Low carbon transportation

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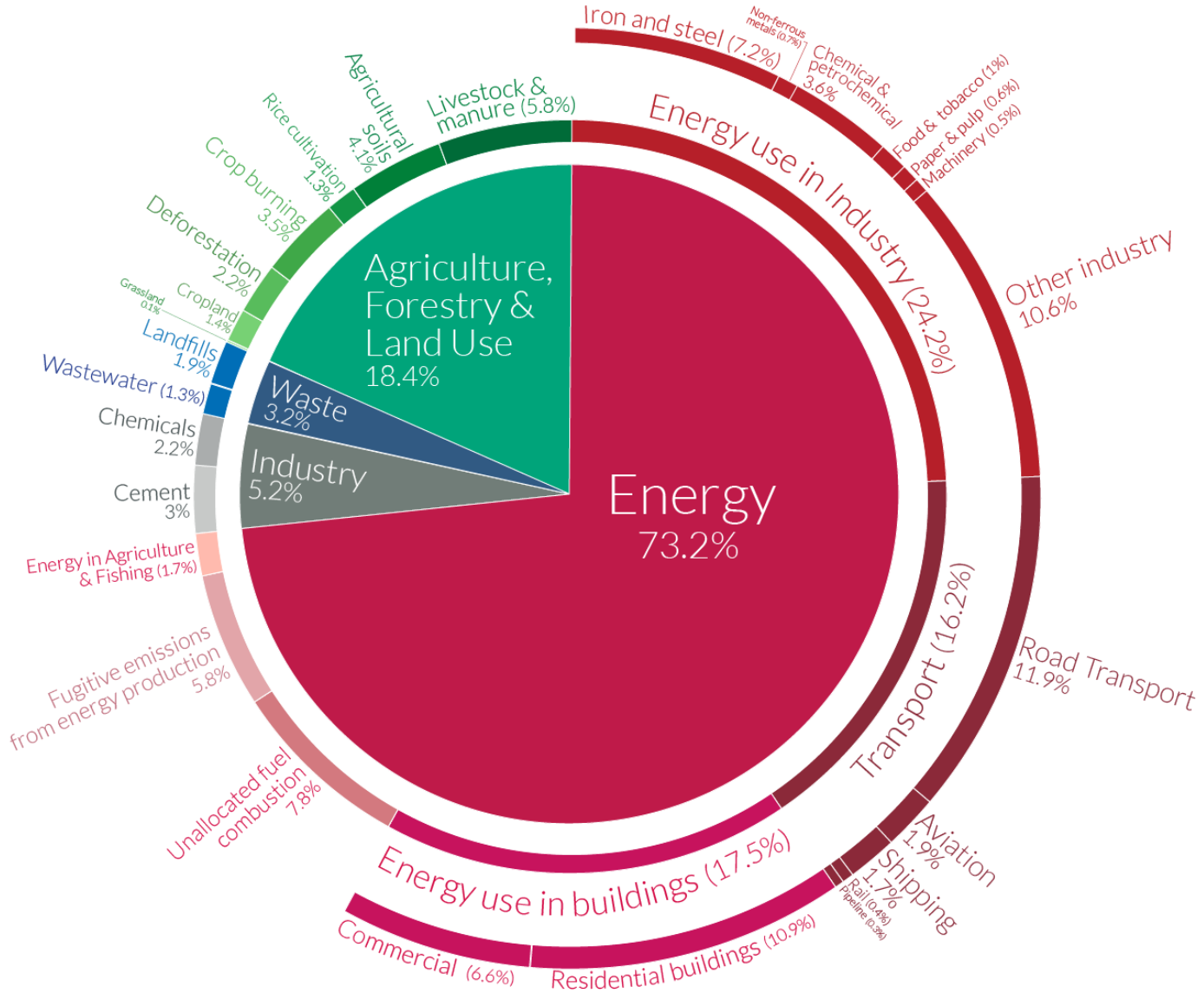
Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

