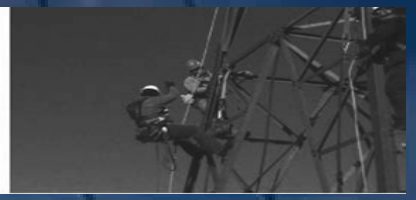




Coordinamento Ingegneri e Tecnici



# Conferenza - Dibattito

# Guerre tecnologiche e commerciali nel secolo dei cambiamenti

25-06-2019

CASA DELLE ASSOCIAZIONI E DEL VOLONTARIATO

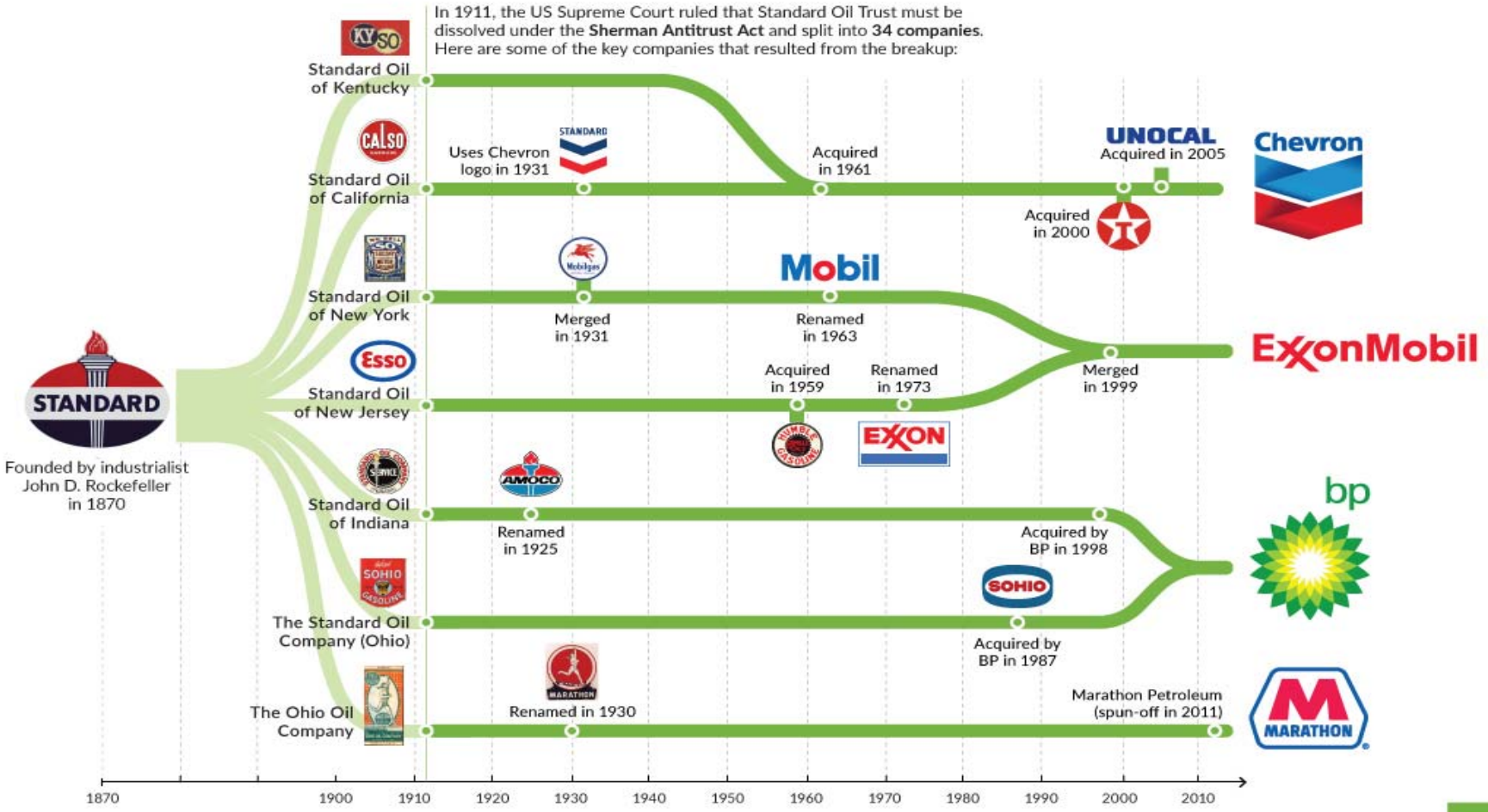
Via Miramare 9 –MM1 Sesto Marelli



Chart of the Week

# THE EVOLUTION OF STANDARD OIL

Following the remnants of John D. Rockefeller's oil juggernaut




SOURCE: Wikipedia

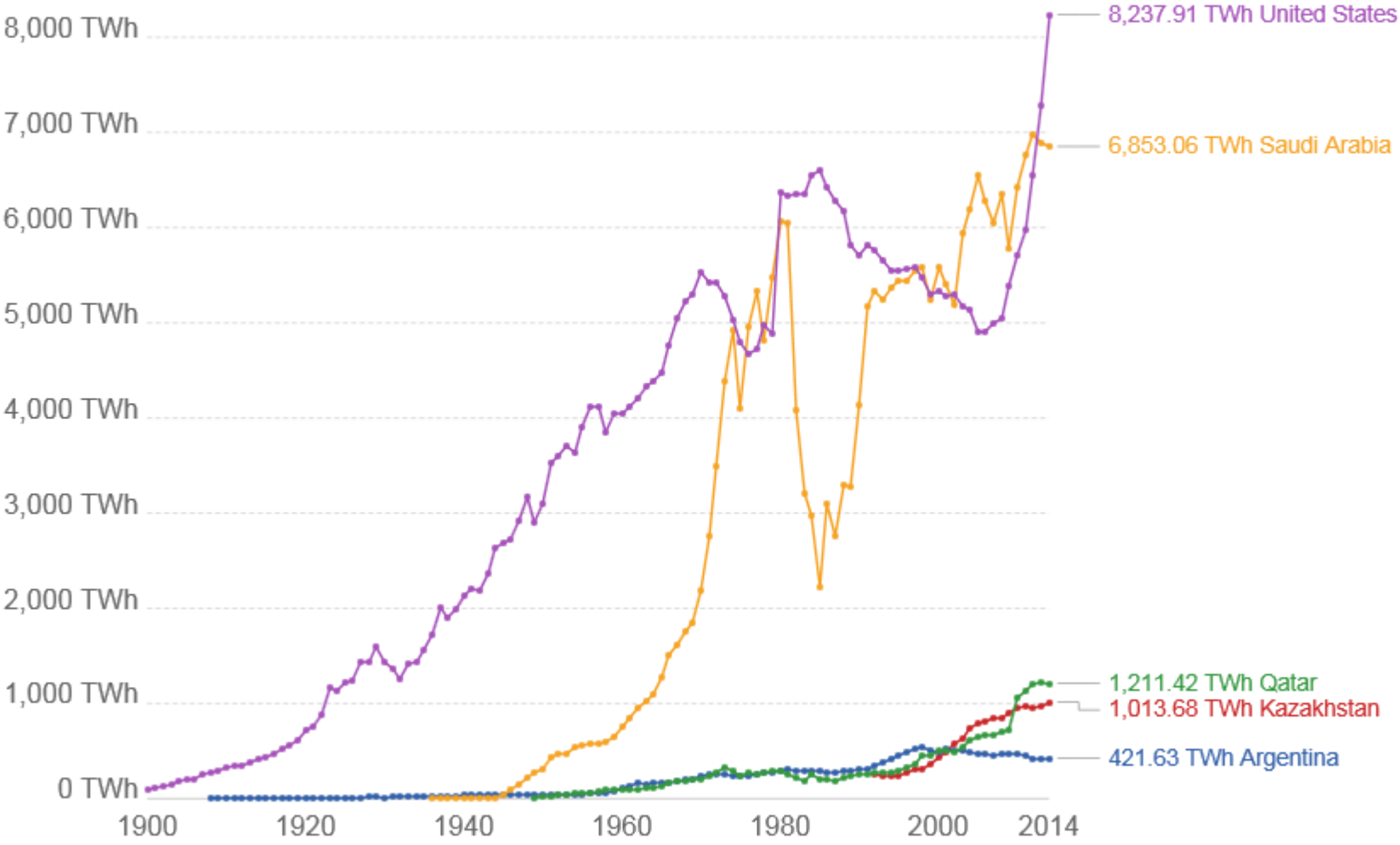
visualcapitalist.com



# Oil production by country, terawatt-hours (TWh)

Oil production by country, measured in terawatt-hour (TWh) equivalents per year.

Our World in Data




Source: The SHIFT Project - Etemad & Luciana; US IEA

OurWorldInData.org/fossil-fuels/ • CC BY



**The seven sisters shares of world oil production 1972 - The seven sisters Anthony Sampson**

| Company | Production in US (thousand of B/D) | % of total US production | Production in ME and Lybia (thousand of B/D) | % of total ME and Lybia production | Production in all OPEC (thousand B/D) | % of total OPEC production | Production world wide excluding E. Europe and China (thousand of B/D) | % of world production excluding E. Europe and China |
|---|---|---|---|---|---|---|---|---|
| Exxon | 1.114 | 9,9 | 2.527 | 12,9 | 4.050 | 15,2 | 6.145 | 14,7 |
| Texaco | 916 | 8,1 | 2.155 | 11,0 | 2.674 | 10,0 | 4.021 | 9,6 |
| Socal | 528 | 4,7 | 2.155 | 11,0 | 2.614 | 9,8 | 3.323 | 7,9 |
| Gulf | 651 | 5,8 | 1.887 | 9,7 | 2.409 | 9,0 | 3.404 | 8,1 |
| Mobil | 457 | 4,1 | 1.178 | 6,0 | 1.477 | 5,5 | 2.399 | 5,7 |
| BP | | | 3.903 | 20,0 | 4.506 | 16,9 | 4.659 | 11,1 |
| Shell | 726 | 6,5 | 1.372 | 7,0 | 2.877 | 10,8 | 5.416 | 12,9 |
| | | | | | | | | |
| Total | 4.392 | 39,1 | 15.177 | 77,6 | 20.607 | 77,2 | 29.367 | 70,0 |



# Crude oil prices over the long term, US$ per barrel

Global crude oil prices, measured in 2016 US dollars per barrel.

