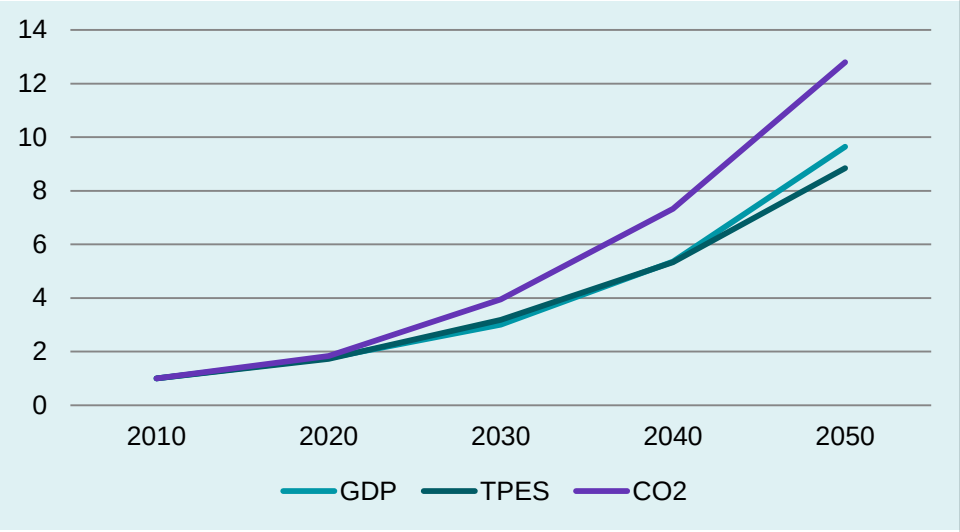
Energy sector outlook towards 2050

Preliminary findings

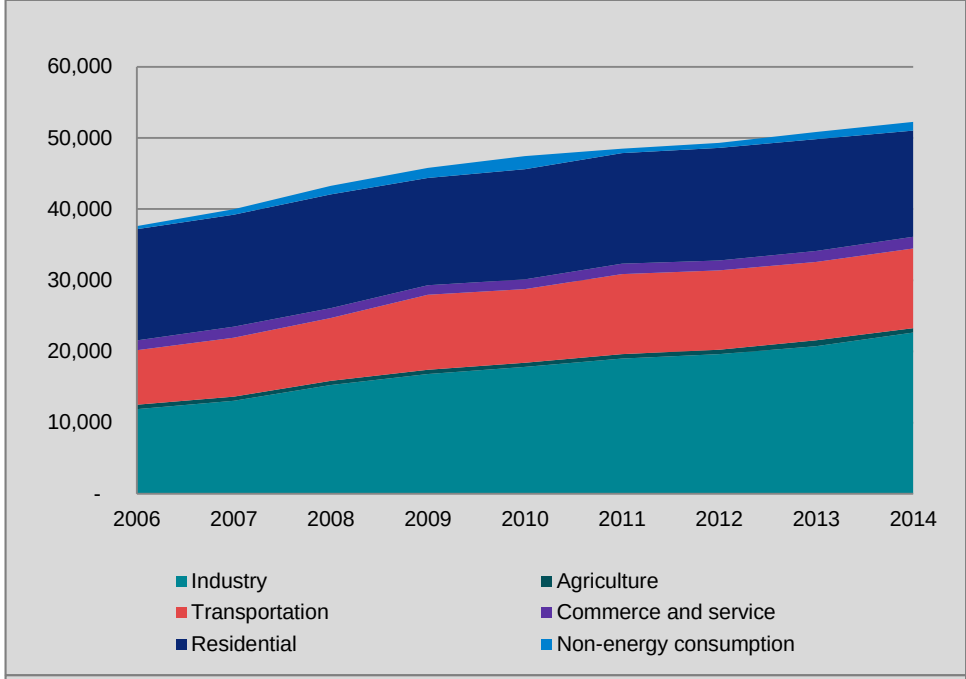
Which way, Vietnam?

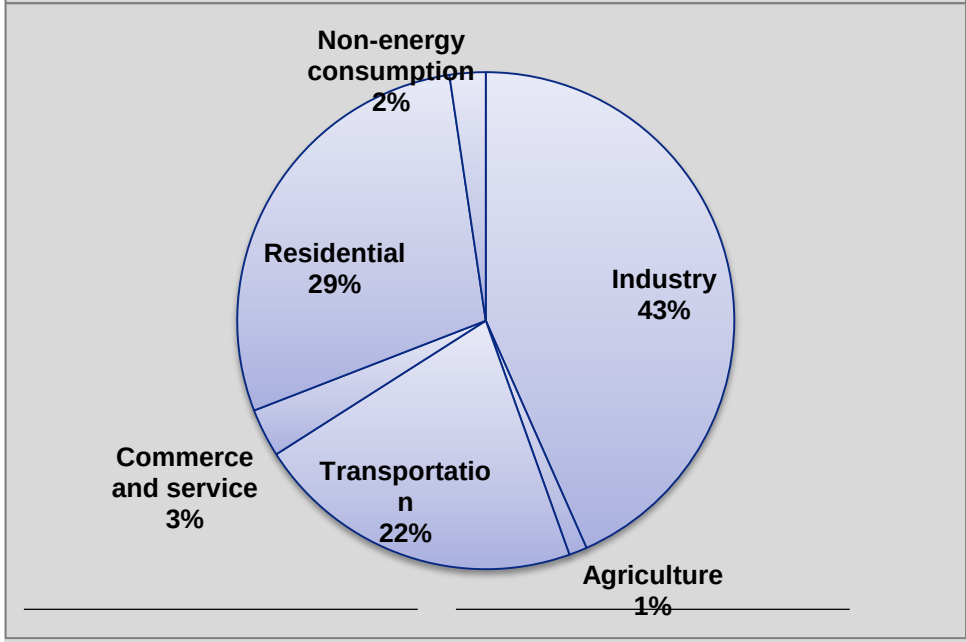


- GDP and energy supply to double every 13 years
- CO2 emissions to double every 11 years.
- Fuel import share to increase to 77% in 2050.