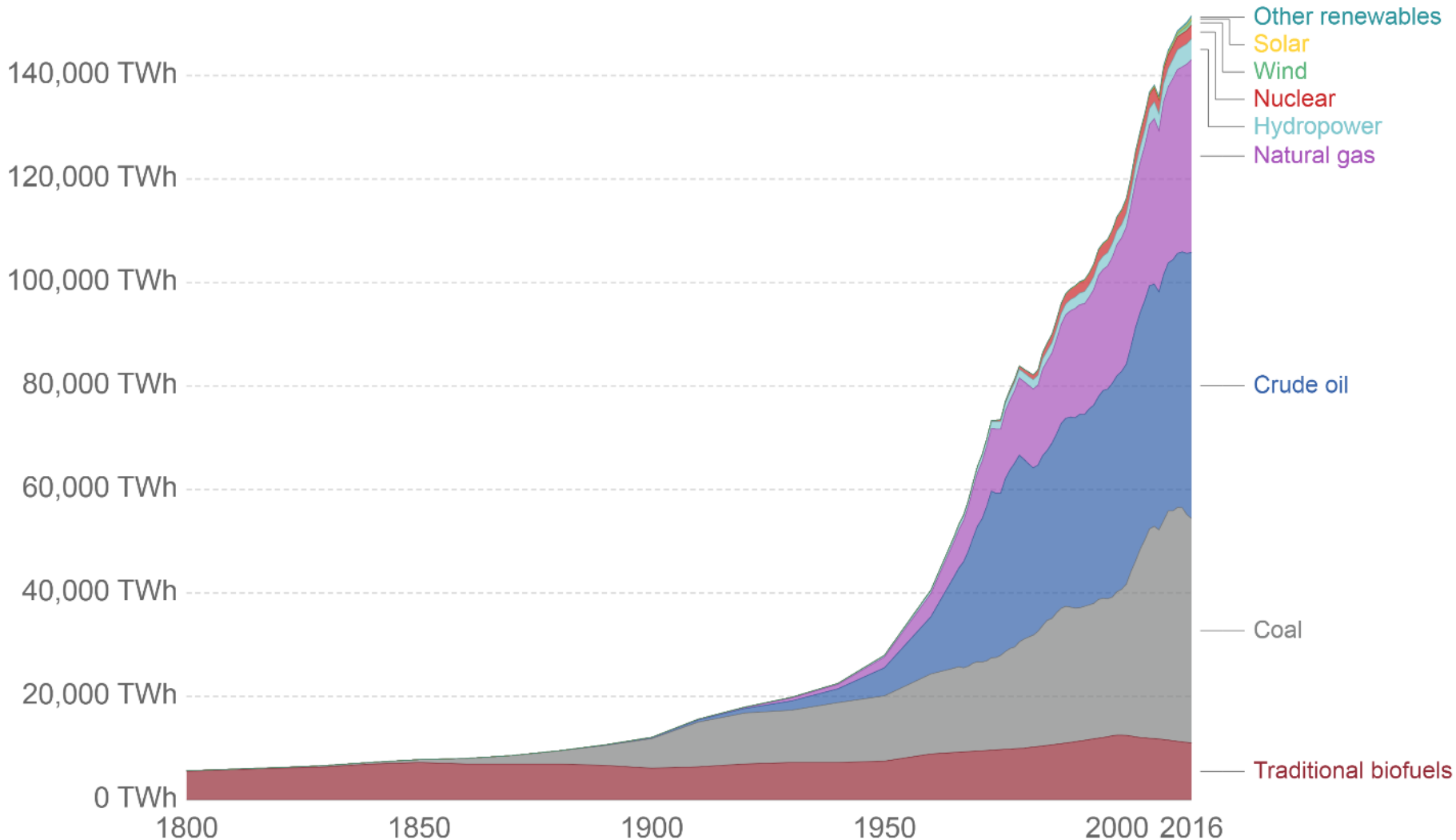
Our World in Data



Global Primary Energy Consumption, World

Global primary energy consumption, measured in terawatt-hours (TWh) per year. Here 'other renewables' are renewable technologies not including solar, wind, hydropower and traditional biofuels.