Our World in Data


Source: BP Statistical Review 2016

OurWorldInData.org/energy-production-and-changing-energy-sources/ • CC BY



**Largest public companies ordered per revenues (Fortune 2018) - World GPD about 80,000 billion USD**

| Rank | Company Name | Country | Number of Employees | Revenues ($millions) | Profits ($millions) | Profit Change | Assets ($millions) |
|---|---|---|---|---|---|---|---|
| 1 | Walmart | USA | 2.300.000 | $500.343 | $9.862,0 | -27,7% | $204.522 |
| 2 | State Grid | China | 913.546 | $348.903 | $9.533,4 | -0,4% | $585.278 |
| 3 | Sinopec Group | China | 667.793 | $326.953 | $1.537,8 | 22,2% | $346.545 |
| 4 | China National Petroleum | China | 1.470.193 | $326.008 | -$690,5 | -137,0% | $629.411 |
| 5 | Royal Dutch Shell | Netherlands | 84.000 | $311.870 | $12.977,0 | 183,7% | $407.097 |
| 6 | Toyota Motor | Japan | 369.124 | $265.172 | $22.510,1 | 33,2% | $473.133 |
| 7 | Volkswagen | Germany | 642.292 | $260.028 | $13.107,3 | 120,8% | $506.956 |
| 8 | BP | Britain | 74.000 | $244.582 | $3.389,0 | 2847,0% | $276.515 |
| 9 | Exxon Mobil | USA | 71.200 | $244.363 | $19.710,0 | 151,4% | $348.691 |
| 10 | Berkshire Hathaway | USA | 377.000 | $242.137 | $44.940,0 | 86,7% | $702.095 |



## Largest public oil & gas companies ordered per revenues (Fortune 2018) - World GPD about 80,000 billion USD

| Rank | Company Name | Country | Number of Employees | Revenues ($millions) | Profits ($millions) | Profit Change | Assets ($millions) |
|---|---|---|---|---|---|---|---|
| 3 | Sinopec Group | China | 667.793 | $326.953 | $1.537,8 | 22,2% | $346.545 |
| 4 | China National Petroleum | China | 1.470.193 | $326.008 | -$690,5 | -137,0% | $629.411 |
| 5 | Royal Dutch Shell | Netherlands | 84.000 | $311.870 | $12.977,0 | 183,7% | $407.097 |
| 8 | BP | Britain | 74.000 | $244.582 | $3.389,0 | 2847,0% | $276.515 |
| 9 | Exxon Mobil | USA | 71.200 | $244.363 | $19.710,0 | 151,4% | $348.691 |
| 28 | Total | France | 98.277 | $149.099 | $8.631,0 | 39,3% | $242.631 |
| 33 | Chevron | USA | 51.900 | $134.533 | $9.195,0 | - | $253.806 |
| 49 | Gazprom | Russia | 469.600 | $111.983 | $12.249,9 | -13,9% | $316.871 |
| 63 | Lukoil | Russia | 103.600 | $93.897 | $7.182,3 | 132,4% | $90.798 |
| 73 | Petrobras | Brazil | 62.703 | $88.827 | -$91,0 | - | $251.366 |
| 89 | ENI | Italy | 32.934 | $80.006 | $3.803,2 | - | $138.002 |



**Largest state owned oil companies ordered per revenues (2017) - World GPD about 80,000 billion USD**

| Rank | Company Name | Country | Number of Employees | Revenues ($billions) | Profits ($millions) | Profit Change | Reserves (MMB) |
|---|---|---|---|---|---|---|---|
| 1 | Saudi Aramco | Saudi Arabia | ND | $465 | ND | ND | 332,000 |
| 2 | Sinopec | China | ND | $448 | ND | ND | ND |
| 3 | CNPC | China | ND | $428 | ND | ND | ND |
| 4 | Kuwait Oil Company | Kuwait | ND | $251 | ND | ND | ND |
| 5 | PDVESA | Venezuela | ND | $128 | ND | ND | ND |
| 6 | Pemex | Mexico | ND | $117 | ND | ND | ND |
| 7 | NIOC | Iran | ND | ND | ND | ND | 156,000 |
| 8 | Petronas | Malaysia | ND | $100 | ND | ND | ND |



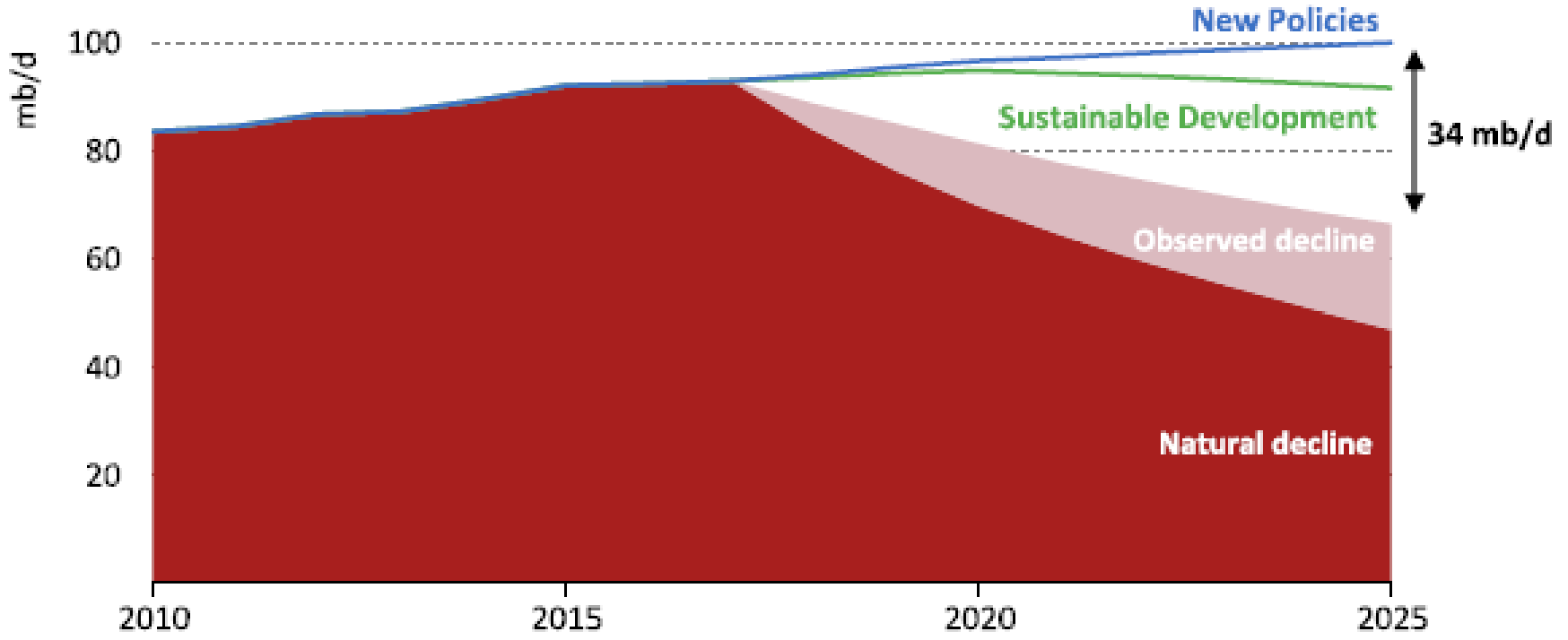
**Table 2.5** ▷ **Primary energy demand in the Sustainable Development Scenario** (Mtoe)

| | 2000 | 2017 | 2025 | 2030 | 2035 | 2040 | 2017-2040 Change | 2017-2040 CAAGR |
|---|---|---|---|---|---|---|---|---|
| Coal | 2 308 | 3 750 | 3 045 | 2 416 | 1 917 | 1 597 | -57% | -3.6% |
| Oil | 3 665 | 4 435 | 4 334 | 3 985 | 3 515 | 3 156 | -29% | -1.5% |
| Gas | 2 071 | 3 107 | 3 454 | 3 554 | 3 532 | 3 433 | 10% | 0.4% |
| Nuclear | 675 | 688 | 861 | 1 013 | 1 182 | 1 293 | 88% | 2.8% |
| Renewables* | 662 | 1 334 | 2 056 | 2 707 | 3 430 | 4 159 | 212% | 5.1% |
| Hydro | 225 | 353 | 431 | 492 | 548 | 601 | 70% | 2.3% |
| Modern biomass | 377 | 726 | 976 | 1 132 | 1 283 | 1 427 | 96% | 3.0% |
| Other | 60 | 254 | 648 | 1 083 | 1 598 | 2 132 | 739% | 9.7% |
| Traditional use of biomass | 646 | 658 | 396 | 144 | 112 | 77 | -88% | -8.9% |
| Fossil fuel share | 80% | 81% | 77% | 72% | 65% | 60% | | |
| *of which equipped with CCUS* | *0%* | *0%* | *1%* | *2%* | *6%* | *10%* | | |
| Energy intensity (toe/$1 000 GDP-PPP) | 0.14 | 0.11 | 0.08 | 0.07 | 0.06 | 0.05 | -55% | -3.4% |
| **Total** | **10 027** | **13 972** | **14 146** | **13 820** | **13 688** | **13 715** | **-2%** | **-0.1%** |
| *New Policies Scenario* | | | *15 388* | *16 167* | *16 926* | *17 715* | *27%* | *1.0%* |
| *Current Policies Scenario* | | | *15 782* | *16 943* | *18 125* | *19 328* | *38%* | *1.4%* |

* Renewables excludes the traditional use of biomass. Note: CAAGR = Compound average annual growth rate; CCUS = carbon capture, utilisation and storage; toe = tonnes of oil equivalent; PPP = purchasing power parity.



**Figure 1.19 ▷** Declines in current oil production and demand in the New Policies and Sustainable Development scenarios




*Observed and natural declines in oil production are much faster than the drop in demand in the Sustainable Development Scenario: new upstream investment remains crucial*



**Table 1.7** ▷ **Global annual average energy investment by type and scenario**
($2017 billion)

| | | New Policies | | Current Policies | | Sustainable Development | |
|---|---|---|---|---|---|---|---|
| | 2010-17 | 2018-25 | 2026-40 | 2018-25 | 2026-40 | 2018-25 | 2026-40 |
| Fossil fuels | 1 171 | 967 | 1 081 | 1 043 | 1 407 | 830 | 574 |
| Renewables | 293 | 331 | 380 | 295 | 296 | 467 | 663 |
| Electricity networks | 264 | 313 | 387 | 334 | 397 | 286 | 462 |
| Other | 20 | 61 | 62 | 60 | 57 | 67 | 150 |
| **Total supply** | **1 749** | **1 672** | **1 909** | **1 732** | **2 157** | **1 649** | **1 848** |
| *Fuel supply* | *58%* | *52%* | *53%* | *53%* | *60%* | *46%* | *32%* |
| *Power supply* | *42%* | *48%* | *47%* | *47%* | *40%* | *54%* | *68%* |
| Energy efficiency | 236 | 397 | 666 | 299 | 496 | 505 | 828 |
| Other end-use | 124 | 148 | 246 | 122 | 143 | 203 | 581 |
| **Total end-use** | **360** | **545** | **912** | **421** | **640** | **708** | **1 409** |
| **Total investment** | **2 109** | **2 216** | **2 821** | **2 153** | **2 796** | **2 357** | **3 257** |
| *Cumulative 2018-2040* | | 60 042 | | 59 168 | | 67 713 | |

Notes: The historical value for energy efficiency includes only 2017. Other includes nuclear, battery storage and carbon capture, utilisation and storage (CCUS) in the power sector. Other end-use includes direct use of renewables in end-use sectors (except biofuels, which are included in supply), electric vehicles and CCUS in industry.



