



Globaali energiahaaste ja hiiliviisaampi tulevaisuus

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1. Väestön lukumäärä jatkuvassa kasvussa...



Year	Population (Billion)
1990	5,3
2017	7,6
2030	8,6
2050	9,8
2100	11,2

Source: United Nations, World Population Prospects 2019 (Medium variant)

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2. Ihmiset haluavat omistaa ja kuluttaa yhä enemmän...



sti

Increase in global GDP

Trillion \$US PPP



2017 2040

Source: BP Energy Outlook, 2019 Edition

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3. Mitä korkeampi elintaso, sitä enemmän energiaa kuluu..



sti

Primary energy demand - fuel

Billion toe



Source: BP Energy Outlook, 2019 Edition

FOSSIL FUELS

How Much Do You Consume in a Lifetime?

We consume fossil fuels every day for transportation, heating, and manufacturing, but over a lifetime of 80 years how much does the average American consume?

199.3 tonnes (131.5 tons)

COAL



5.2m
17ft

Coal is primarily used to generate electricity, but it is also used to manufacture steel, cement, and other industrial materials.

236.8 tonnes (211 tons)

PETROLEUM PRODUCTS



6.7m
22ft

Along with automotive fuels, petroleum products are also used to manufacture pharmaceuticals, textiles, plastics, and wax.

192m³ (6,780 ft³)

NATURAL GAS



5.2m
17ft

The primary use for natural gas is heating and electricity generation, but it is also used as a raw material in the manufacturing of anhydrous ammonia fertilizer.

1.7m
5.6ft

AVG. PERSON

Methodology: To visualize the average American's fossil fuel consumption, we took petroleum product, coal, and natural gas per capita data and multiplied it by 80 to calculate a lifetime consumption figure. The natural gas figure was already in cubic meters, however the figures for coal and petroleum were still weight figures. Using the density of these materials (1.33kg per bulk tonne) and the density for petroleum products and the weight of a lifetime's worth of consumption we calculated the total volume the materials would make up.

ELEMENTS 2 Source: National Mining Association, Worldometer ELEMENTS.VISUALCAPITALIST.COM

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Mihin olemme menossa yhteiskuntana

VS.

Mihin meidän pitäisi olla menossa...

ILLUSTRATIVE PATHWAY OF GLOBAL NET CO₂ EMISSIONS LIMITING GLOBAL WARMING TO 1.5 °C

Source: Global Carbon budget 2019, IATA SSP Database, SSP2-19 and SSP2-baseline scenarios

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Kestävä hiilikierto vaatii valtavia investointeja

HIILIVELKA
200–300 MRD. TONNI

HIILIOKSIDIPÄÄSTÖJEN VÄHENTÄMINEN

ENERGIA TEHOKKUUS

UUSIUTUVA ENERGIA

HIILEN SITOMINEN

CO₂ TALTEENOTTO

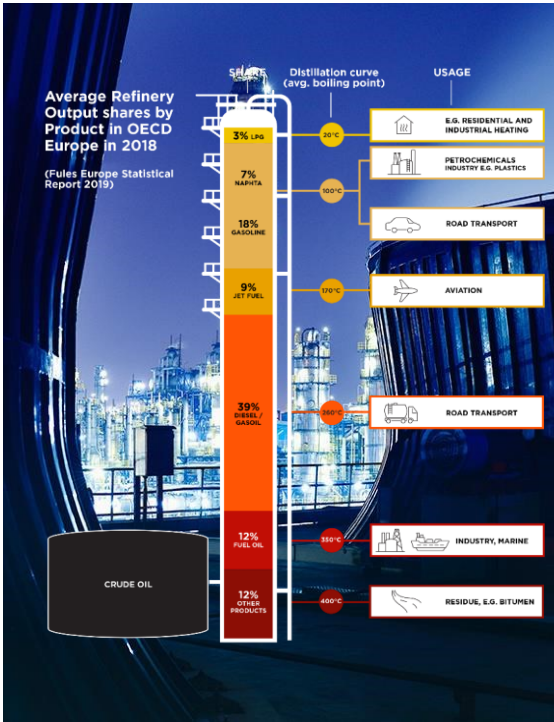
HIILINIELUT

CARBON UTILIZATION (CCU) POWER-TO-X

CARBON STORAGE (CCS)

Keeping fossil reserves under ground

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Kohti hiilisiempaa tulevaisuutta. Haaste josta ei puhuta tarpeeksi.

Raakaöljyn tisluskäyrä



Yhden öljytuotteen kysyntään vastaaminen tuottaa myös muita lopputuotteita.

Esim. Lentoliikenteeseen povataan jatkuvaa kasvua.

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