Final energy demand by sector,2006-2014

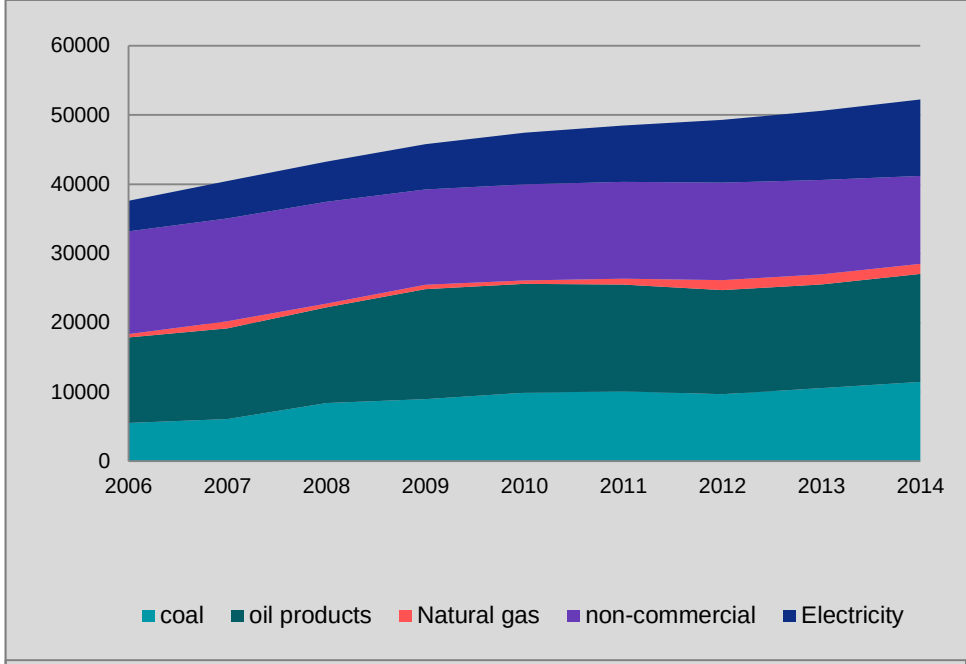
- Energy demand increased by 5% per year
- Fastest growth in industry

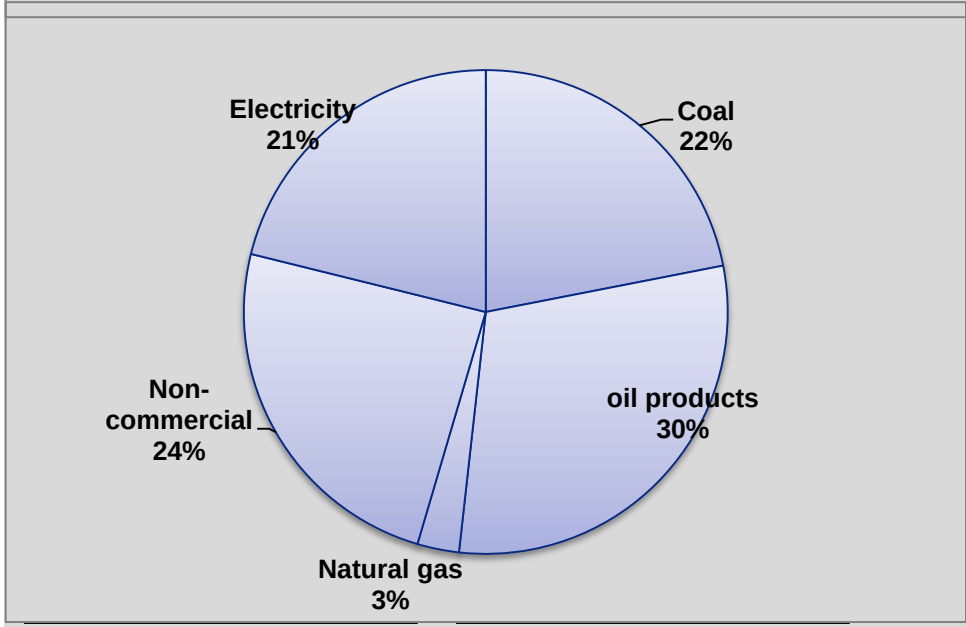




Final energy demand by fuel, 2006-2014

- Share of non-commercial is declining
- Shares of coal and electricity are increasing





Coal demand trends, 2006-2014

- Demand more than doubled over period
- Total Industrial coal demand exceeds demand for power generation

