8. TARGET SCENARIO

Emission should be less than 18 GtCO2 by 2050 (1.8 t/capita)

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Ekoenergo Oy

2019

Based on the Book:
"Fundamentals of Global Warming"

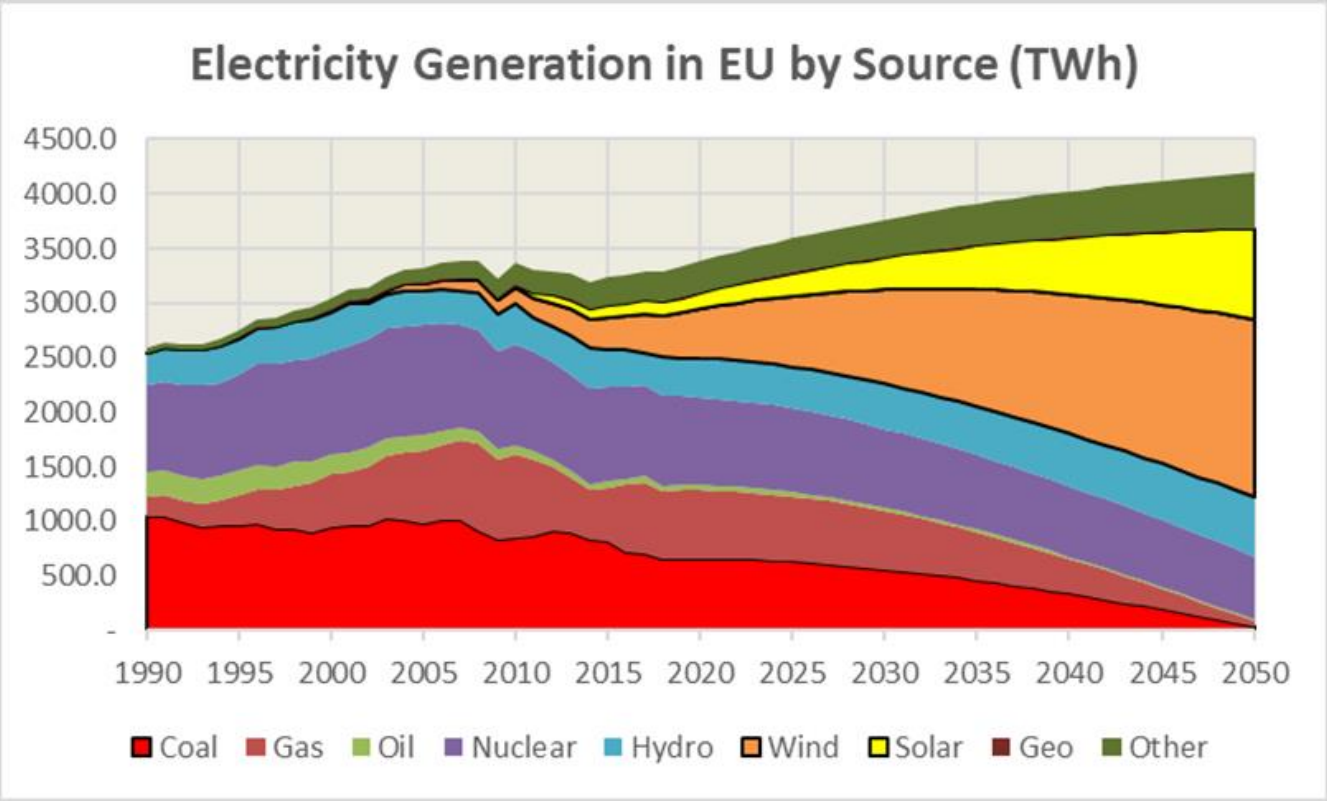
Presentation Slides about Global Warming

1. Global Warming 1901-2018
2. Influence of the Sun
3. CO2 Emissions and Concentration
4. Forecasting Global Warming
5. Seawater and Ice Conditions
6. Milankovich Cycles
7. Action Plans
8. Target Scenario 2050

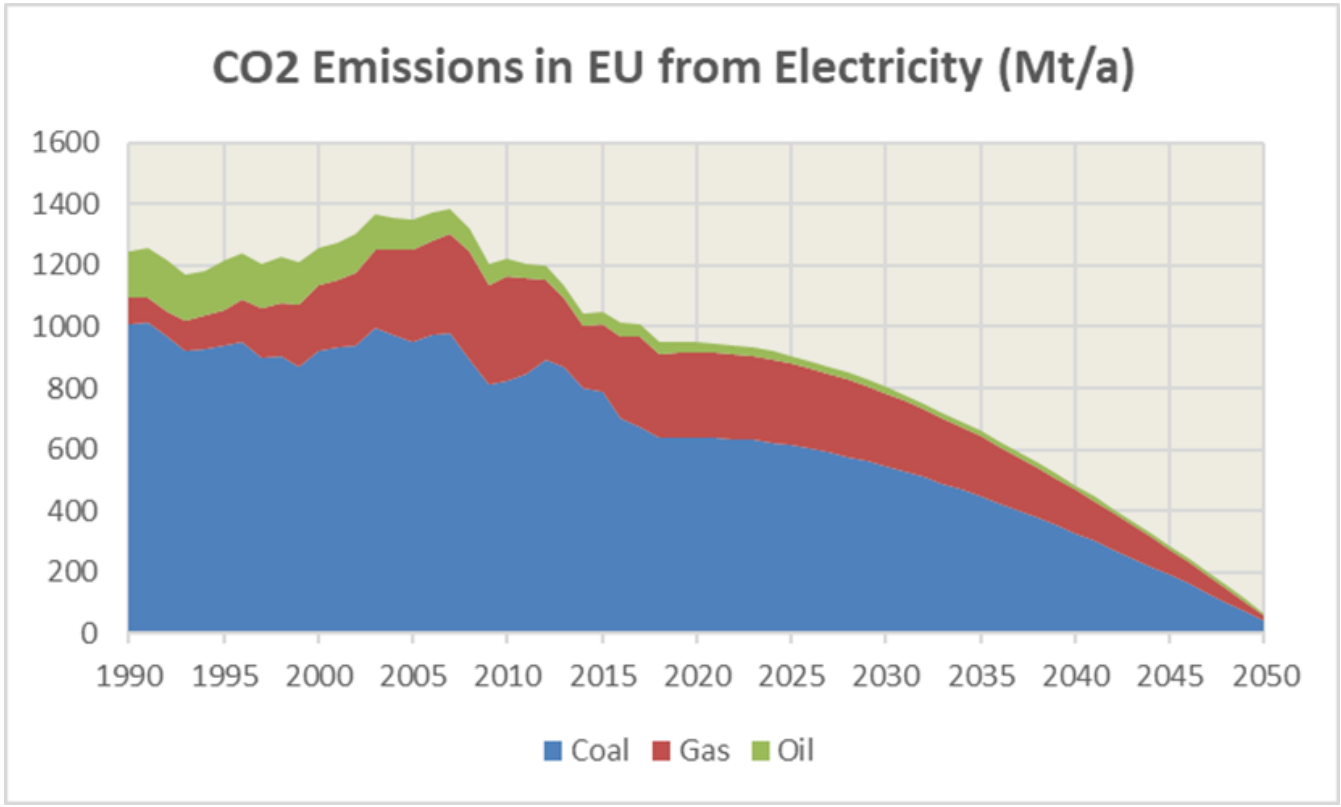
Contents

I. EUROPEAN UNION

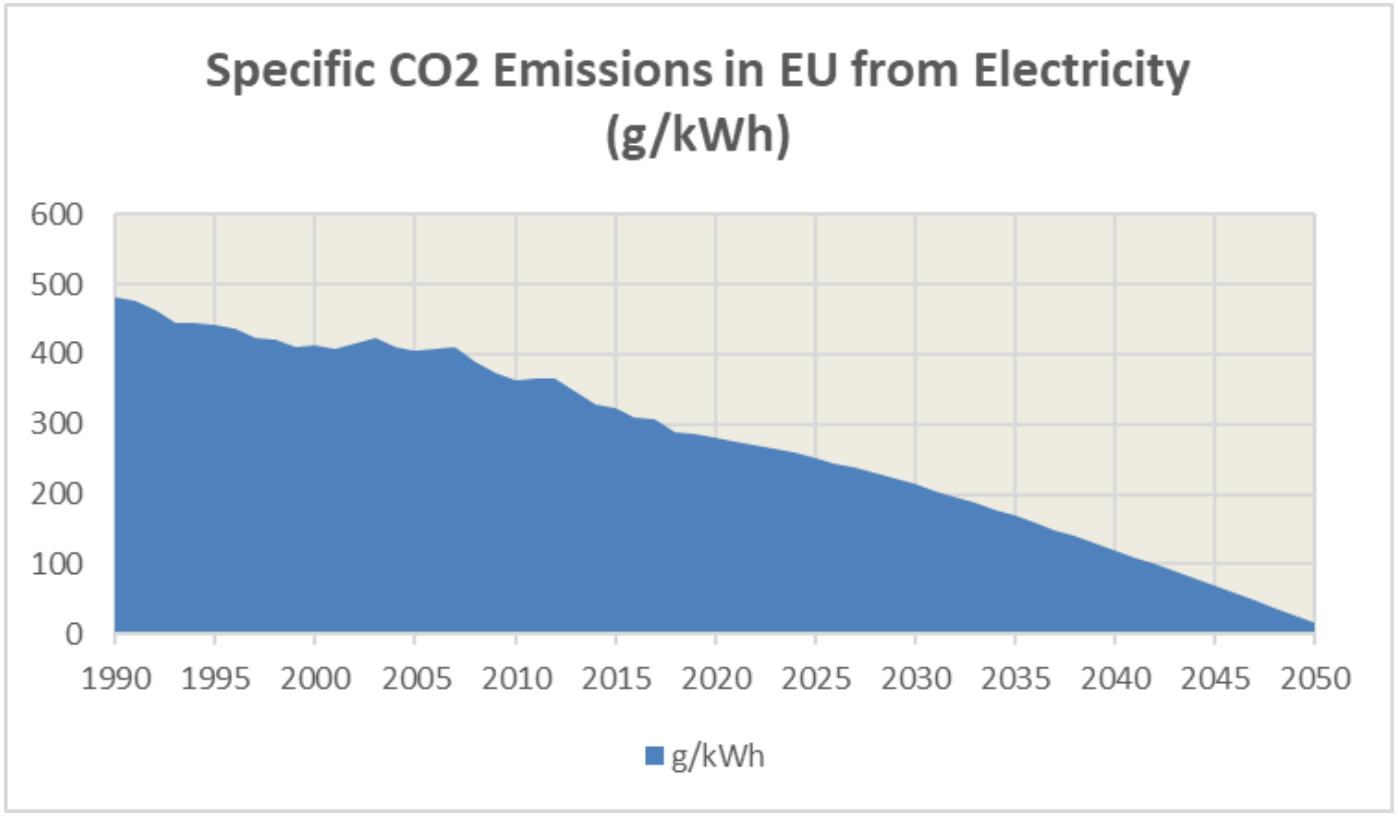
Carbon free electricity in EU by 2050



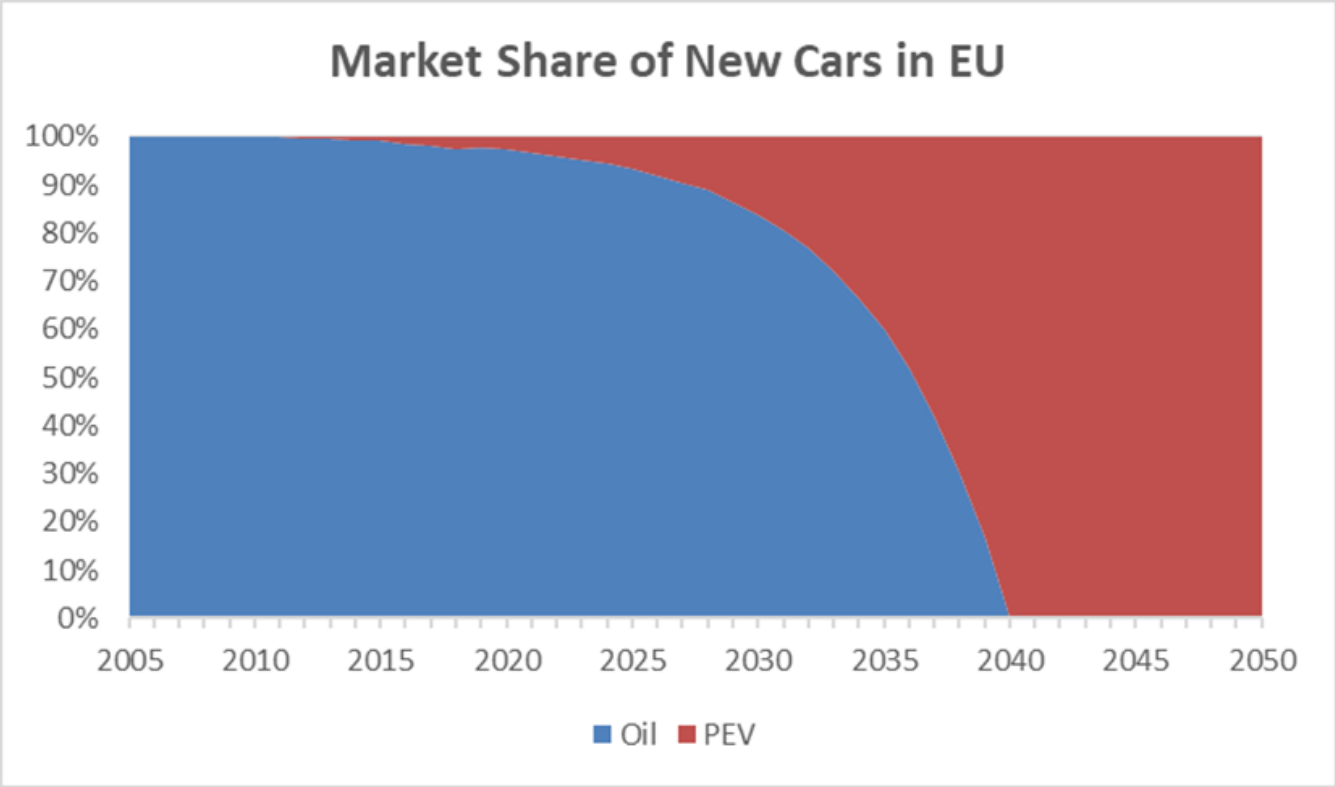
Reduction of CO2 Emissions from Electricity (from 900 MtCO2 to zero)