Our World in Data

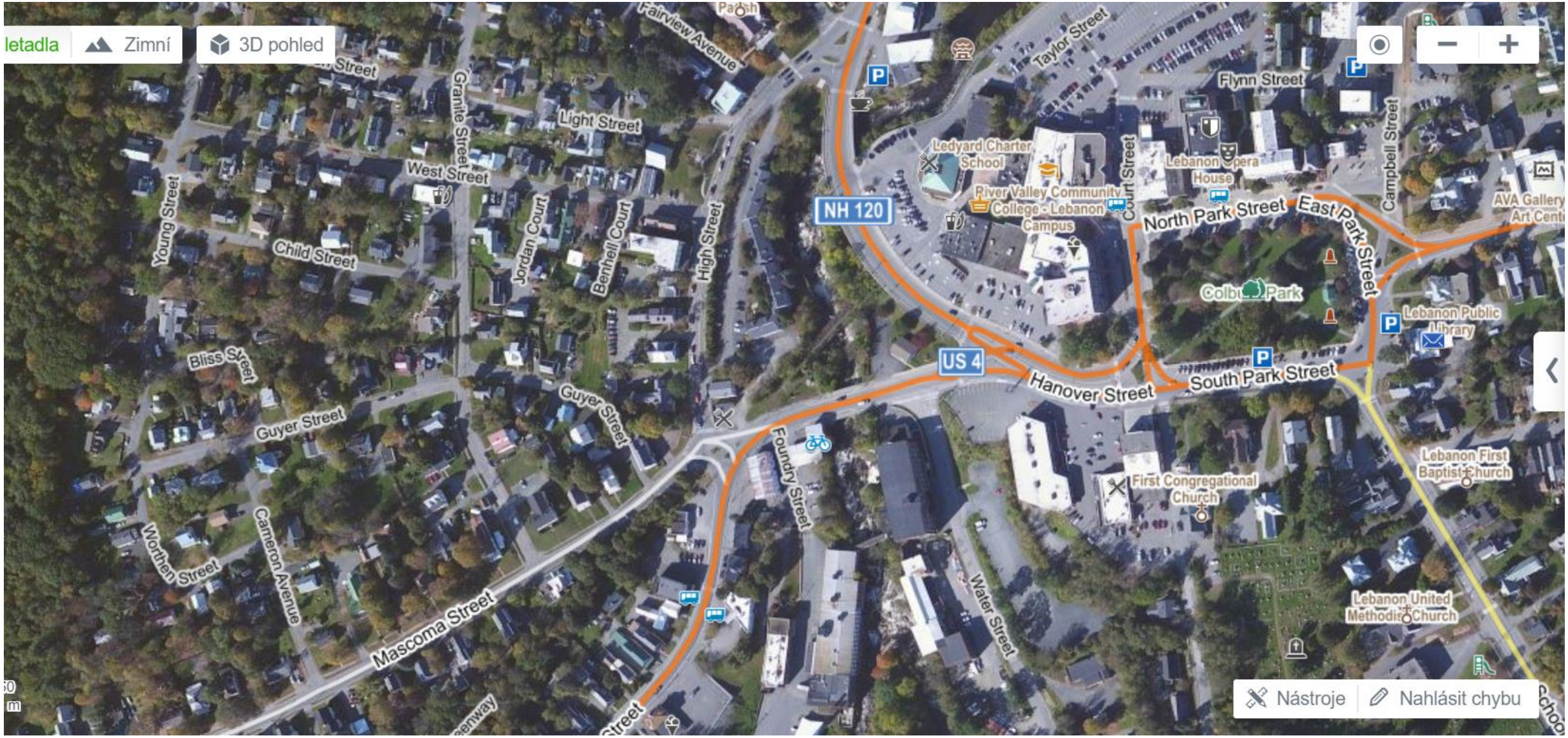


Source: Vaclav Smil (2017) and BP Statistical Review of World Energy

Decarbonization pathways

- Reduction of travel distances (urban planning).
- Increase of share of public transportation.
- Increase of energy efficiency of vehicles.
- Shift of road freight activity to rail and shipping.
- Change in public preferences.
- Use of low-carbon fuels.


Divadlo
Reduta
Restaurace Špalíček


letadla
Zimní
3D pohled
Fairview Avenue
Granite Street
Light Street
West Street
Young Street
Child Street
Jordan Court
Benhell Court
High Street
Taylor Street
Flynn Street
Campbell Street
Ledyard Charter School
River Valley Community College - Lebanon Campus
Court Street
Lebanon Opera House
NH 120
North Park Street
East Park Street
Colbu Park
Lebanon Public Library
US 4
Hanover Street
South Park Street
Bliss Street
Guyer Street
Foundry Street
First Congregational Church
Lebanon First Baptist Church
Worthen Street
Cameron Avenue
Mascoma Street
Water Street
Lebanon United Methodist Church
Nástroje
Nahlásit chybu


195 S Main St
Lebanon, New Hampshire
Google
Street View – čvc 2019
KFC
TACO BELL
S Main St
J. Maxx
Market St
L.L.Bean
Glen Rd
Google
Pořízení obrázku: čvc 2019
© 2022 Google
Spojené státy
Smluvní podmínky
Ochrana soukromí
Nahlásit problém