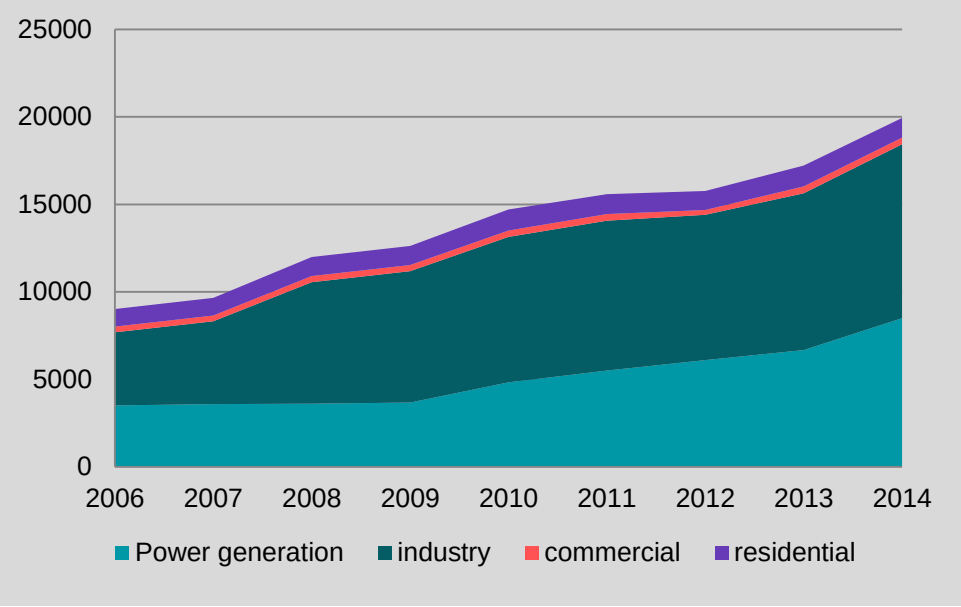


FIGURE 4: COAL DEMAND BY MAIN SECTOR, 2006-2014

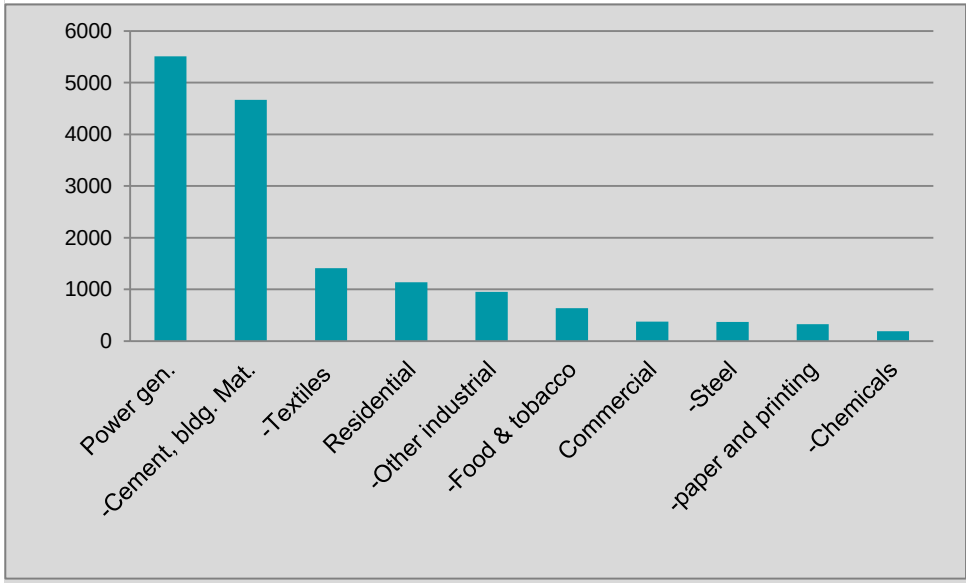
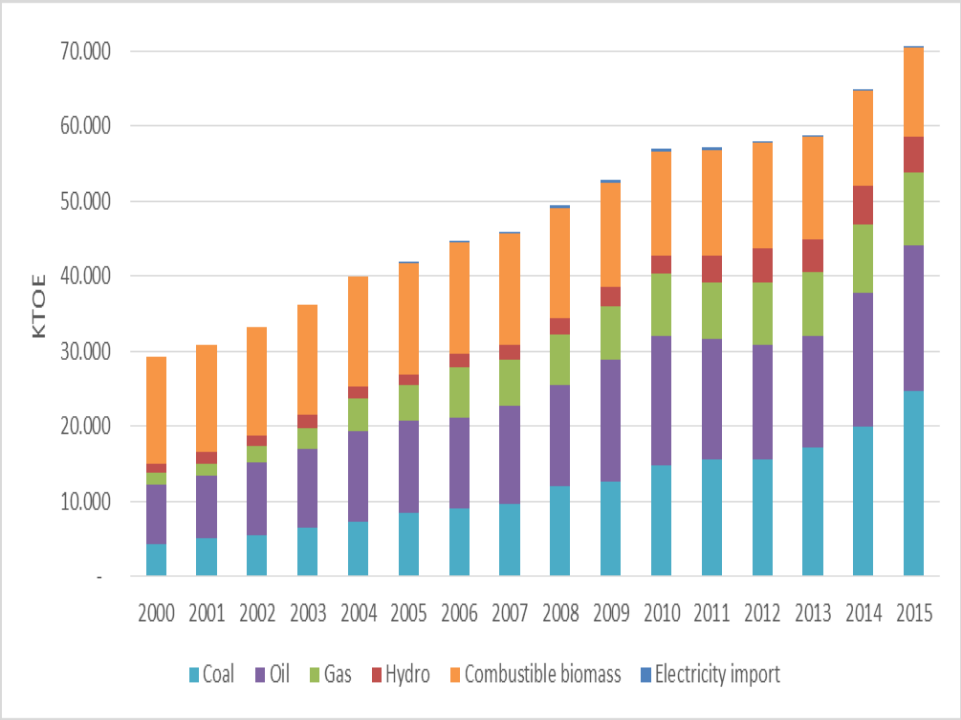


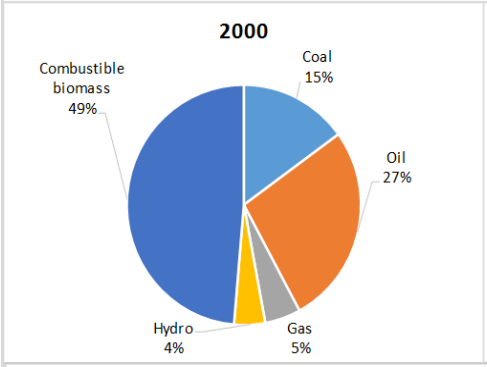
FIGURE 3: COAL DEMAND BY SUB-SECTOR, 2011.

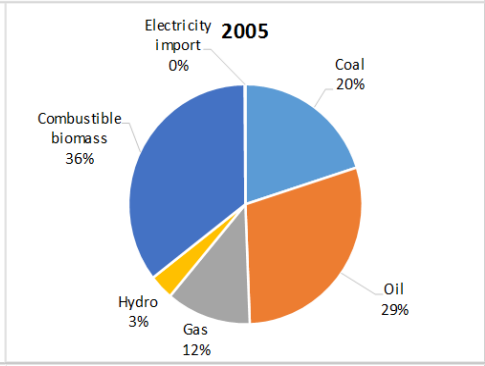
Primary energy supply

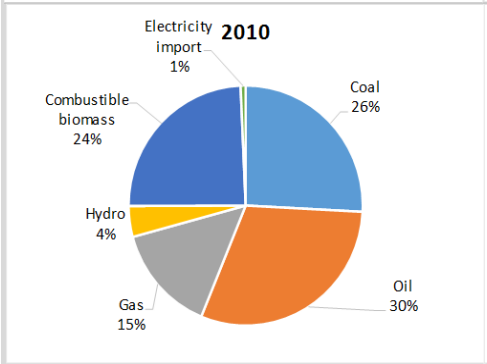
2006-2014

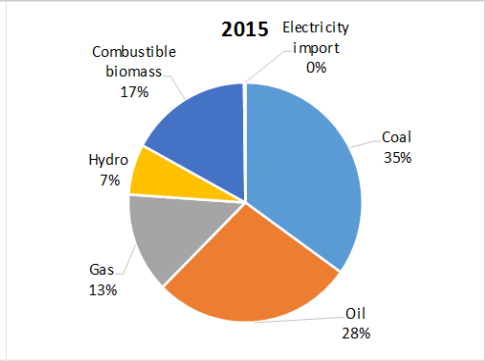
- Growth by factor of 2.3
- Particularly coal supply increased
- Fossil fuel share increased from 47% to 76%.