Specific Emissions from Electricity will drop from 280 g/kWh to zero by 2050

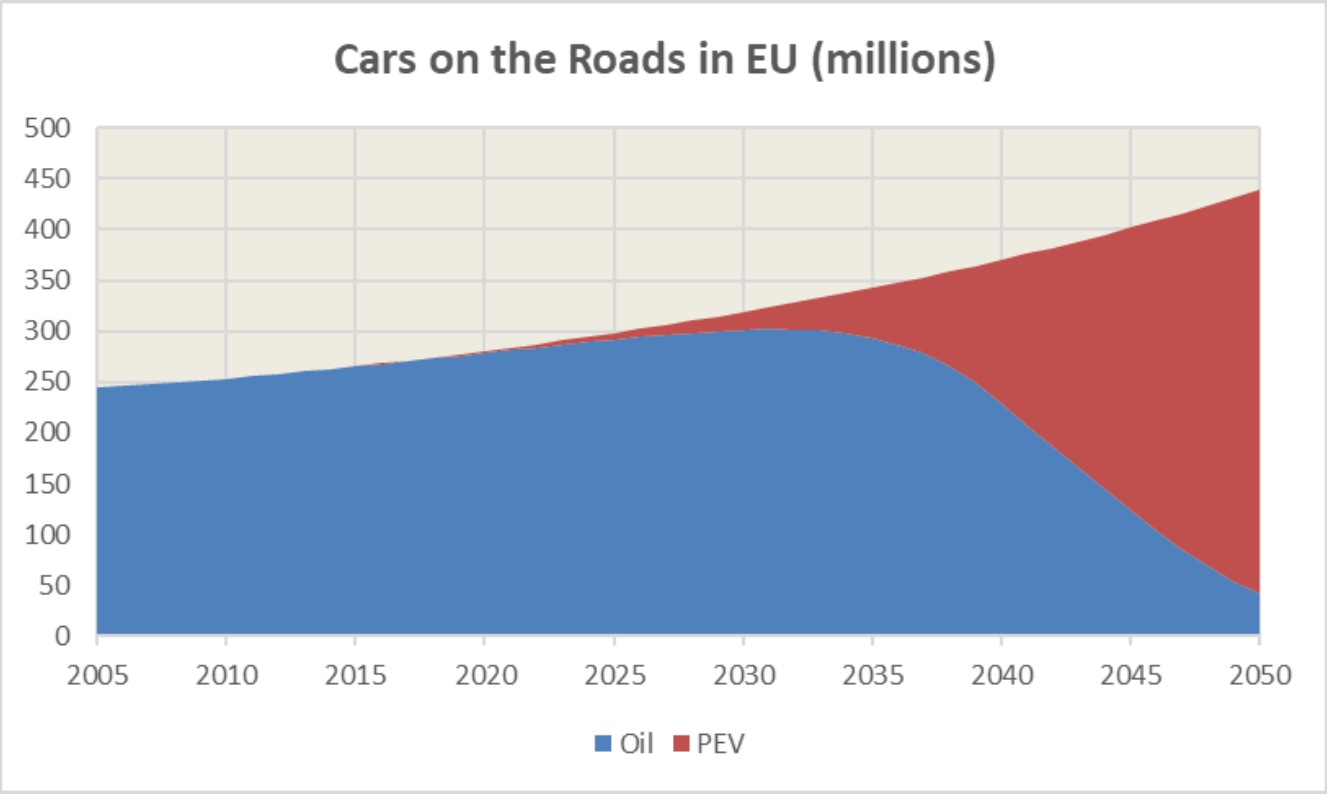


New Cars in EU will be PEVs by 2040



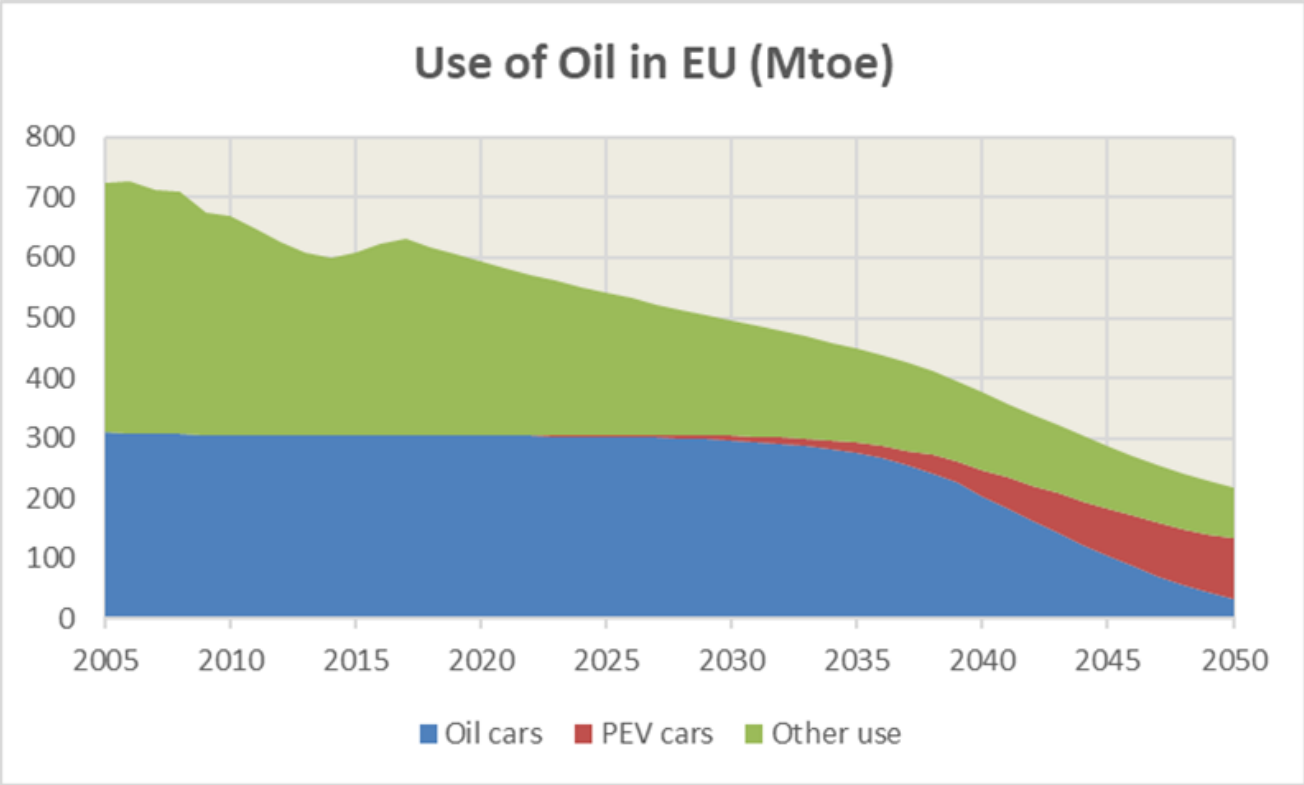
PEV = Plug-in Electric Vehicles

90 % Cars on the Roads in EU will be PEVs by 2050



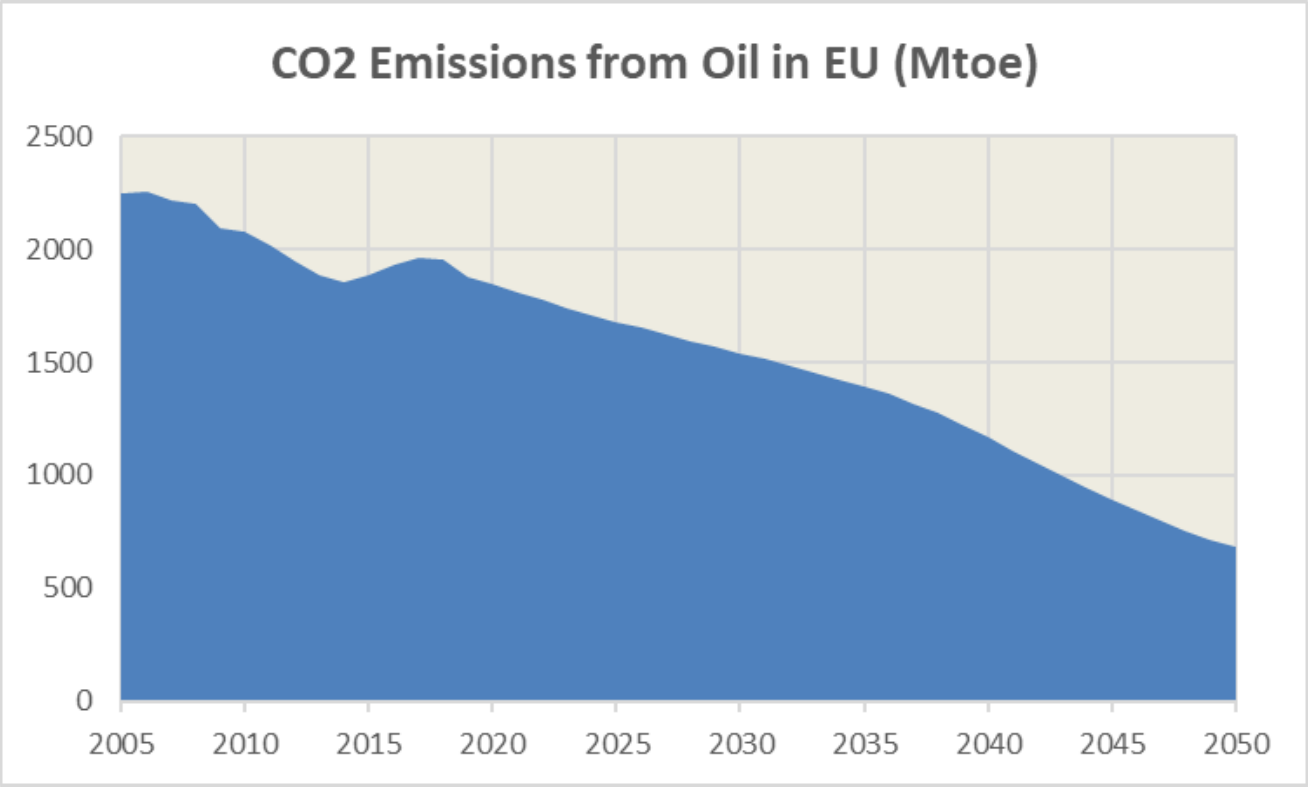
PEV = Plug-in Electric Vehicles

Consumption of Oil in EU will drop from 600 Mtoe in 2018 to 200 Mtoe by 2050

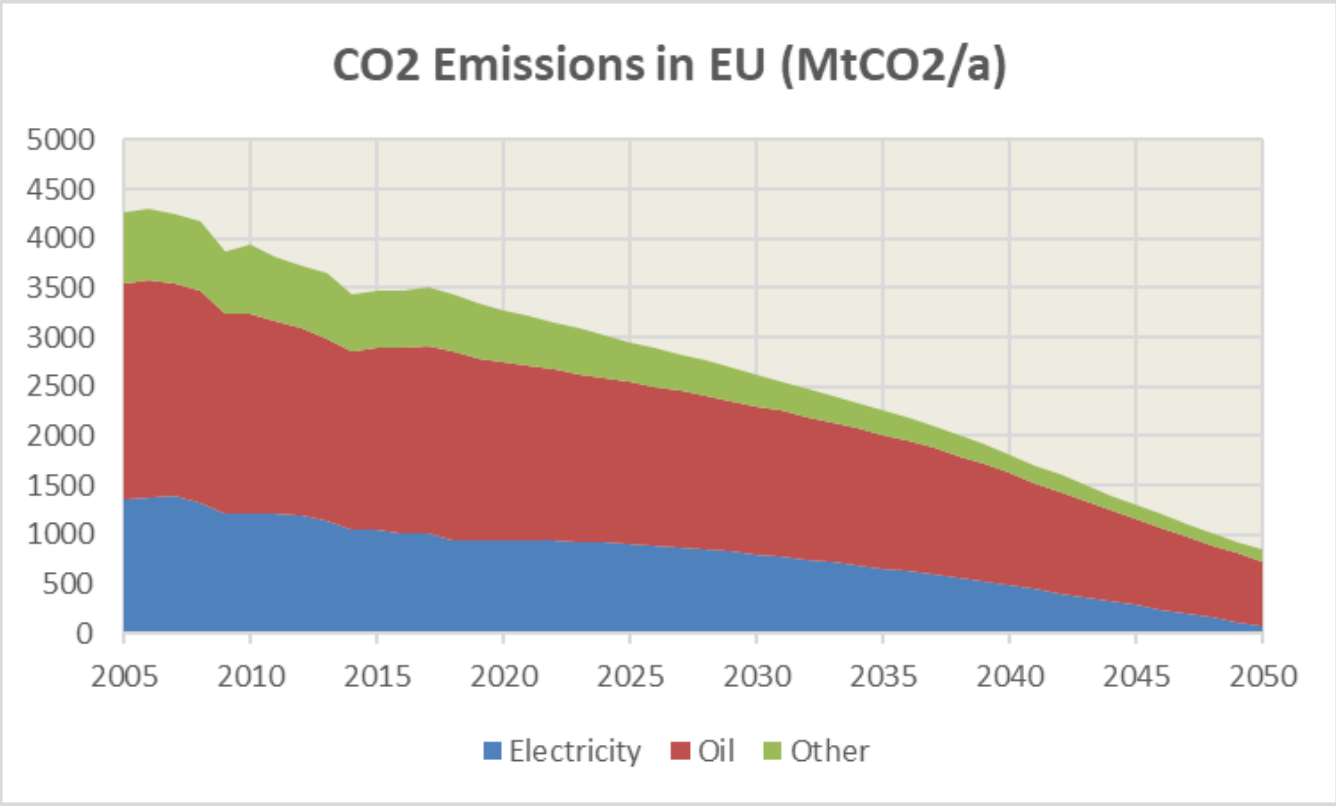


PEV = Plug-in Electric Vehicles

CO2 Emissions from Oil in EU will drop from 1950 Mt in 2018 to 700 Mt by 2050



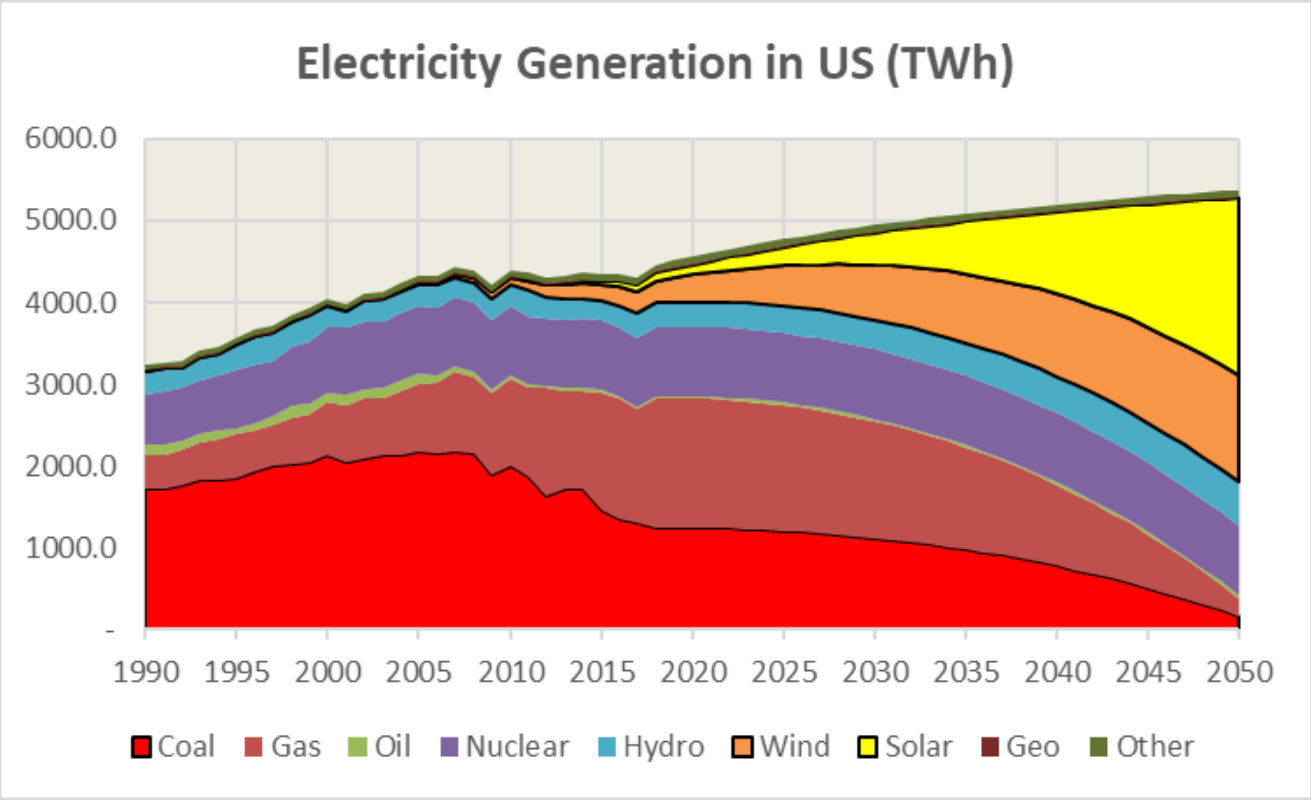
CO2 Emissions in EU will drop from 3000 Mt in 2018 to 850 Mt by 2050



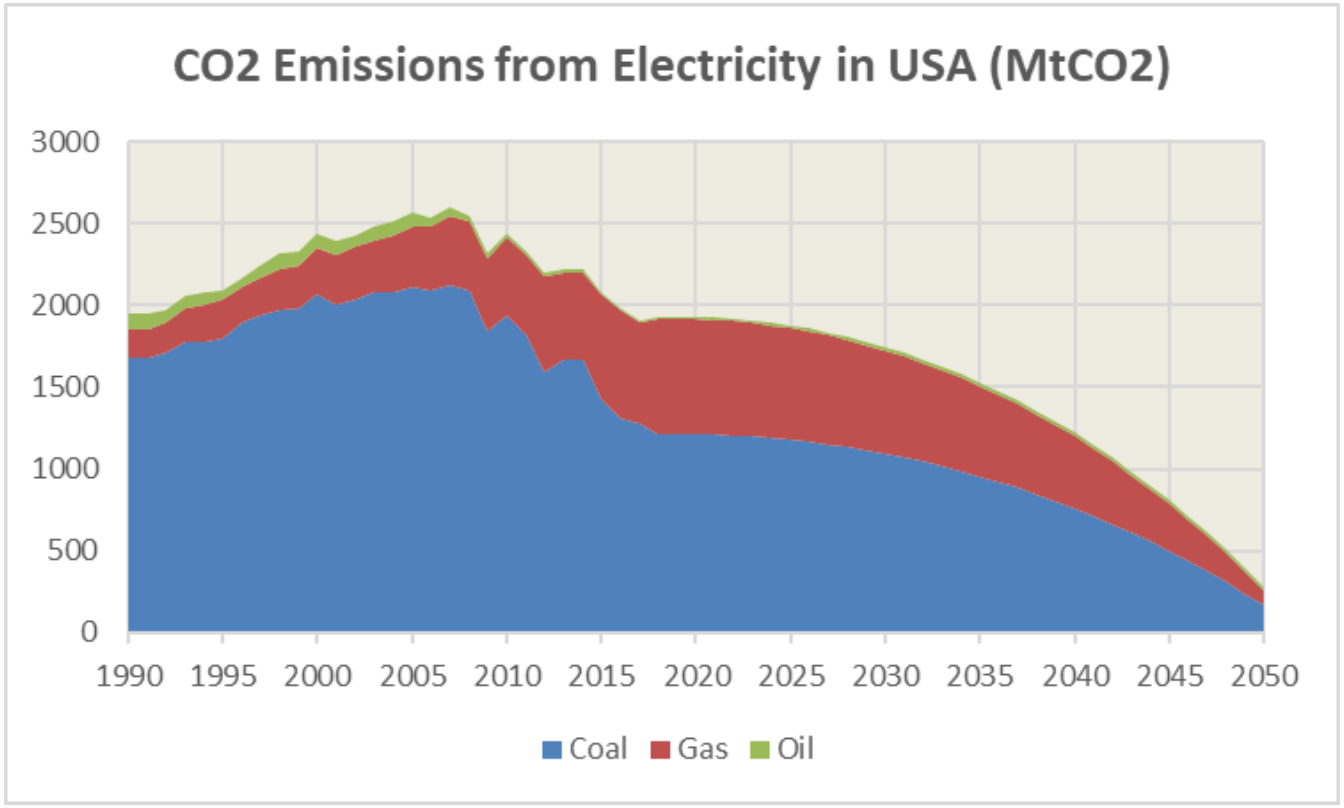
2050 emissions 850 Mt / 500 = 1,7 tCO2/capita

2. UNITED STATES

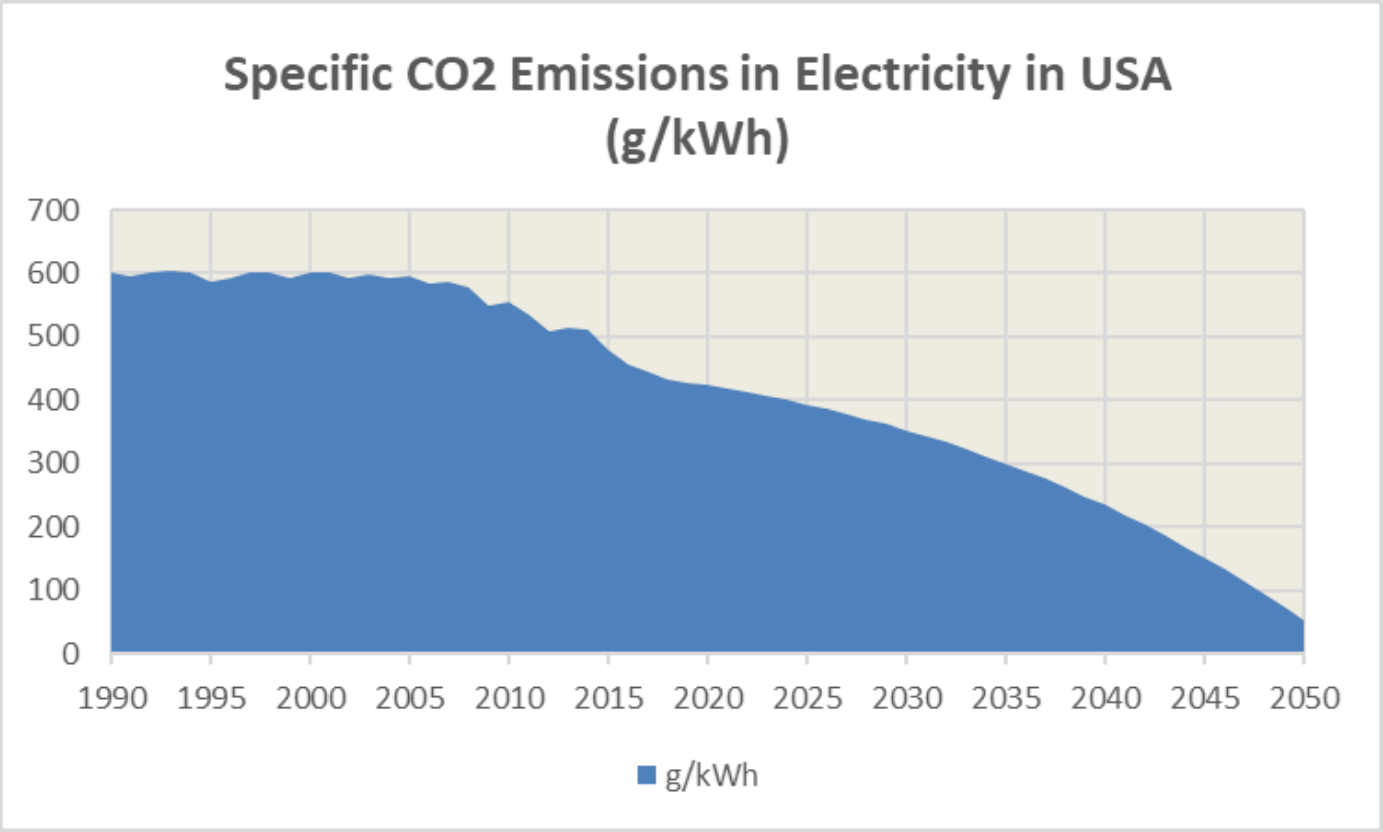
Near carbon free electricity in US by 2050



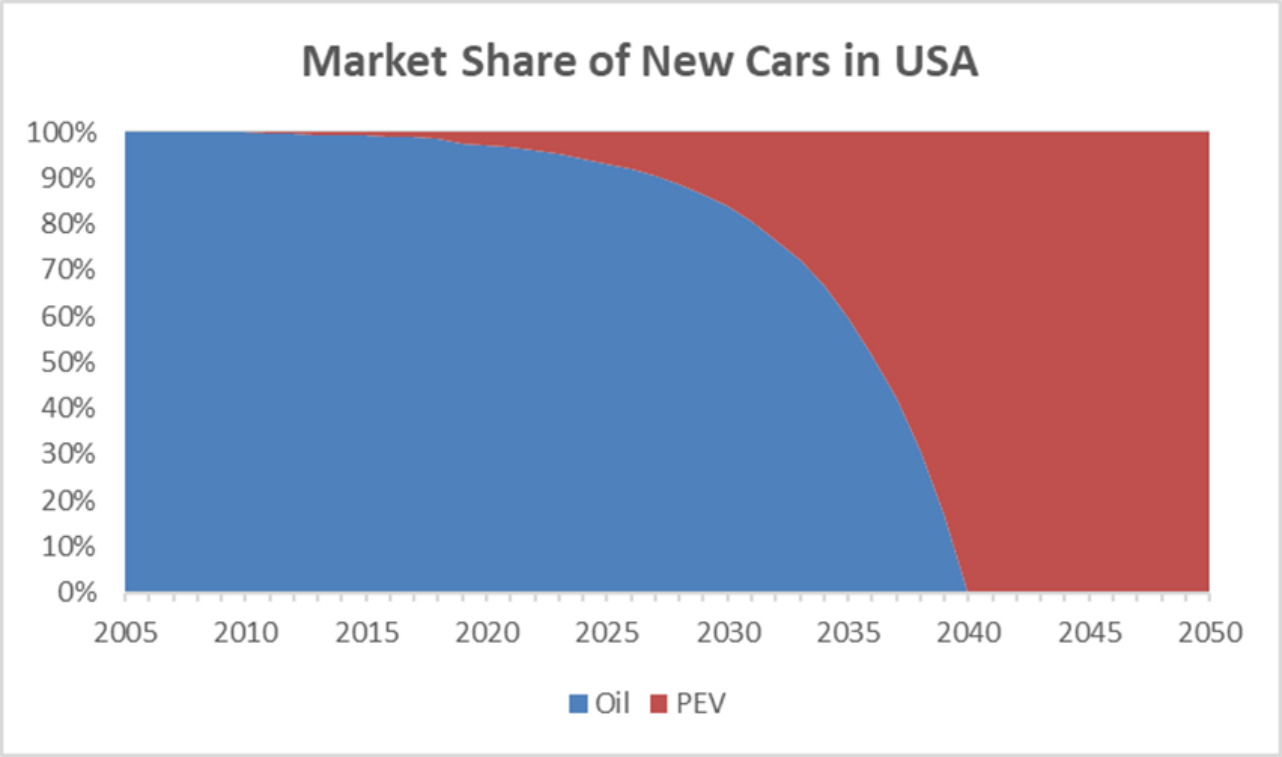
Reduction of CO2 emissions from 1900 Mt Electricity will drop to 200 Mt by 2050