**Table 3.1 ▷ Global oil demand and production by scenario** (mb/d)

| | | | New Policies | | Current Policies | | Sustainable Development | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2017 | 2025 | 2040 | 2025 | 2040 | 2025 | 2040 |
| Road transport | 30.1 | 41.2 | 44.7 | 44.9 | 46.2 | 53.6 | 40.5 | 23.0 |
| Aviation and shipping | 8.3 | 11.5 | 13.2 | 16.3 | 13.8 | 18.5 | 11.2 | 9.3 |
| Industry and petrochemicals | 14.5 | 17.8 | 20.7 | 23.3 | 20.9 | 23.8 | 20.0 | 20.7 |
| Buildings and power | 14.3 | 12.5 | 11.2 | 9.2 | 11.8 | 10.9 | 10.2 | 6.5 |
| Other sectors | 10.1 | 11.8 | 12.6 | 12.6 | 12.9 | 13.6 | 12.0 | 10.4 |
| **World oil demand** | **77.3** | **94.8** | **102.4** | **106.3** | **105.5** | **120.5** | **93.9** | **69.9** |
| *Share of Asia Pacific* | *25%* | *32%* | *35%* | *37%* | *35%* | *37%* | *36%* | *38%* |
| Biofuels | 0.2 | 1.8 | 2.8 | 4.7 | 2.5 | 3.5 | 4.4 | 7.3 |
| **World liquids demand** | **77.5** | **96.6** | **105.2** | **110.9** | **108.0** | **124.1** | **98.3** | **77.2** |
| Conventional crude oil | 64.8 | 66.9 | 65.6 | 63.8 | 67.2 | 72.6 | 59.8 | 40.2 |
| Tight oil | - | 4.8 | 9.8 | 11.0 | 10.3 | 12.1 | 9.1 | 7.3 |
| Natural gas liquids | 8.9 | 16.7 | 19.0 | 21.1 | 19.8 | 22.9 | 17.5 | 15.6 |
| Extra-heavy oil and bitumen | 1.0 | 3.7 | 4.2 | 5.5 | 4.3 | 7.0 | 3.9 | 3.5 |
| Other production | 0.5 | 0.7 | 1.3 | 2.1 | 1.4 | 2.7 | 1.2 | 1.3 |
| **World oil production** | **75.2** | **92.8** | **99.9** | **103.4** | **102.9** | **117.2** | **91.6** | **68.0** |
| *Share of OPEC* | *42%* | *43%* | *40%* | *45%* | *40%* | *45%* | *40%* | *44%* |
| Processing gains | 1.8 | 2.3 | 2.5 | 2.9 | 2.6 | 3.3 | 2.3 | 1.9 |
| **World oil supply** | **77.0** | **95.1** | **102.4** | **106.3** | **105.5** | **120.5** | **93.9** | **69.9** |
| **IEA crude oil price** (2017$/barrel) | **39** | **52** | **88** | **112** | **101** | **137** | **74** | **64** |

Notes: Other production includes coal-to-liquids, gas-to-liquids, additives and kerogen oil. See Annex C for other definitions. Differences between historical supply and demand volumes are due to changes in stocks.



**Table 3.8 ▷ Cumulative oil and natural gas supply investment by region in the New Policies Scenario, 2018-2040** ($2017 billion)

| | Total oil and gas | Upstream oil and gas | Transport | | Refining oil | Annual average upstream oil and gas |
|---|---|---|---|---|---|---|
| | | | Oil | Gas | | |
| North America | 5 258 | 4 295 | 163 | 666 | 134 | 187 |
| Central and South America | 1 875 | 1 609 | 102 | 120 | 44 | 70 |
| Europe | 1 758 | 1 270 | 25 | 375 | 89 | 55 |
| Africa | 2 033 | 1 703 | 80 | 185 | 66 | 74 |
| Middle East | 2 989 | 2 283 | 205 | 317 | 184 | 99 |
| Eurasia | 2 716 | 2 273 | 57 | 334 | 53 | 99 |
| Asia Pacific | 3 651 | 2 296 | 85 | 822 | 448 | 100 |
| Shipping | 427 | n.a. | 299 | 128 | n.a. | n.a. |
| **World** | **20 708** | **15 730** | **1 015** | **2 946** | **1 017** | **684** |
| Current Policies | 25 316 | 19 520 | 1 348 | 3 172 | 1 277 | 849 |
| Sustainable Development | 13 455 | 9 824 | 452 | 2 531 | 649 | 427 |

Note: n.a. = not applicable.



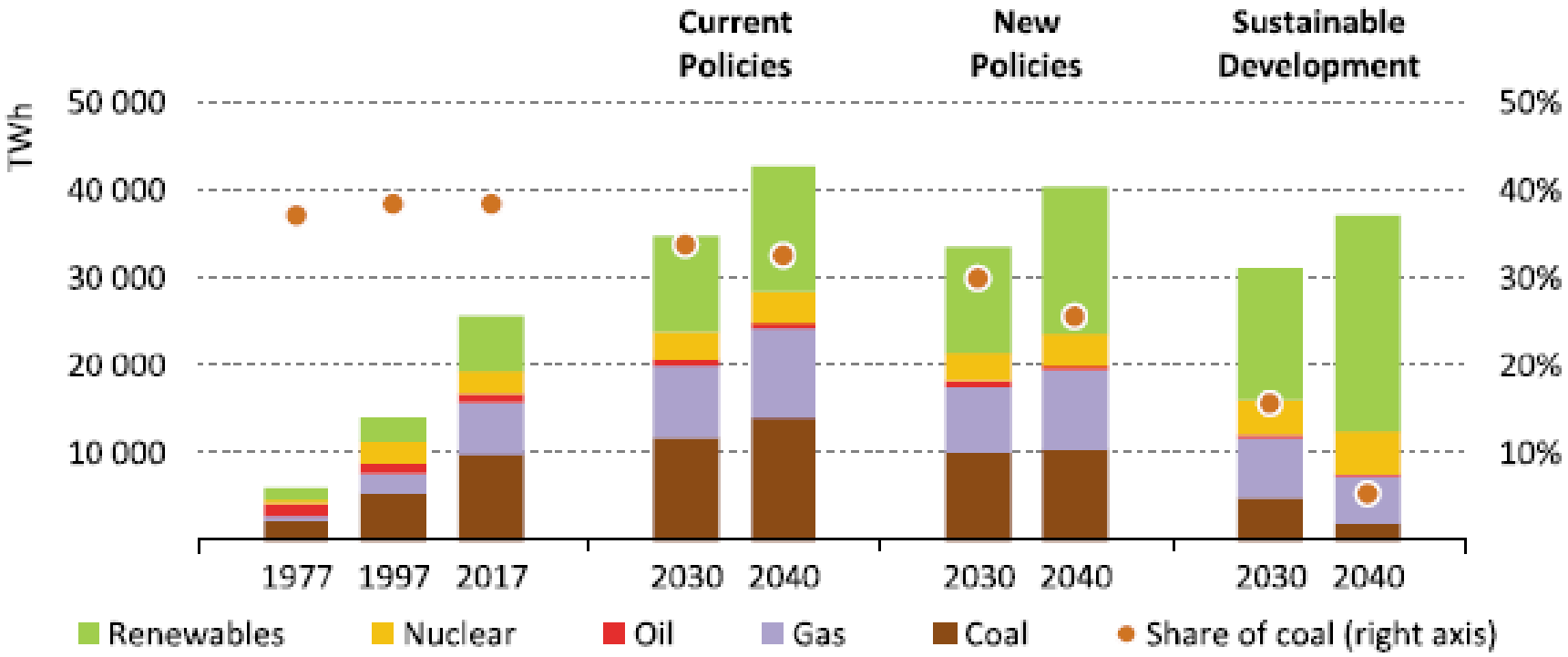
**Table 5.5 ▷ Cumulative coal supply investment by region in the New Policies Scenario, 2018-2040** ($2017 billion)

| | Total | Mining | | | Ports and rail | Total annual average |
|---|---|---|---|---|---|---|
| | | Capacity additions | Maintenance | Total | | |
| North America | 59 | 19 | 29 | 48 | 11 | 3 |
| Central and South America | 22 | 11 | 8 | 19 | 3 | 1 |
| Europe | 24 | 5 | 6 | 11 | 12 | 1 |
| Africa | 44 | 18 | 19 | 37 | 7 | 2 |
| Middle East | 1 | 0 | 0 | 0 | 1 | 0 |
| Eurasia | 72 | 23 | 28 | 50 | 22 | 3 |
| Asia Pacific | 706 | 299 | 278 | 578 | 129 | 31 |
| Shipping | 54 | n.a. | n.a. | n.a. | 54 | 2 |
| **World** | **983** | **376** | **367** | **743** | **240** | **43** |
| Current Policies | 1 228 | 457 | 408 | 865 | 364 | 53 |
| Sustainable Development | 590 | 179 | 257 | 436 | 154 | 26 |

Note: n.a. = not applicable.