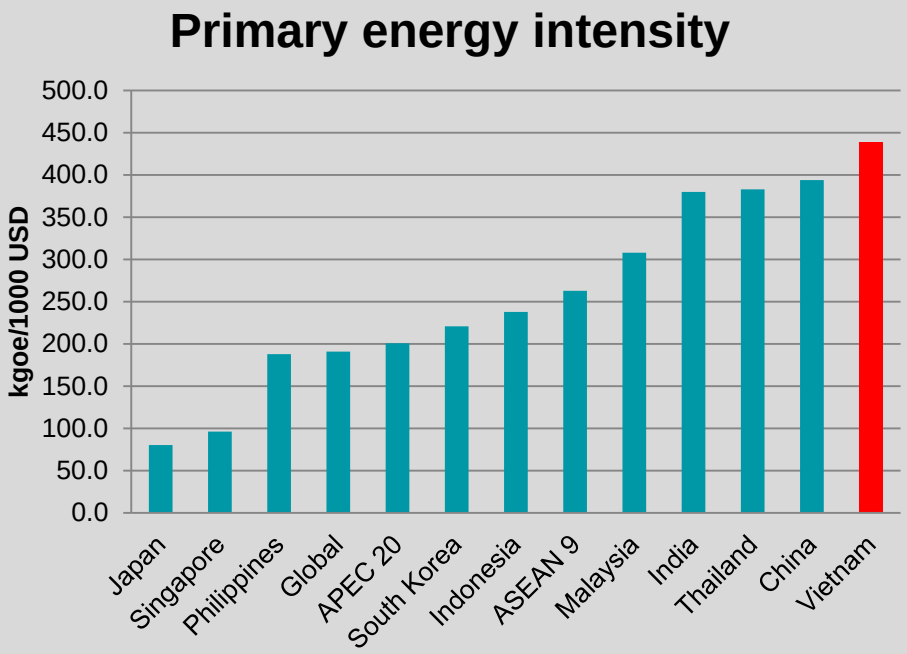


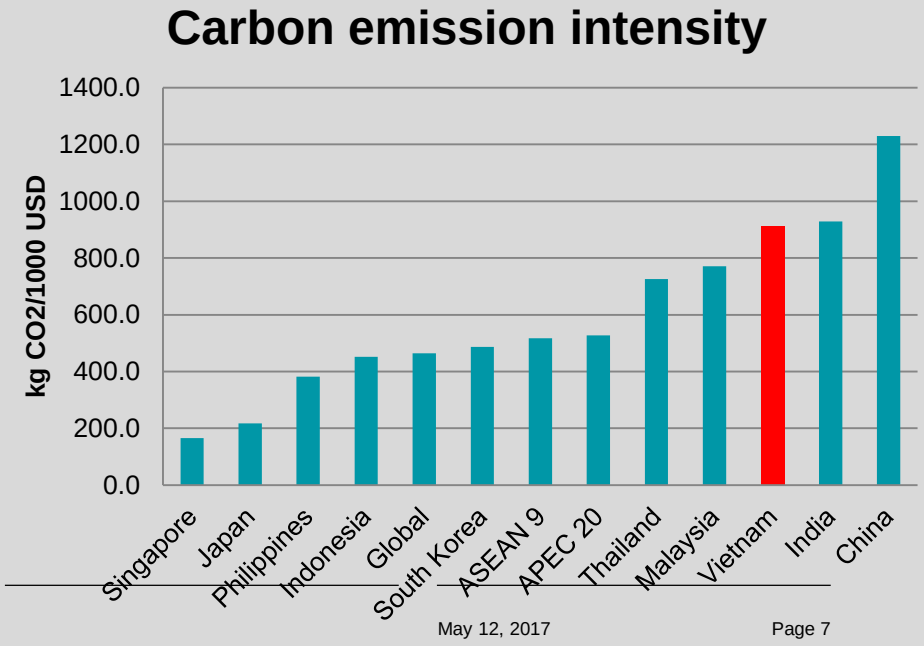






Regional benchmarking of energy and carbon intensities

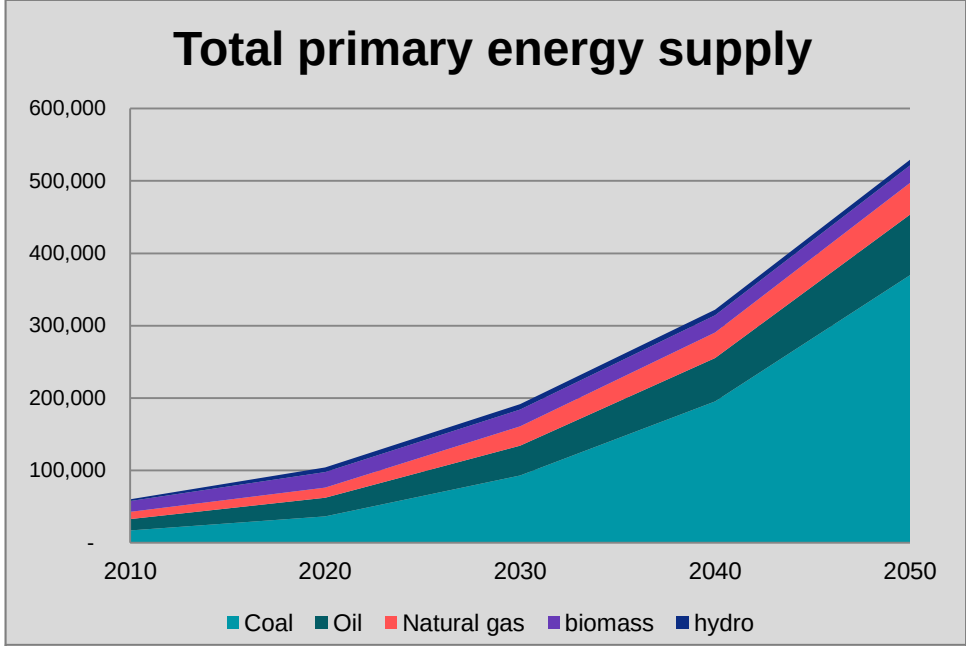


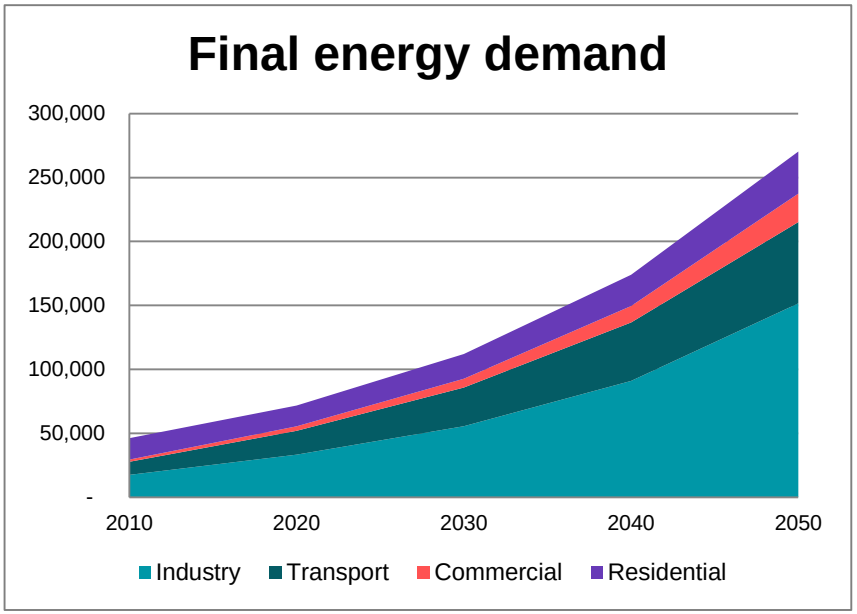


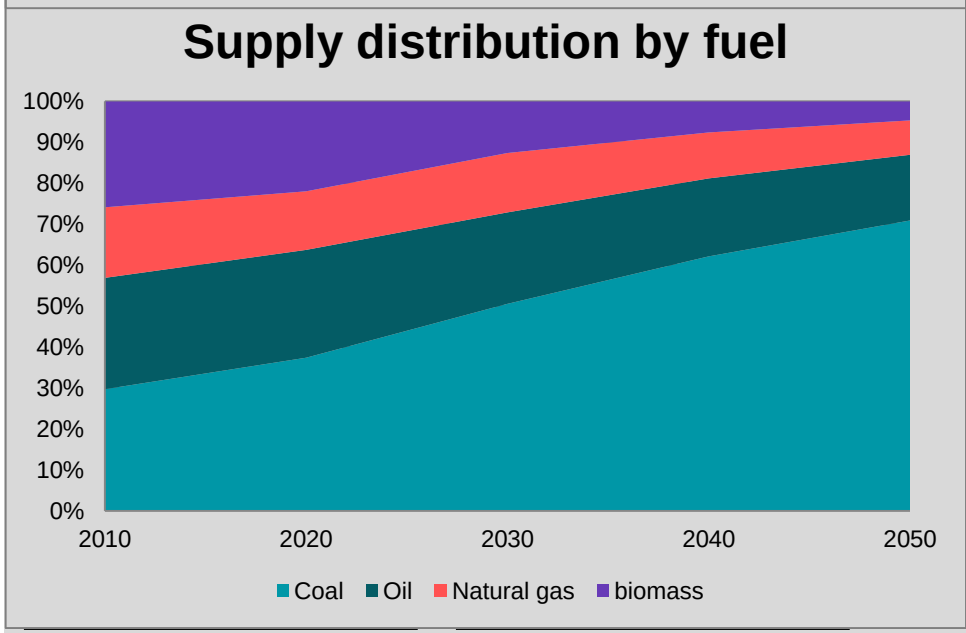
Projections:

Final energy demand

Primary energy supply

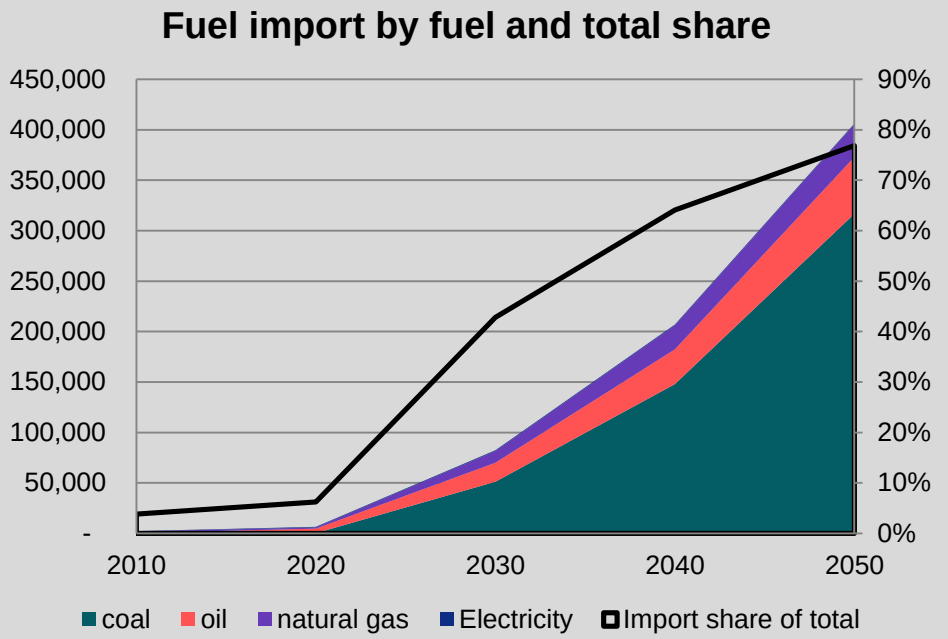


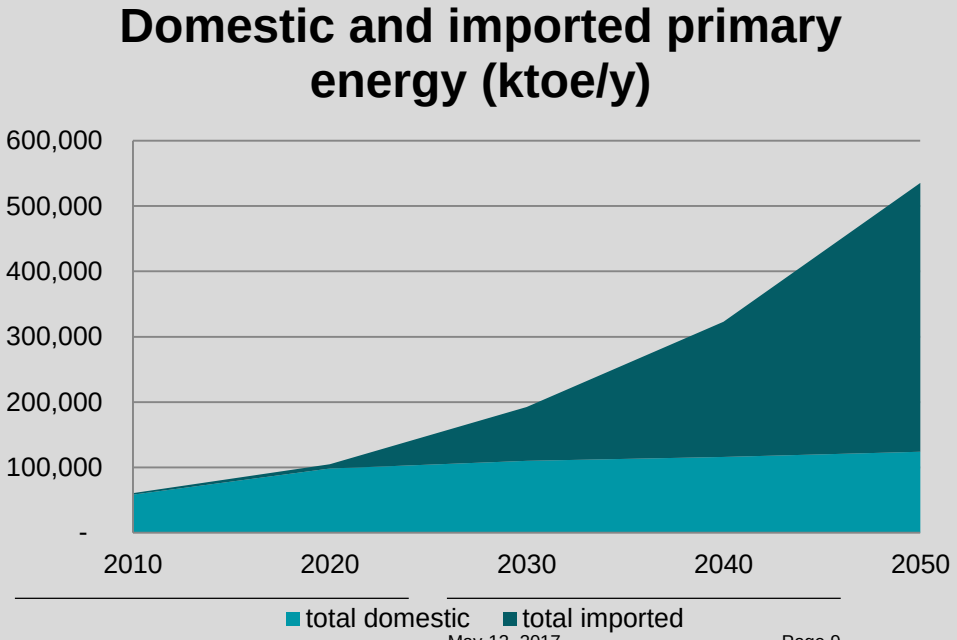




Surging need for fuel import

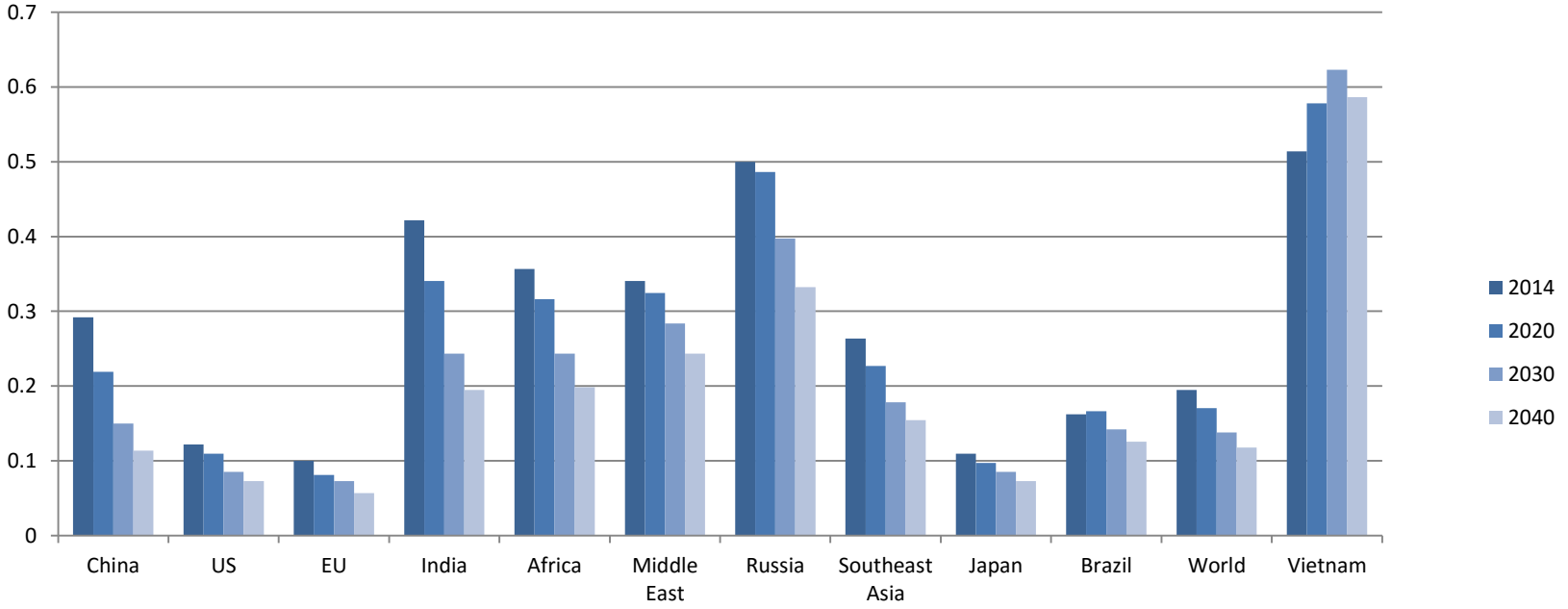
- From 2020 domestic supply remains almost constant
- Fuel import need may involve a fuel supply risk.