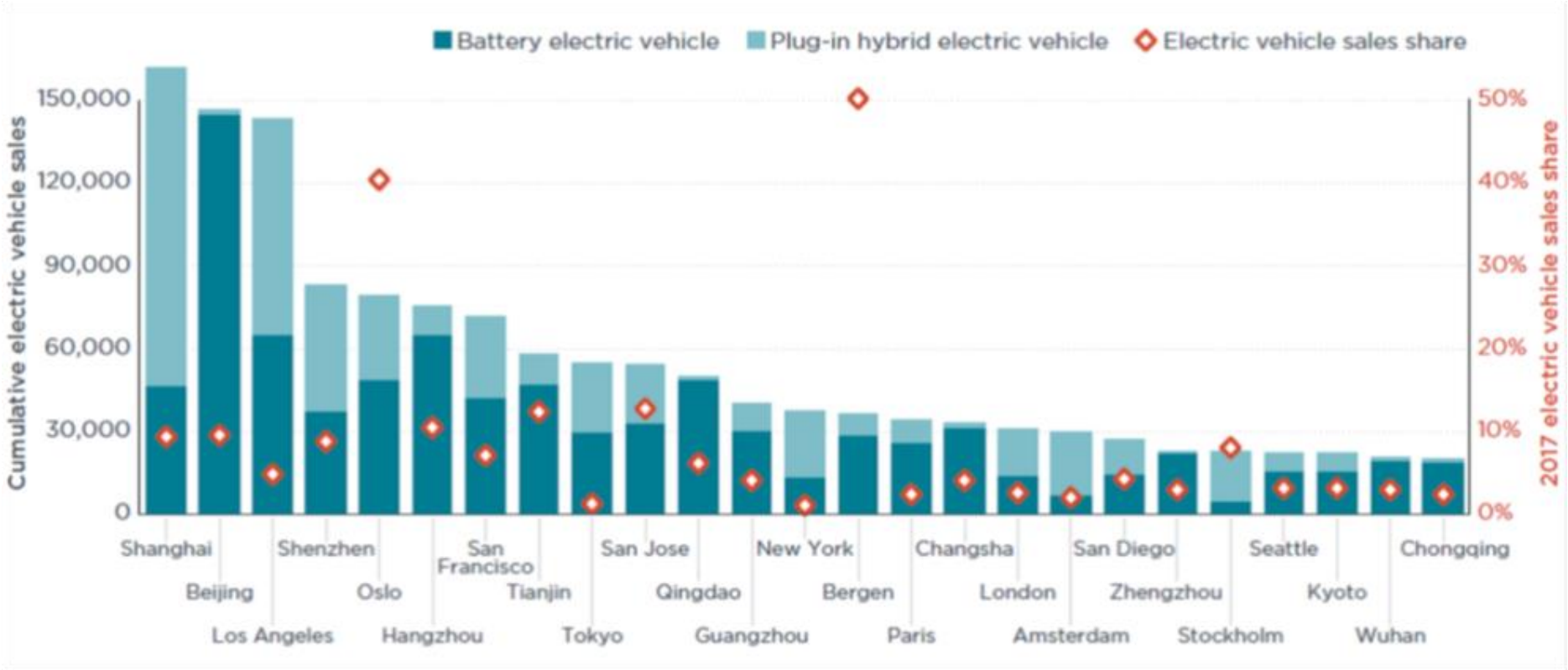
Billings Farm Road
Christian Street
Christian Street
Hartford Avenue
Woodhaven Drive
Kacey Drive
Dohan Brook
Hazen Trail
Backwater
Hartford
Nástroje
Nahlásit chybu

