

BRIEFING NOTES: IEA World Energy Outlook 2012 report

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The IEA is *not* recommending the world to accept their 450 ppm CO₂e scenario. IEA just says *if* world goes down that route *than those* are the implications. The IEA has five mid-term (until 2035) energy scenarios which they analyse re investment costs, technology choices, carbon emissions, temperature change etc.

The “Current Policies” – sort of BAU/reference scenario that leads to climate disaster – up to >5 degree C eventually, assuming all policies and measures PRESENTLY agreed ARE in place and implemented and those in pipeline presently are successfully implemented domestically, but not much more. In this scenario overall net GHG emissions will grow from almost 50 Gt CO₂e today to 57 and 69 Gt CO₂e by 2020 and 2035 respectively. Global emissions peak is foreseen by 2070 and stabilisation of atmospheric CO₂e concentration does not occur before 2150 with around 950 ppm CO₂e.

The “New Polices” – assuming more ‘rational’ energy policy, more climate change mitigation, more RES, more nukes, more energy efficiency and CCS etc., assuming more of the same kind of all happening, but not too aggressive “costly” climate policies. This is “preferred scenario” of IEA reflecting on likelihood. This may lead to 3.6 degree C. Overall GHG emissions stay roughly flat between now and 2050 at about 51 Gt CO₂e and start declining not before 2050. Overall CO₂e concentration in atmosphere stabilise at about 650 ppm in 2100.

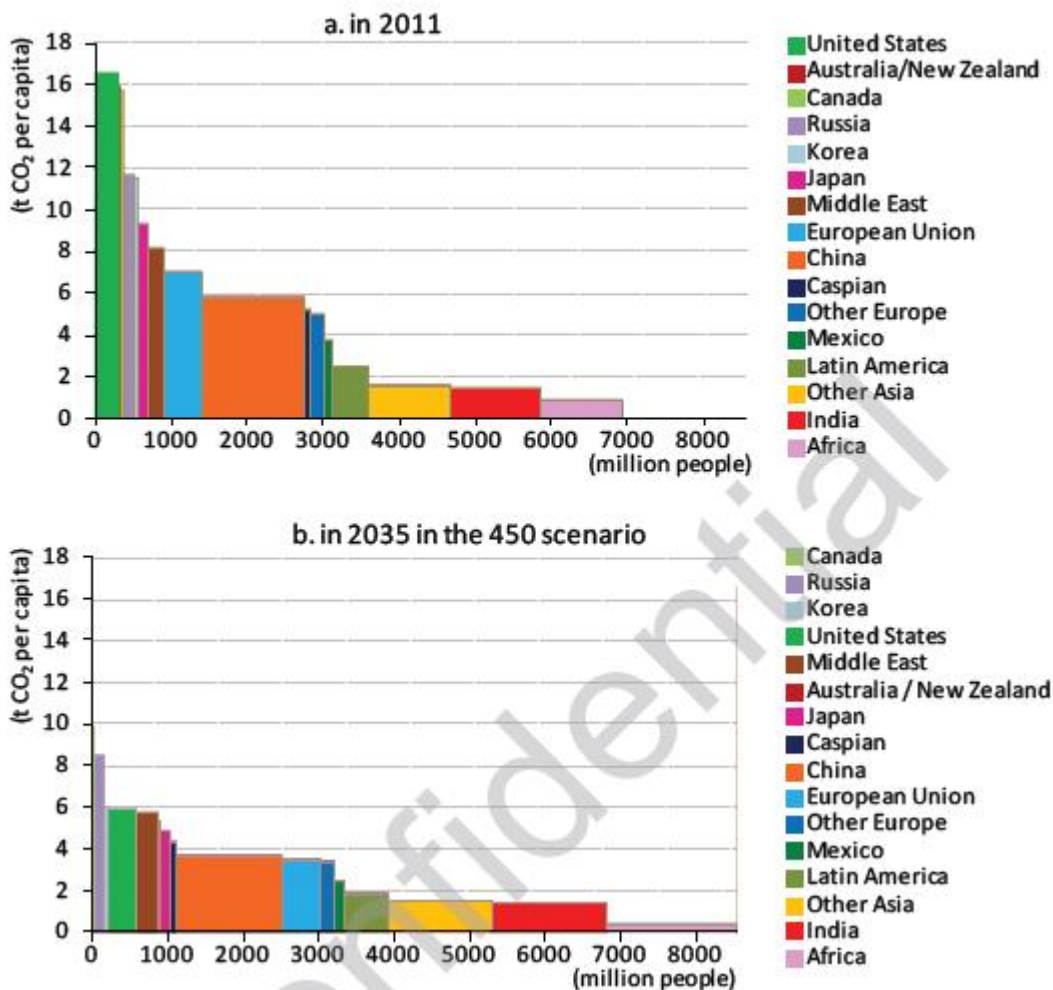
The “Energy Efficiency” – focus on EnEff particularly but not much on RES – will lead us to about 3 degree. An enhanced version of the “New Policies”

The “Golden Age of Gas” – assuming fossil gas, mainly unconventional shale gas in future, creates a global energy revolution, replacing lots of coal and oil but also RES and energy efficiency (low priced gas), leading to >3.5 degree warming. Somewhere between the “Current” and “New” Policy scenarios. Note that this scenario explicitly excludes CCS because it is estimated that the geological reservoirs for shale gas overlap with geological sediments suitable for carbon storage eventually. Shale gas exploitation creates a patchwork of leaky geological situations.... *In case* this problem can be overcome, IEA assumes that such a “Golden Age for Gas” scenario may lead to staying <3 degree. Again, no good enough!

