

# Globaalit energiatrendit ja niiden vaikutukset Suomen energiapolitiikkaan ja kilpailukykyyn

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# Globaali energiahaaste:

1. Energian kysyntä jatkaa kasvua
  - Väestönkasvu
  - BKT:n kasvu
2. Kasvava energian kulutus lisää CO<sub>2</sub>-päästöjä ja kiihdyttää ilmastonmuutosta
  - Miten hallitaan suuri murros
  - Siirtyminen uusiutuviin energiamuotoihin

# THE ENERGY CHALLENGE: Demand will rise



9.5 billion people,  
75% living in  
cities in 50 years  
time  
  
(2.5 billion more  
than today)



Hundreds of  
millions of people  
will rise out of  
poverty;  
with higher living  
standards energy  
use rises



Energy demand  
could be 80%  
more over the  
next 50-60 years  
..  
.. while CO<sub>2</sub>  
emissions must  
be a quarter of  
today's to avoid  
serious climate  
change



Over 2 billion  
vehicles  
  
(800 million at the  
moment)



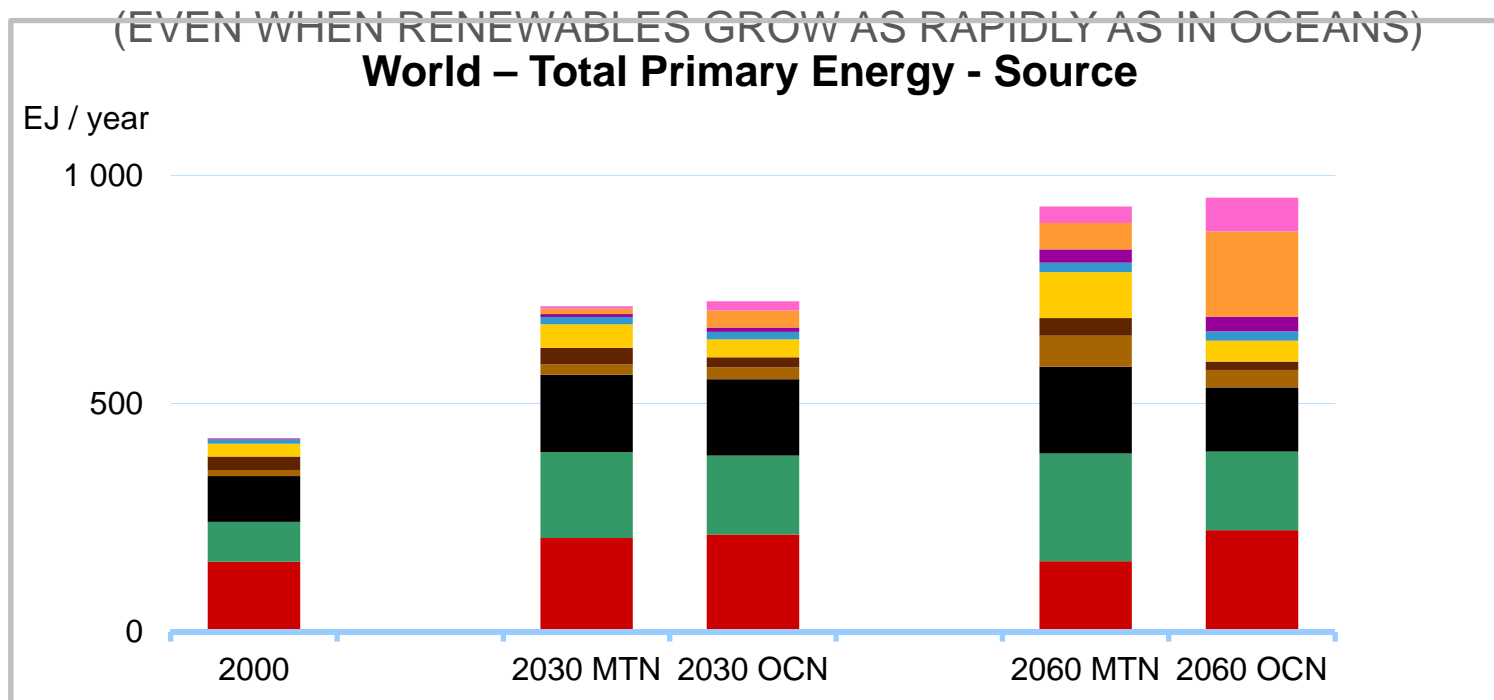
Twice as efficient,  
using half the  
energy to produce  
each dollar of  
wealth