EV cars – development

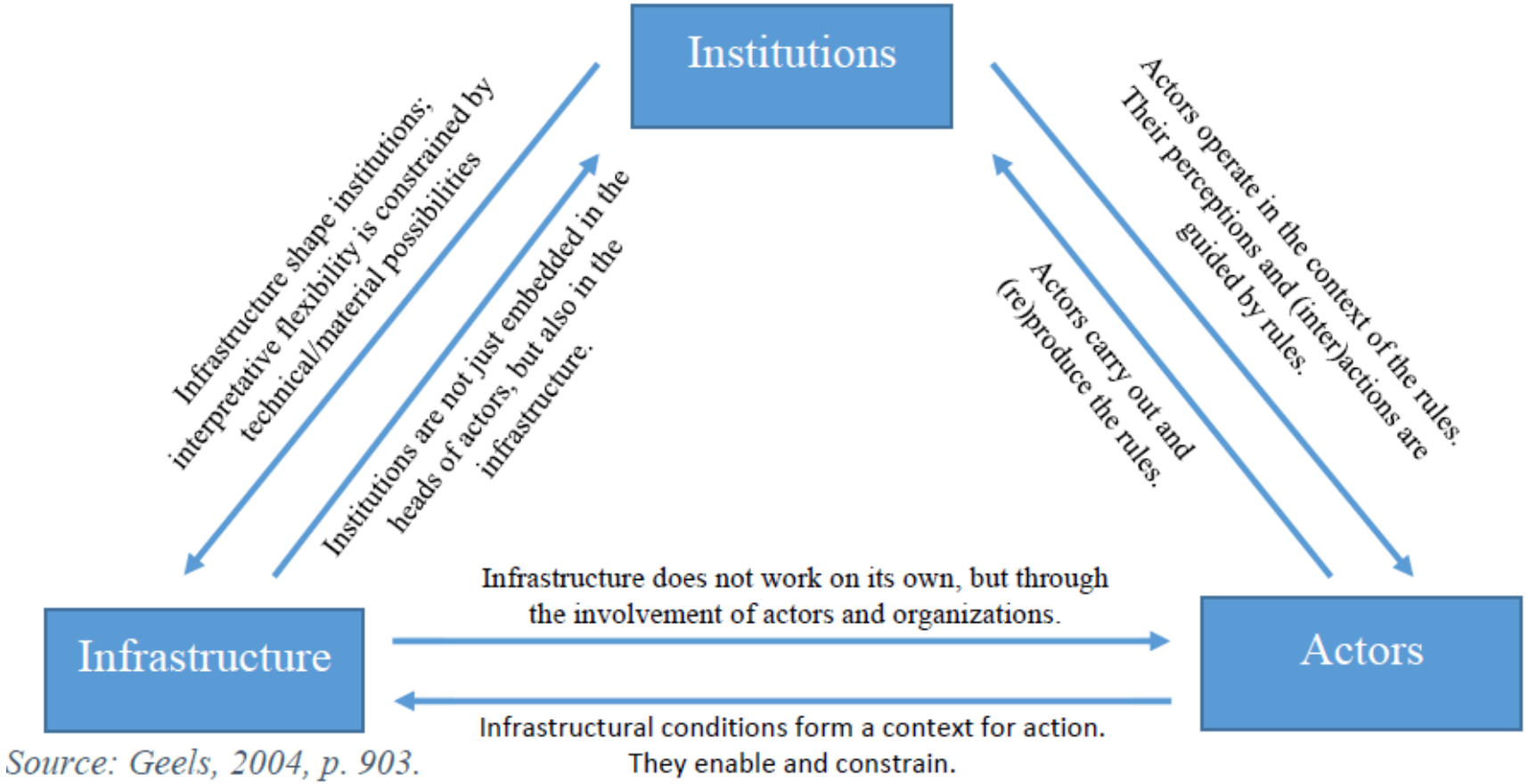
- A total of 14% of all new cars sold were electric in 2022, up from around 9% in 2021 and less than 5% in 2020.
- China accounting for around 60% of global EV car sales.
- 35% yoy sales increase expected in 2023.
- Emerging EV market in India, Thailand, Indonesia.
- Two or three-wheelers are the most electrified market segment today.
- By 2025, under current policies, road transport oil demand is expected to peak, with electric vehicles displacing over 5 million barrels per day by 2030.
- Major markets continue to issue supporting legislation.

EV in cities

- 25 world cities accounting for 44% of global EV shales.
- By 2050 nearly 70% of the world´s population concentrated in cities.