Must it be so challenging?

- The global trend goes towards a declining energy intensity (International Energy Agency).
- The official projections for Vietnam are based on an assumption of increased intensity.



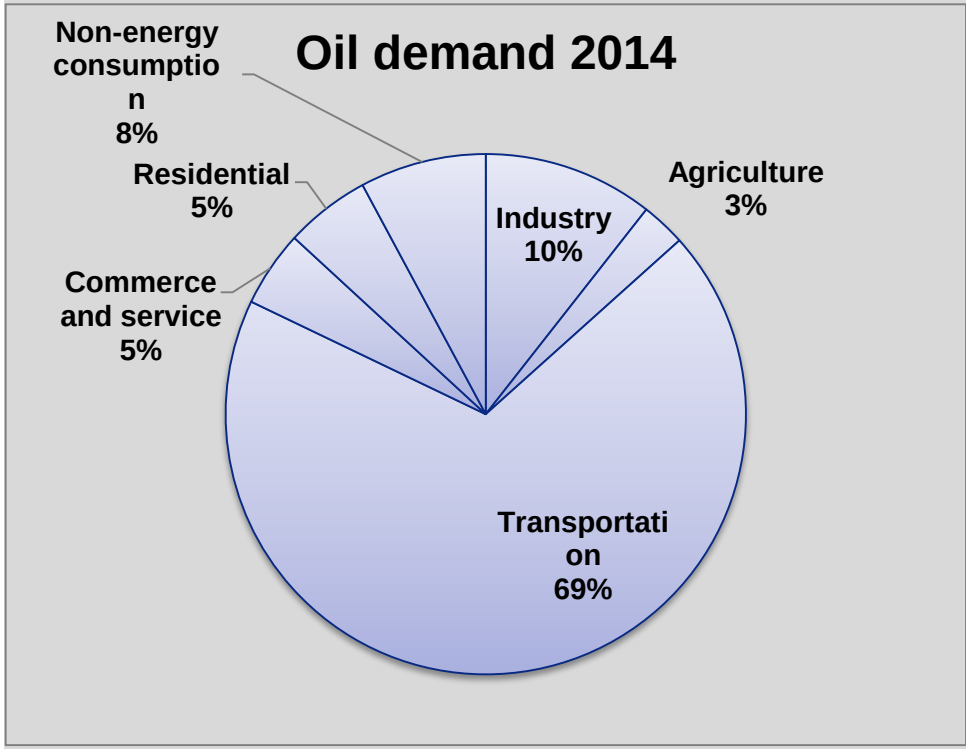
Domestic coal reserves

- Extraction rate to increase to 57 million tons/year by 2030
- Proven and probable reserves could be exhausted by 2070

	Proven and probable reserves	Additional resources
North-East	2,218,617	4,068,460
Red River		42,010,804
Inland	41,741	164,514
Other mines		37,434
Peat coal		336,382
Total	2,260,358	46,617,594

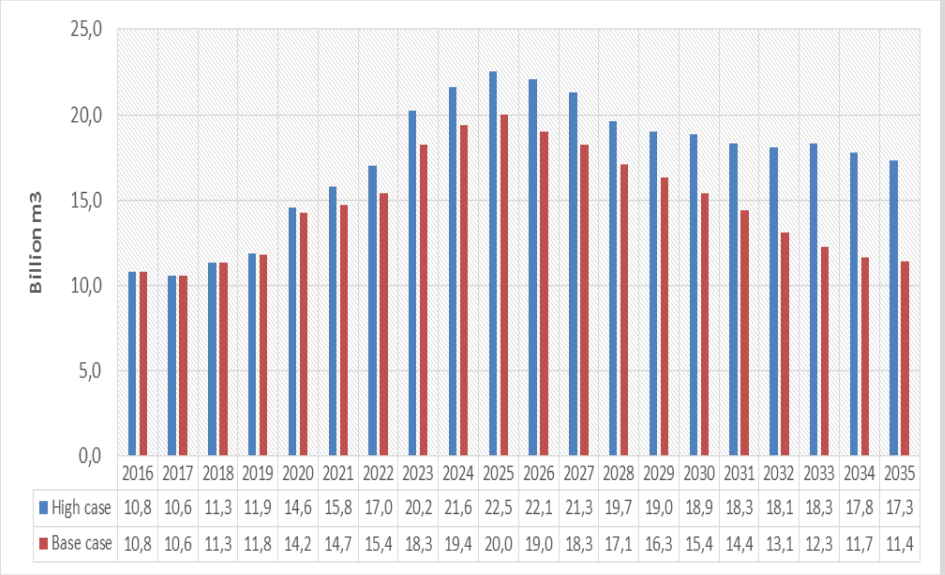
Oil supply and extraction

- Current extraction rate of 18 million tons/year is expected to decline towards 5 million tons/year by 2035.
- Domestic refining is currently about 50% of demand.
- → Refined oil product import dependency will increase.



Natural gas supply and extraction

- Gas extraction set to double over the coming decade.
- From 2025 it is expected to decline.
- The rate of deline depends on results of ongoing exploration
- LNG import expected to start before 2020 and go up to 10 billion M3/year in 2035