Up to 4 times  
more energy from  
renewable  
sources by 2060

# ENERGY TRENDS: The world will need ALL energy sources ..

IN SHELL'S SCENARIOS (MOUNTAINS AND OCEANS)  
TO MEET GROWING DEMAND... HYDROCARBONS ARE THERE TO STAY

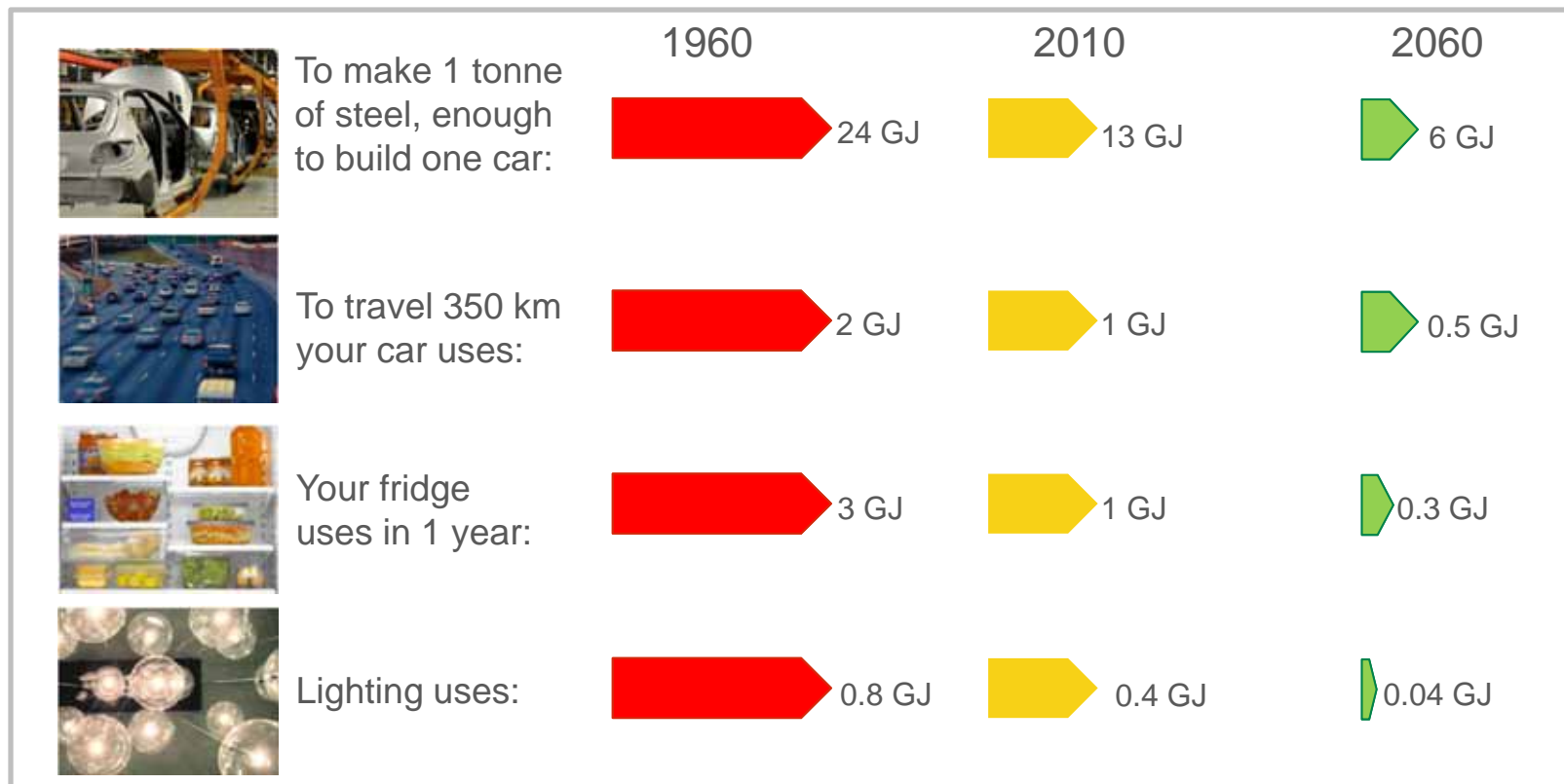


- Oil + Biofuels
- Coal
- Gas
- Nuclear
- Commercial Biomass/Waste
- Traditional Biomass
- Hydro
- Geothermal
- Wind
- Solar