Specific Emissions from Electricity in US will drop from 400 g/kWh to 50 g/kWh

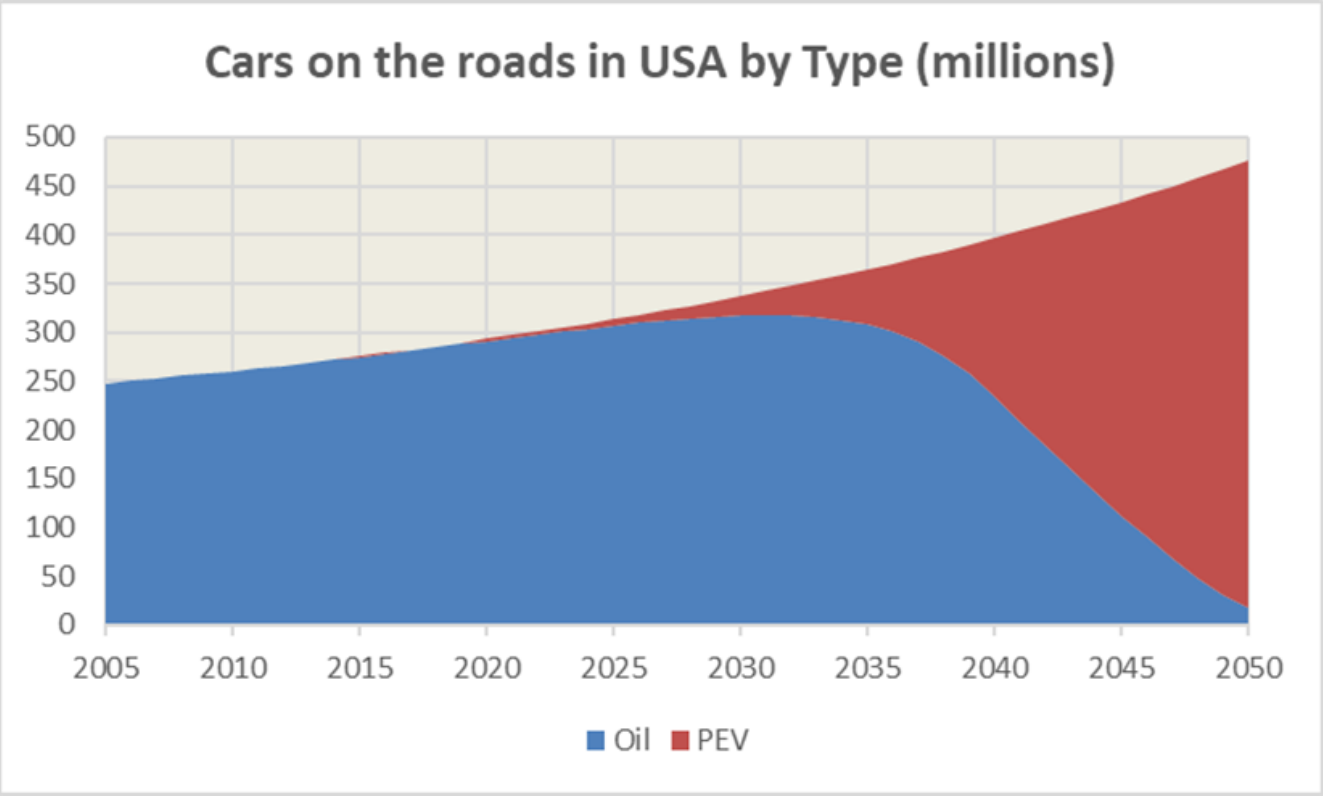


New Cars in US will be PEVs by 2040



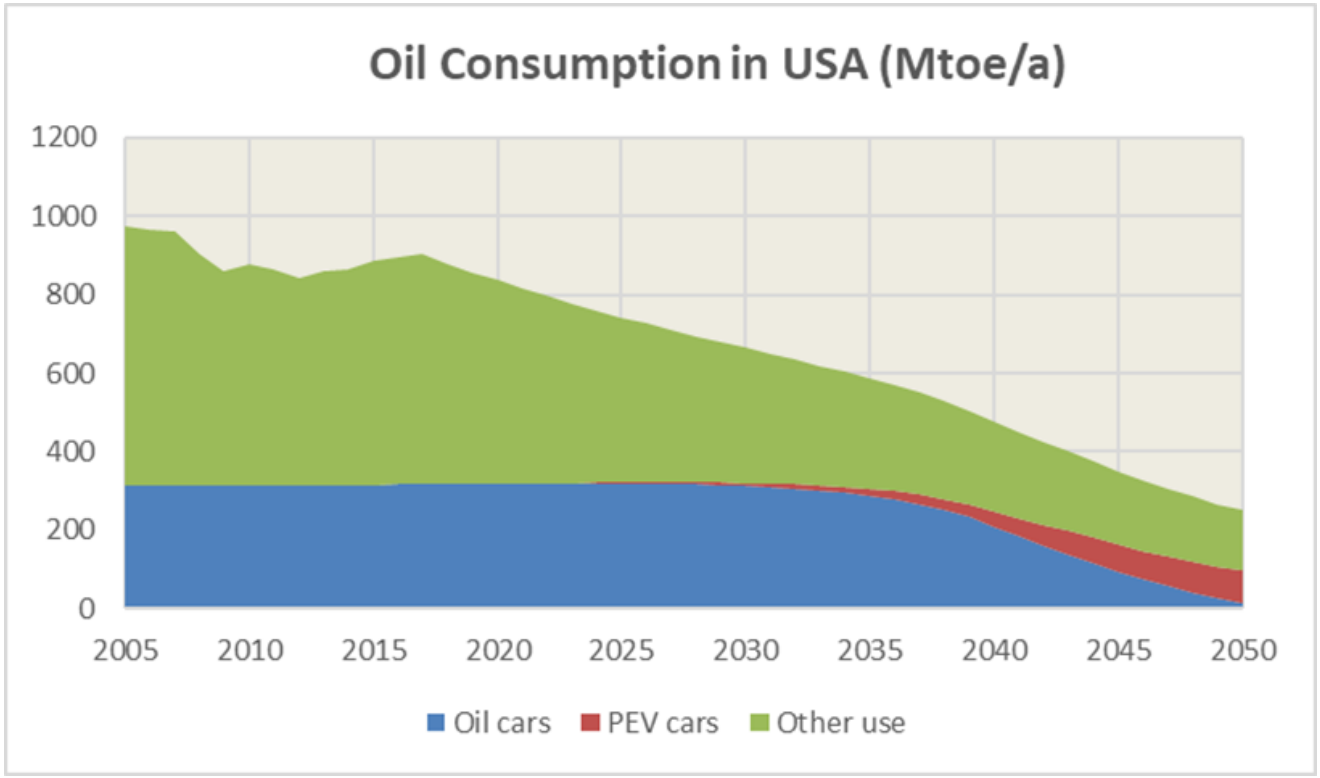
PEV = Plug-in Electric Vehicles

90 % Cars on the Roads in US will be PEVs by 2050



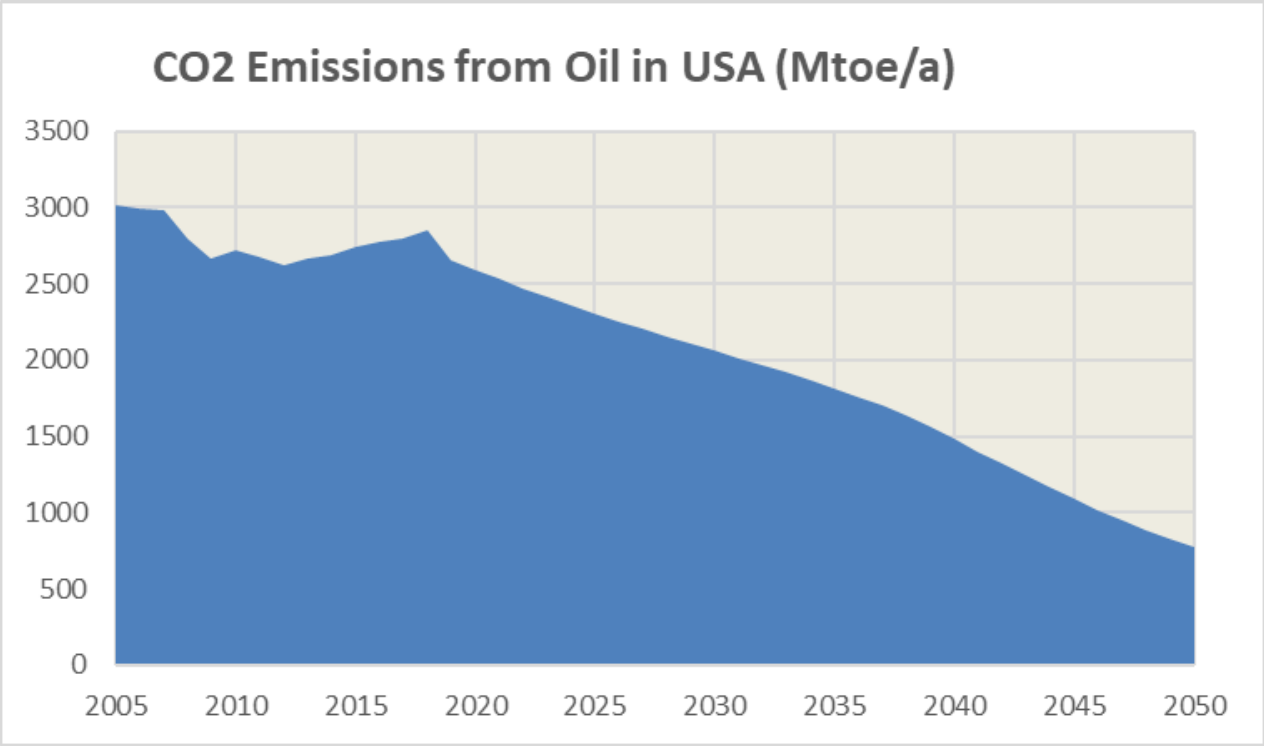
PEV = Plug-in Electric Vehicles

Consumption of Oil in US will drop from 800 Mtoe in 2018 to 220 Mtoe by 2050

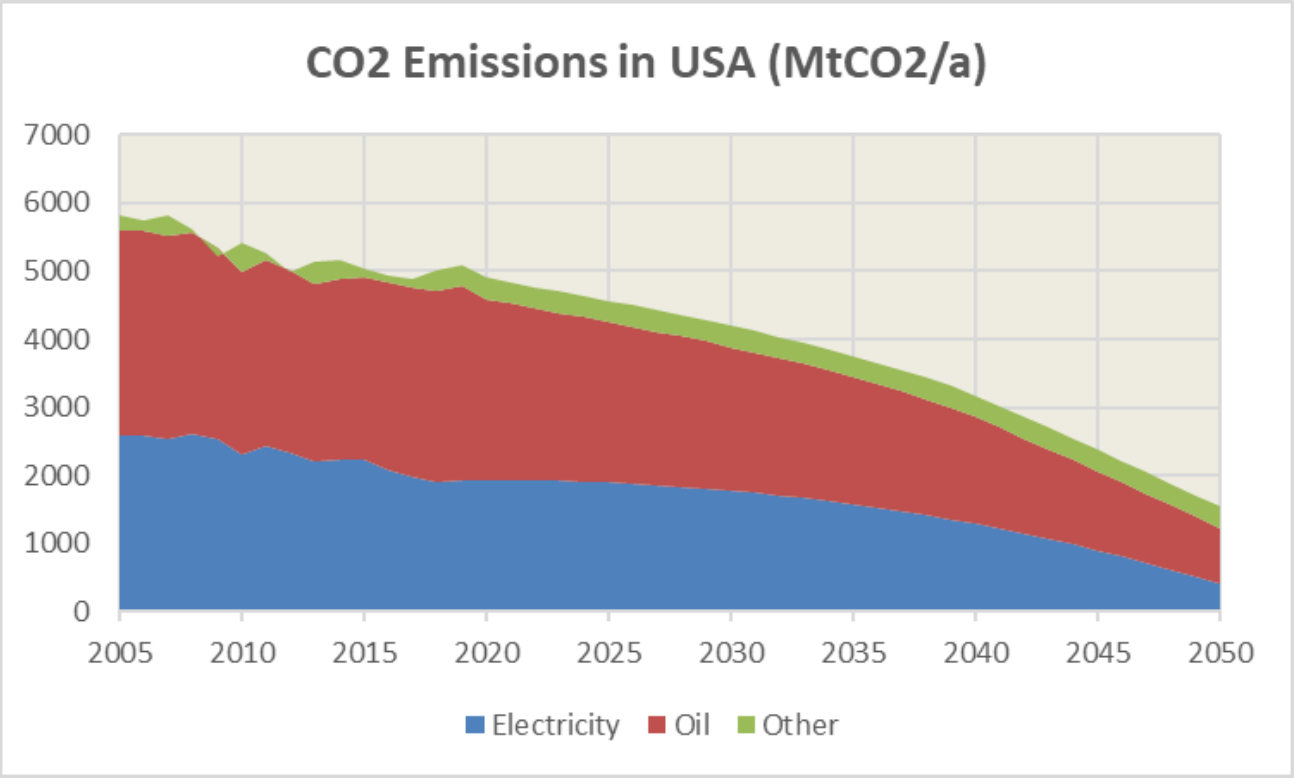


PEV = Plug-in Electric Vehicles

CO2 Emissions from Oil in US will drop from 2850 Mt in 2018 to 800 Mt by 2050



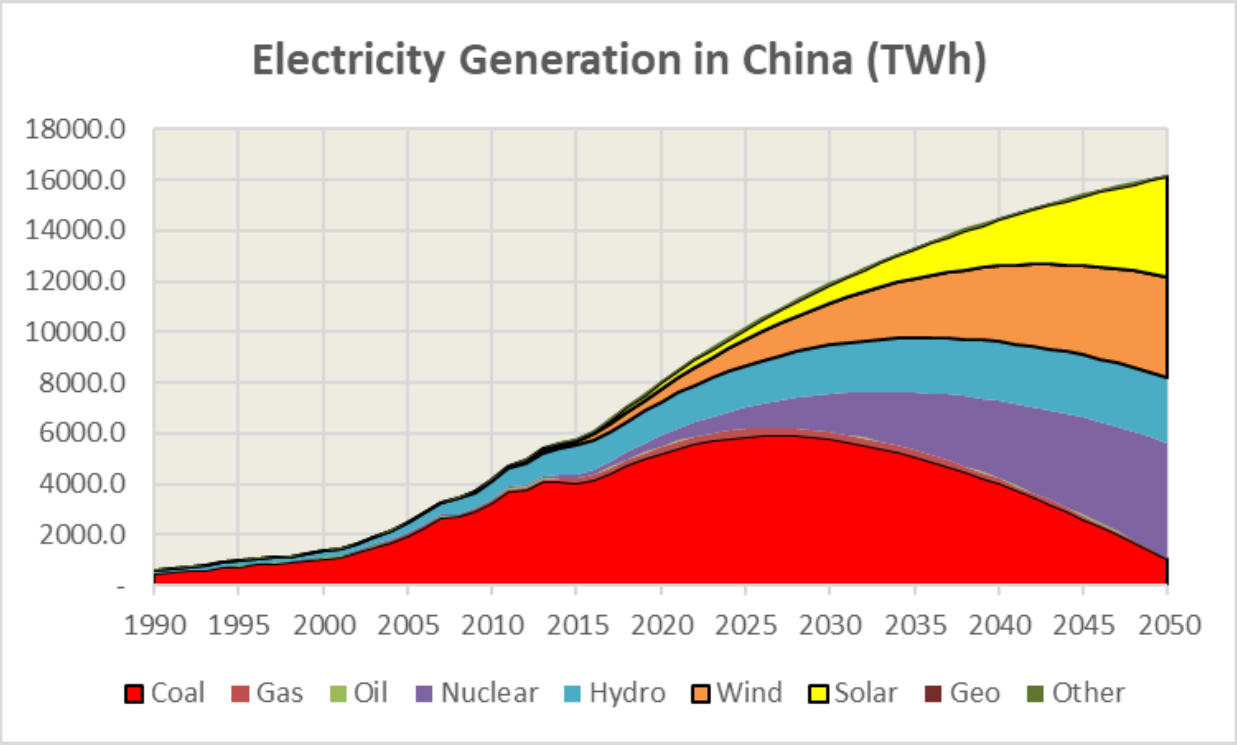
CO2 Emissions in US will drop from 4800 Mt in 2018 to 1500 Mt by 2050



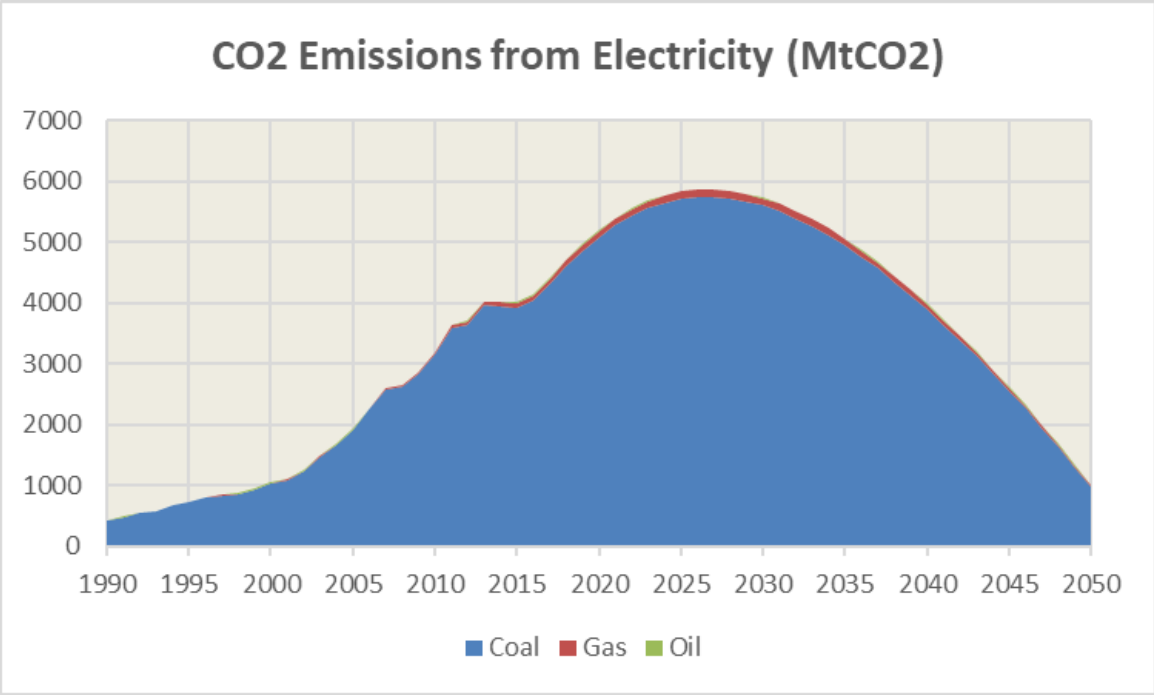
1500 Mt / 440 = 3.4 tCO2/capita, 90 % more than the target

3. CHINA

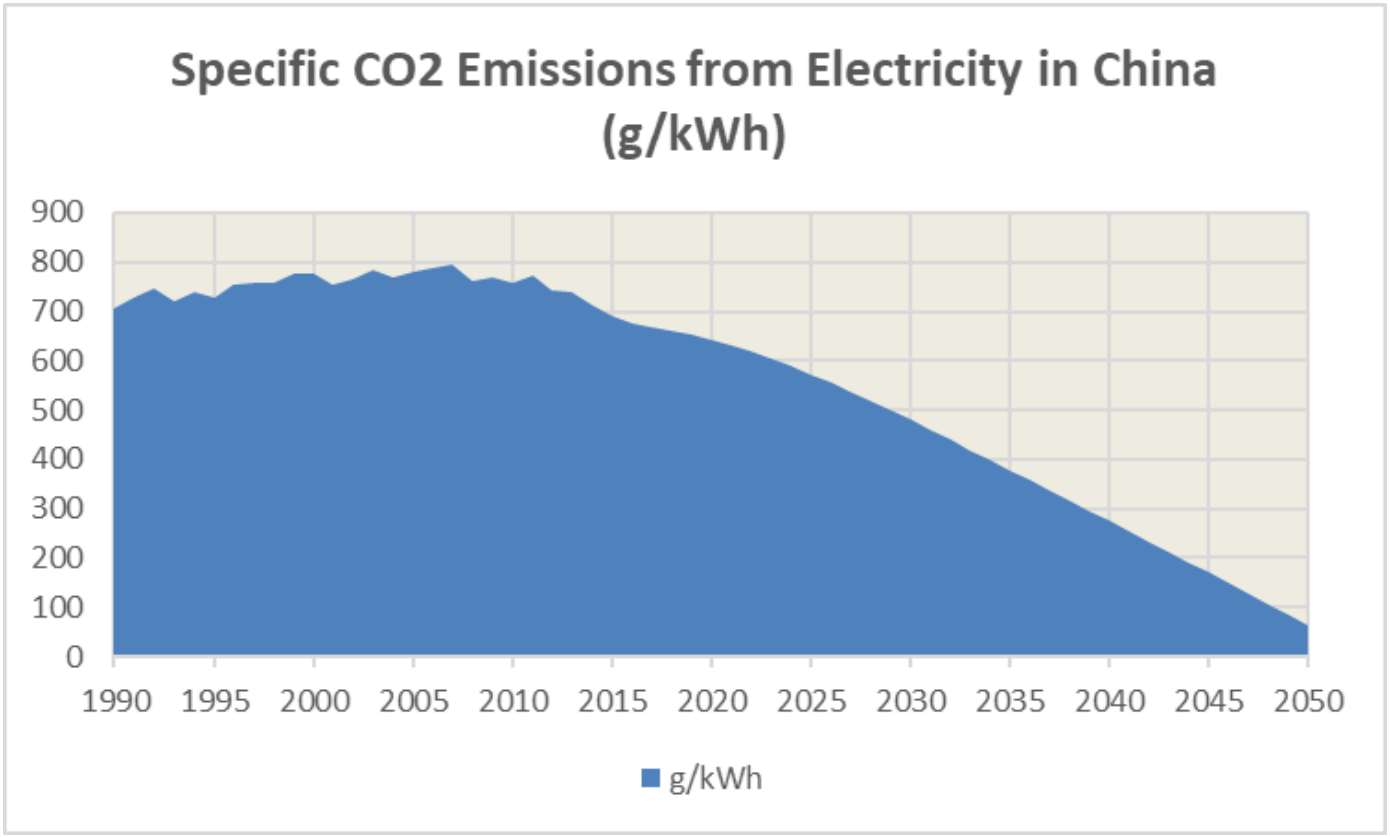
Near Carbon free Electricity in China by 2050



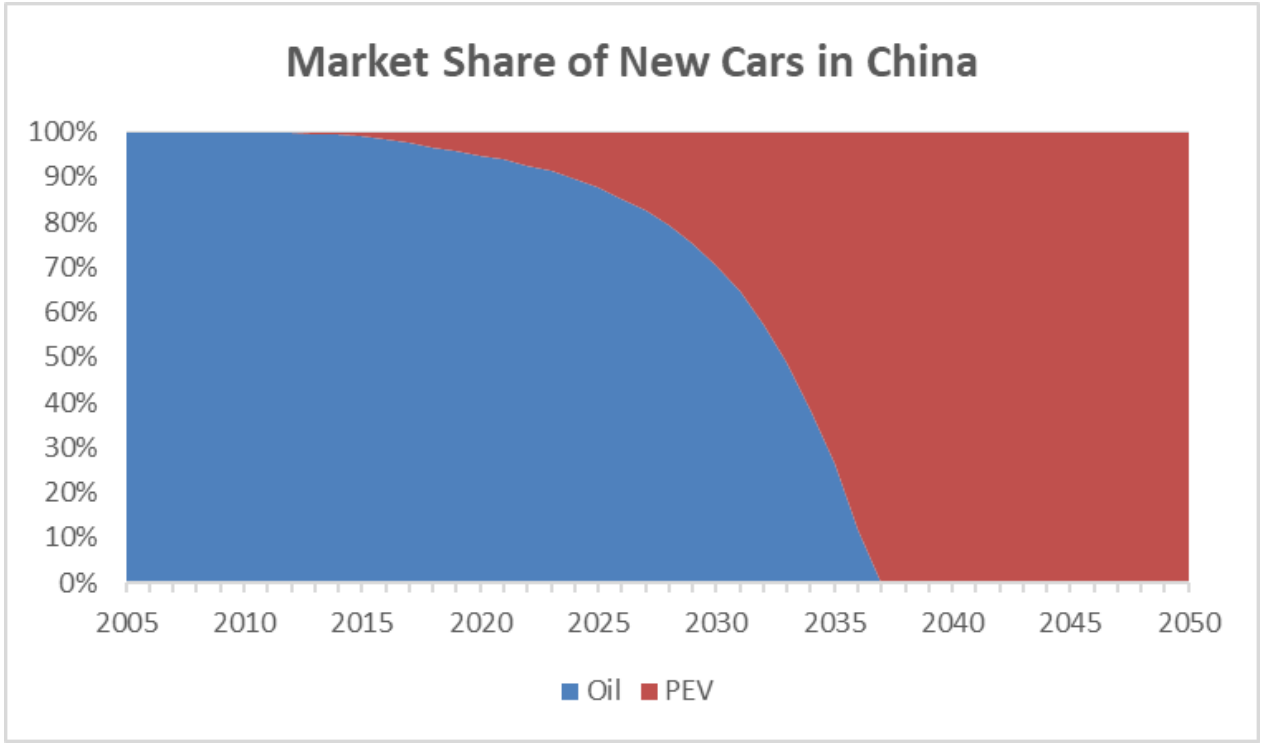
CO2 emissions from Electricity in China will drop from 5900 Mt to 1000 Mt by 2050



Specific Emissions from Electricity in China will drop from 650 g/kWh to 60 g/kWh by 2050