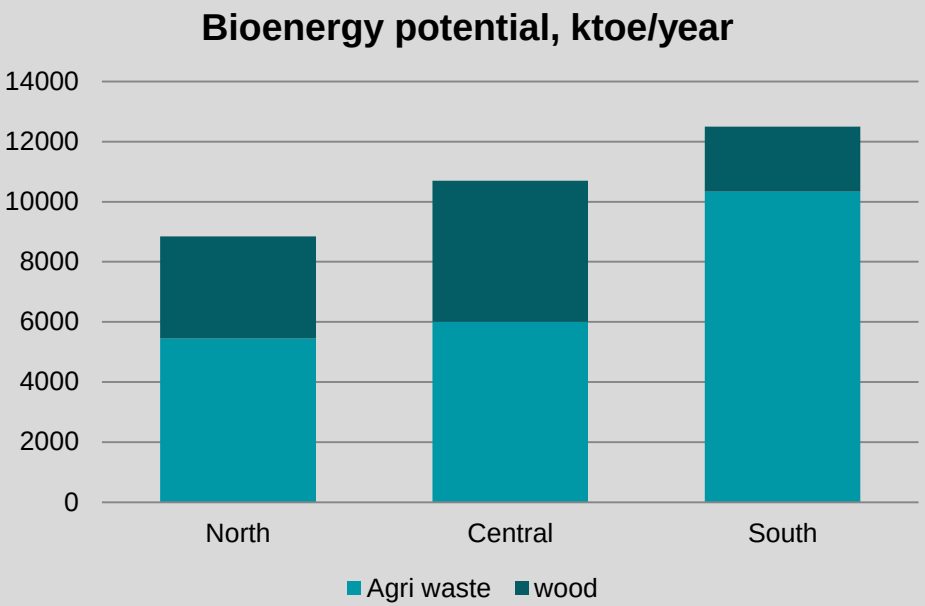


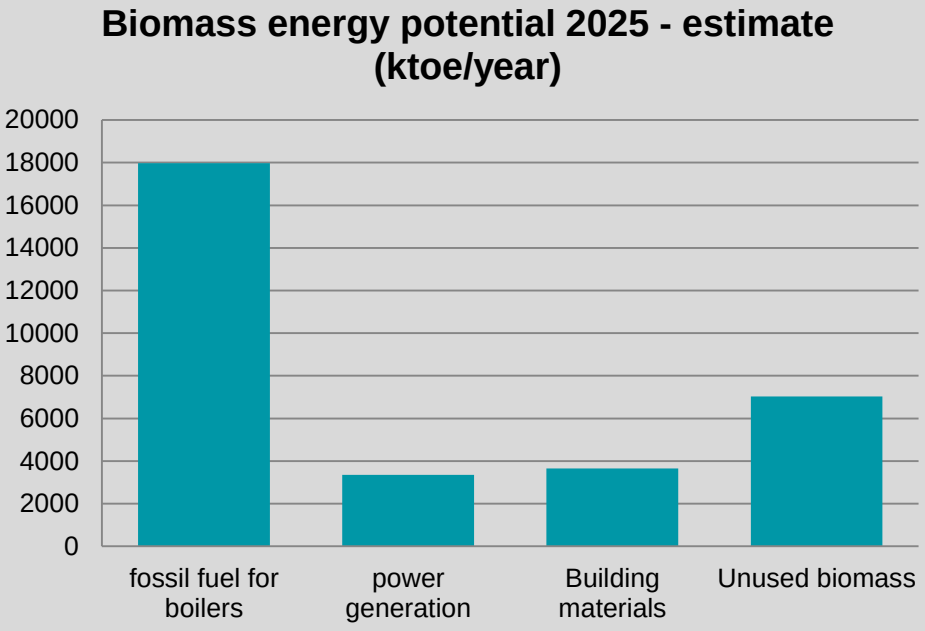
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
High case	10,8	10,6	11,3	11,9	14,6	15,8	17,0	20,2	21,6	22,5	22,1	21,3	19,7	19,0	18,9	18,3	18,1	18,3	17,8	17,3
Base case	10,8	10,6	11,3	11,8	14,2	14,7	15,4	18,3	19,4	20,0	19,0	18,3	17,1	16,3	15,4	14,4	13,1	12,3	11,7	11,4

FIGURE 15: NATURAL GAS EXTRACTION FORECAST. BASE CASE AND HIGH SUPPLY. SOURCE: INSTITUTE OF ENERGY.

Bioenergy potential

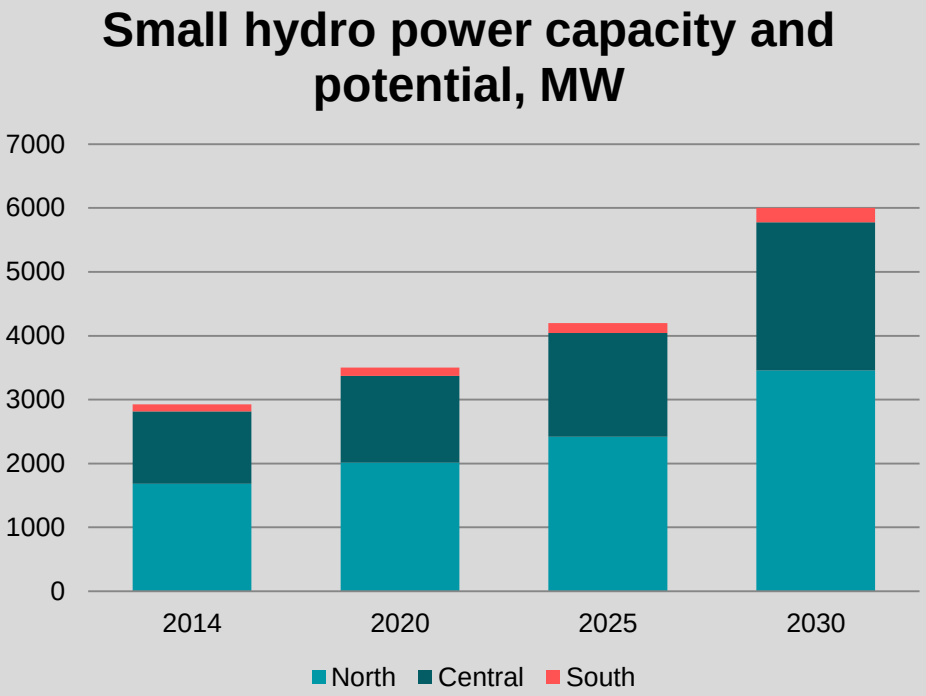
- Total available potential of 32,000 ktoe/year = 61% of fossil fuel supply in 2014.
- Relatively evenly distributed across regions
- Viable substitution in boilers and building material industry + power generation (2,000 MW)
- Corresponds to 20% of fossil fuel consumption in 2025.





