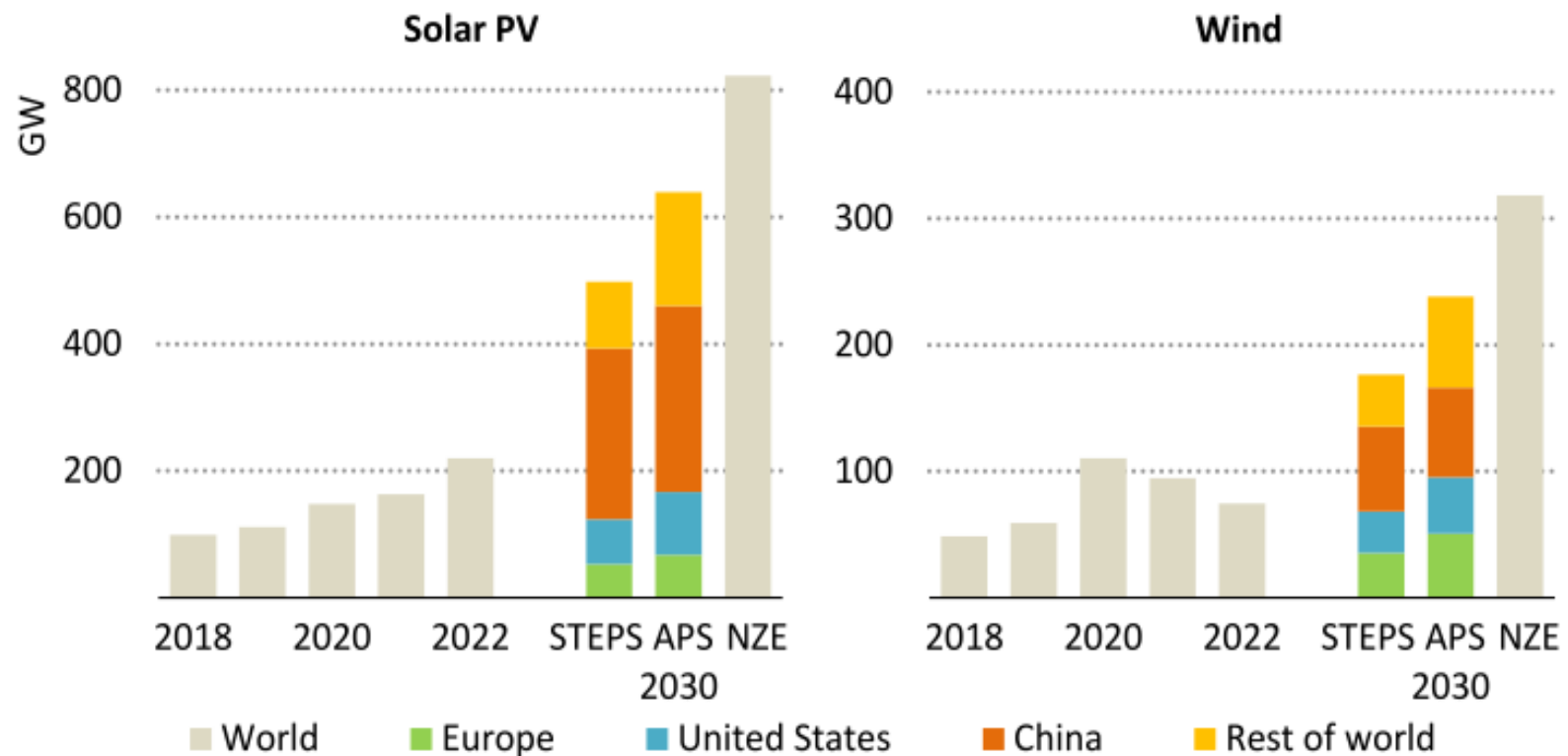


	Capital costs (USD/kW)			Fuel, CO ₂ , O&M (USD/MWh)		
	2022	2030	2050	2022	2030	2050
European Union						
Nuclear	6 600	5 100	4 500	35	35	35
Coal	2 000	2 000	2 000	125	150	160
Gas CCGT	1 000	1 000	1 000	170	125	130
Solar PV	990	620	450	10	10	10
Wind onshore	1 750	1 670	1 610	20	15	15
Wind offshore	3 420	2 280	1 740	15	10	10
China						
Nuclear	2 800	2 800	2 500	25	25	25
Coal	800	800	800	50	60	70
Gas CCGT	560	560	560	95	95	100
Solar PV	720	430	300	10	10	10
Wind onshore	1 100	1 040	1 000	10	10	10
Wind offshore	2 820	1 880	1 420	25	15	10