The 450 ppm CO₂e scenario. That is that one with aggressive climate measures. Kind of 'compliance' scenario with internationally agreed objectives by governments (not exceeding 2 degree) – Note, that even this scenario gives only a 50% chance to NOT exceed 2 degree eventually. There are various sub-scenarios by IEA on the 450 piece. Focussing either more on RES, nukes, CCS, energy efficiency. But all with same results globally on 'allowed' temperature change. The IEA is saying 2/3 of all fossil reserves which are about 2.8 Teraton of CO₂, need to be left underground when aiming at the 2-degree objective... *unless CCS is developed and deployed massively in next decades*" Fossil Fuel resources represent >20 Teraton CO₂ if burnt. We have purposely left this CCS piece out in our argumentation for a variety of reason incl. the present prohibitive costs of CCS which are presently about 10 times the EAAU price per t/CO₂ and the sheer size of carbon storage reservoirs needed globally to put about up to 2 Teraton CO₂ underground in case all reserves are being used. But *theoretically and physically* it is indeed possible to stay below 2 degree and use all of the fossil fuel reserves. Not likely and not very practical.....but let's keep that in mind for questions of clever journalists. IEA also indicates that 4 world regions, US, Russia, China and Middle East harbour around 2/3 of all fossil fuel reserves. So overwhelming majority of actions has to take place here.....The 450ppm scenario sees a peak of global emissions at 2017 and a decline to about 33 Gt CO₂e by 2035 by which atmospheric concentrations of CO₂e are on way to decline. We should be aware that the specific 450ppmCO₂e scenario of IEA foresees a substantive growth of nuclear power from about 10% presently to almost 20% of global power supply by 2035. However, the largest action is required with energy efficiency and renewables followed by CCS compared to "Current policies". *Keep in mind please also that in case world moves towards a 3/3.5-degree trajectory (500 – 600 ppm CO₂ conc) and CCS is not taking off, even then major parts of presently proven fossil fuel reserves (1/3 – 1/2) need to be stay underground simply from cumulative carbon emissions budget reasons...*

See breakdown of projected per capita CO₂-energy emissions today and in 2035 based on the technological end economic potentials in countries:

Figure 8.10 ▶ Per capita emissions and total emissions by region (t CO₂)



You see that based on IEA methodology largest reductions actions from today onwards (not 1990!) have to occur in US (-63%), Russia (-30%), EU (-50%), China (-34%), others to stabilise per capita emissions on present levels roughly. I am not suggesting we are supporting THIS scenario in its allocation of technologies or emissions reductions to countries/regions. But I think the overall challenge is clear. OECD alone cannot do it. And China plays a substantive part in emissions reductions in future.

There are a few other key issues highlighted by IEA and reflect on projections under both 'Current' and 'New' Policy scenarios

- Although not officially recommending the 450 ppm scenario, IEA is saying that world presently is failing to put the world energy system on a sustainable pathway.
- Until 2035 based on "New Policies", energy demand will stabilise in OECD and that in non-OECD mainly China, India and Middle East will grow by >30%. Coal remains dominant in Asia, but others switch more to gas and renewables. Biggest unknown is nukes.
- Fossil Fuel subsidies, now 523 \$US billion in 2011 were 30% up compared to 2010, and six times higher than renewable subsidies (Note that IEA only looks at consumption subsidies in developing countries AND subsidies for renewables include Feed-in-Tariffs which when paid for by the consumers are NO subsidies in the legal sense!).

- Following observed trends in last few years, despite rapid growth in RES in some countries, new unconventional oil and gas will be the real challenge and take off substantially
- Based on current trends, USA will be the largest oil producer AND remain the largest gas producer in the world in 2020s overtaking Saudi Arabia. After shale gas boom there is now shale oil (tight oil) booming in US. US may even become net oil exporter in 2030.
- In addition to renewables, energy efficiency is key.
- Renewables will likely represent 1/3 of all power produced by 2035 and 'require' \$US 240 billion 'subsidies' by 2035.
- Coal use in Asia (mainly India and China) will grow substantively; Gas may replace some coal in some places but also RES and may even lead to US becoming a major coal exporter as we have seen in last year when cheap shale gas expansion in US led to CO2 reductions in US but more coal use in EU. Imported US coal replaced comparatively costly EU natural gas. "No one is an Island" (IEA).

Read the IEA report at:

<http://www.iea.org/newsroomandevents/pressreleases/2012/november/name,33015,en.html>

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