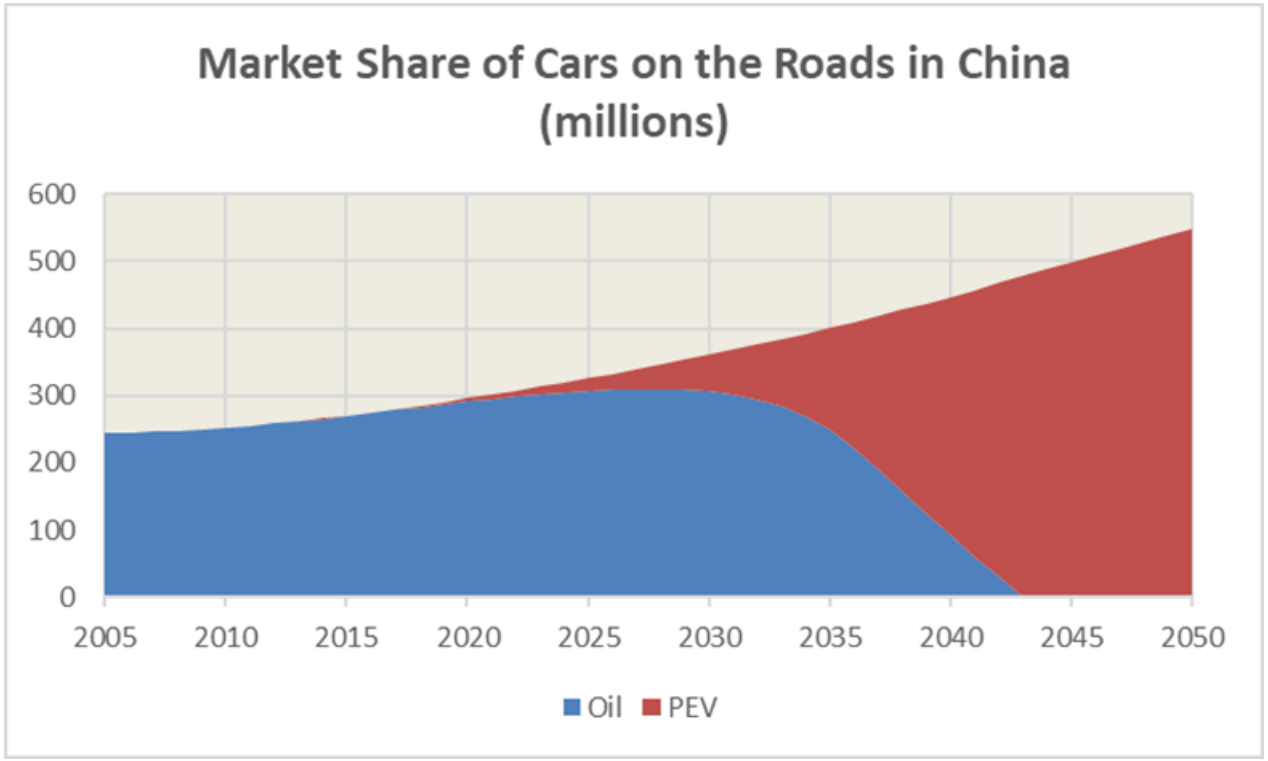


New Cars in China will be PEVs by 2037



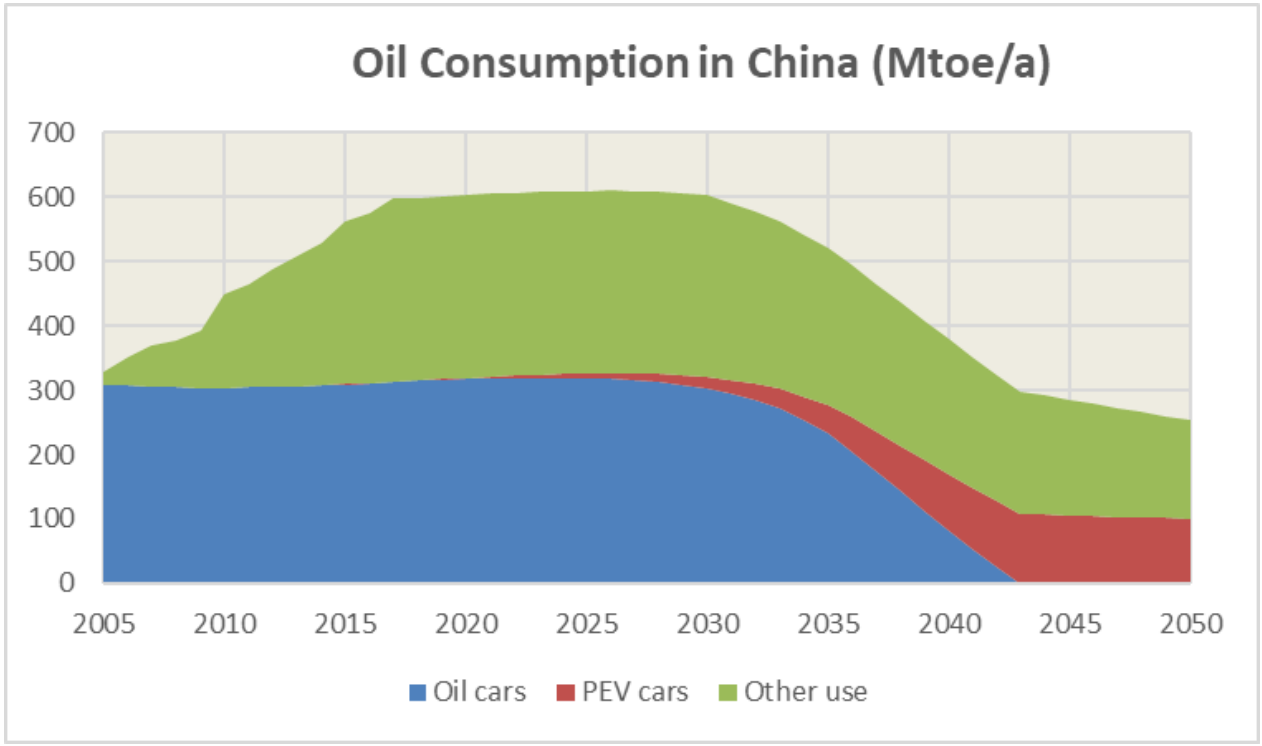
PEV = Plug-in Electric Vehicles

All Cars on the Roads in China will be PEVs by 2045



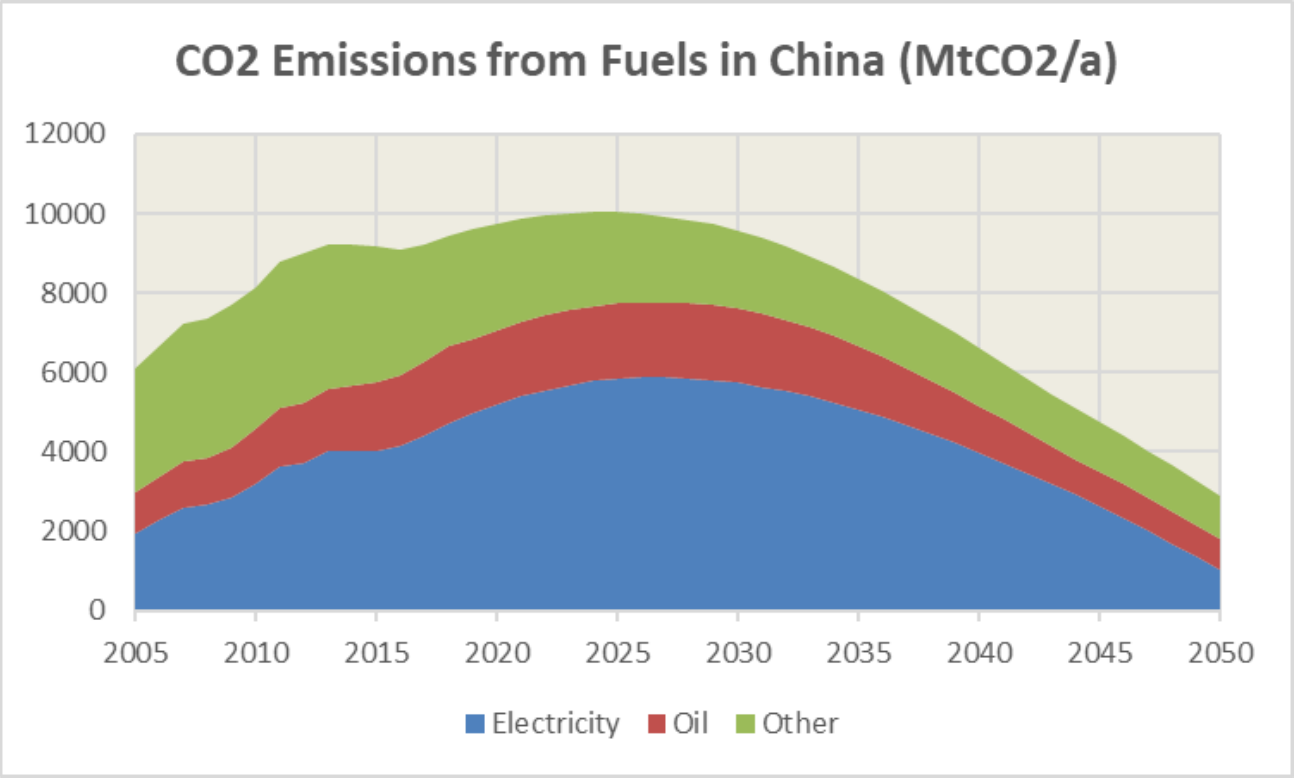
PEV = Plug-in Electric Vehicles

Consumption of Oil will drop from 600 Mtoe in 2018 to 250 Mtoe by 2050



PEV = Plug-in Electric Vehicles

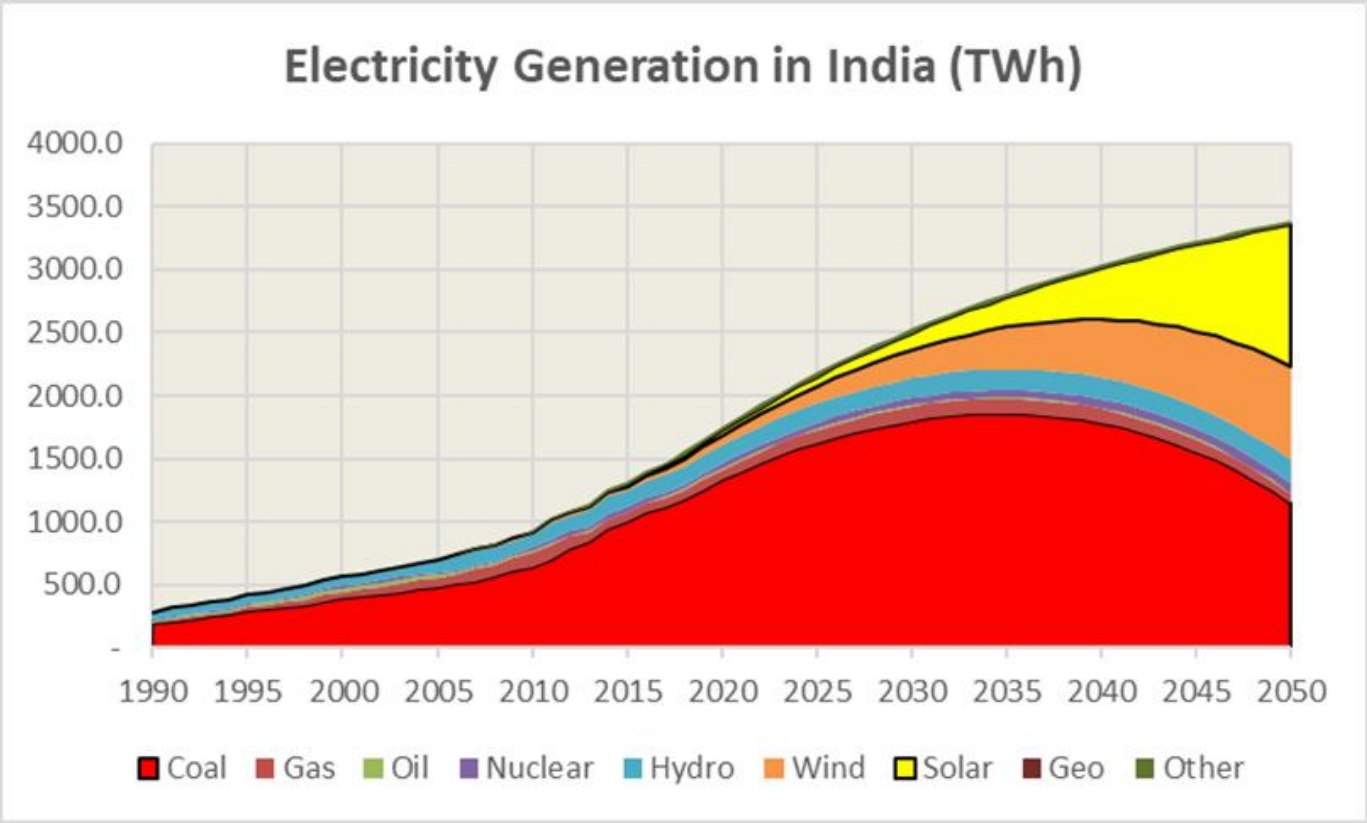
CO2 Emissions will drop from 10 Gt in 2018 to 2.9 Gt by 2050



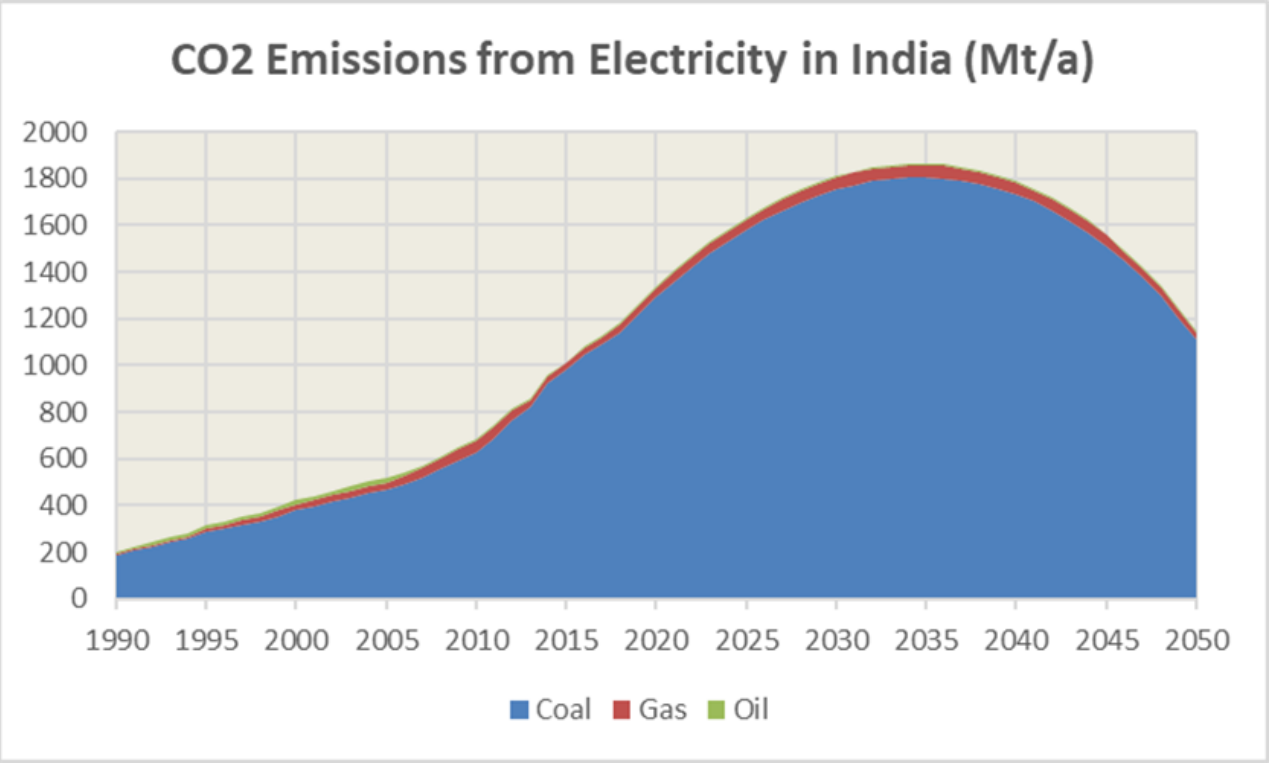
2900 Mt / 1450 = 2 tCO2/capita, 10 % more than the target

4. INDIA

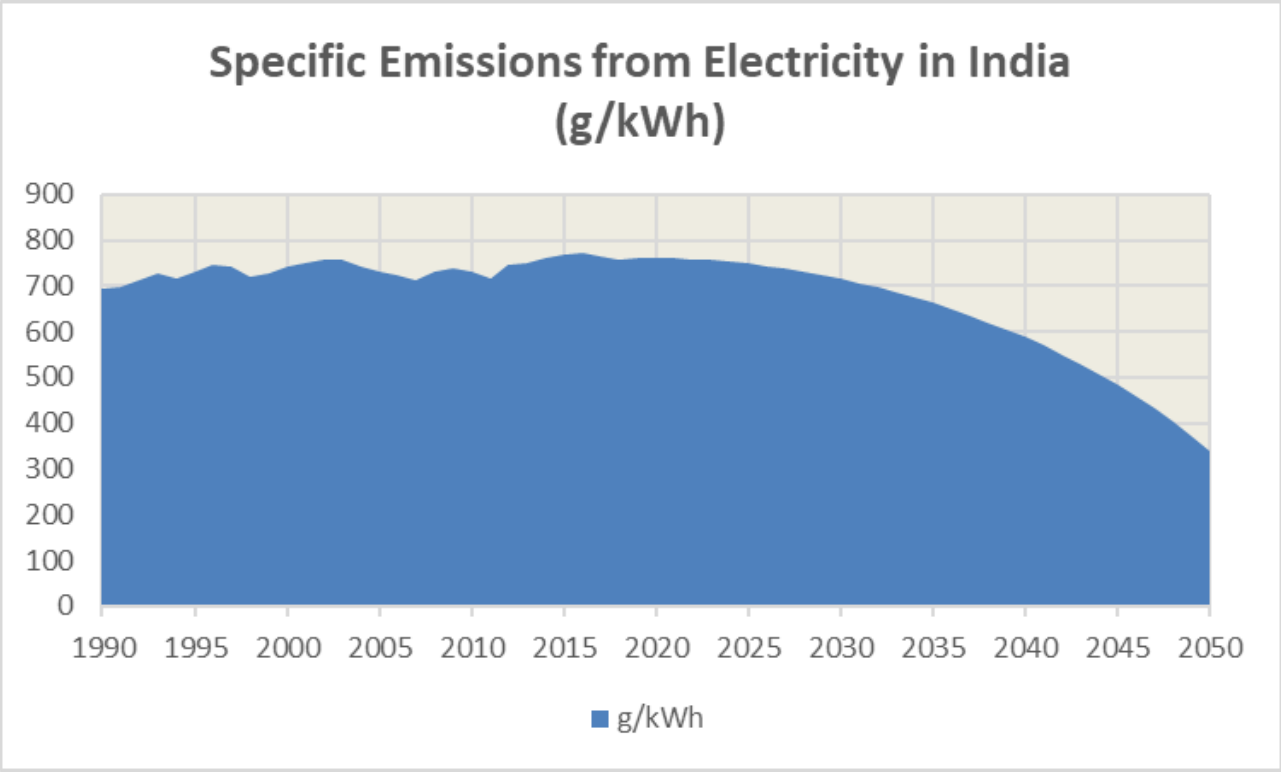
50 % from Electricity from Renewables in India by 2050



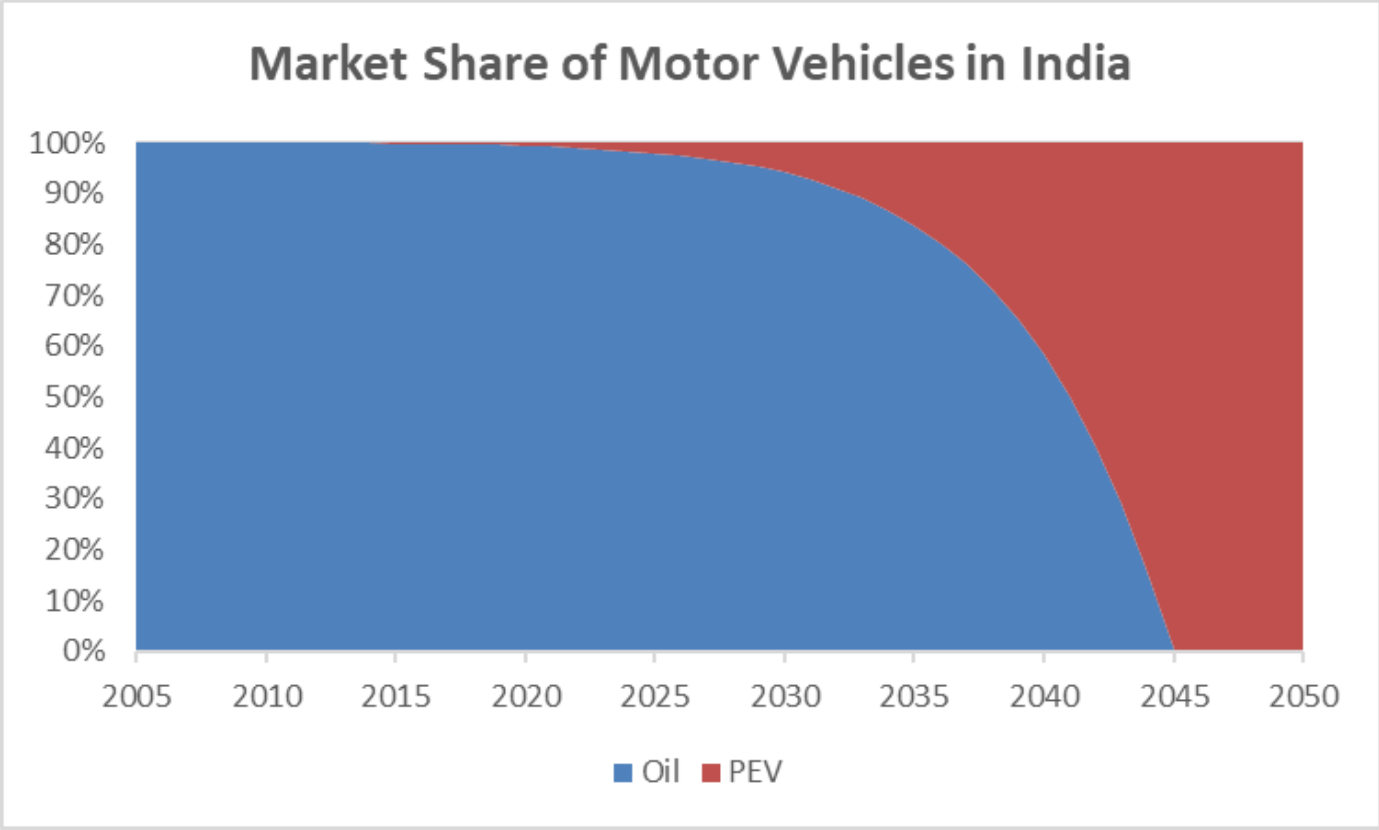
CO2 Emissions from Electricity in India will drop from 1200 Mt to 1100 Mt by 2050



Specific Emissions from Electricity in India will drop from 760 g/kWh to 340 g/kWh by 2050

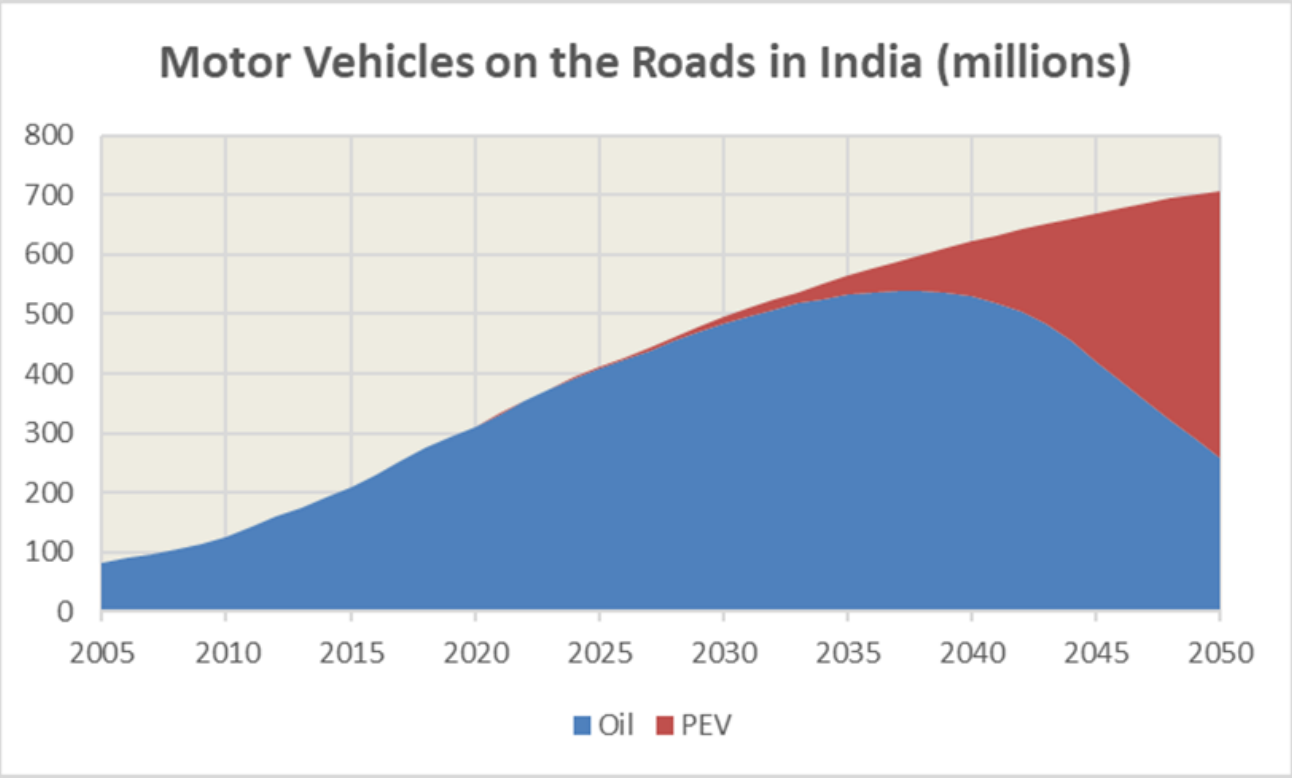


New Vehices in India will be PEVs by 2045



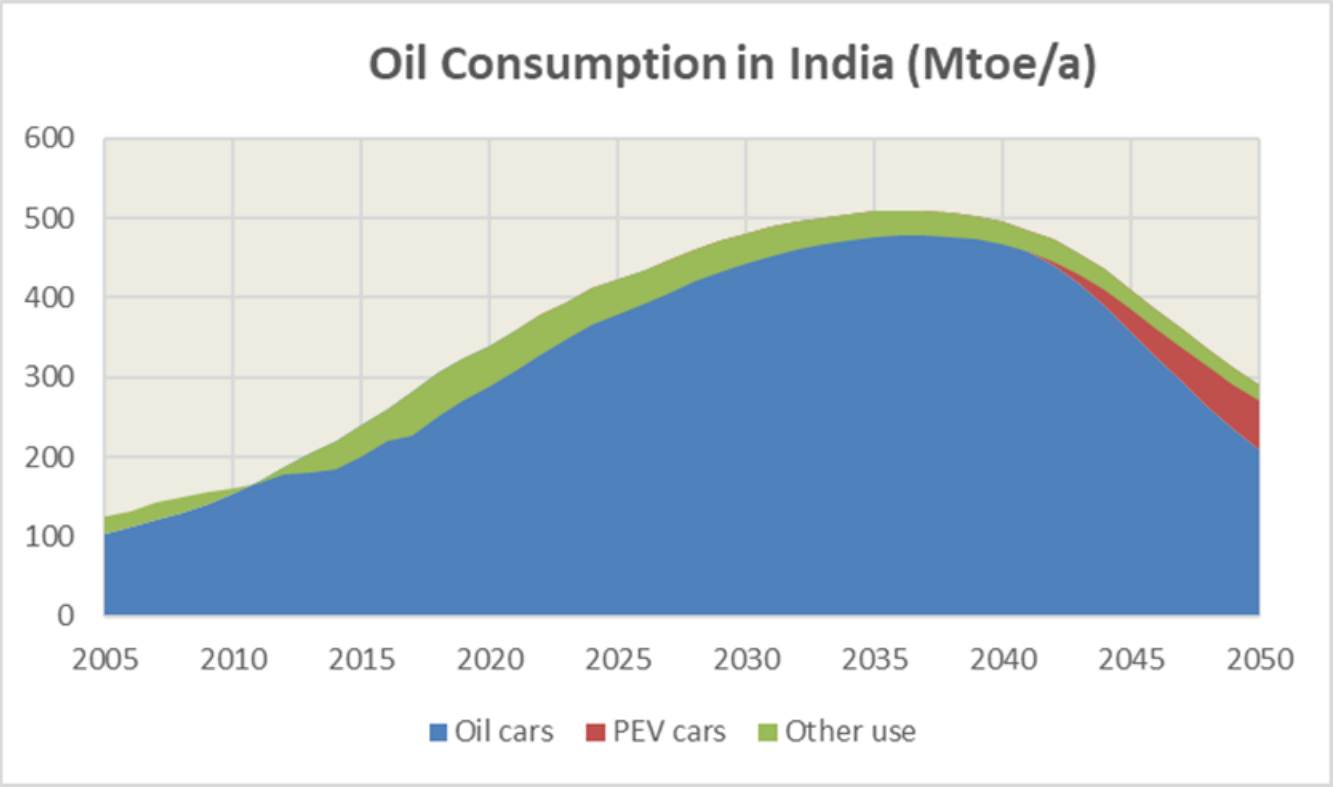
PEV = Plug-in Electric Vehicles

60 % of Vehicles on the Roads in India will be PEVs by 2050



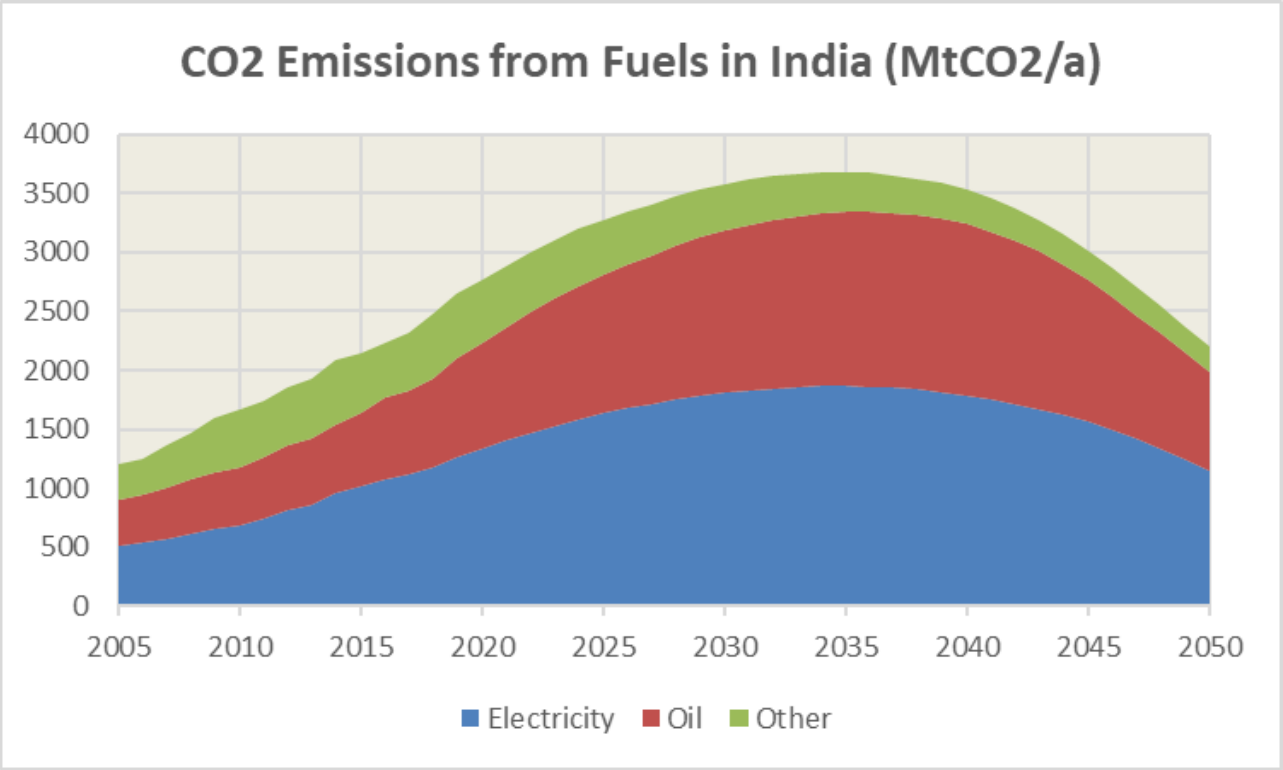
PEV = Plug-in Electric Vehicles

Consumption of Oil in India will be peaking at 500 Mtoe by 2035



PEV = Plug-in Electric Vehicles

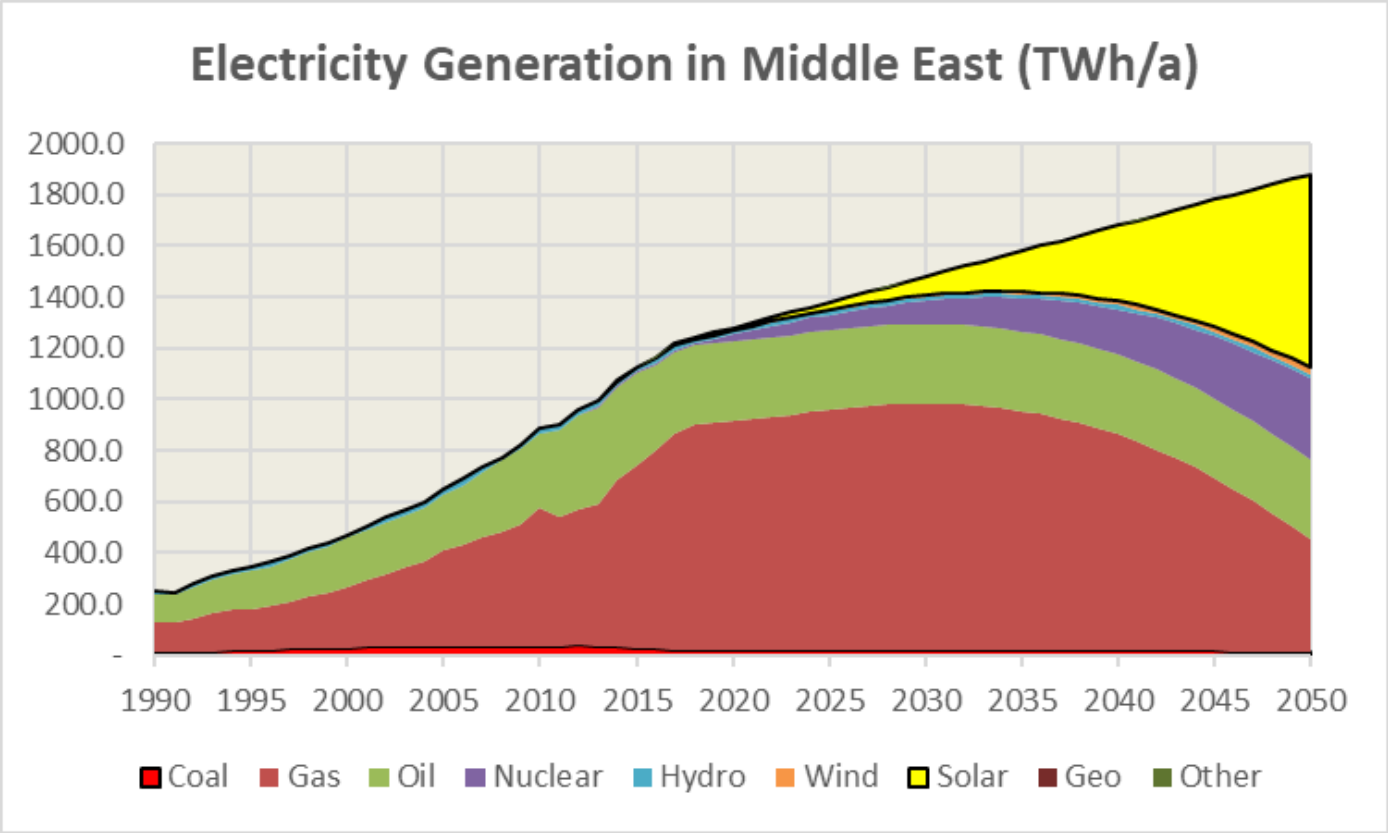
CO2 Emissions from Fuels will be peaking at 3600 Mt by 2035 and drop to 2200 Mt by 2050