Social components of the systems



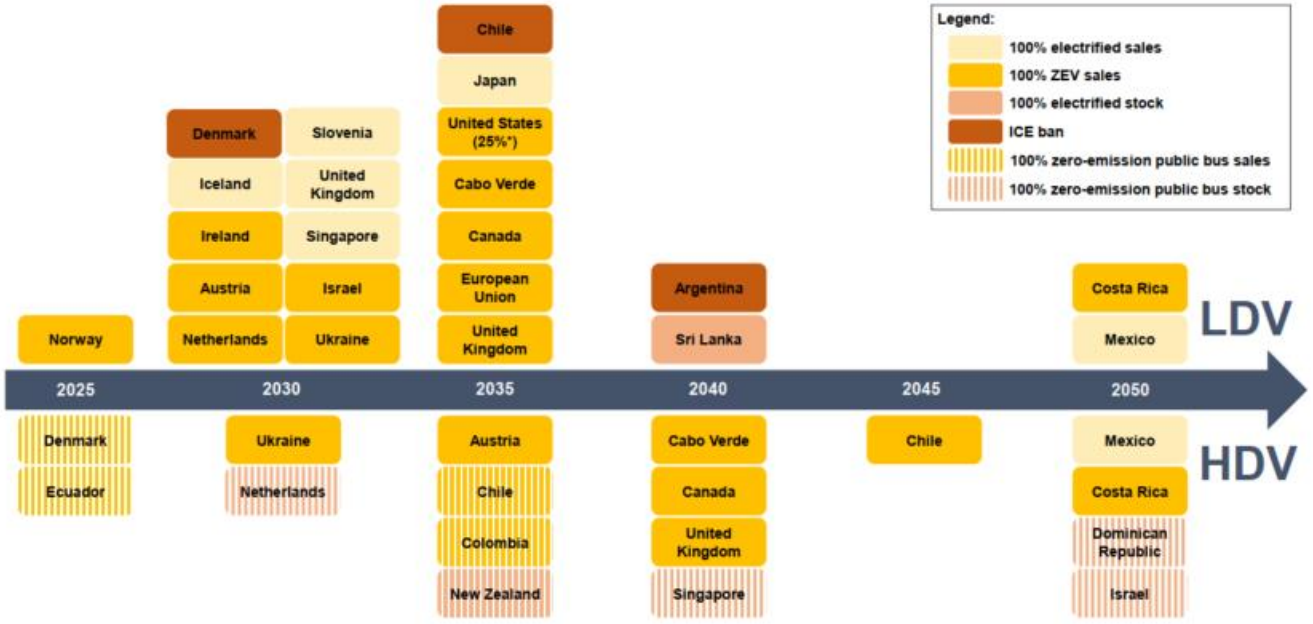
Source: Geels, 2004, p. 903.

Actors - governments

- The ability of institutional policy to override market forces.
- Government intervention can eliminate market uncertainty regarding the direction of technological development through policies (RES, EVs).
- Political inertia, driven by the fear of disruptive consequences, arises from the often tumultuous nature of changes => the rarity of major shifts in policy regimes (significant role of ideology).

Actors - governments

Figure 2.2. Global zero-emission vehicle mandates and internal combustion engine bans



* Refers to the share of passenger light-duty vehicle sales accounted for by Advanced Clean Cars II (ACC II) signatories or proposed signatories.

Notes: ICE = internal combustion engine; ZEV = zero-emission vehicle; "electrified" includes hybrid electric vehicles (HEVs) in addition to electric vehicles (EVs) and fuel cell electric vehicles. European Union countries with LDV targets earlier than the EU 2035 target are included separately. Only countries that have legislated or proposed an ICE ban or 100% electrification target have been included. The proposed EU heavy-duty vehicle CO_2 standards include a 100% emission reduction target only for urban buses, and are thus not included in the chart. The Global Memorandum of Understanding (MoU) on Zero-Emission Medium- and Heavy-Duty Vehicles is a pledge and is therefore also not included.

Source: IEA analysis based on announced policies; see the Global EV Policy Explorer for further details.

Actors - companies

- Newcomers, challenging the system, vs. status quo actors, defending it (and their positions within).
- Protected niches challenging the regime.