20. Nuove installazioni di eolico e pannelli solari 2018-30



Figure 3.33 ▶ Solar PV and wind capacity additions by scenario, 2018-2030



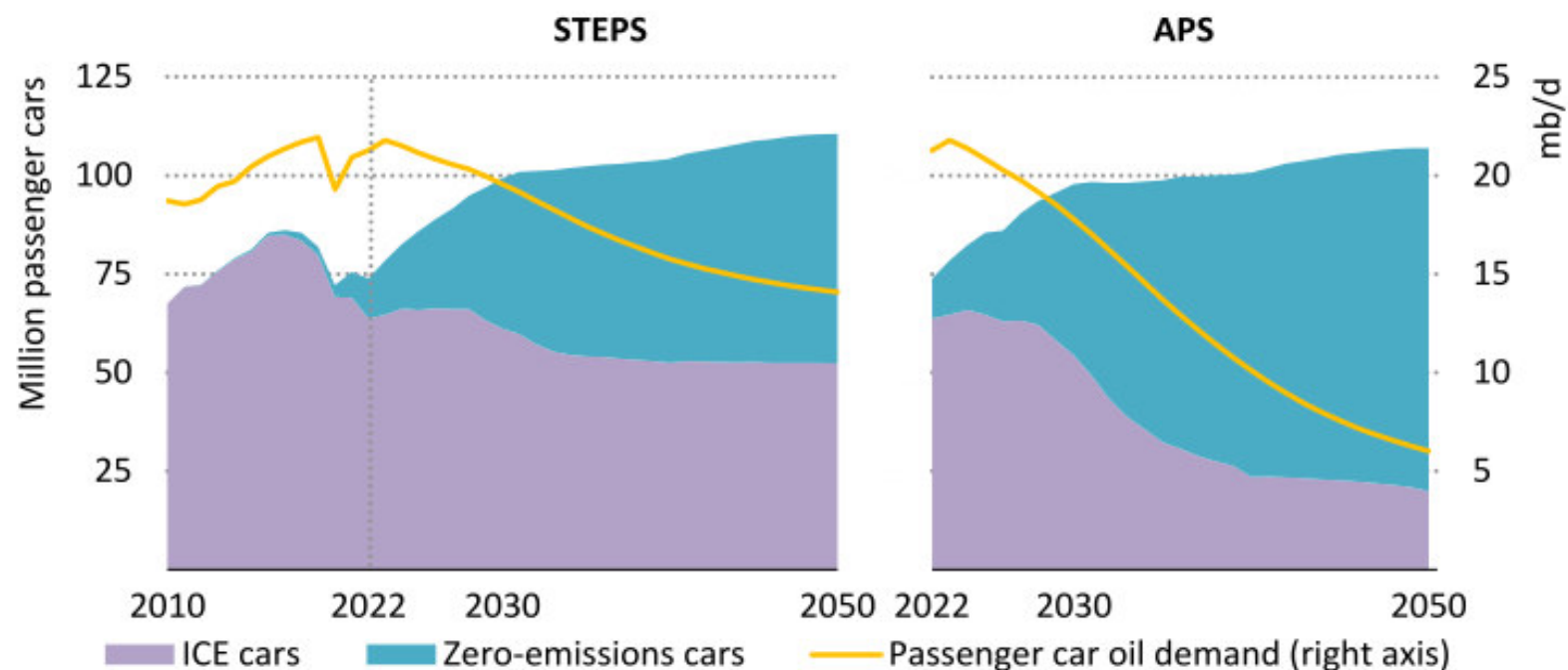
IEA. CC BY 4.0.