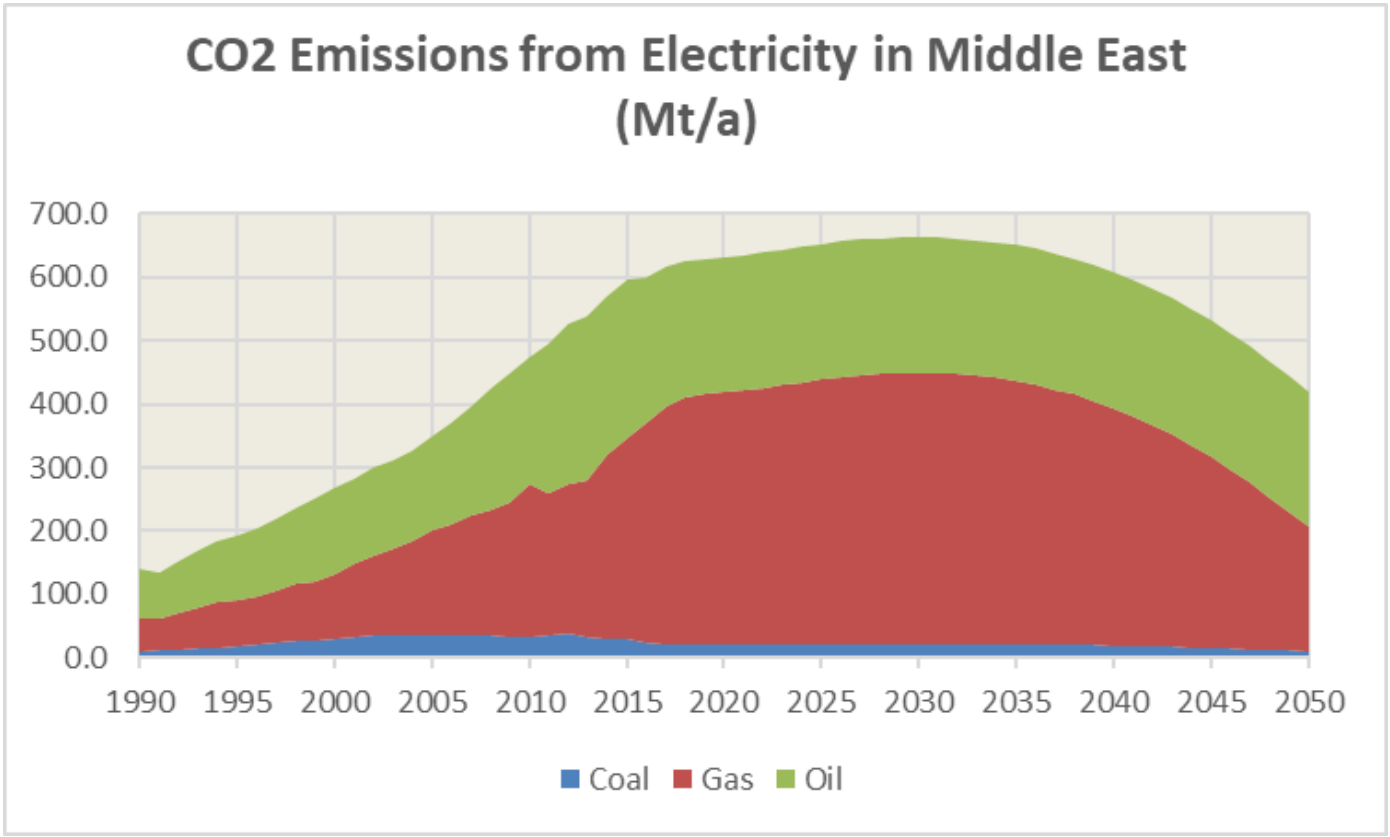
2200 Mt / 1500 = 1.5 tCO2/capita, 20 % less than the target 1.8 t/capita

5. MIDDLE EAST

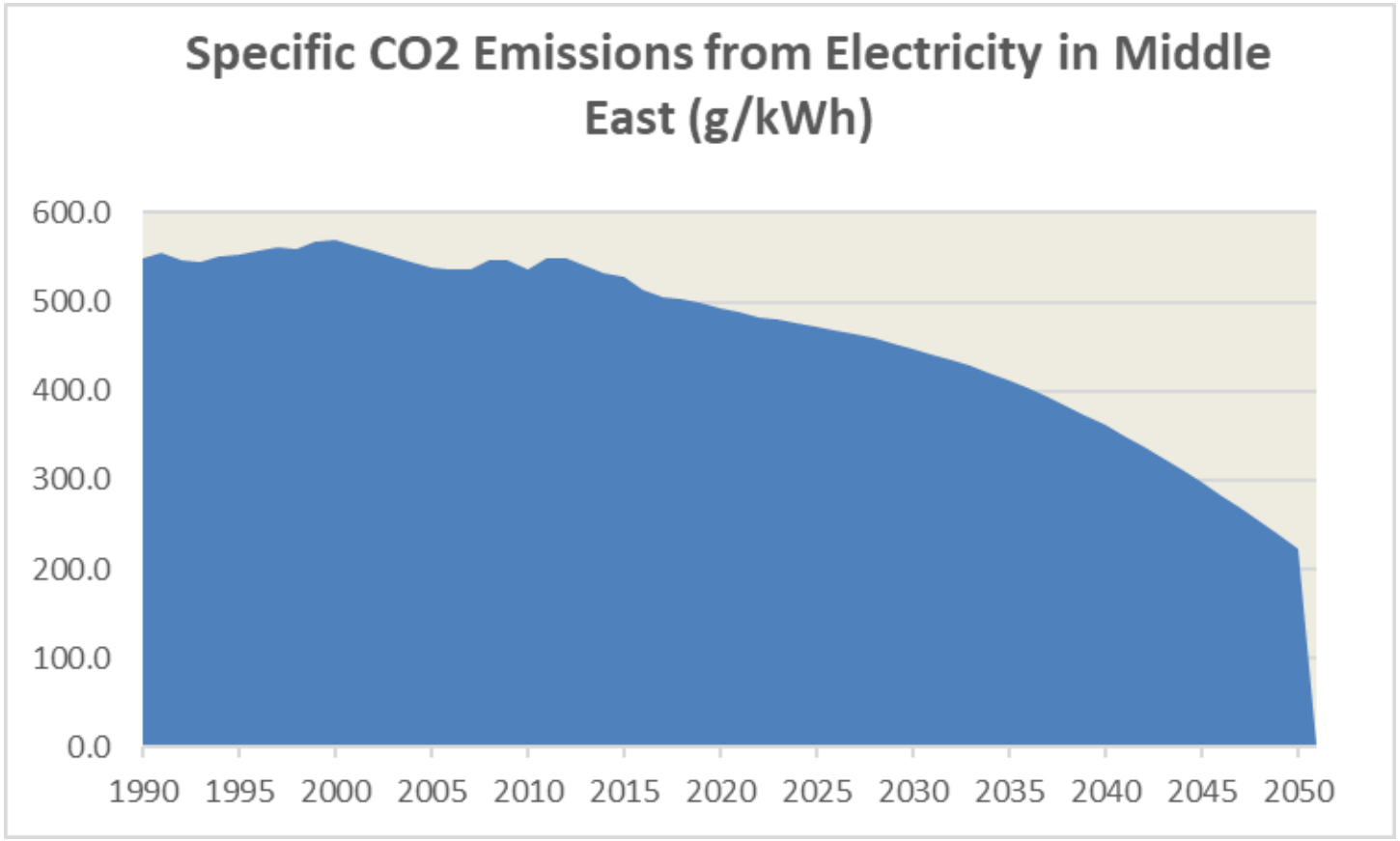
50 % from Electricity from Sun and Nuclear in Middle East by 2050



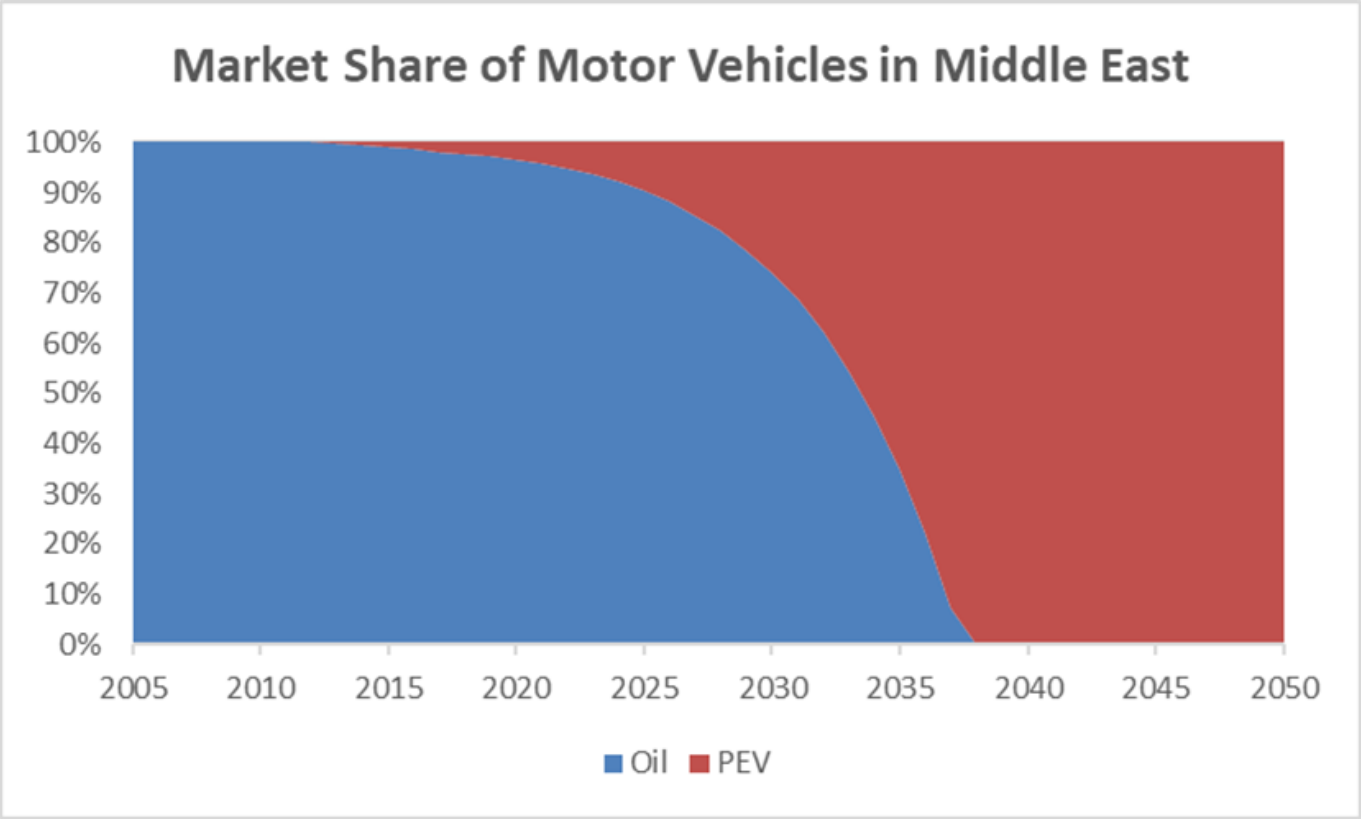
CO2 Emissions from Electricity in Middle East will drop from 600 Mt to 400 Mt by 2050



Specific Emissions from Electricity in Middle East will drop from 500 g/kWh to 220 g/kWh by 2050

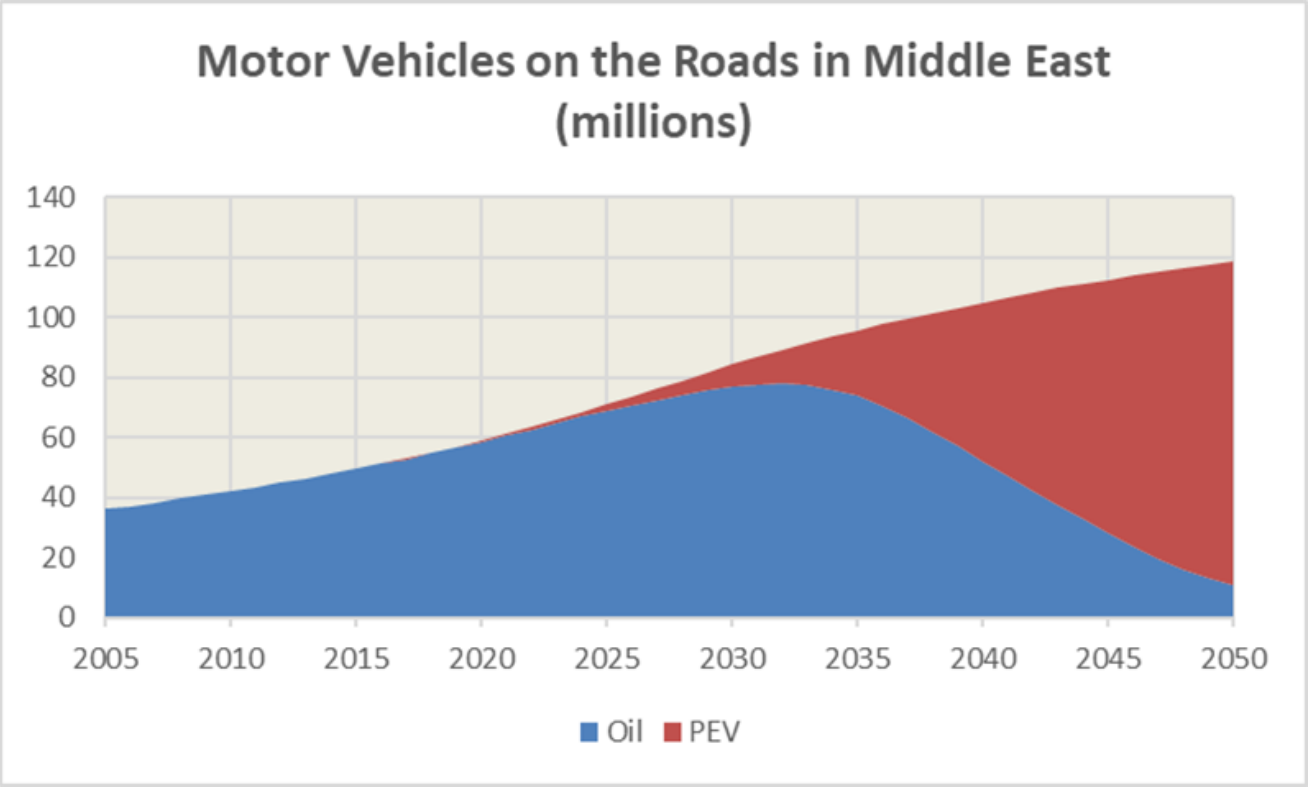


New Vehices in Middle East will be PEVs by 2040



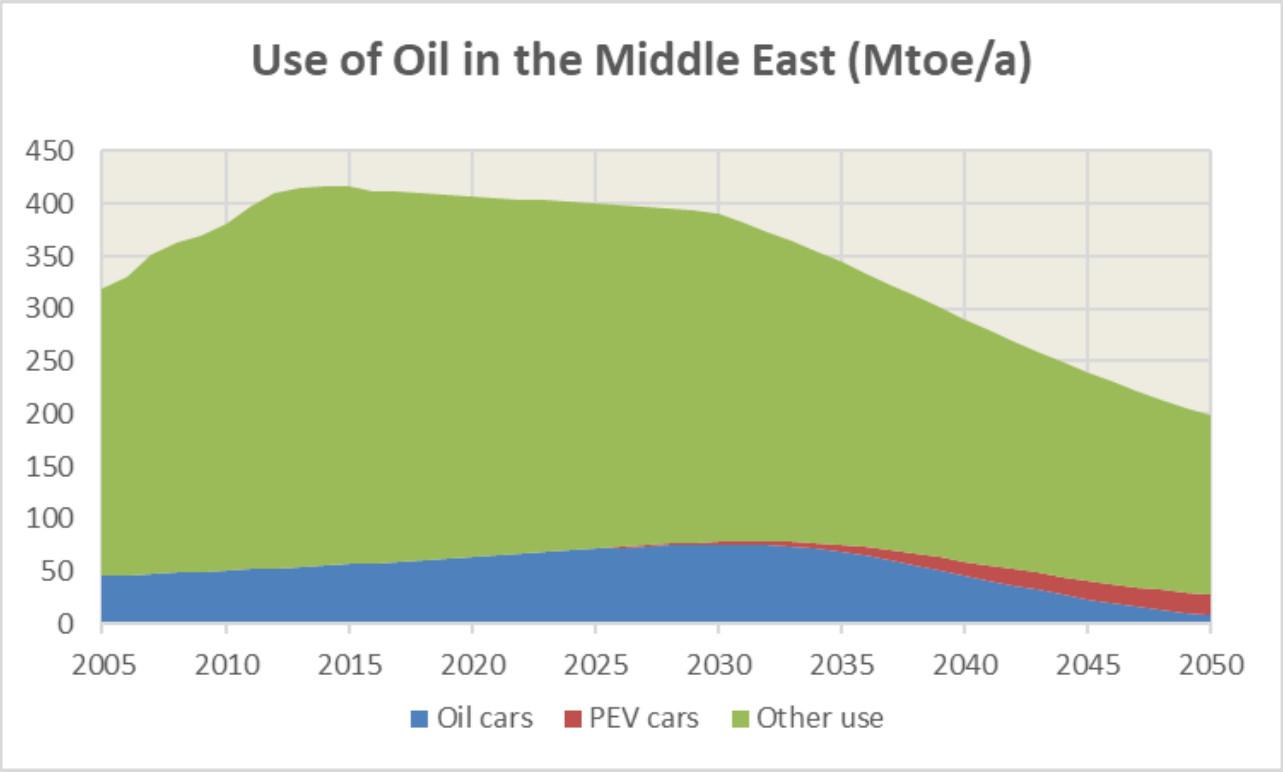
PEV = Plug-in Electric Vehicles

90 % of Vehicles on the Roads in Middle East will be PEVs by 2050



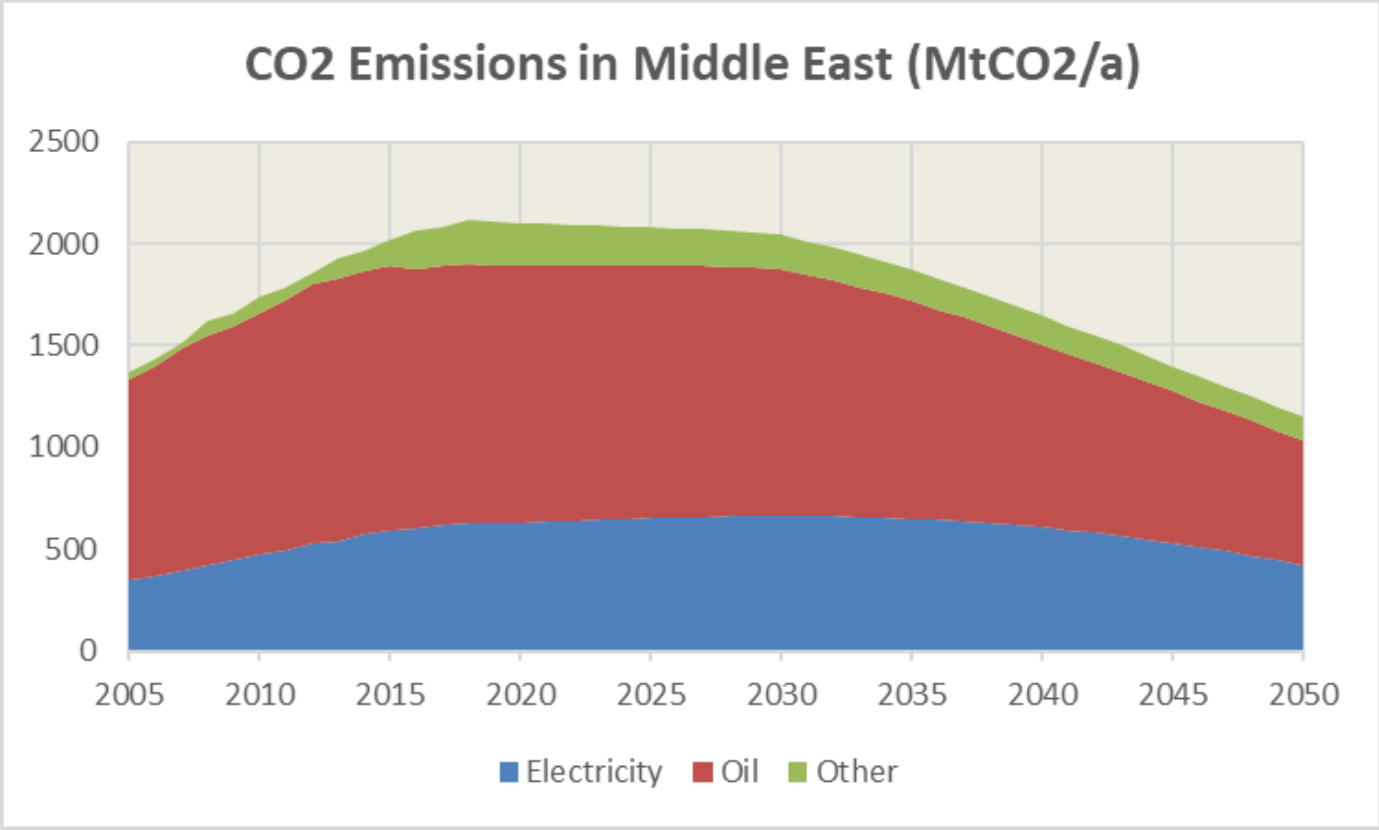
PEV = Plug-in Electric Vehicles

Consumption of Oil in Middle East will be reducing from 400 Mtoe to 200 Mtoe by 2035



PEV = Plug-in Electric Vehicles

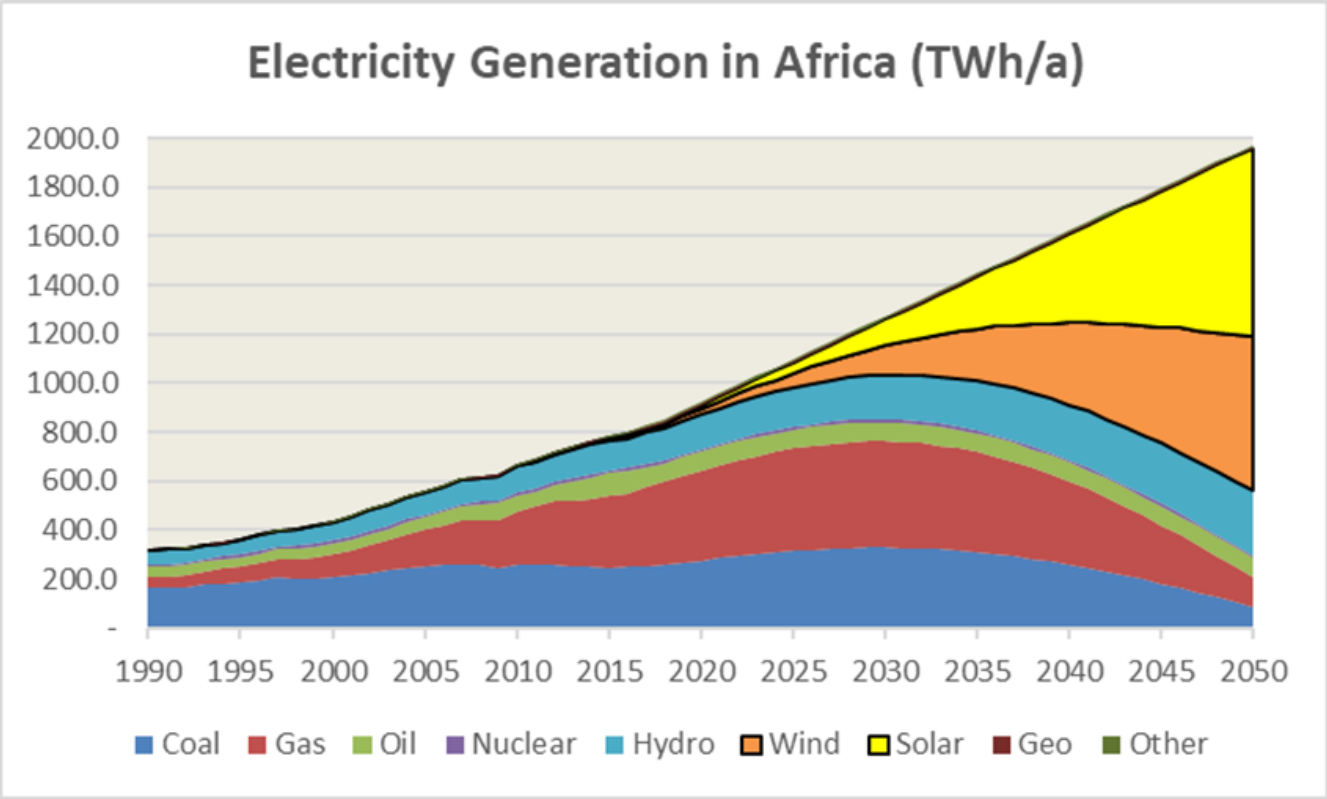
CO2 Emissions from Fuels will drop at from 2100 Mt to 1150 Mt by 2050