# ENERGY TRENDS: Energy efficiency improvements are a MUST

IN THESE SECTORS, EFFICIENCY HAS DOUBLED OVER THE LAST 50 YEARS AND COULD DOUBLE AGAIN OVER THE NEXT 50 YEARS

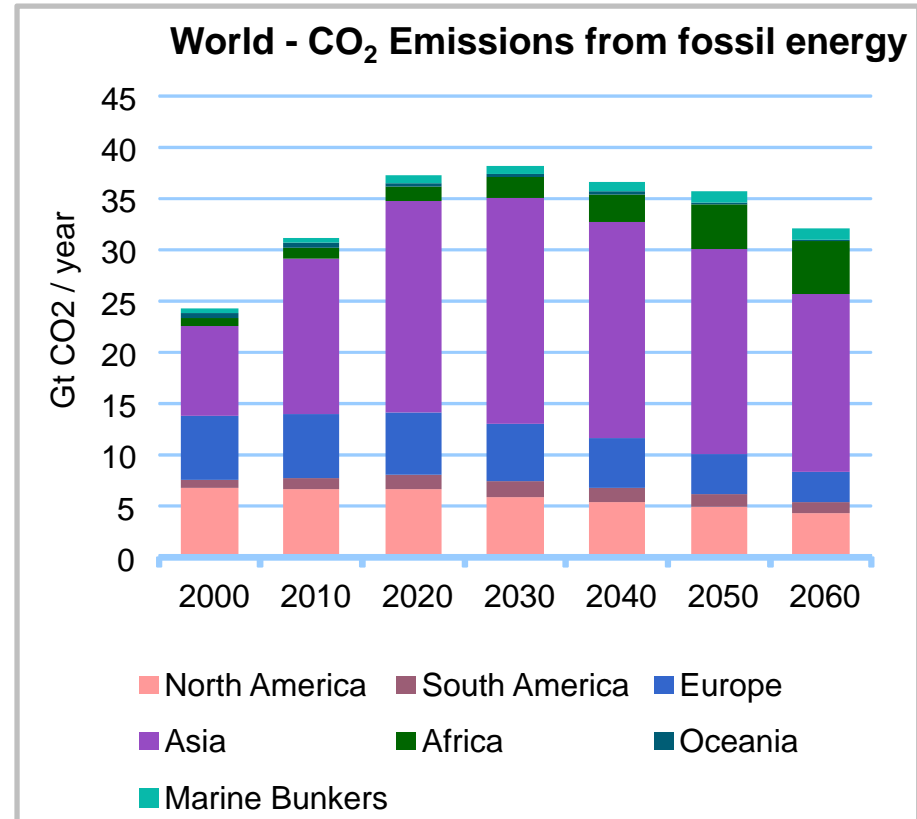
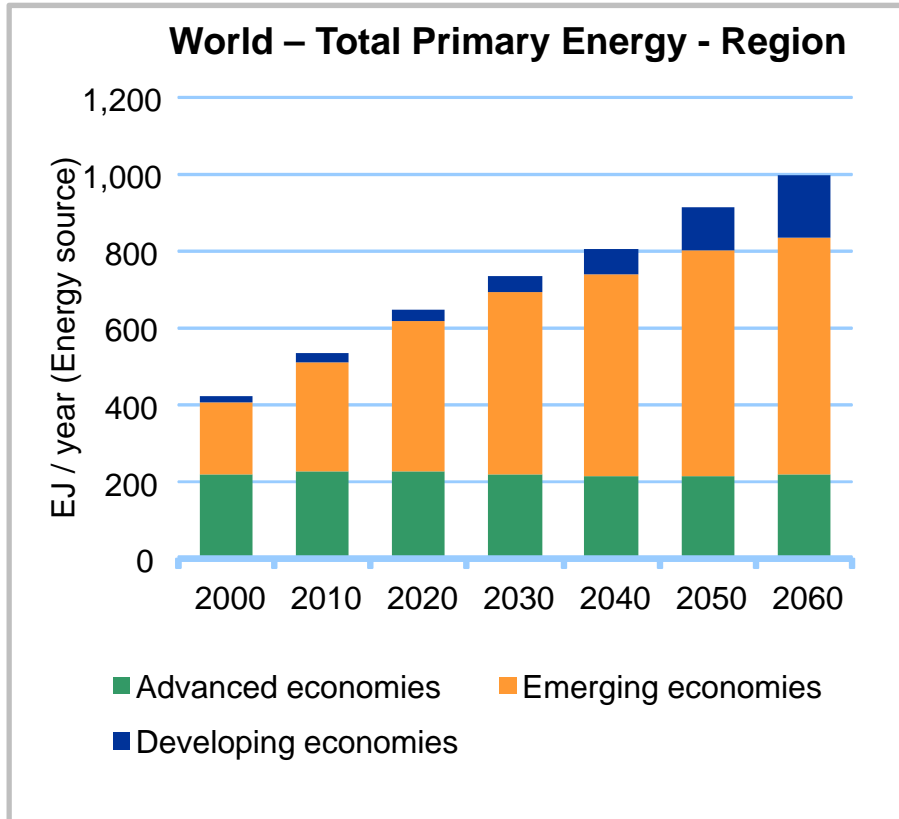
BUT EVEN THEN.. ALL FORMS OF ENERGY WILL BE REQUIRED