**Figure 5.7 ▷ Global electricity generation by source and scenario**

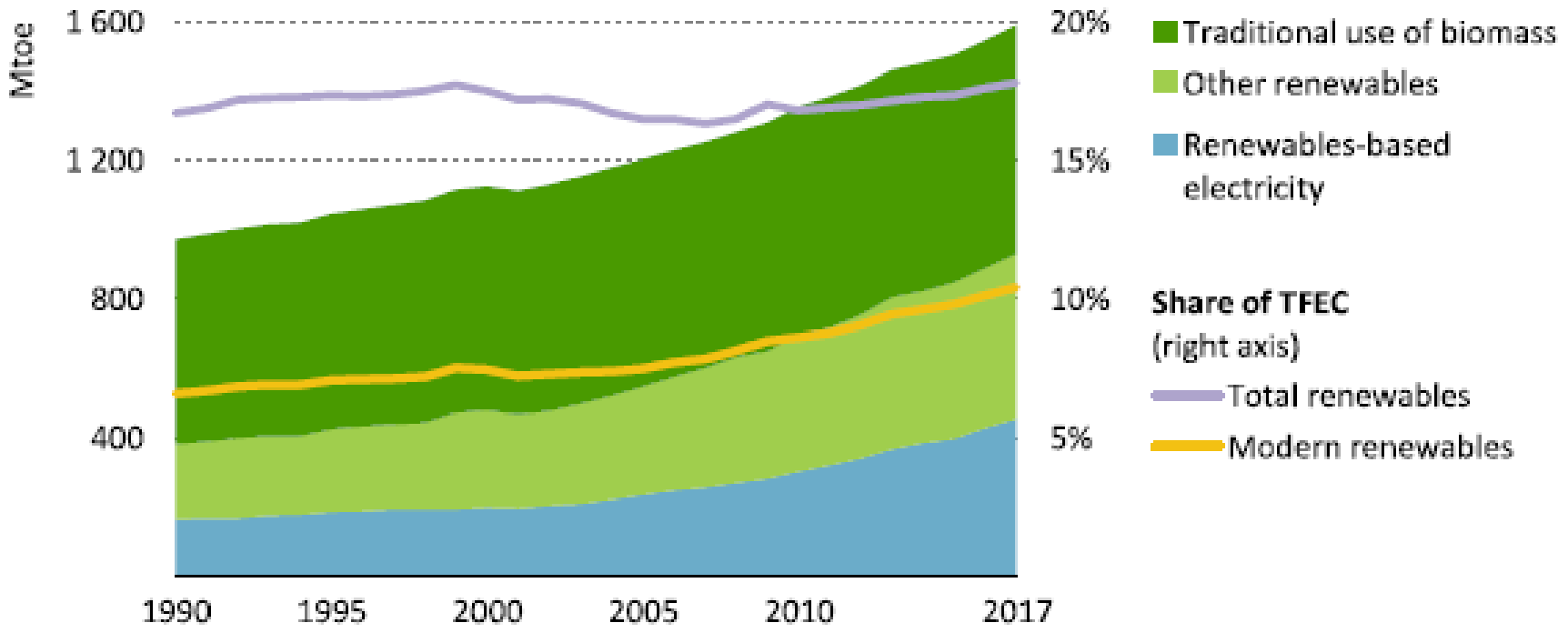



*The higher the climate ambition, the lower the level of coal in the power mix*

Note: TWh = terawatt-hours.



## Figure 6.6 ▷ Renewables in total final energy consumption




*The growth of renewables has outpaced the rate of increase of energy consumption but traditional use of biomass still accounts for 7% of global final energy consumption*

Note: Mtoe = million tonnes of oil equivalent; TFEC = total final energy consumption, which excludes non-energy use.



**Table 6.5 ▷ Global annual average renewables investment by scenario**
($2017 billion)

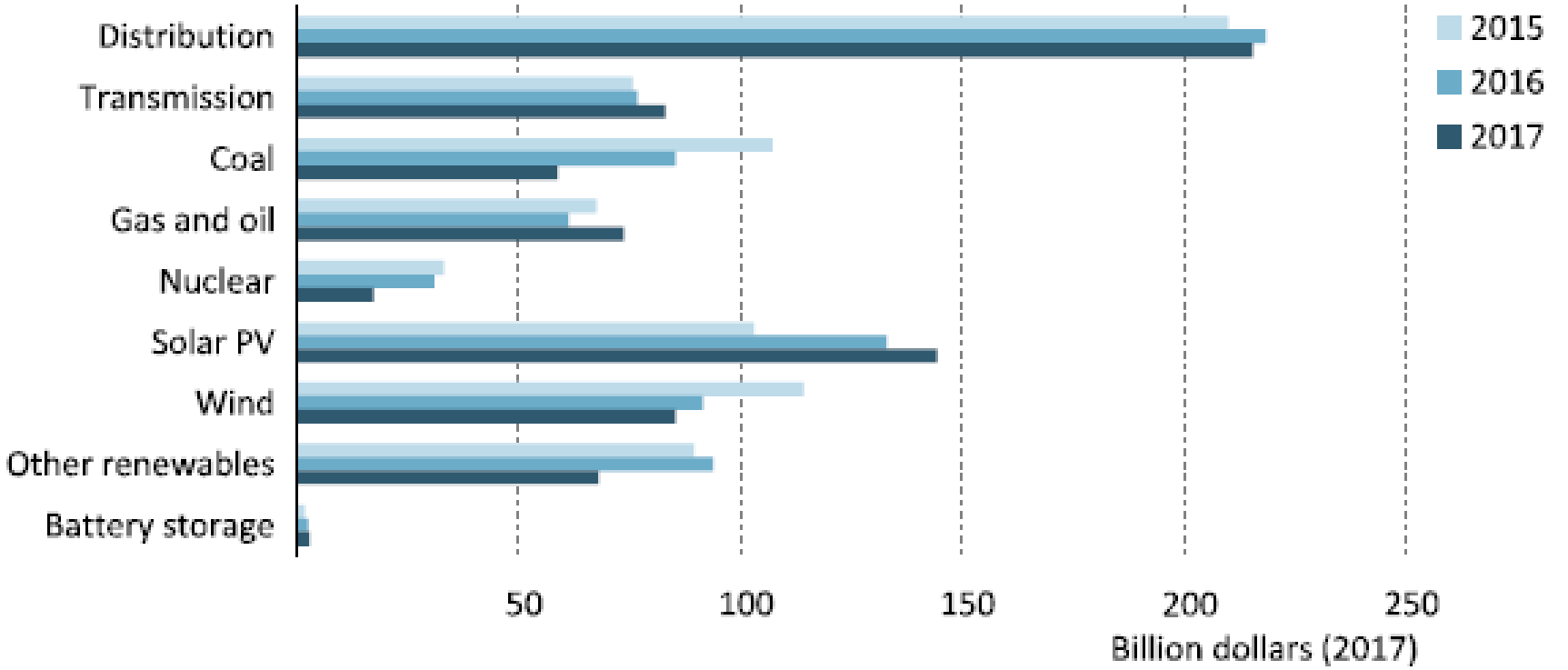
| | | New Policies | | Current Policies | | Sustainable Development | |
|---|---|---|---|---|---|---|---|
| | 2017 | 2018-25 | 2026-40 | 2018-25 | 2026-40 | 2018-25 | 2026-40 |
| Renewables-based power generation | 298 | 322 | 361 | 286 | 278 | 441 | 616 |
| Wind | 85 | 98 | 119 | 85 | 87 | 134 | 218 |
| Solar PV | 144 | 127 | 116 | 111 | 89 | 177 | 186 |
| Transport biofuels | 2 | 9 | 18 | 8 | 18 | 25 | 47 |
| Renewable heat | 109 | 116 | 127 | 103 | 111 | 134 | 154 |
| **Total** | **407** | **437** | **488** | **390** | **389** | **576** | **770** |
| *Cumulative* | | *3 574* | *7 600* | *3 183* | *6 110* | *4 807* | *12 246* |

Note: Renewable heat includes only the direct use of renewables for heat in end-use sectors.

Source: 2017 data for renewables-based power generation from IEA (2018b).



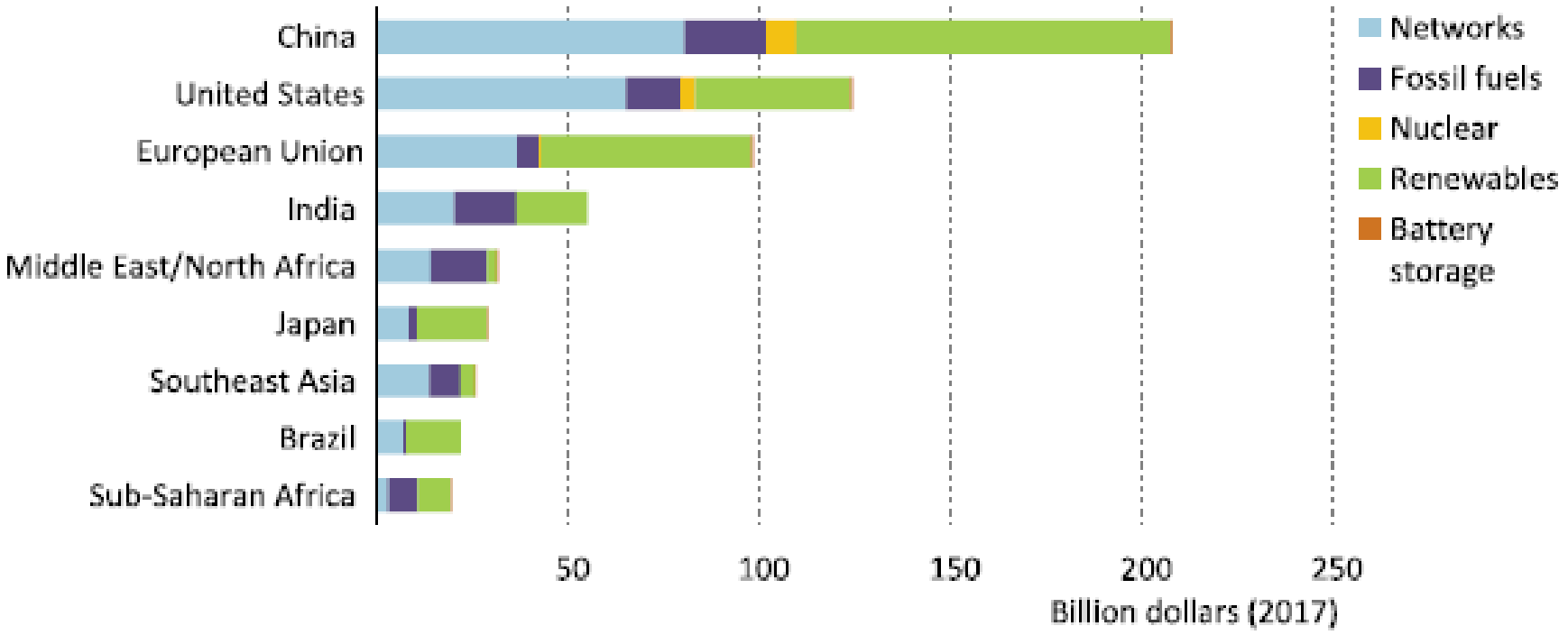
**Figure 7.26** ▷ Global investment in the power sector by technology, 2015-2017