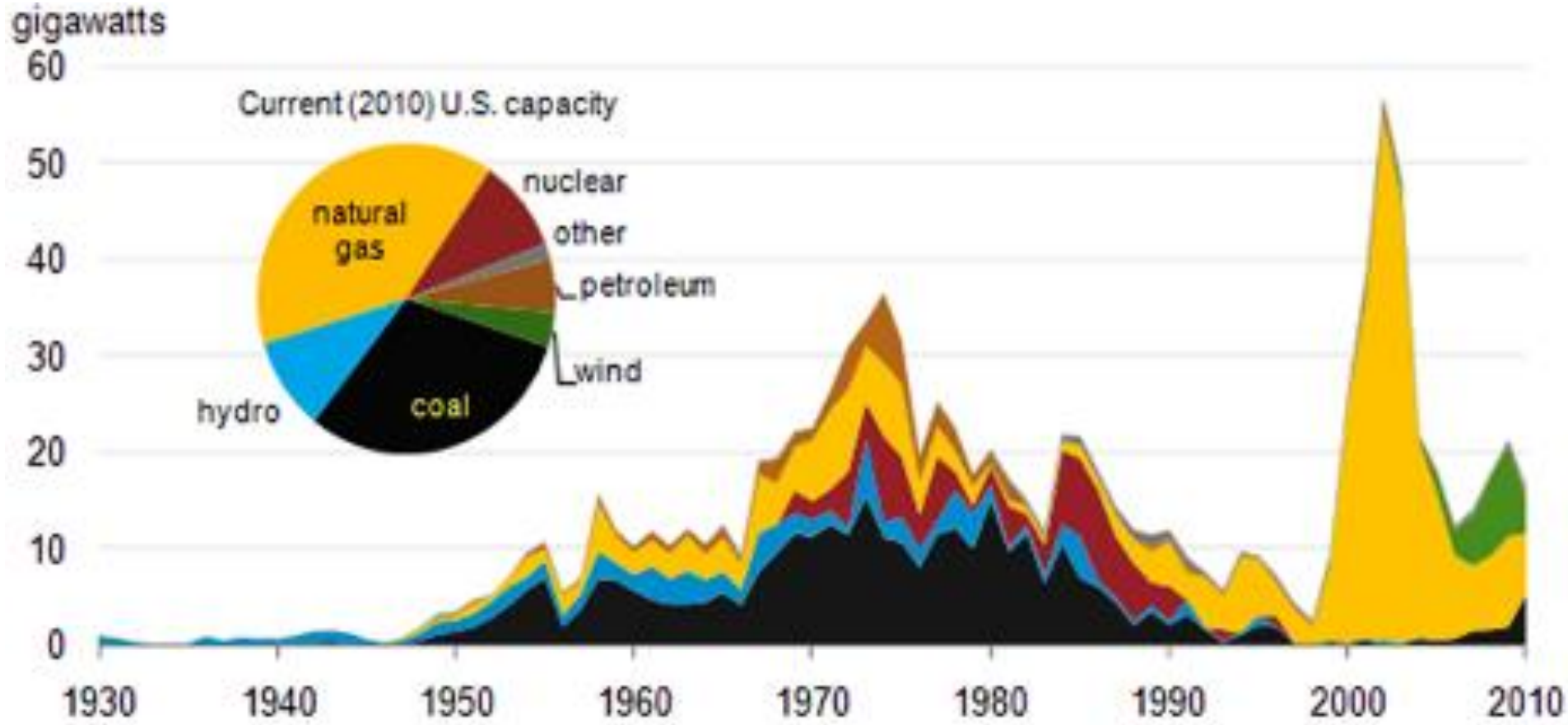
Flow of money – impact on the national level

- In the US, automakers and suppliers, comprising 3% of GDP, are major job providers with exports exceeding USD 692 billion.
- The EU sees 6.1% of total employment (13.3 million workers) and a EUR 90.3 billion trade surplus.
- In Japan, it constitutes 8.7% of the workforce, and in South Korea, it contributes 7% to GDP.