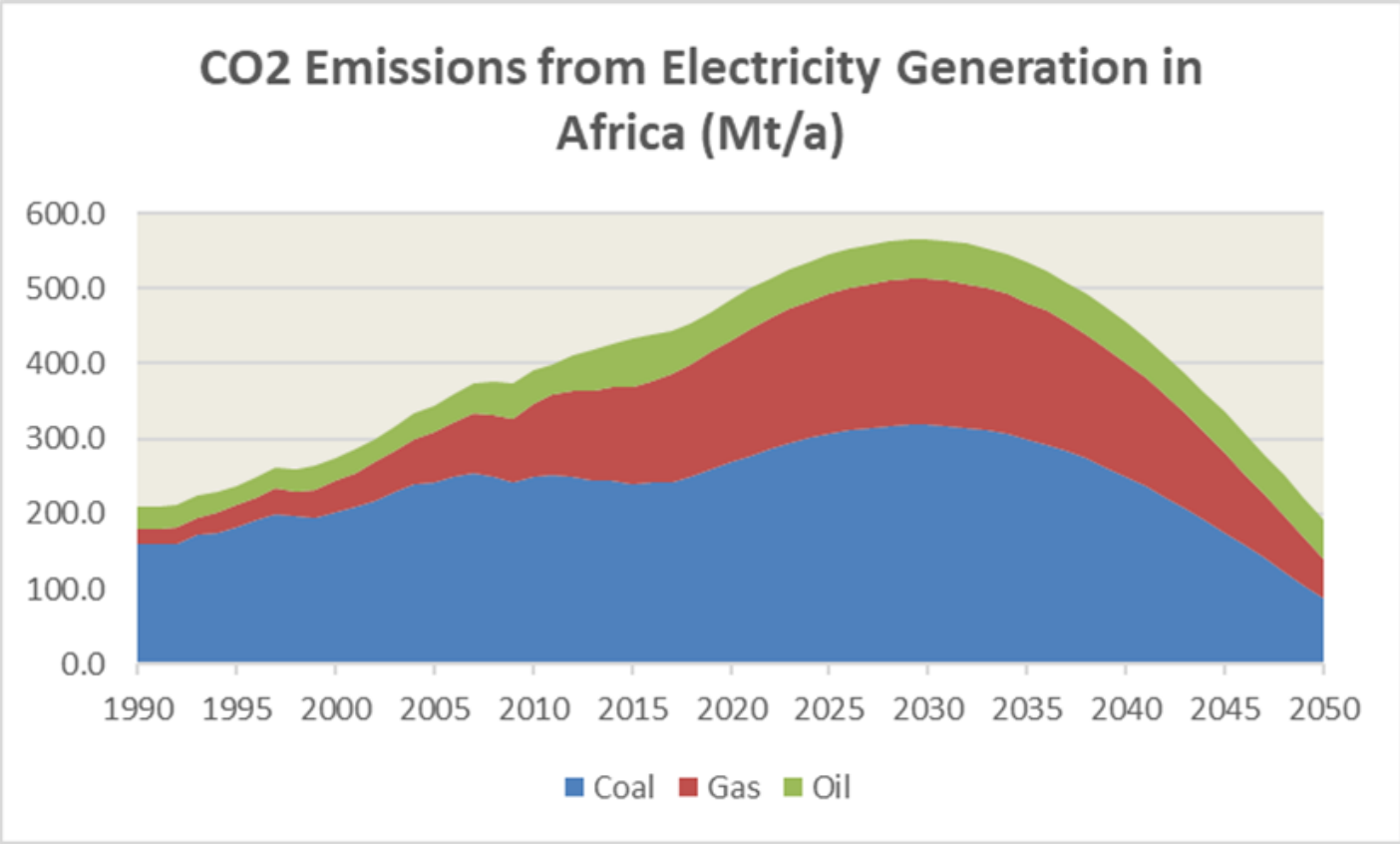
1150 Mt / 700 = 1.6 tCO2/capita, 10 % less than the target 1.8 t/capita

5. AFRICA

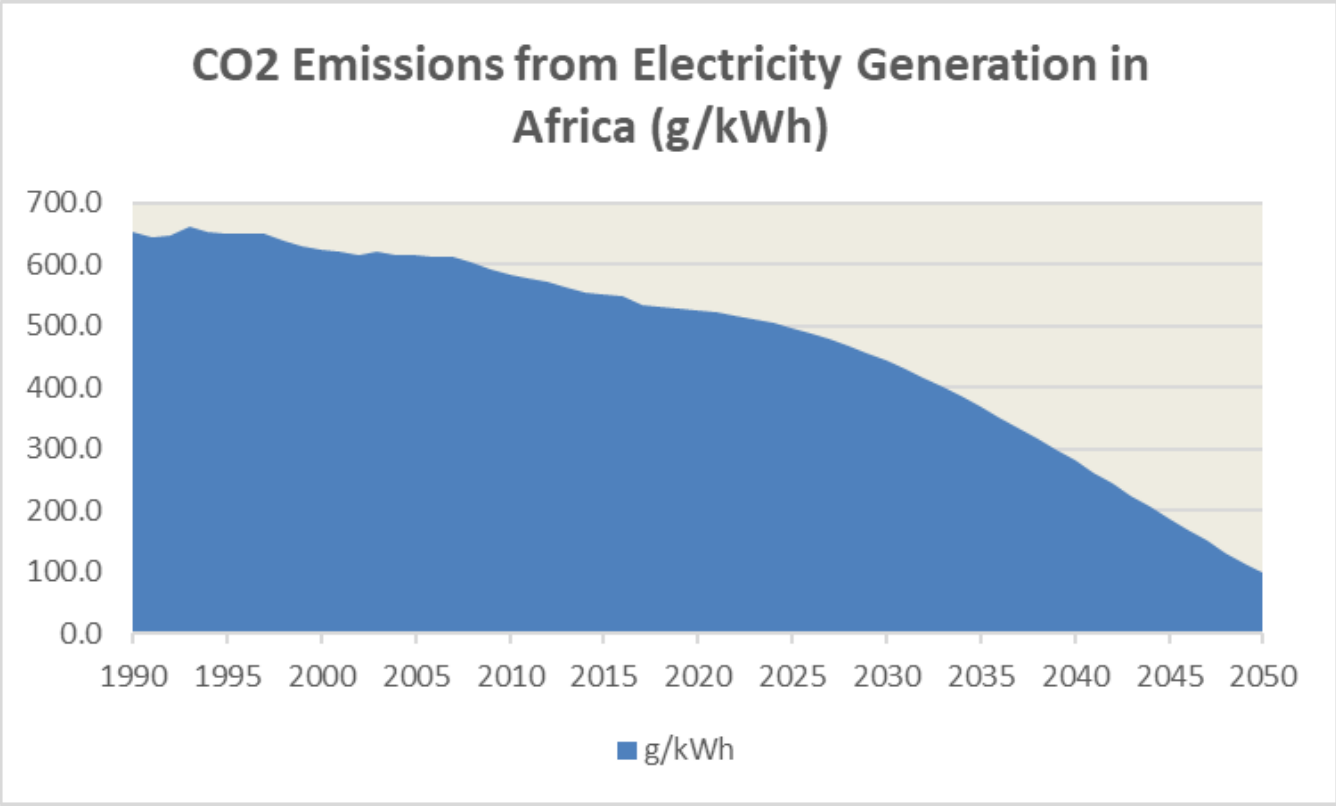
90 % from Electricity from Renewables in Africa by 2050



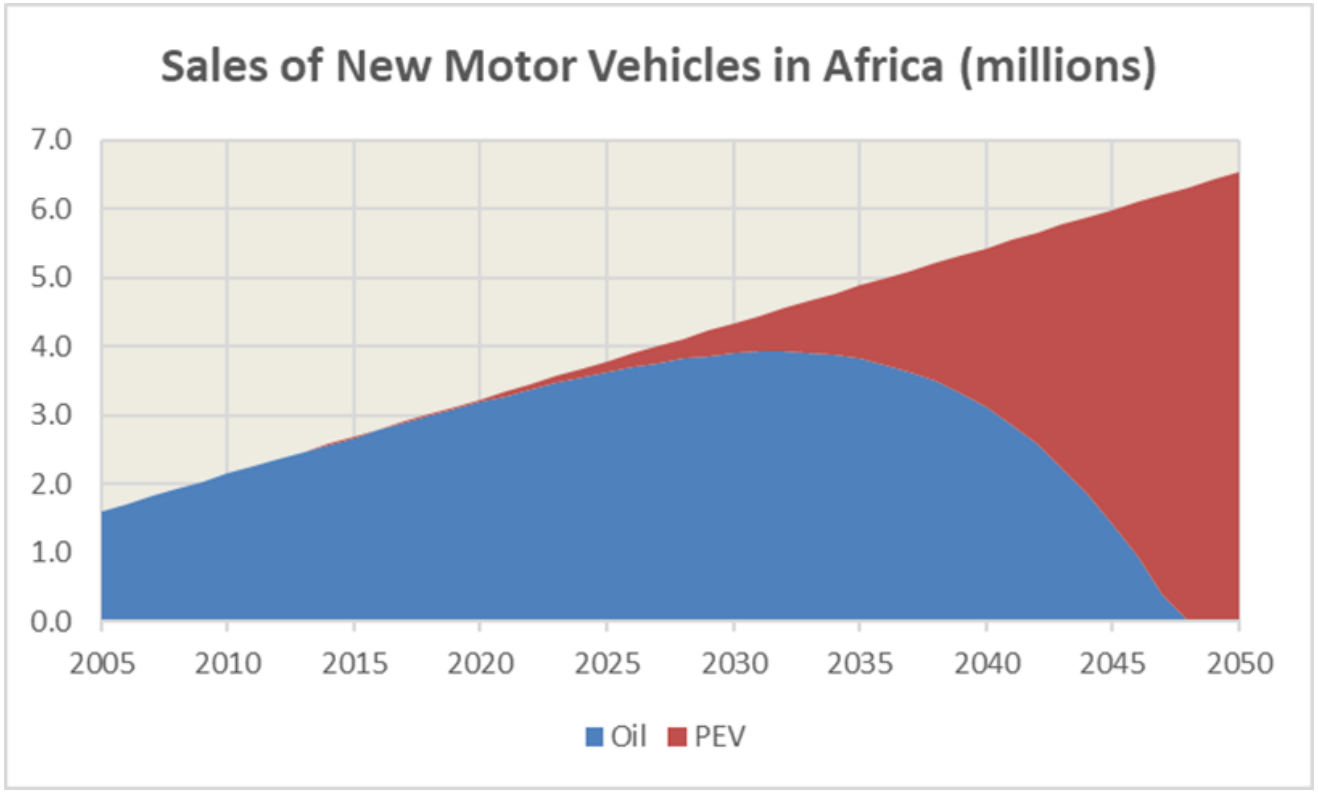
CO2 Emissions from Electricity in be peaking at 550 Mt by 2030 and drop to 200 Mt by 2050



Specific Emissions from Electricity in Africa will drop from 530 g/kWh to 100 g/kWh by 2050

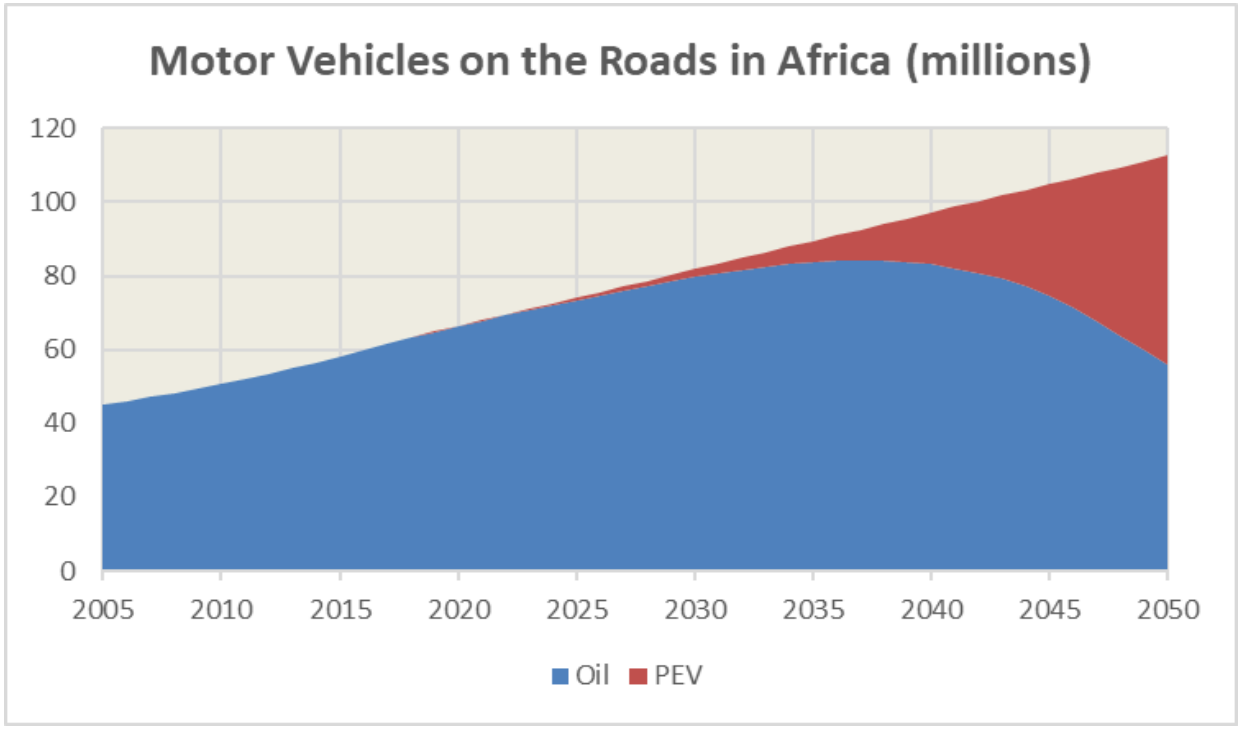


New Vehices in Africa will be PEVs by 2050



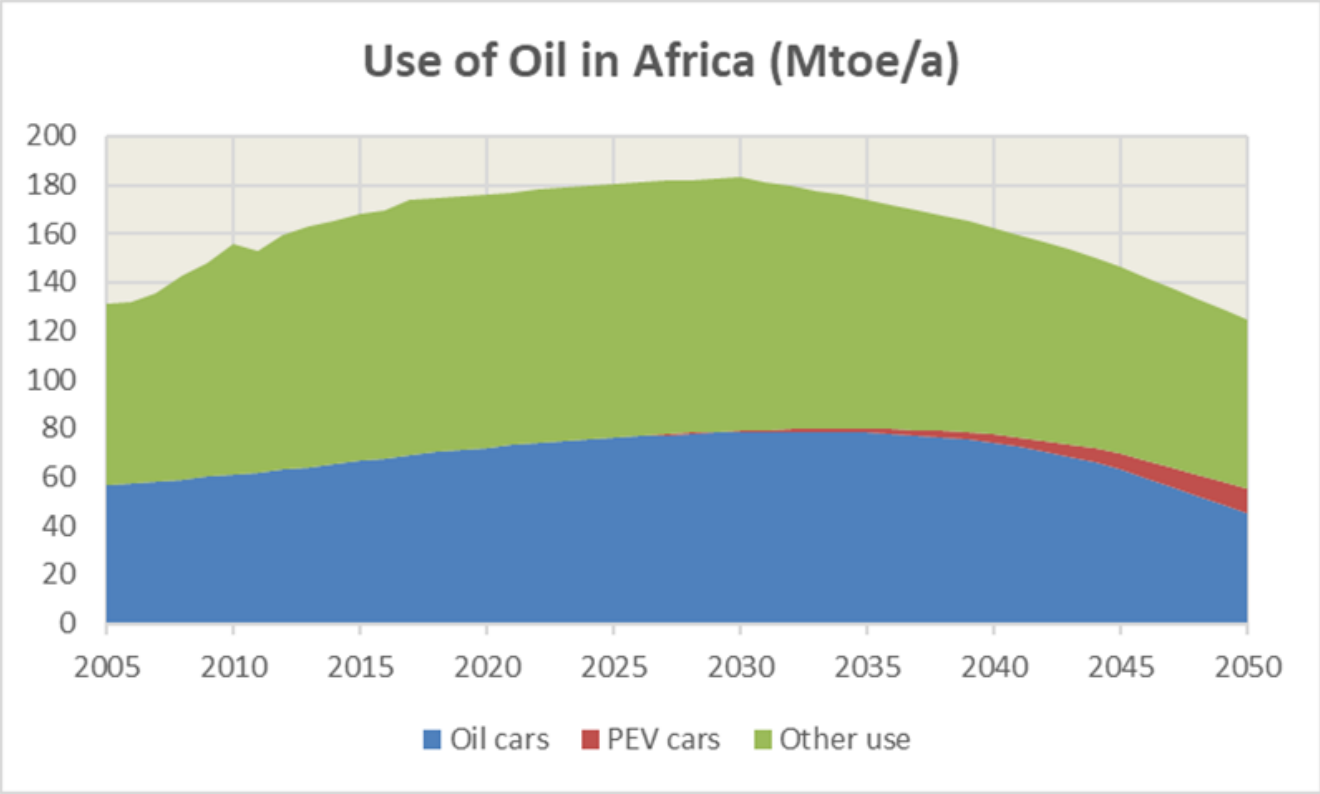
PEV = Plug-in Electric Vehicles

About 45 % of Vehicles on the Roads in Africa will be PEVs by 2050



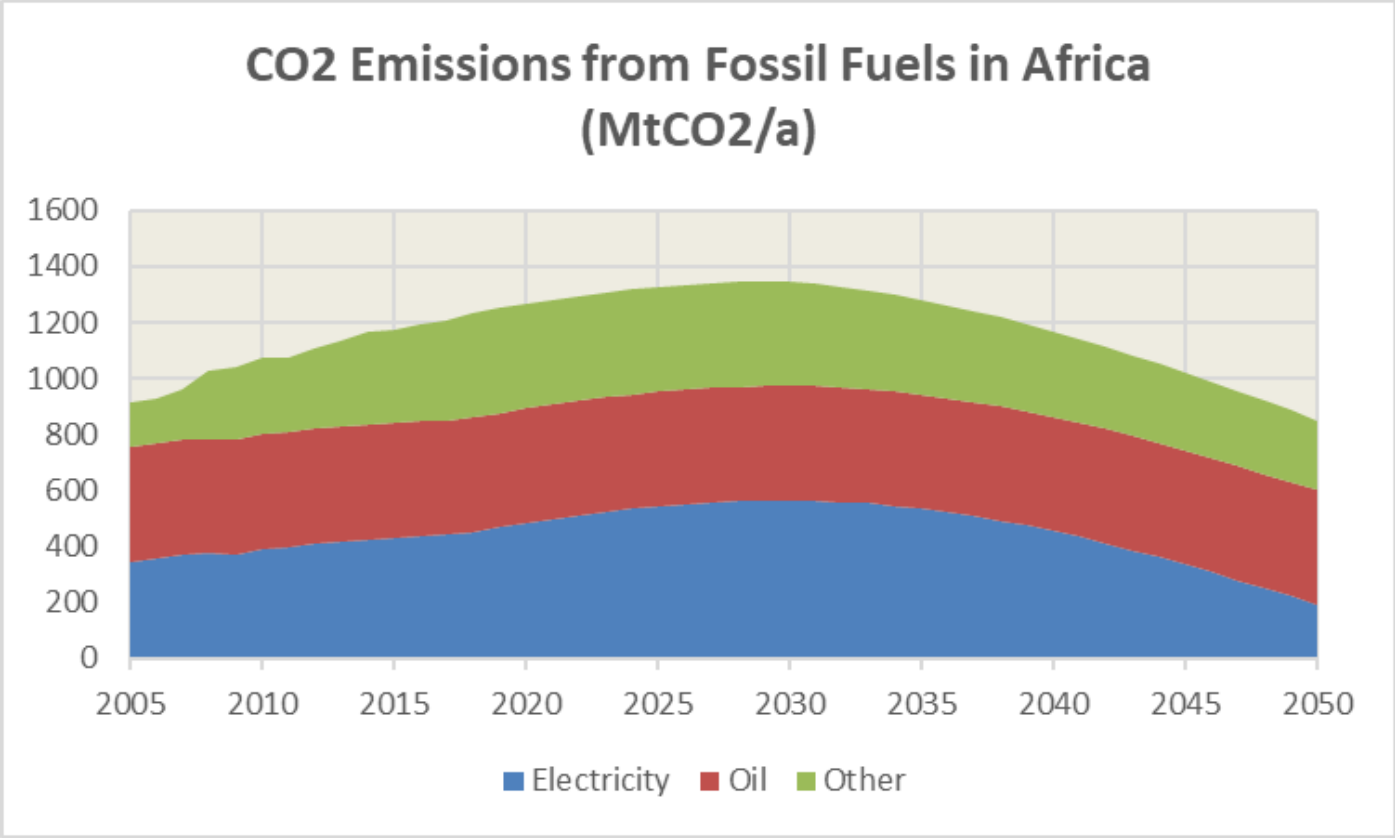
PEV = Plug-in Electric Vehicles

Consumption of Oil in Africa will be peaking at 180 Mtoe by 2030



PEV = Plug-in Electric Vehicles

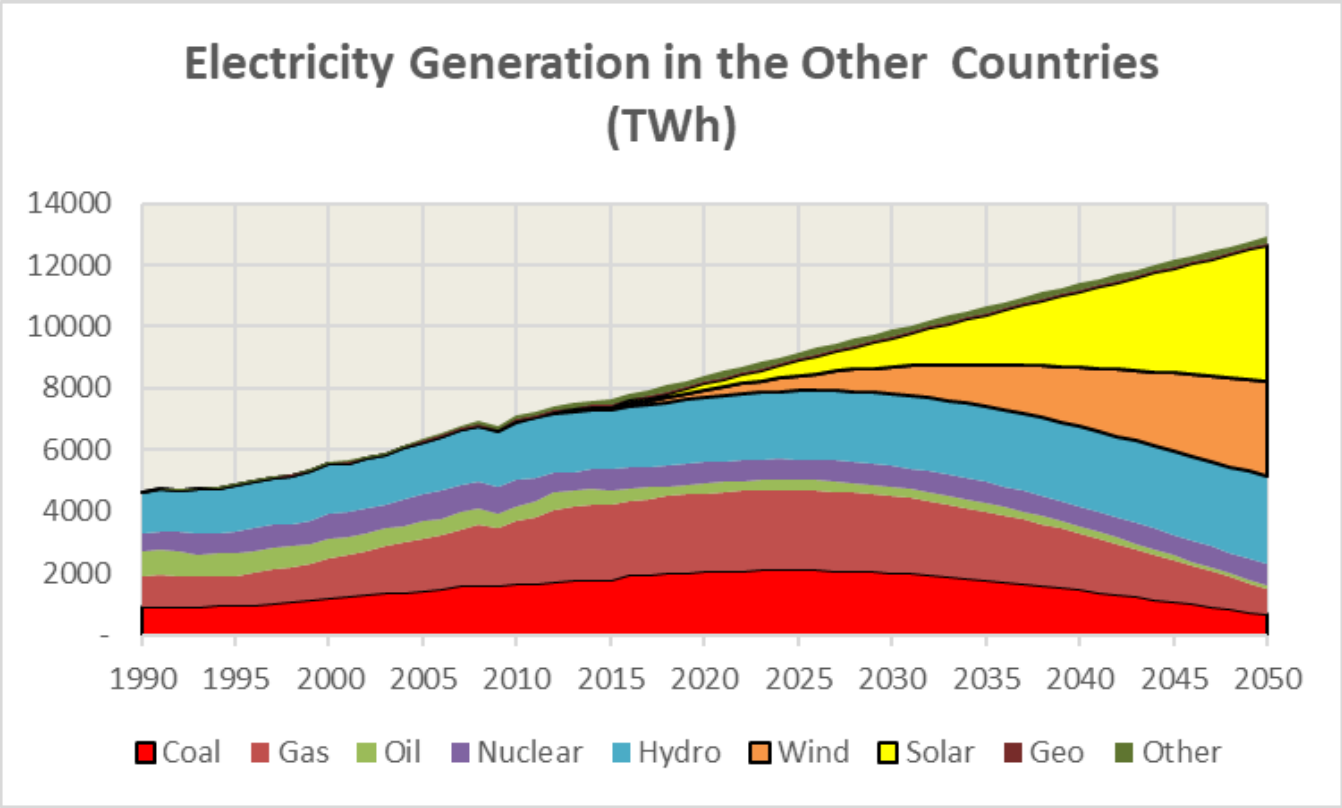
CO2 Emissions from Fuels in Africa will be peaking at 1350 Mt by 2030 and drop to 900 Mt by 2050