Solar PV and wind capacity additions double by 2030 in the STEPS and expand nearly fourfold in the NZE Scenario

21. Proiezioni su vendita auto tradizionali ed elettriche



Figure 3.8 ▶ New passenger car registrations by type and passenger car oil demand in the Stated Policies and Announced Pledges scenarios, 2010-2050



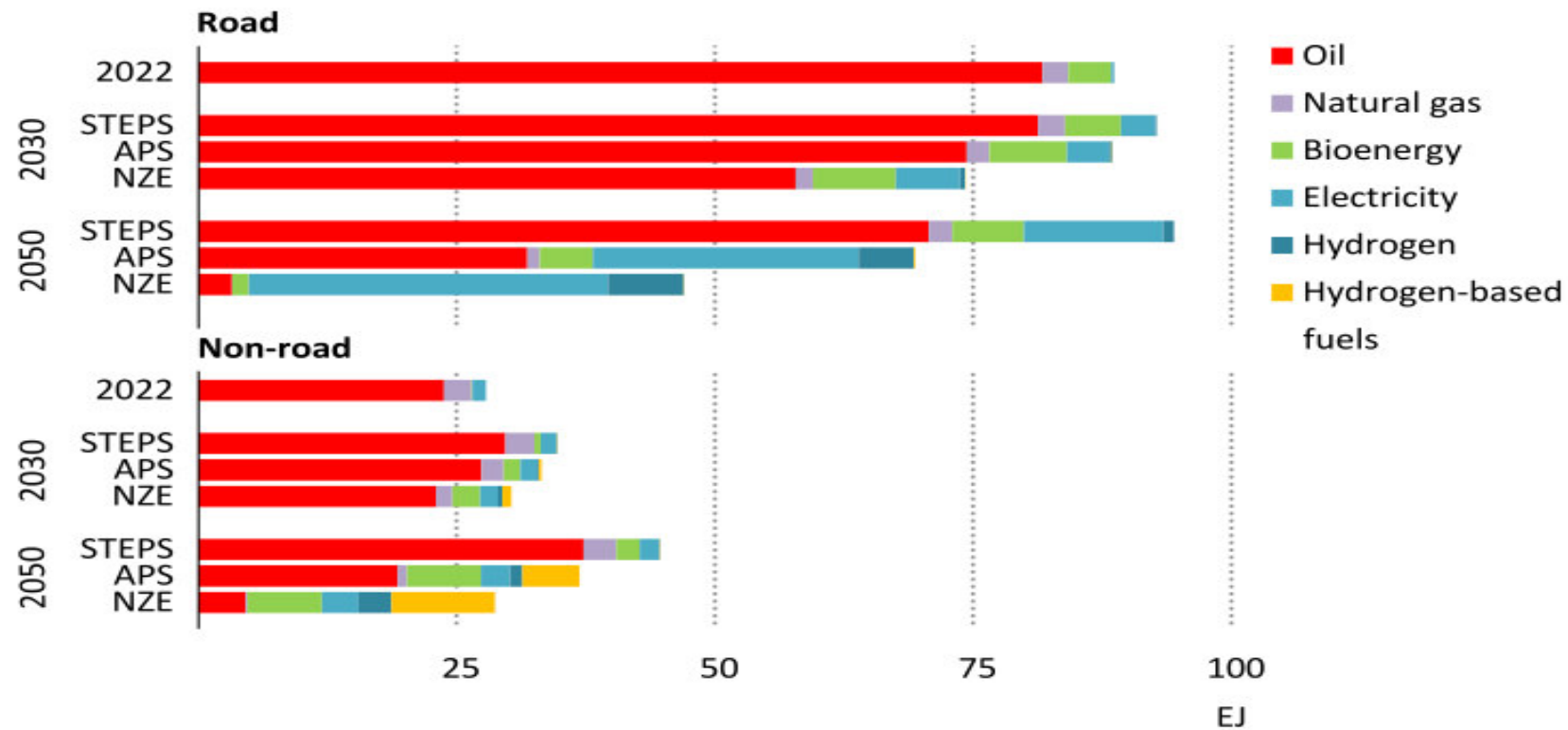
IEA. CC BY 4.0.

Registrations of new conventional cars peaked in 2017; policies supporting electromobility deliver a sharp decline in oil demand from road transport

22. Proiezioni su domanda di energia per trasporti



Figure 3.7 ▶ Energy demand in transport by fuel and scenario, 2022-2050



IEA. CC BY 4.0.

Electricity is key to decarbonising road transport and meets nearly 40% of demand in the APS by 2050; low-emissions fuels make inroads mainly in aviation and navigation

Notes: Non-road transport includes aviation, shipping, rail, pipeline and non-specified transportation. Hydrogen and hydrogen-based fuels are produced via low-emissions pathways.