# ENERGY TRENDS: with growing DEMAND .. ..CO2

## EMISSIONS RISE

### ASIA DRIVES ENERGY DEMAND .. AND .. EMISSIONS

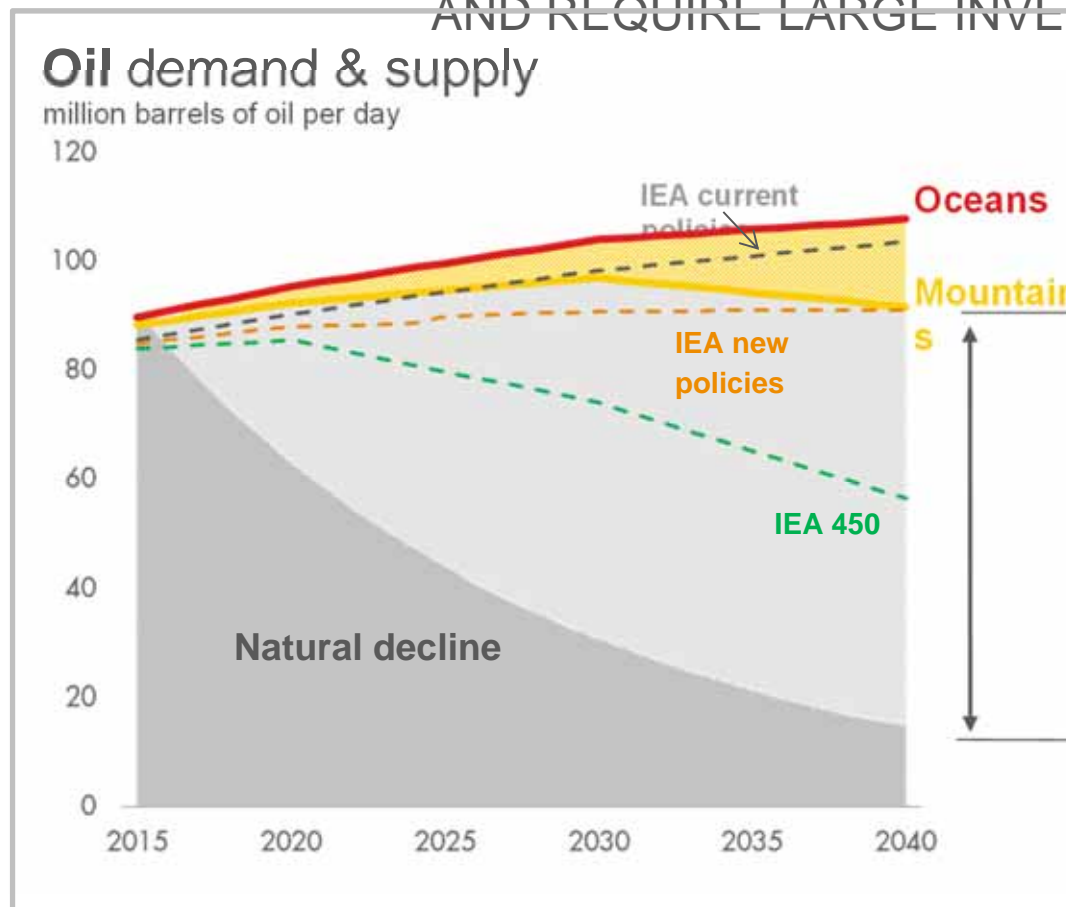


- **Moderation of global CO2 emissions requires:**  
**Energy efficiency, growth in natural gas at the expense of coal, global deployment of renewables and CCS.**