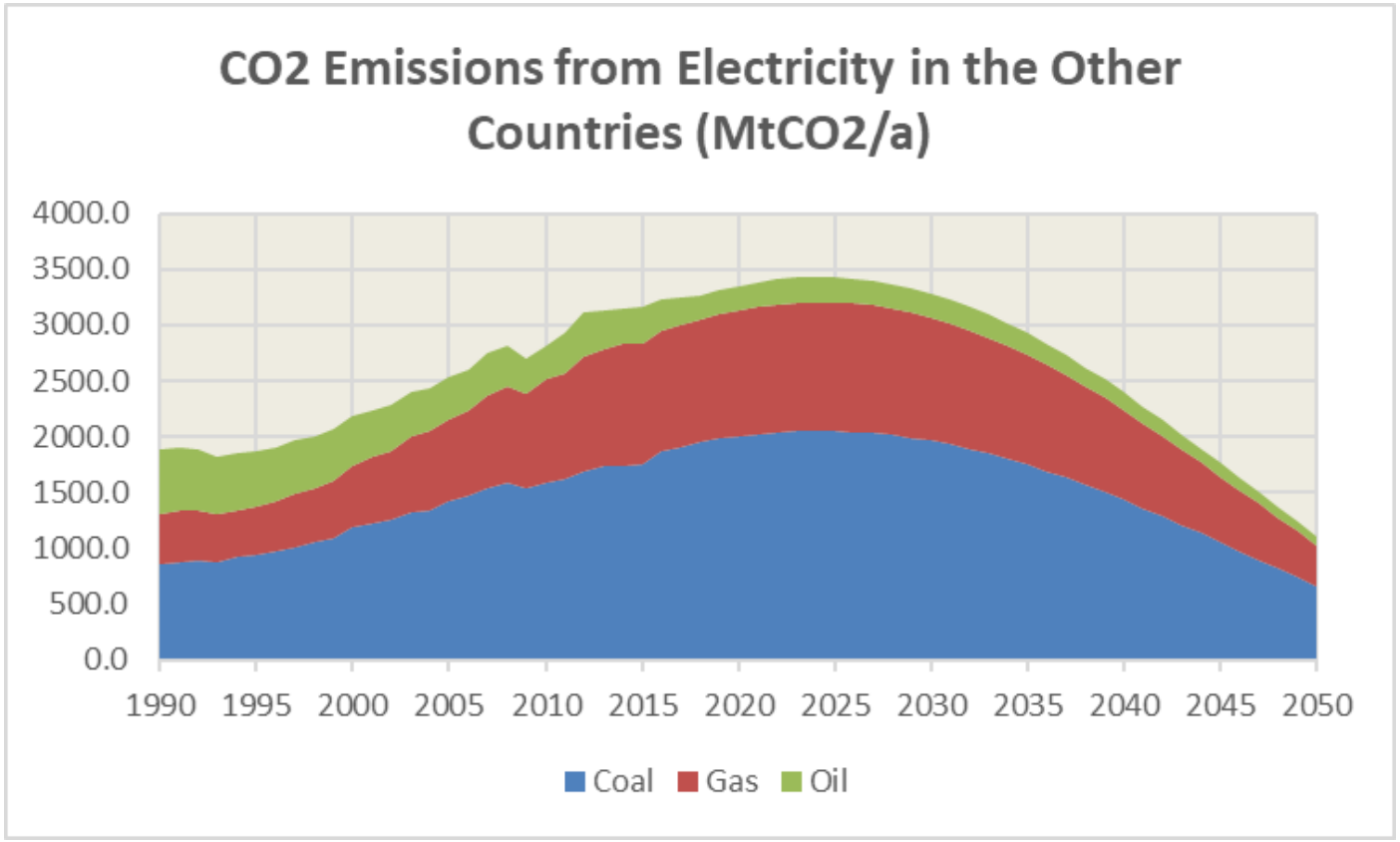
900 Mt / 1000 = 0.9 tCO2/capita, 50 % less than the target 1.8 t/capita

5. REST OF THE WOLD

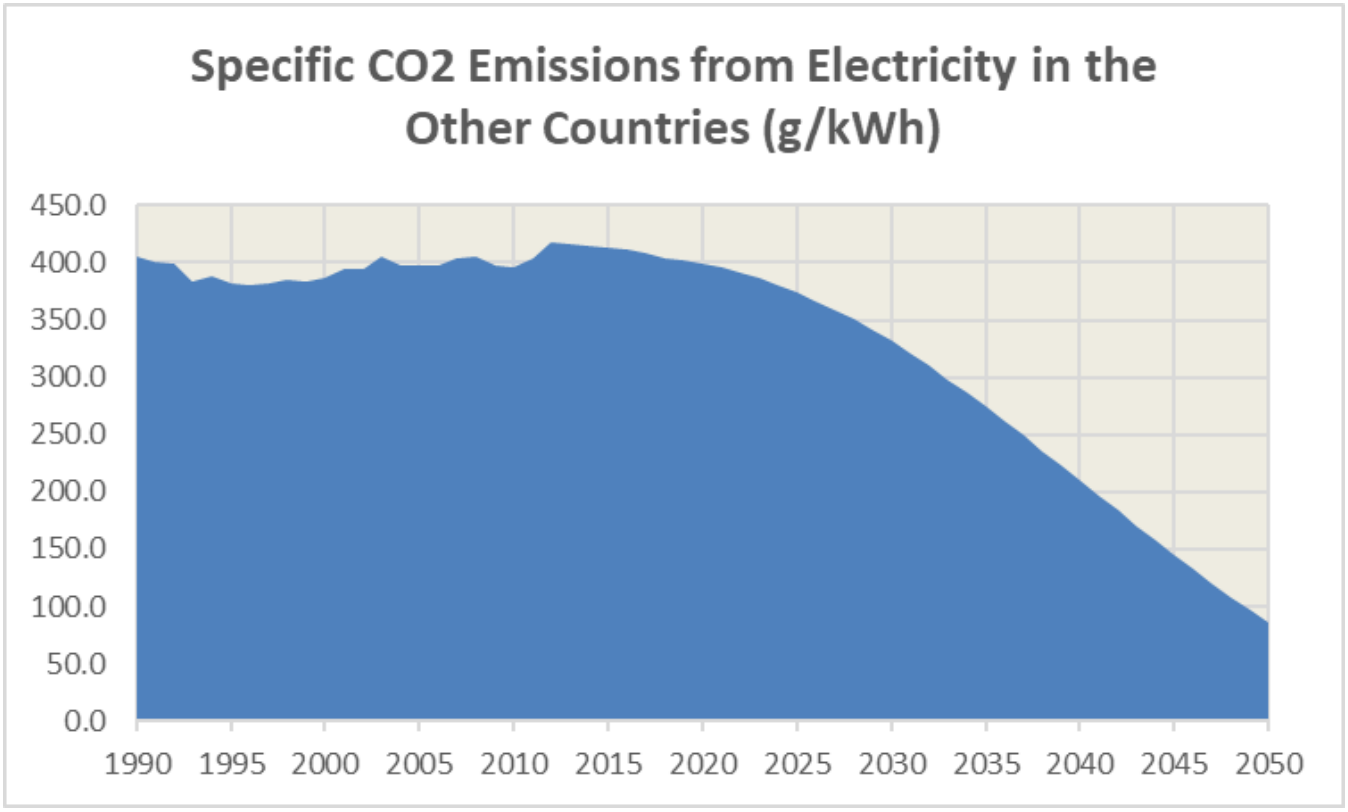
90 % from Electricity from Renewables in Rest of the World by 2050



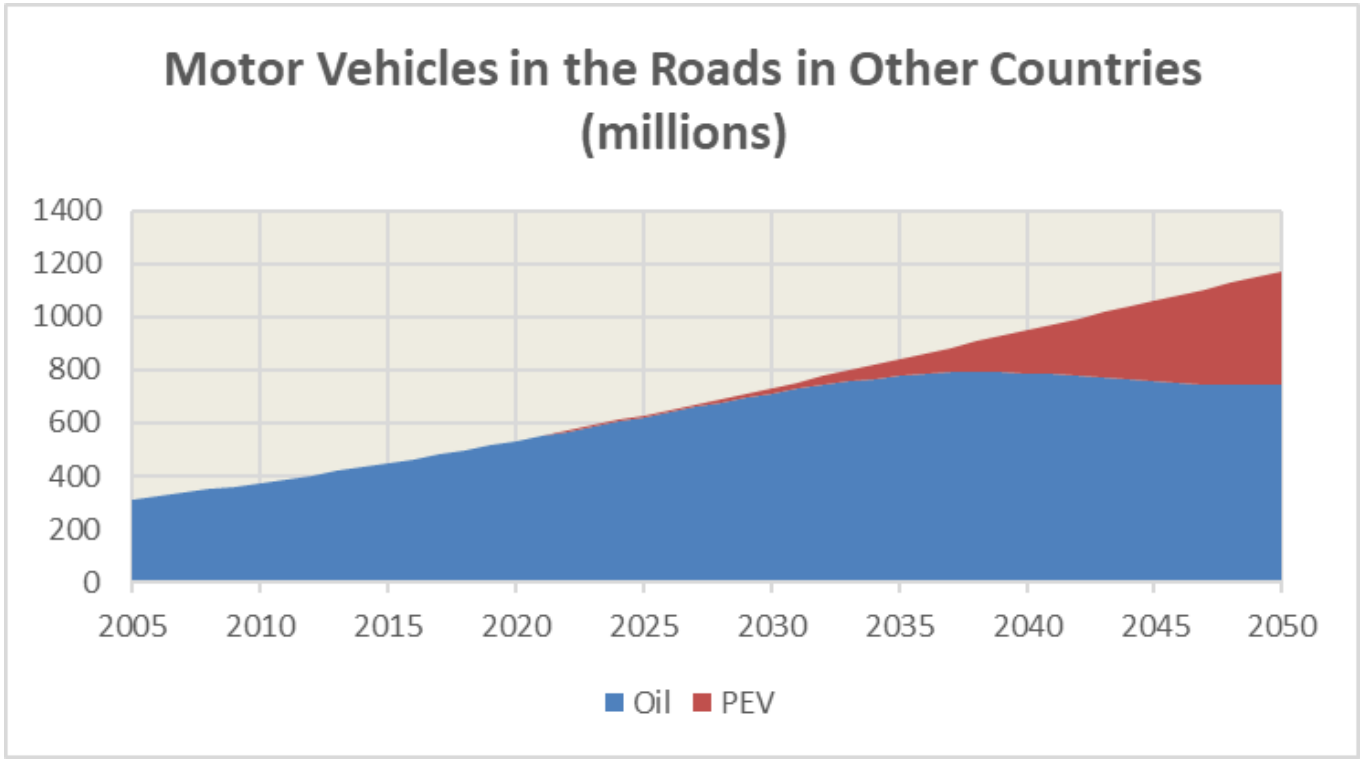
CO2 Emissions from Electricity in be peaking at 3500 Mt by 2025 and drop to 1000 Mt by 2050



Specific Emissions from Electricity in Other Countries will drop from 400 g/kWh to 90 g/kWh by 2050

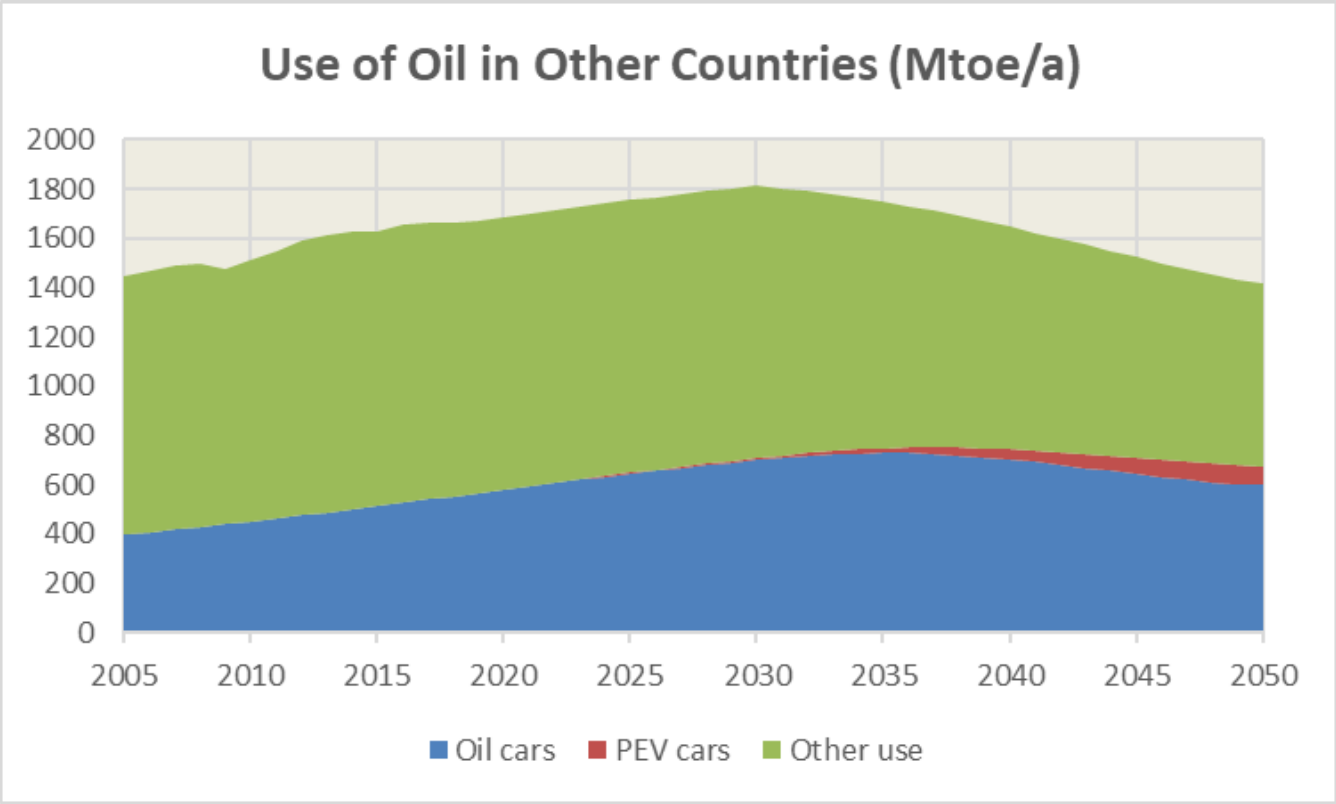


About 40 % of Vehicles on the Roads in the Other Countries will be PEVs by 2050



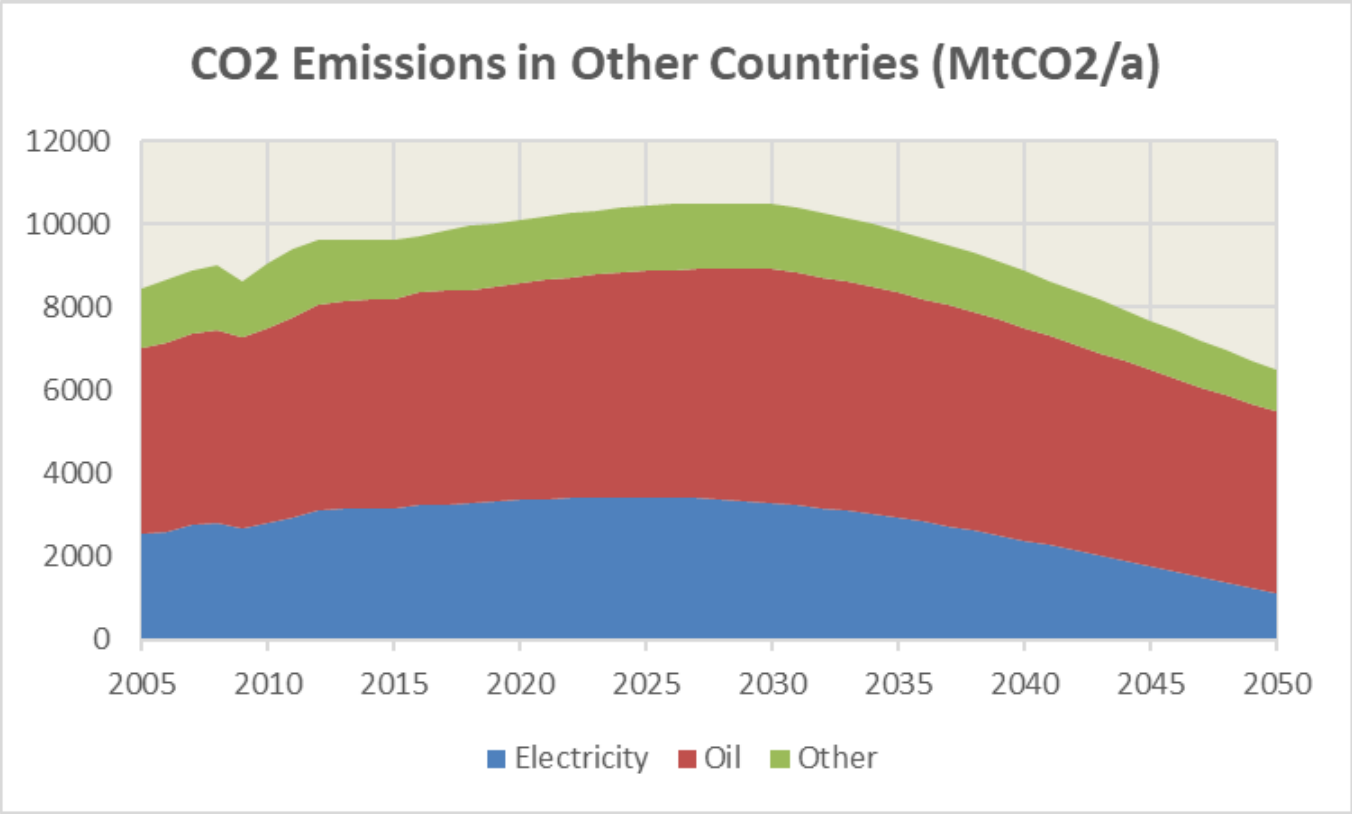
PEV = Plug-in Electric Vehicles

Consumption of Oil in the Other Countries will be peaking at 1800 Mtoe by 2030



PEV = Plug-in Electric Vehicles

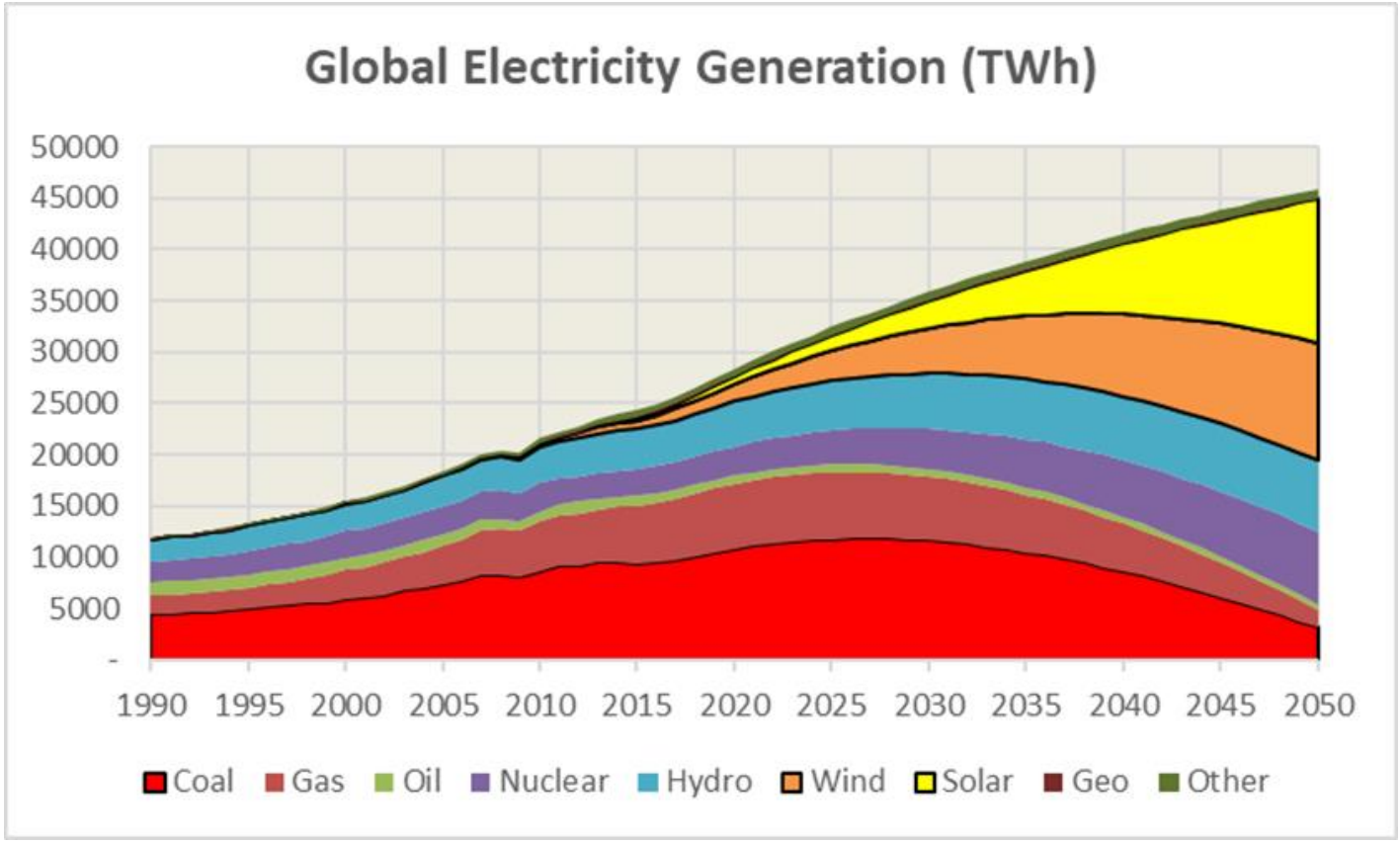
CO2 Emissions from Fuels in the Other Countries will be peaking at 10 Gt by 2030 and drop to 6 Gt by 2050



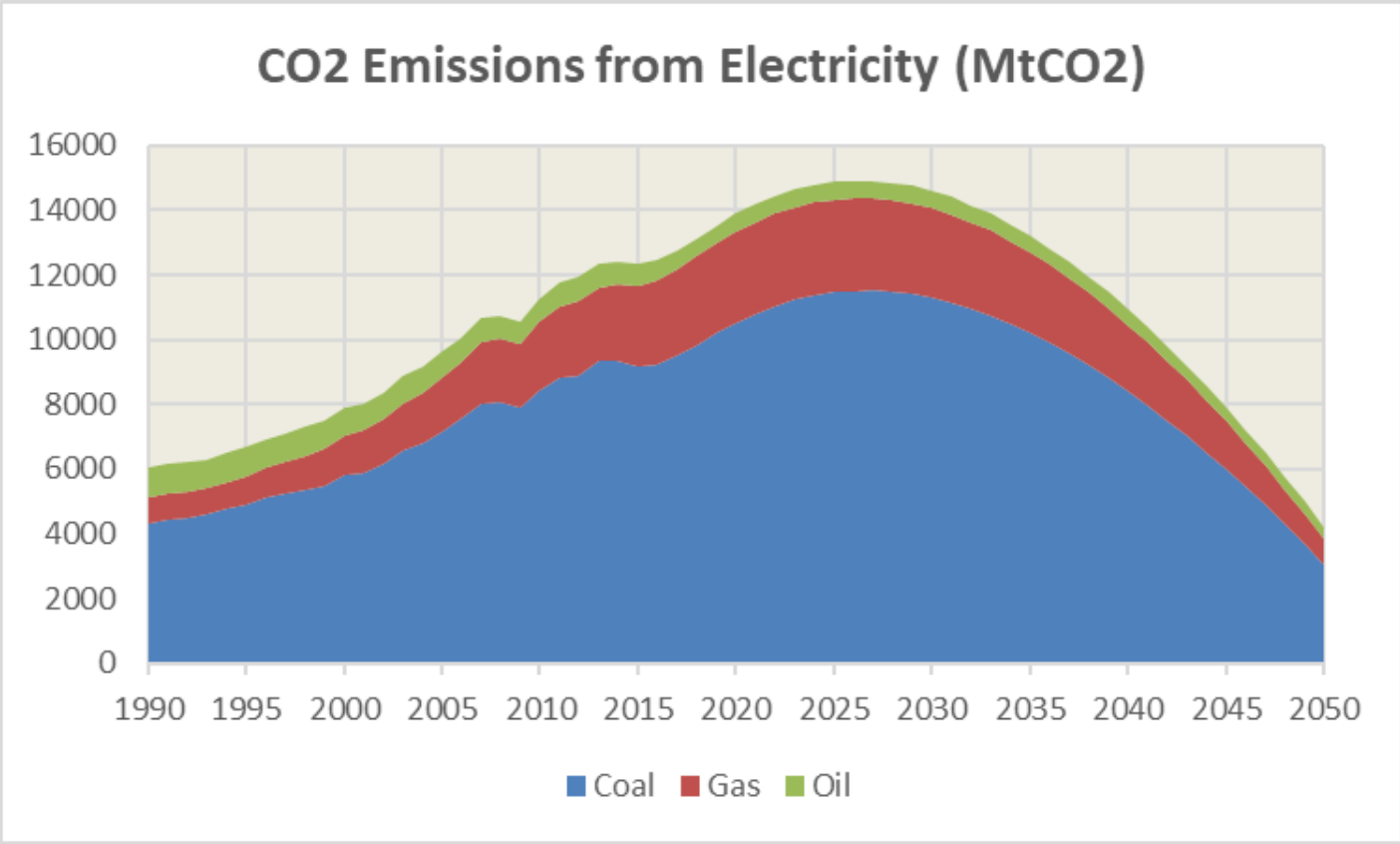
6000 Mt / 3000 = 2 tCO2/capita, 10 % more than the target 1.8 t/capita