*Overall investment in the power sector fell by 6% in 2017 compared to 2016, despite record investment in solar PV and electricity networks*



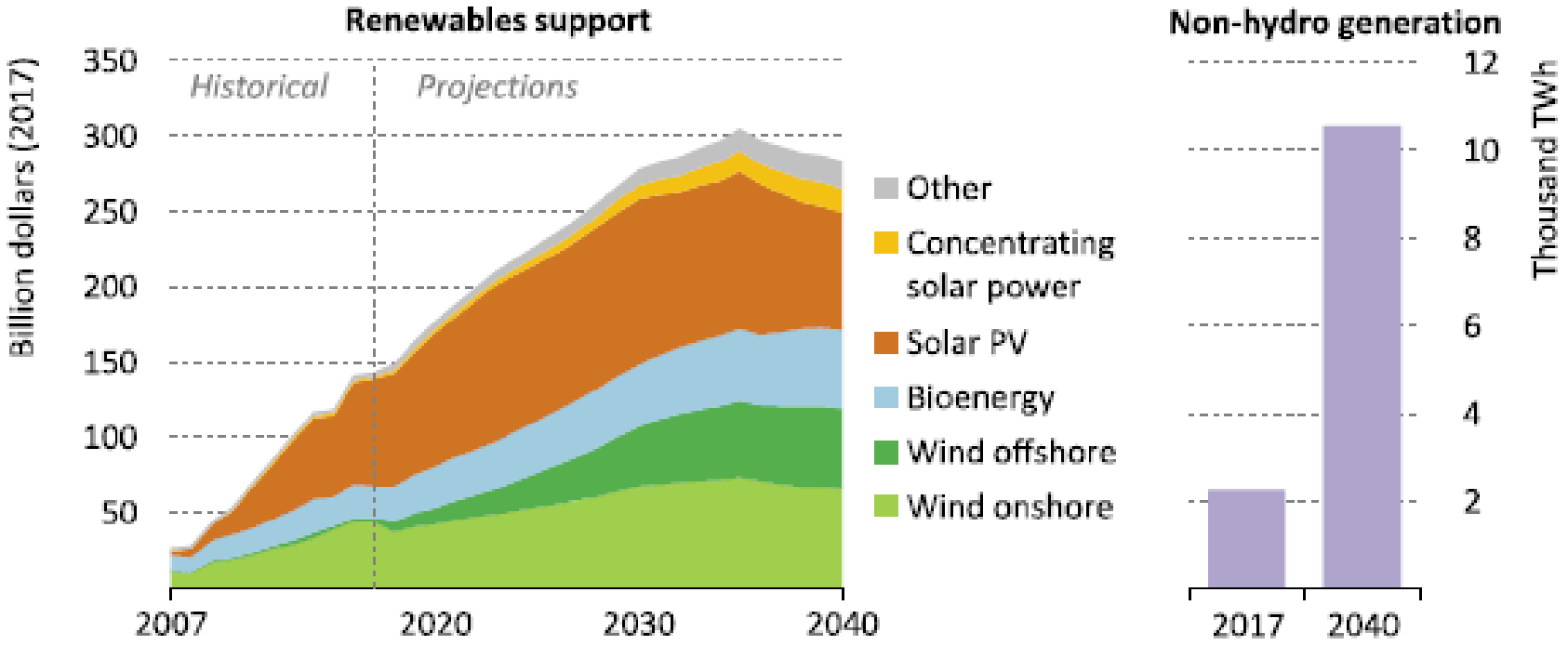
**Figure 7.27** ▷ Power sector investment by selected region, 2017




*More than 70% of worldwide investment in power generation was in low-carbon sources in 2017*



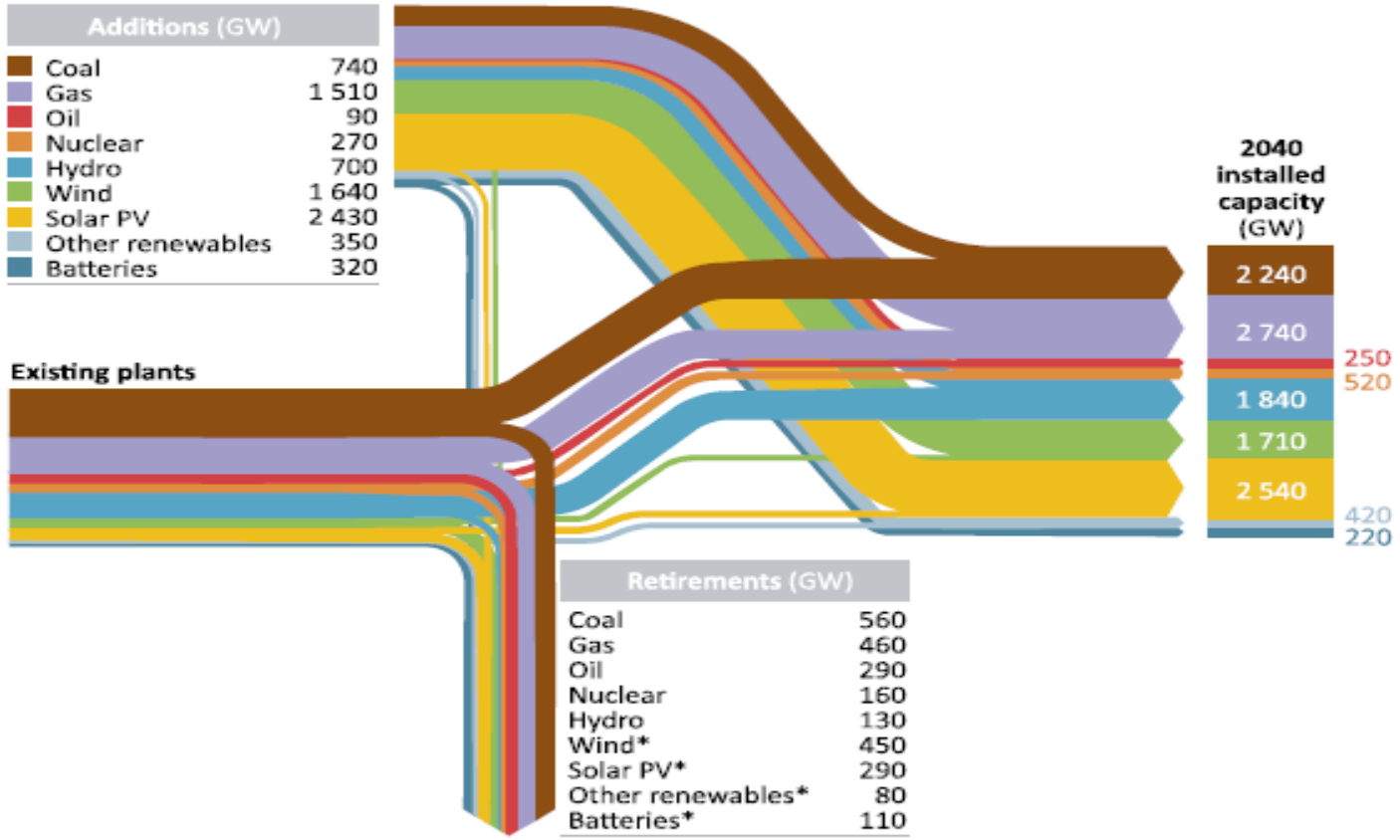
**Figure 6.5** ▷ **Global renewables-based electricity support and non-hydro generation in the New Policies Scenario**




*Globally, support to renewables for power generation increases from $143 billion today to $280 billion in 2040, with generation from non-hydro renewables more than quadrupling*



**Figure 8.15 ▷ Global power generation capacity additions and retirements in the New Policies Scenario, 2018-2040**




***Much of today's power plant fleet will still be operating in 2040, with renewables stepping up to replace capacity retirements and meet new demand***

* A portion of capacity additions of renewables and battery storage are retired by 2040, consistent with the average lifetime assumption for wind and solar PV of 25 years, and 10 years for batteries.

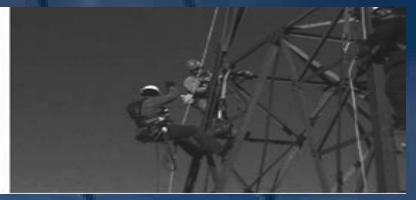


**Table 7.1 ▻ Top-25 world power generation companies by installed capacity**

| Rank | 2017 (GW) | Headquarters (region) | Parent company | Installed capacity by source | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Coal | Gas | Nuclear | Renewables | Other |
| 1 | 230 | China | China Energy Investment Group | 74% | 2% | 0% | 24% | 0% |
| 2 | 172 | China | China Huaneng Group | 69% | 6% | 0% | 25% | 0% |
| 3 | 146 | China | China Huadian Corp. | 61% | 10% | 0% | 29% | 0% |
| 4 | 138 | China | China Datang Corp. | 66% | 3% | 0% | 31% | 0% |
| 5 | 129 | European Union | Électricité de France SA | 4% | 9% | 56% | 24% | 6% |
| 6 | 126 | China | State Power Investment Corp. | 55% | 4% | 0% | 38% | 3% |
| 7 | 90 | Korea | Korea Electric Power Corp. | 45% | 22% | 26% | 7% | 0% |
| 8 | 85 | European Union | Enel S.p.A | 19% | 18% | 4% | 45% | 14% |
| 9 | 70 | China | China Three Gorges Corp. | 1% | 0% | 0% | 99% | 0% |
| 10 | 64 | Japan | Tokyo Electric Power Co. | 5% | 46% | 20% | 16% | 14% |
| 11 | 63 | Saudi Arabia | Saudi Electricity Co. | 0% | 66% | 0% | 0% | 34% |
| 12 | 59 | European Union | Engie | 8% | 49% | 11% | 27% | 5% |
| 13 | 57 | Mexico | Comisión Federal de Electricidad | 9% | 43% | 3% | 24% | 21% |
| 14 | 54 | India | NTPC Ltd. | 86% | 11% | 0% | 3% | 0% |
| 15 | 52 | United States | Duke Energy Corp. | 35% | 35% | 17% | 13% | 1% |
| 16 | 48 | European Union | Iberdrola SA | 2% | 29% | 7% | 60% | 3% |
| 17 | 47 | South Africa | Eskom Holdings Soc. Ltd | 83% | 5% | 4% | 7% | 0% |
| 18 | 46 | United States | NextEra Energy Inc. | 2% | 48% | 13% | 34% | 3% |
| 19 | 46 | United States | Southern Co. | 27% | 47% | 14% | 12% | 0% |
| 20 | 45 | Egypt | Egyptian Electricity Holding Co. | 0% | 57% | 0% | 8% | 34% |
| 21 | 43 | European Union | RWE AG | 42% | 35% | 6% | 10% | 7% |
| 22 | 42 | Chinese Taipei | Taiwan Power Company | 29% | 35% | 12% | 18% | 6% |
| 23 | 40 | Russia | Gazprom Group | 36% | 64% | 0% | 0% | 0% |
| 24 | 40 | Indonesia | Perusahaan Listrik Negara (PLN) | 59% | 31% | 0% | 10% | 0% |
| 25 | 39 | Russia | RusHydro Group | 17% | 5% | 0% | 77% | 1% |

Source: IEA analysis based on China Electricity Council, company websites and national energy regulatory authority websites.