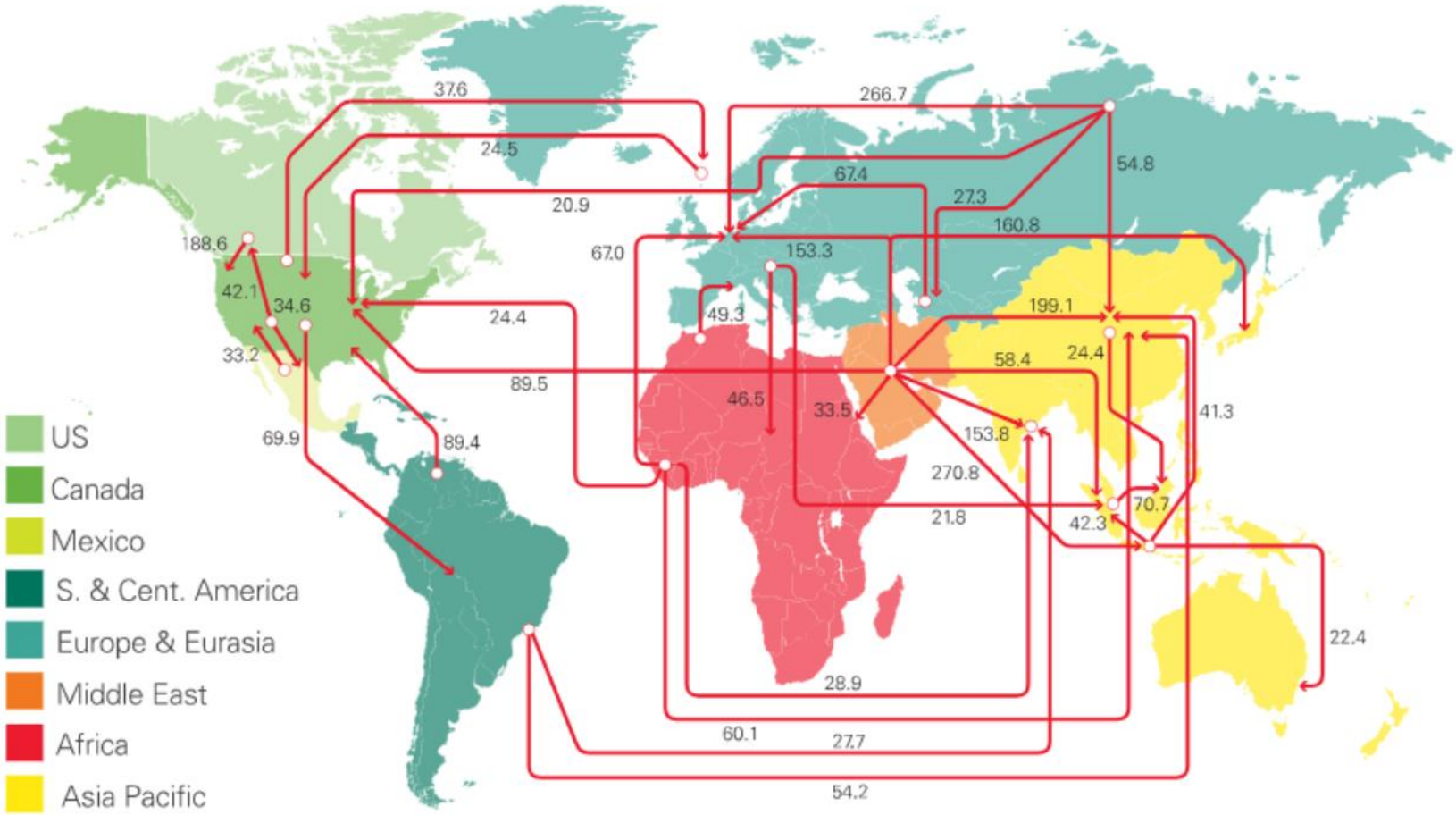
- Significant redistribution of opportunities and wealth?

Infrastructure

Cost of durable capital



Oil major trade movements 2016 (million tonnes)



Institutions and their role in the system

- Path dependence in institutions: superior technological variants don't always prevail in dominant design frameworks.
- Established designs can become locked-in due to path dependence.
- Institutions, whether formal (legal structures) or informal (culture, norms), persist once established.

Societal lock-in transportation

- Customers are not fully rational, cost and time-driven actors.
- (Unrealistic) expectation that automobile culture will be replaced by any means to get somewhere at an affordable costs.
- Cars are more than just a means to an end; they embody identity, conspicuous consumption, privacy (encapsulating cocooning and fortressing), and are seen as symbols of adulthood, skill, and potential hobbies.
- Beyond mere utility, cars confer status and emotional resonance, linked to speed, security, safety, sexuality, career success, and the notion of freedom—they represent not just necessities, but desires.

Concluding remarks

- The strong role of inertia and unwillingness to change.
- From an environmental point of view, EVs may be a tool to save the car industry rather than the environment. (Rebound effect).
- EVs are (used to be) qualitatively inferior to ICE cars.
- Tipping point? (Multiple designs unlikely). Can we expect an acceleration of this transition?

Sources

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- OECD/IEA (2017): Technology Roadmap: Biofuels for Transport
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- McGee, P.(2017): Electric cars´ green image blackens beneath the bonnet.
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- Paoli, L.; Bennett, S.(2019): Evs should be getting cheaper. Instead they‘re getting bigger.
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