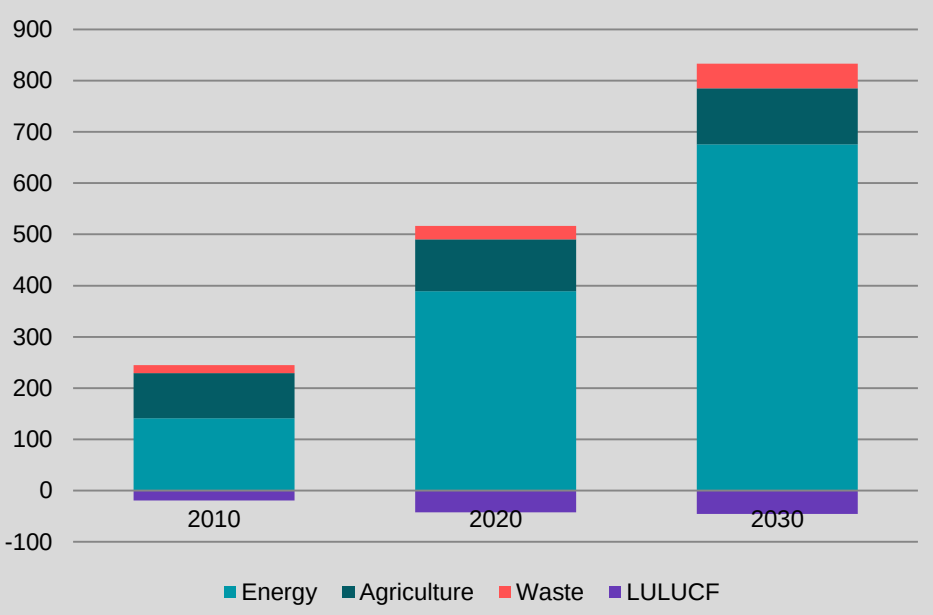
Hydro power

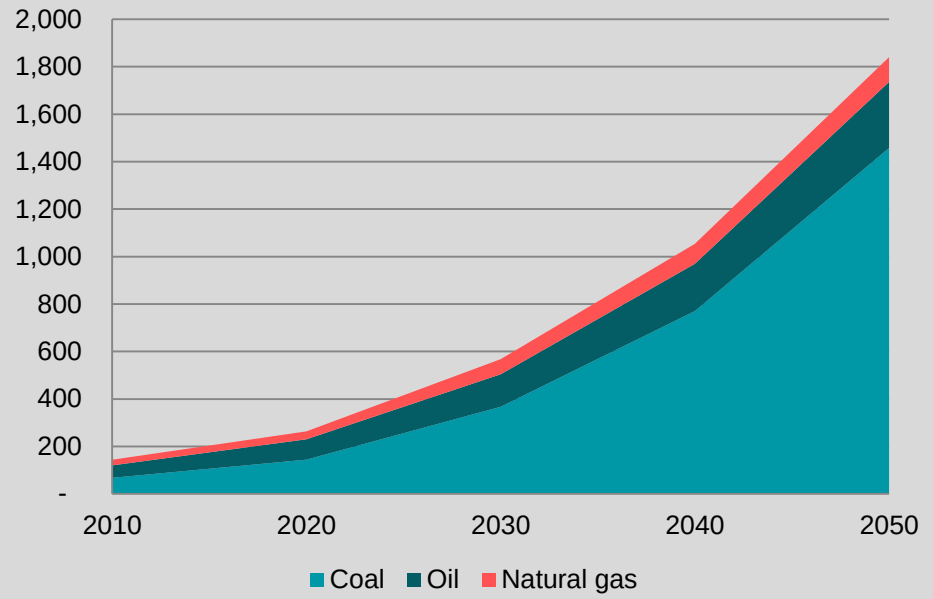
- Technical potential about 35 GW. Financially viable potential 20 GW.
- With 3 planned large plants, the sustainable potential for large hydro is exhausted.
- Small hydro potential up to 6 GW.



Environmental impacts

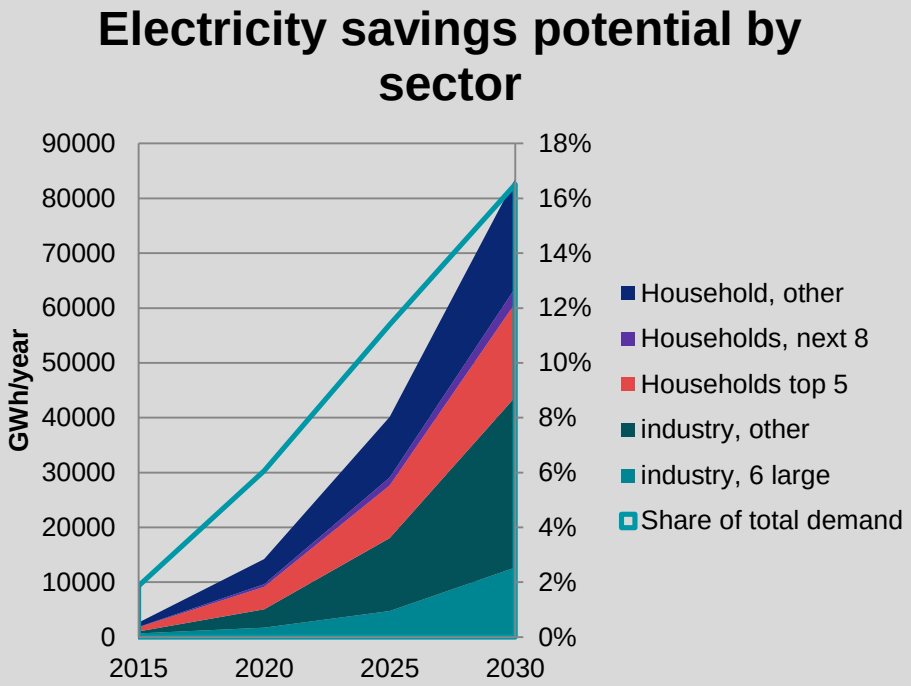
- Energy sector contributes to largest and growing share of greenhouse gas emissions
- Coal is going to completely dominate CO2 emissions
- Environmental costs of electricity 3% of GDP by 2040
- Environmental costs of other energy could be even more – likely in the range of 10%.





Energy efficiency potential

- Potential only partly known
- 17% of electricity consumption could be saved by 2030
- Estimated 30% coal savings potential by 2025, particularly in the buildings industry
- More potential in buildings and transport



Conclusions

- RE strategy targets can be met:
  - The RE resources are available
  - Costs are minimal if any
- NDC: The 25% CO2 reduction targets can be achieved through a combination of RE strategy; EE solutions and biomass conversion, probably at no additional costs.
- RE for non-power use is a largely neglected opportunity. Could substitute what corresponds to 20% of all fossil fuel by 2025
- The power sector is currently not in a good position to secure financing of the investments needed
  - Reform of the sector as well as the market is urgently needed
- Import requirements can be reduced very significantly through a combination of EE and RE
- Large untapped EE potential; at least 17% electricity and 30% coal by 2030

Recommendations

Energy efficiency

- Provide in-depth information about potentials of EE and related costs
- Strengthen regulation
- Targeted financial incentives to prospective technologies and sectors

Biomass energy

- Secure development of strong biomass energy markets – stable prices and standardized quality
- Temporary incentives for biomass use

Recommendations (2)

Power sector reform

- Investment requirements of US$ 7.5 billion /year
- Minimize investor risks
  - Independent TSO, market operator and single buyer.
- Market operator and TSO may need more resources

Power market reform

- Secure easy and transparent priority access for RE to the grid
- Secure full cost recovery through energy bills
- Move towards full market clearance of all supply services

Recommendations (3)

Solar and wind energy

- Streamline procedures for permitting (land use rights and costs etc.)
- Strengthen provincial planning for solar and wind
- Pilot near-shore wind farms
- Consider kick-starting market through auctioning or temporarily high FIT

Integrated energy planning

- Secure detailed and reliable data of energy demand and supply to be regularly updated
- Improve energy demand forecasts
- Compile and regularly update supply and demand side options
- Run sector-wide scenarios to help identify best scenarios