Coordinamento Ingegneri e Tecnici



# Conferenza - Dibattito

# Guerre tecnologiche e commerciali nel secolo dei cambiamenti

25-06-2019

CASA DELLE ASSOCIAZIONI E DEL VOLONTARIATO

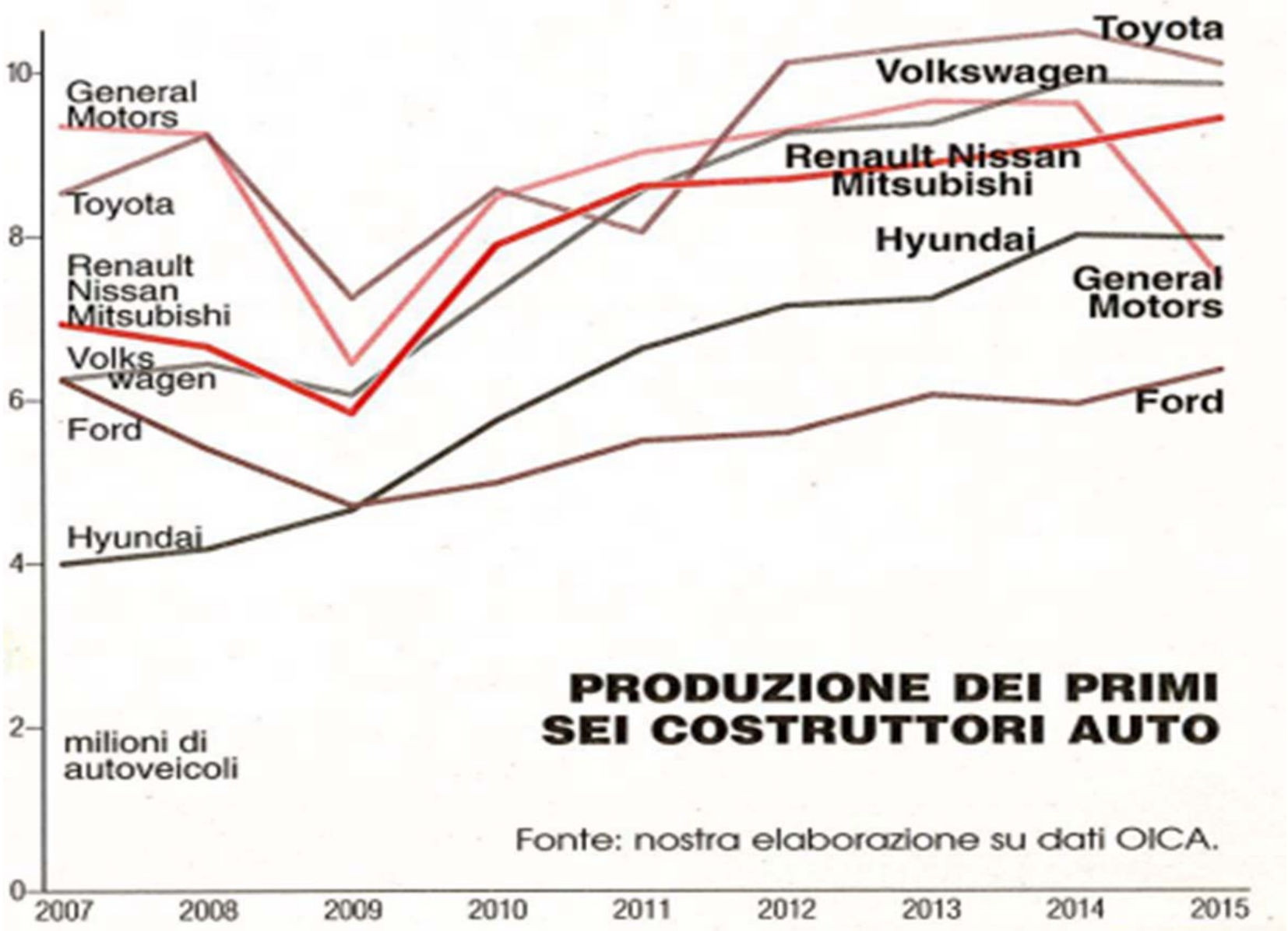
Via Miramare 9 –MM1 Sesto Marelli



# PRODUZIONE MONDIALE DI AUTOVEICOLI

| | GRUPPI AUTOMOBILISTICI | QUOTE | | % QUOTE | | DIFFERENZA |
|---|---|---|---|---|---|---|
| | | 2007 | 2015 | 2007 | 2015 | 2007-2015 |
| 1 | Toyota | 8.535 | 10.084 | 11,8 | 11,2 | -0,6 |
| 2 | Gruppo Volkswagen | 6.268 | 9.872 | 8,7 | 11 | +2,3 |
| 3 | Renault-Nissan-mitsubishi | 7.512 | 9.422 | 10,4 | 10,5 | +0,1 |
| 4 | Hyundai-Kia | 3.987 | 7.988 | 5,5 | 8,9 | +3,4 |
| 5 | General Motors | 9.350 | 7.966 | 13 | 8,8 | -4,2 |
| 6 | Ford | 6.248 | 6.396 | 8,7 | 7,1 | -1,6 |
| 7 | FCA (FIAT-Chrysler) | 5.208 | 4.865 | 7,2 | 5,4 | -1,8 |
| 8 | Honda | 3.912 | 4.544 | 5,4 | 5 | -0,4 |
| 9 | PSA | 3.900 | 4.200 | 5,4 | 4,7 | -0,7 |
| 10 | Suzuki | 2.596 | 3.034 | 3,6 | 3,4 | -0,2 |
| | Totale Mondo | 72.178 | 90.086 | 100,00 | 100,00 | |



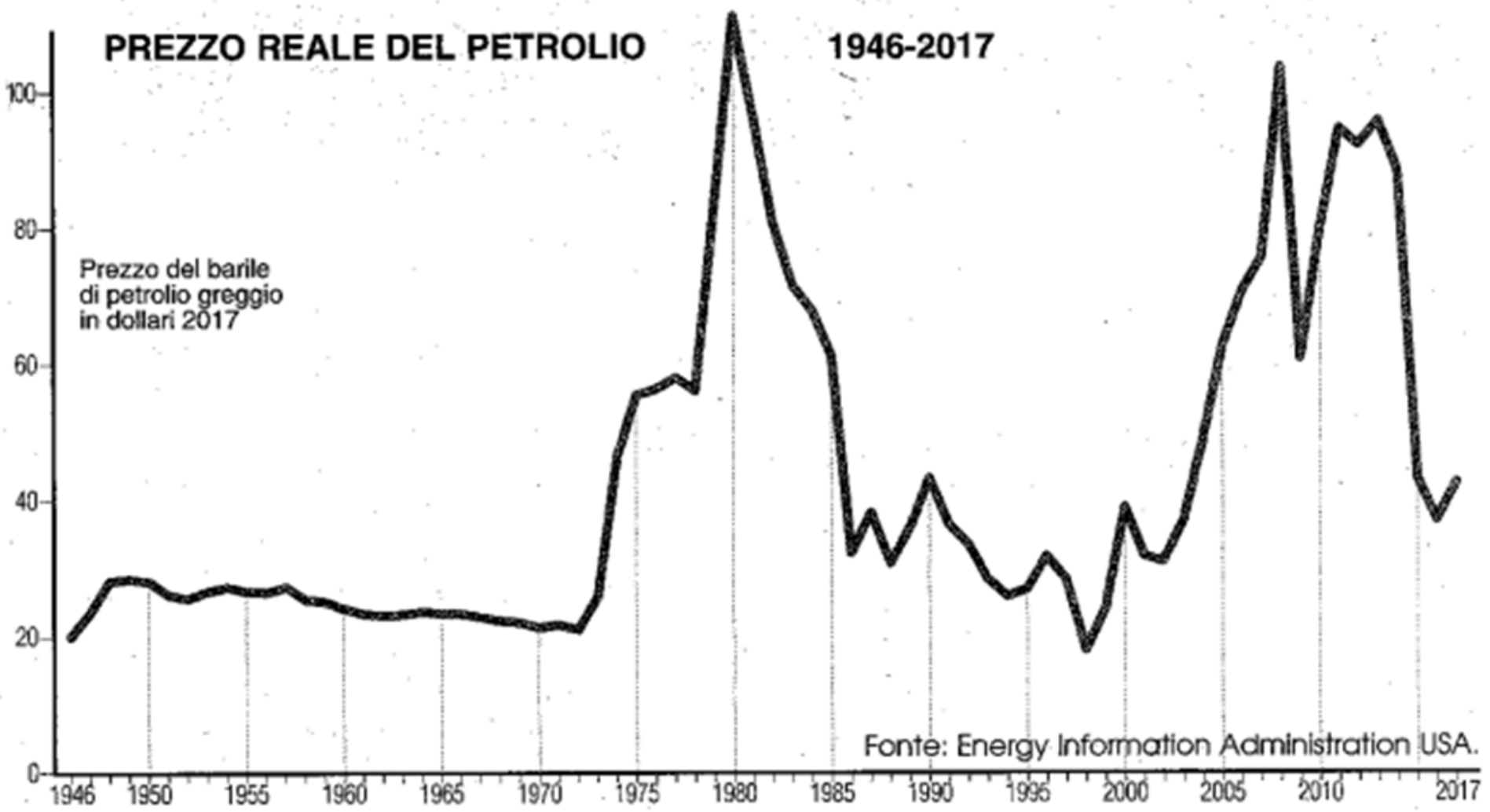



**PRODUZIONE DEI PRIMI SEI COSTRUTTORI AUTO**

Fonte: nostra elaborazione su dati OICA.