# ENERGY TRENDS: Hydrocarbons need replacement in time

## NATURAL DECLINE OF OIL AND GAS PRODUCTION DRIVES NEW SUPPLY

THIS WILL UNDERPIN GAS AND OIL PRICES IN THE LONG RUN AND REQUIRE LARGE INVESTMENT LEVELS



- Substantial supply gap
- 70 million barrels per day
- 80% replacement of today's production
- Equivalent to ~6 x Saudi Arabia or ~80 x UK Continental Shelf
- ~\$15 trillion investment

# Ilmastopolitiikan tulokset vaatimattomia

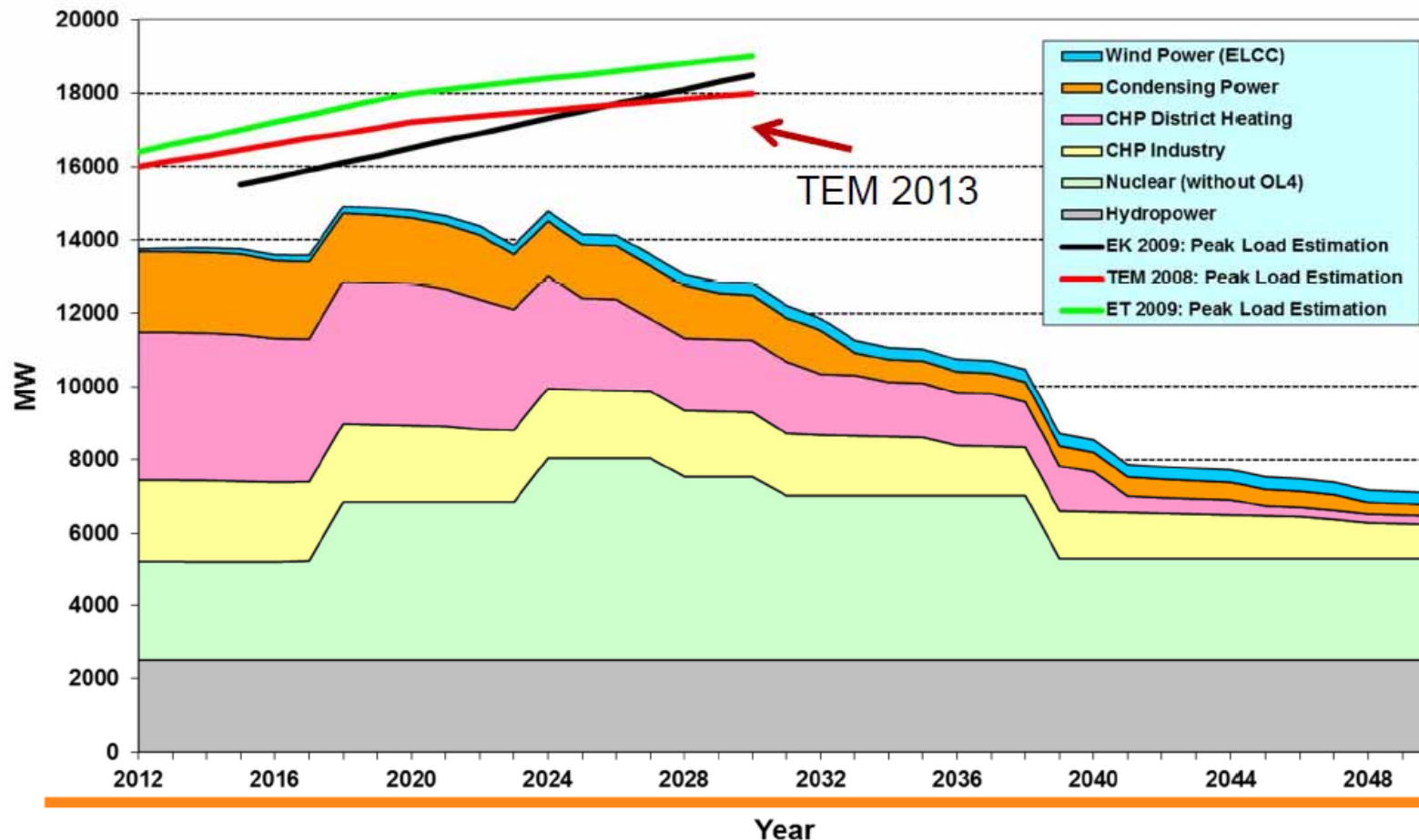
➤ Toimenpiteitä vahvistettava

1. Tukiaispolitiikka remonttiin
2. Energiatehokkuus prioriteetiksi
3. Kaasu korvaamaan hiili
4. CCS, teknologiatuki
5. Kv. sopimus: hiilelle hinta,  
hiilivero; cap-and trade