5. GLOBAL

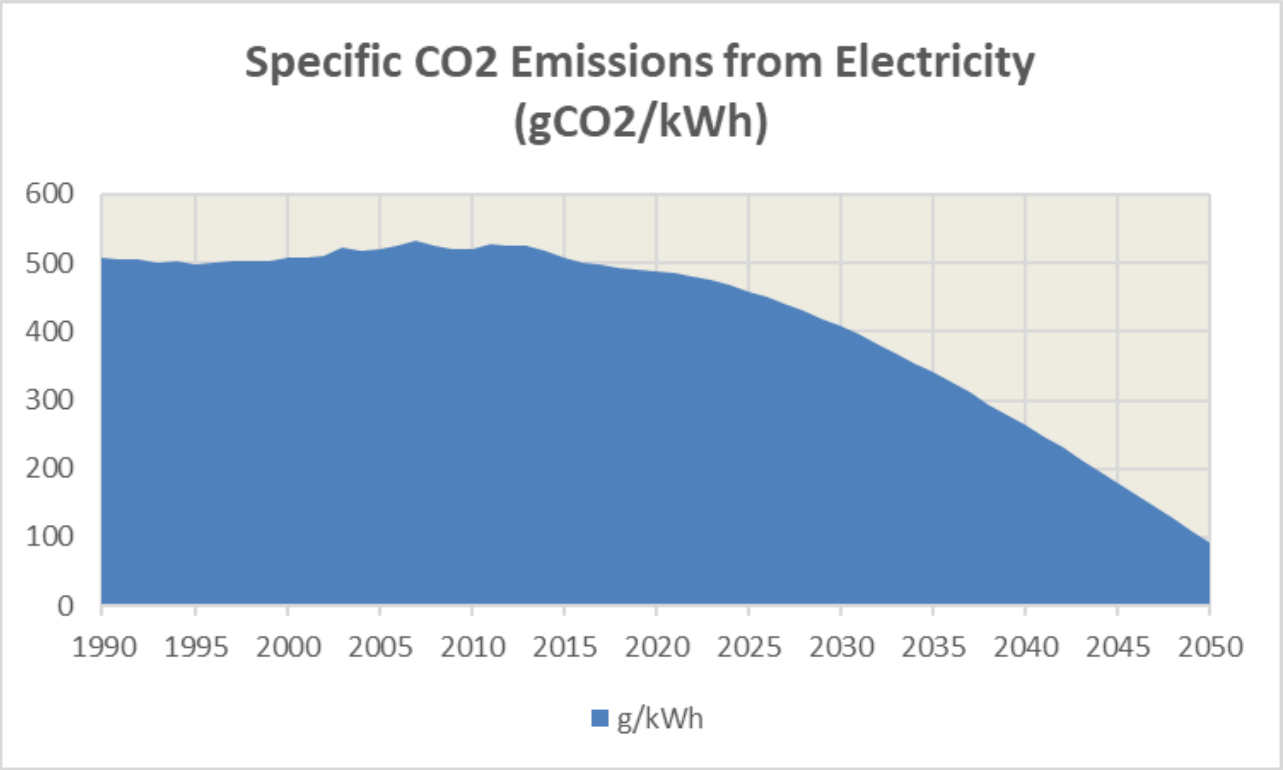
90 % from Global Electricity will be CO2 free by 2050



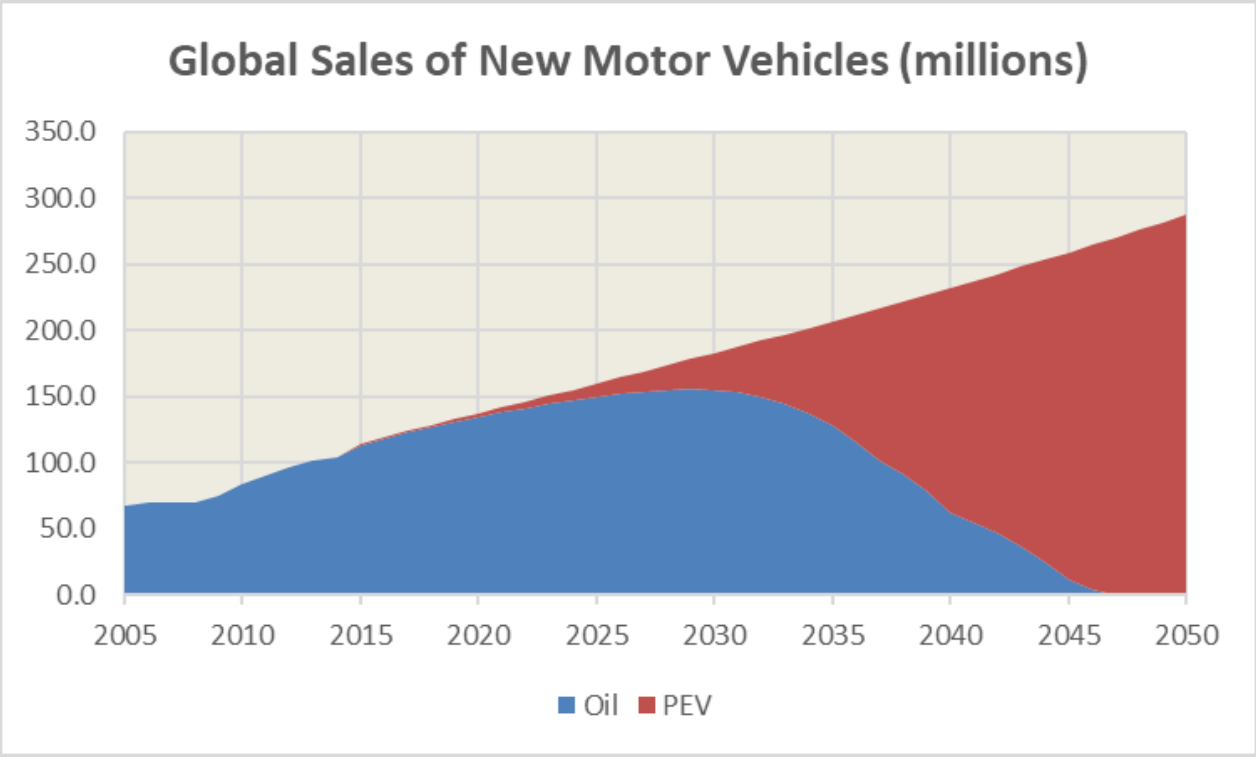
CO2 Emissions from Global Electricity will be peaking at 14.5 Gt by 2025 and drop to 4 Gt by 2050



Specific Emissions from Global Electricity in will drop from 500 g/kWh to 90 g/kWh by 2050

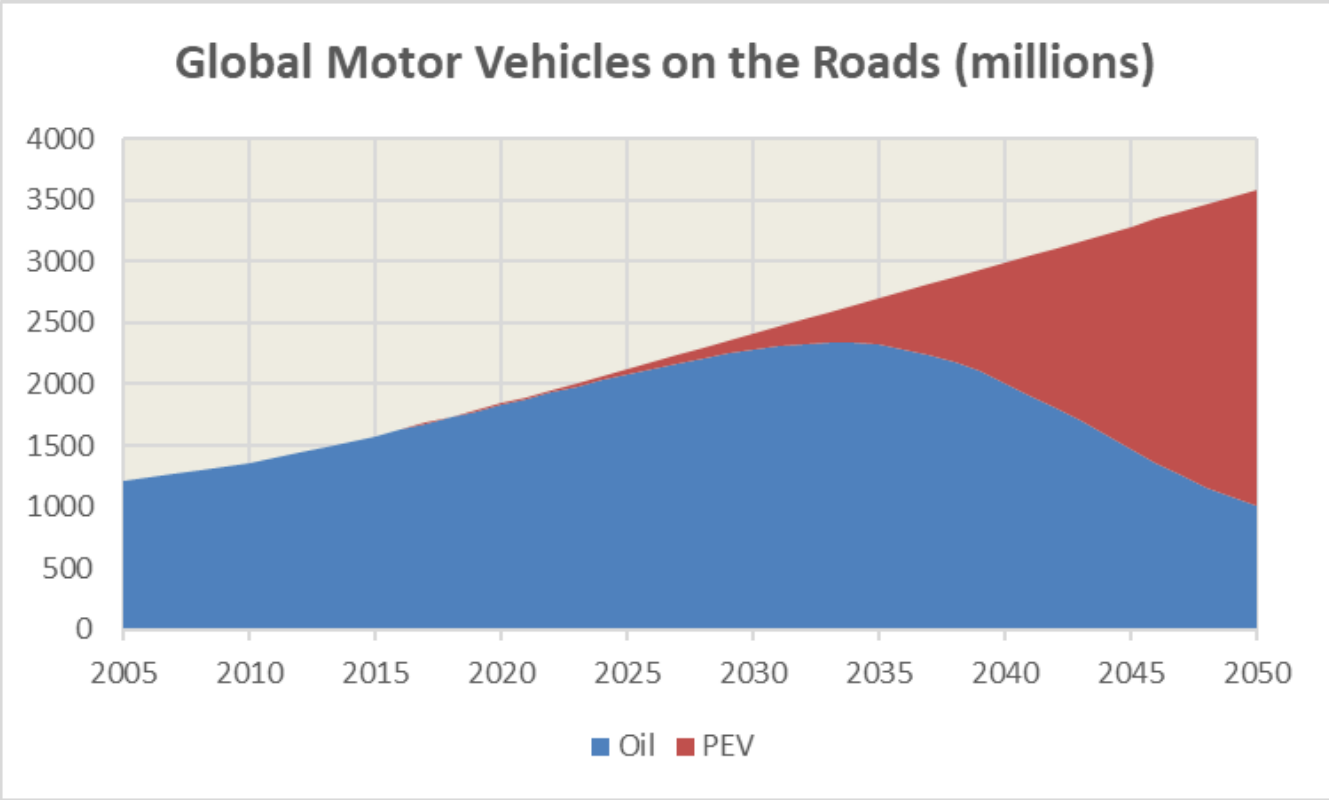


100 % of New Vehicles will be PEVs by 2050



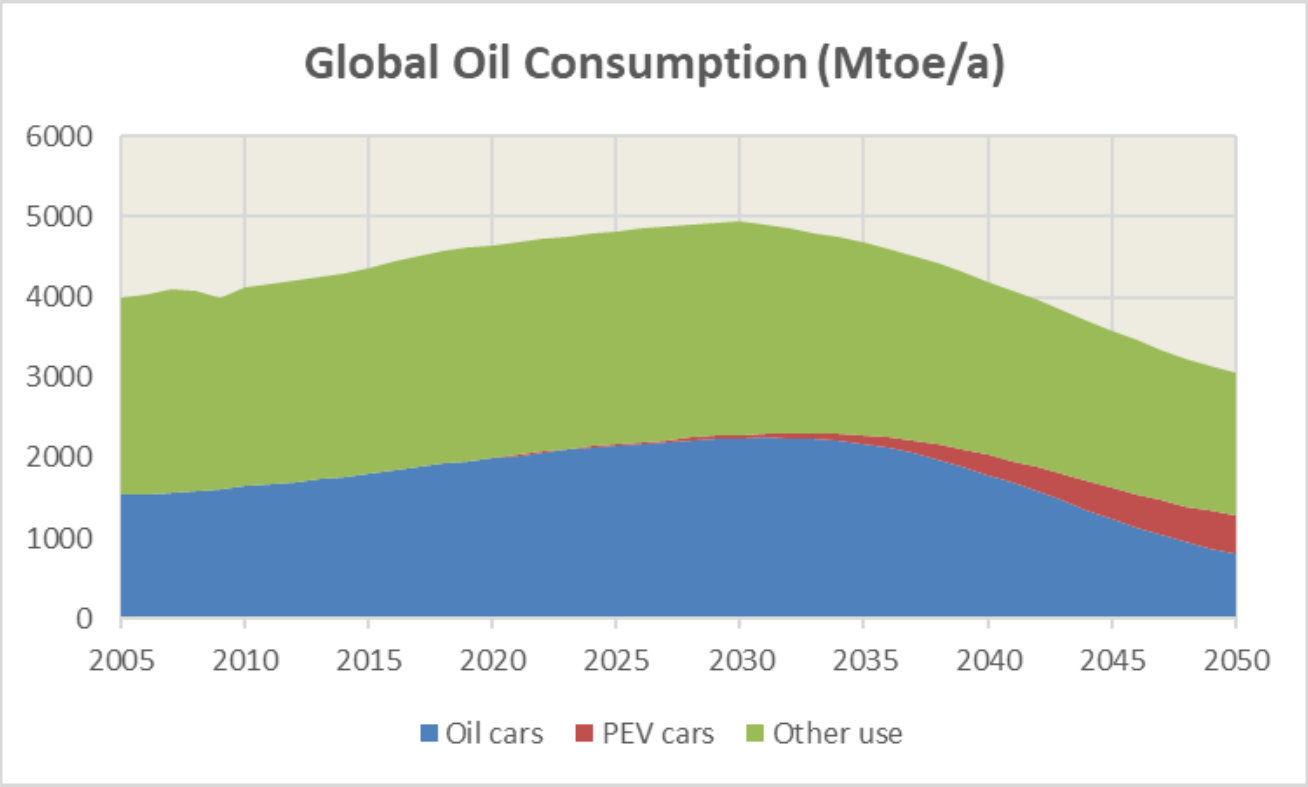
PEV = Plug-in Electric Vehicles

About 70 % of Vehicles on the Roads will be PEVs by 2050



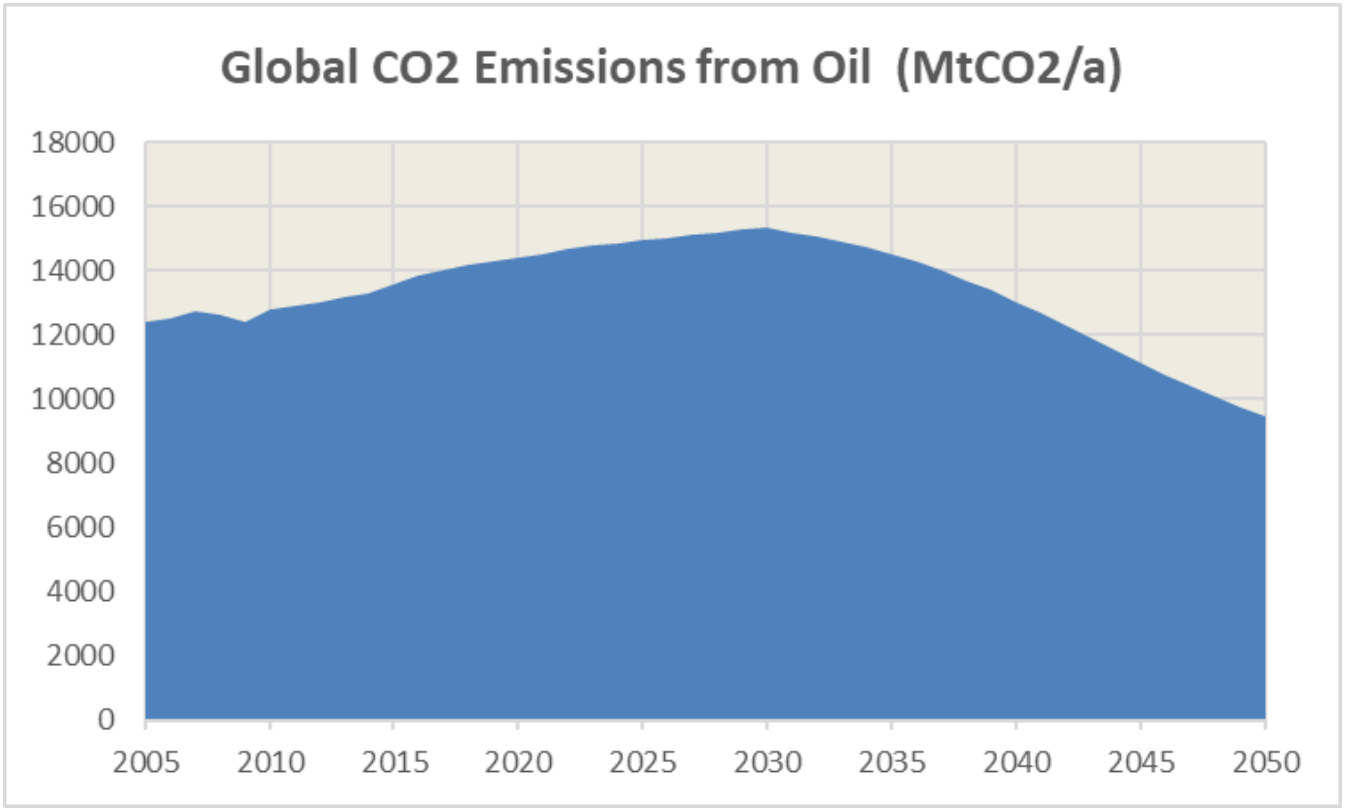
PEV = Plug-in Electric Vehicles

Global Oil Consumption will be peaking at 5000 Mtoe by 2030

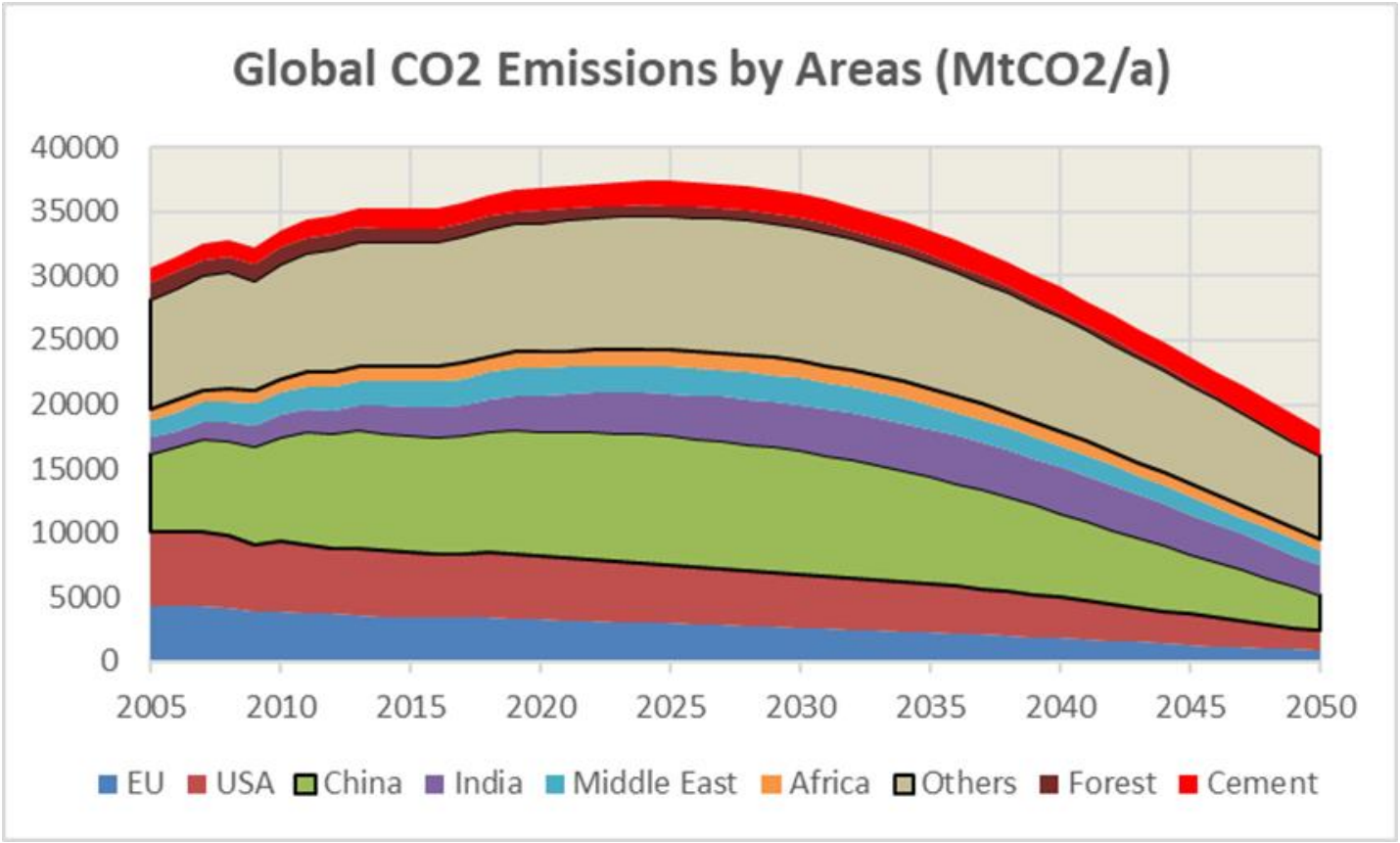


PEV = Plug-in Electric Vehicles

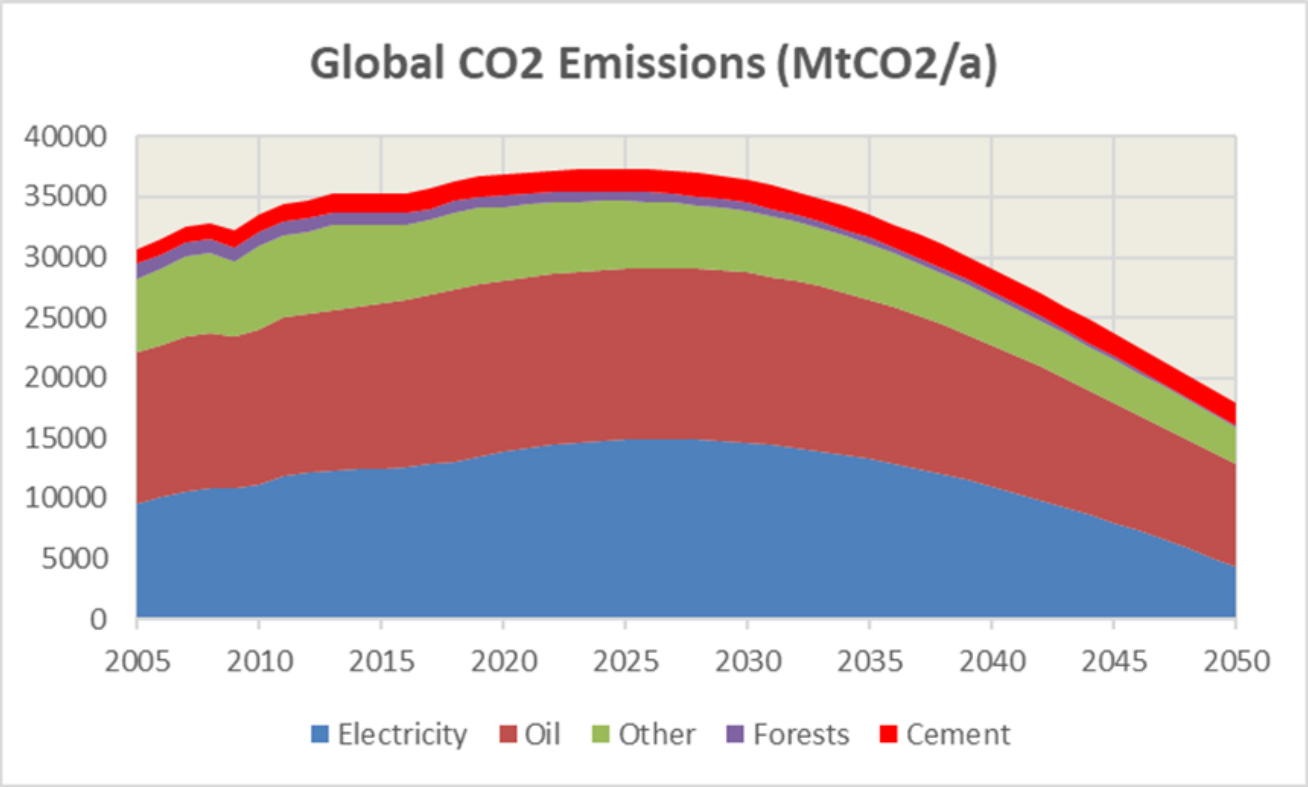
Global Emissions from Oil will be peaking at 15 GtCO2 by 2030



Global CO2 Emissions will be peaking at 37 Gt by 2025 and drop to 18 Gt by 2050



Global CO2 Emissions will be peaking at 37 Gt by 2025 and drop to 18 Gt by 2050



18000 Mt / 10000 = 1.8 tCO2/capita, the same as the target 1.8 t/capita

7. SUMMARY

Summary

It is possible to limit global warming to 2.0 deg. C, if emissions will be reduced at least 2 % annually or with the target plan to achive less than 18 Gt emissions by 2050

This can be achieved by installing zero emission power plants (Wind, Solar, Hydro, Nuclear, Bio), changing cars from oil to electricity and by increasing carbon sinks by building wooden houses

Summary

All countries should limit their CO2 emissions below 1.8 tons/capita.

Countries with more than 10 tons/capita, should reduce their emissions 5-10 %/a

Countries with 5 – 10 tons/capita should reduce their emissions 3 - 5 %/a

Countries with 2 – 5 tons/capita could limit their emissions 0 - 3 %/a

Reference

The book
“Fundamentals of Global Warming”
can be downloaded from

www.ekoenergo.fi