## PREZZO REALE DEL PETROLIO 1946-2017





## CONSUMO DI PETROLIO DEI PAESI DELL'EUROPA A 27

*Distribuzione percentuale*

| | |
|---|---|
| trasporti su strada | 54 |
| altri trasporti | 11 |
| industria | 21 |
| abitazioni | 7 |
| servizi e altro | 7 |
| Totale | 100 |

## DIPENDENZA PETROLIFERA DEI PAESI DELL'EUROPA A 27

*Peso import su consumo*

| | |
|---|---|
| 2000 | 76% |
| 2015 | 88% |

Fonte: Eurostat.



# AUTOVEICOLI IN CIRCOLAZIONE

| | 2005 | 2015 | Variaz.% 2005/2015 | autoveicoli per 1000 abitanti | Peso % su totale 2005 | Peso % su totale 2015 |
|---|---|---|---|---|---|---|
| Europa | 321.716 | 387.520 | +20,5 | 471 | 36,0 | 30,2 |
| NAFTA | 278.157 | 324.763 | +16,8 | 670 | 31,2 | 25,3 |
| Centro e Sud America | 49.630 | 88.962 | +79,3 | 176 | 5,6 | 6,9 |
| Asia, Oceania, M.Oriente | 216.799 | 436.222 | +101,2 | 105 | 24,3 | 34,1 |
| di cui: -Cina | 31.597 | 162.845 | +415,4 | 118 | 3,5 | 12,7 |
| -India | 10.332 | 28.860 | +179,3 | 22 | 1,2 | 2,3 |
| -Giappone | 75.687 | 77.404 | +2,3 | 609 | 8,5 | 6,0 |
| -Sud Corea | 15.397 | 20.990 | +36,3 | 417 | 1,7 | 1,6 |
| Africa | 25.726 | 44.803 | +74,2 | 42 | 2,9 | 3,5 |
| Mondo | 892.028 | 1.282.270 | +43,7 | 182 | 100,0 | 100,0 |

Automobili e veicoli commerciali, dati in migliaia.



# CONSUMO GIORNALIERO CARBURANTI

| | | 1986 | 2012 | Variaz.% |
|---|---|---|---|---|
| Europa | | 6,02 | 10,07 | +67 |
| NAFTA | | 11,49 | 15,00 | +31 |
| Asia | | 4,91 | 15,86 | +223 |
| di cui: | -Cina | 0,82 | 5,36 | +554 |
| | -India | 0,41 | 1,79 | +337 |
| altri | | 6,52 | 7,73 | +19 |
| Mondo | | 28,94 | 48,66 | +68 |

**Benzina e gasolio in milioni di barili al giorno.**

*Fonte: nostra elaborazione su dati AIE.*



# SPESA IN RICERCA E SVILUPPO (R&D)

| | società | Stato | Settore | Spesa |
|---|---|---|---|---|
| **1** | Volkswagen | Germania | Auto | **13.612** |
| **2** | Samsung | Sud Corea | elettronica | **12.528** |
| **3** | Intel | USA | hardware | **11.140** |
| **4** | Alphabet | USA | software | **11.053** |
| **5** | Microsoft | USA | software | **11.011** |
| **6** | Novartis | Svizzera | farmaceutica | **9.002** |
| **7** | Roche | Svizzera | farmaceutica | **8.640** |
| **8** | Huawei | Cina | hardware | **8.358** |
| **9** | Johnson & Johnson | USA | farmaceutica | **8.309** |
| **10** | Toyota Motor | Giappone | Auto | **8.047** |
| **11** | Apple | USA | hardware | **7.410** |
| **12** | Pfizer | USA | farmaceutica | **7.046** |
| **13** | General Motors | USA | Auto | **6.889** |
| **14** | Renault-Nissan-Mitsubishi | Frac./Giapp. | Auto | **6.641** |
| **15** | Daimler | Germania | Auto | **6.529** |
| **16** | Merck | USA | farmaceutica | **6.439** |
| **17** | Ford Motor | USA | Auto | **6.154** |
| **18** | Cisco Systems | USA | hardware | **5.701** |
| **19** | Honda Motor | Giappone | Auto | **5.487** |
| **20** | Oracle | USA | software | **5.315** |
| | totale | | | **165.311** |
| | settore auto | | | **53.359** |
| | **peso % auto sulle prime venti** | | | **32,3** |

Dati 2016 in milioni di Euro.

*Fonte: Commissione Europea, "R&D Scoreboard 2016".*



# Produzione in Cina di autoveicoli (tutte le motorizzazioni)

| marchi non cinesi | 2016 | peso% |
|---|---|---|
| 1 Gruppo Volkswagen | 3.977.165 | 4,20 |
| 2 General Motors | 3.870.488 | 4,08 |
| 3 Hyundai-Kia | 1.814.615 | 1,91 |
| 4 Renault-Nissan-Mitsubishi | 1.619.411 | 1,71 |
| 5 Ford | 1.276.596 | 1,35 |
| 6 Honda | 1.247.885 | 1,32 |
| 7 Toyota | 1.213.547 | 1,28 |
| 8 Gruppo PSA | 618.035 | 0,65 |
| 9 BMW | 516.073 | 0,54 |
| 10 Daimler | 488.772 | 0,52 |
| 11 Mazda | 285.694 | 0,30 |
| 12 FCA | 179.880 | 0,19 |
| 13 Jaguar Land Rover | 119.024 | 0,13 |
| 14 Volvo Cars | 90.946 | 0,10 |
| **totale** | **17.318.131** | **18,28** |

| marchi cinesi | 2016 | peso% |
|---|---|---|
| 1 SAIC | 2.566.793 | 2,71 |
| 2 Changan | 1.715.871 | 1,81 |
| 3 BAIC | 1.391.643 | 1,47 |
| 4 Dongfeng Motor | 1.315.490 | 1,39 |
| 5 Geely | 1.266.456 | 1,34 |
| 6 Great wall | 1.094.360 | 1,15 |
| 7 Chery | 695.617 | 0,73 |
| 8 Jac Motors | 651.291 | 0,69 |
| 9 FAW | 557.174 | 0,59 |
| 10 BYD | 510.572 | 0,54 |
| 11 Brilliance | 464.210 | 0,49 |
| 12 Guangzhou Auto Industry | 384.937 | 0,41 |
| 13 Hunan Jiangnan | 335.585 | 0,35 |
| 14 Chongqing Lifan Motor | 278.389 | 0,29 |
| 15 China Nat. Heavy Duty Truck | 199.941 | 0,21 |
| 16 Haima | 152.980 | 0,16 |
| 17 Shaanxi Automobile | 116.034 | 0,12 |
| 18 South East (Fujian) | 114.515 | 0,12 |
| 19 Changfeng | 88.888 | 0,09 |
| 20 Rongcheng Huatai | 84.621 | 0,09 |
| 21 Xiamen King Long | 75.233 | 0,08 |
| 22 Zhengzhou Yutong | 71.192 | 0,08 |
| 23 Chengdu Dayun | 59.298 | 0,06 |
| **totale** | **14.191.090** | **14,97** |
| **Produzione mondiale** | **94.771.814** | **100,00** |

Linea di montaggio Hyundai di Pechino



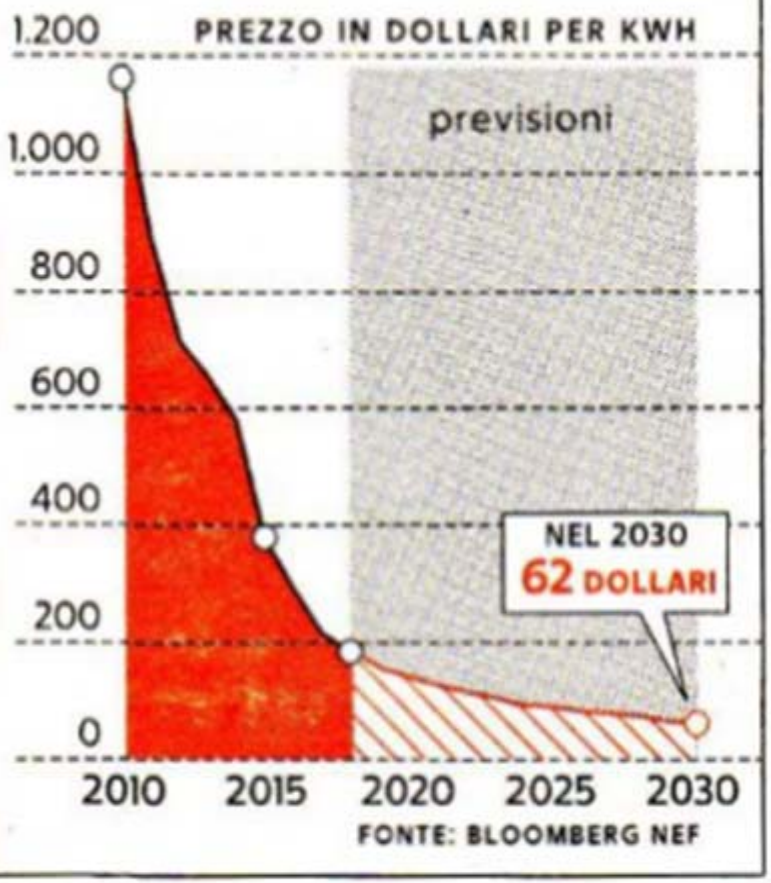
# CAPACITA' PRODUTTIVA BATTERIE PER VEICOLI

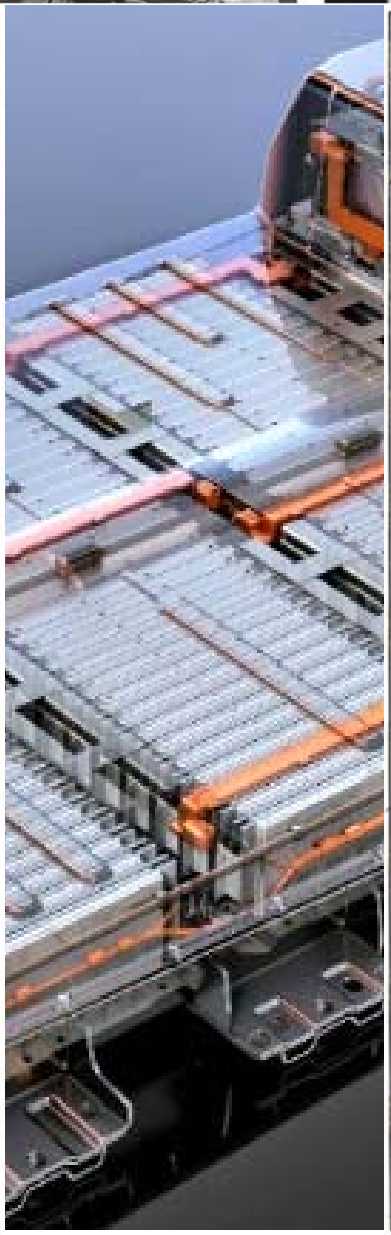
| | società | Stato | Gigawattora 2018 |
|---|---|---|---|
| 1 | CATL | Cina | 12,0 |
| 2 | Panasonic | Giappone | 10,0 |
| 3 | Byd | Cina | 7,2 |
| 4 | OptimumNano Energy | Cina | 5,5 |
| 5 | LG Chemical | Sud Corea | 4,5 |
| 6 | Guoxuan High-Tech | Cina | 3,2 |
| 7 | Samsung SDI | Sud Corea | 2,8 |
| 8 | Beijing National Battery | Cina | 1,9 |
| 9 | Shenzhen BAK Battery | Cina | 1,6 |
| 10 | Funeng Technology | Cina-USA | 1,3 |