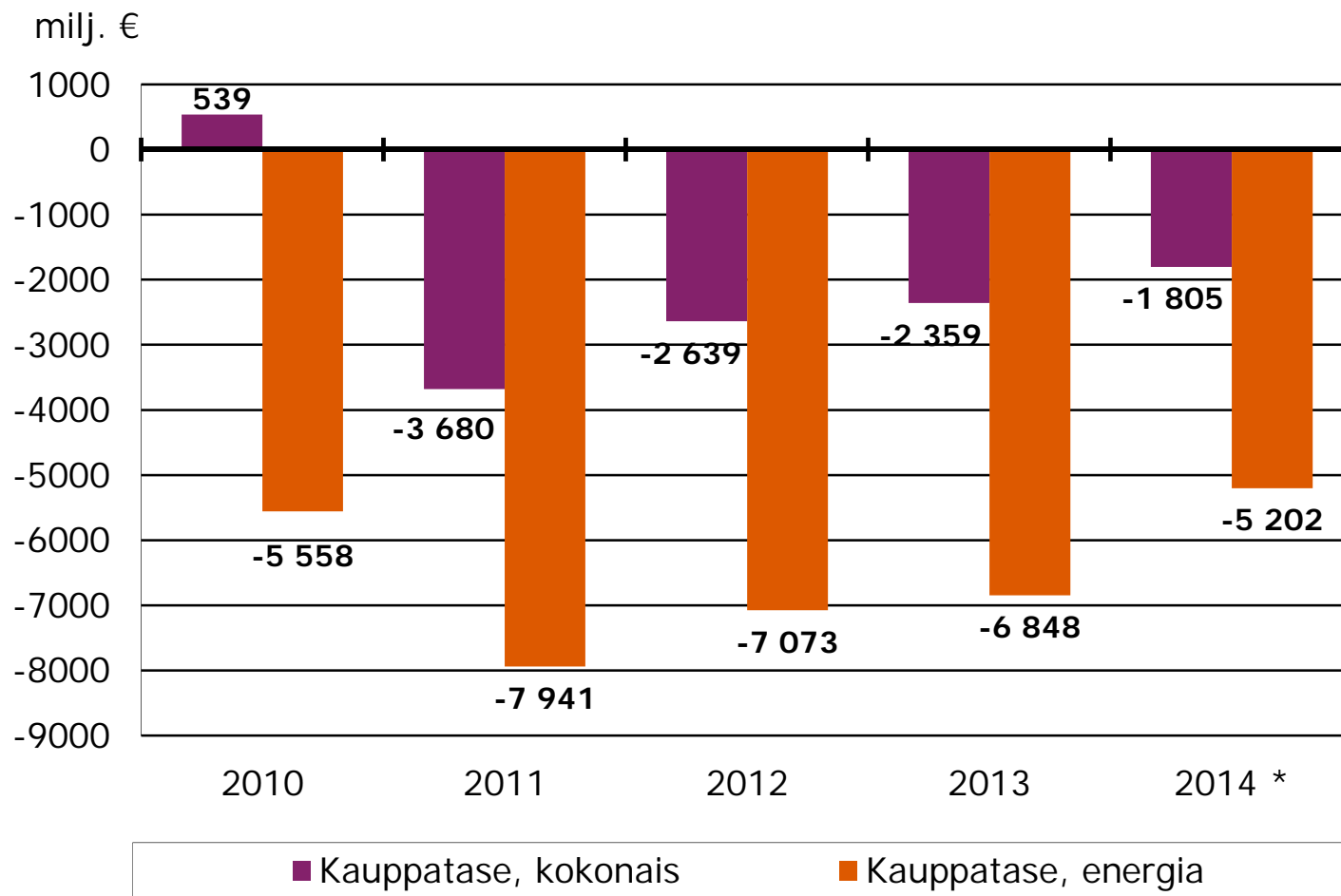
COP21 Pariisi



## Sähköntuotantokapasiteetin kehitys vs. huippukulutus Suomessa, tilannearvio 2014, Fennovoima mukana, OL4 ei



# Suomen kauppatase ja energian kauppatase



- Energian tuonnin arvo n. 20 % kokonaistuonnin arvosta
- Energian viennin arvo n. 10 % kokonaisviennin arvosta
- \* ennakko

KIITOS