## I numeri

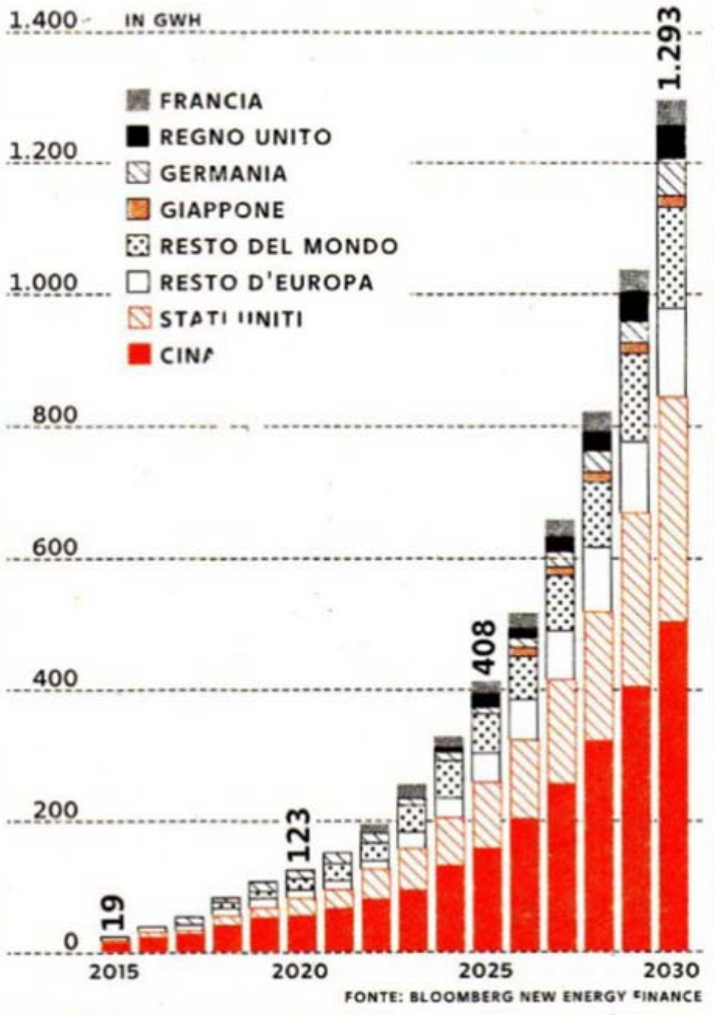
### IL PREZZO DELLE BATTERIE



## I numeri

### LA DOMANDA MONDIALE DI BATTERIE A IONI DI LITIO

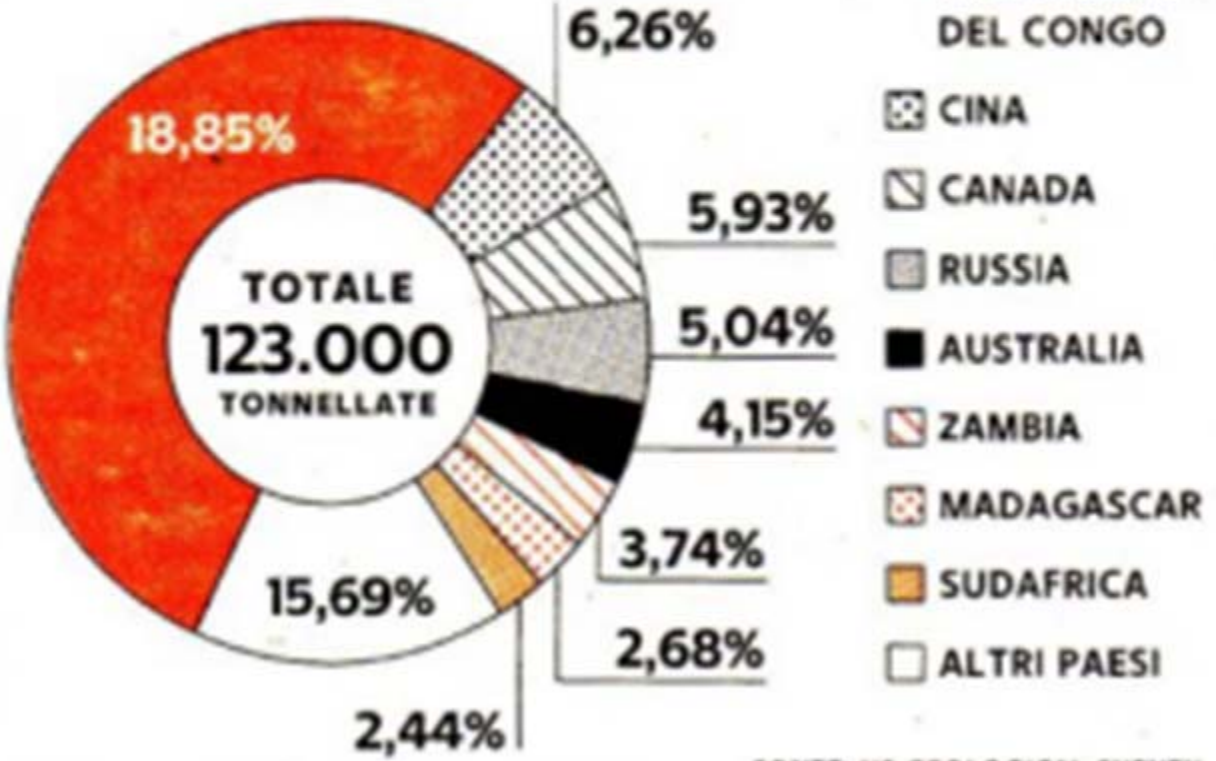




## I numeri

### L'ESTRAZIONE DI COBALTO NEL MONDO

QUOTE DI PRODUZIONE 2016



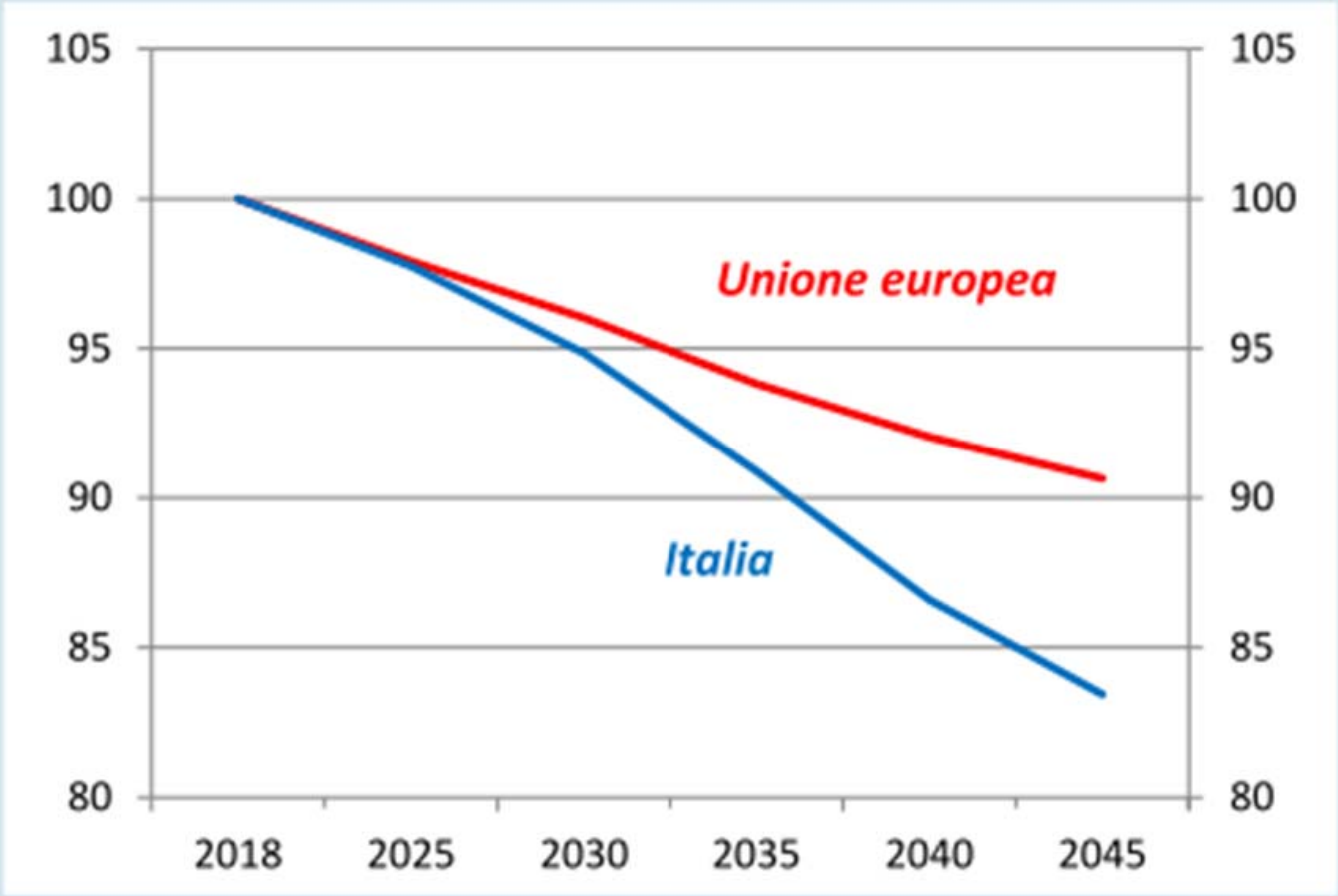

FONTE: US GEOLOGICAL SURVEY

Miniera di cobalto in Congo



## Popolazione di età compresa tra 20 e 64 anni: proiezioni

*(indici, 2018=100)*




Fonte: elaborazioni su dati Eurostat.






**A voi: contributi , domande, questioni.**