

Quantification of Indicators for Selected SDGs with the Climate Change Mitigation Pathways for China

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Introduction

- **China's pledge for climate change mitigation**
 - Paris Agreement; NDC
 - CO₂ emission peak by 2030; Carbon neutral by 2060
- **Meanwhile, China has launched policy development processes to support the achievement of the Sustainable Development Goals (SDGs)**
 - China's National Plan on Implementation of the 2030 Agenda for Sustainable Development (2016)
- **the quantitative relationship between the mitigation measures under the specific climate target and the SDGs indicators are urgently required**
 - the impact of GHG emissions reduction on SDG targets

Scenario setting

	Description
BaU	Existing climate and energy policies achieved; GDP growth rapidly; Low-carbon technologies in building and transport sectors develop fast; High consumption pattern; Treatment after pollution way.
2 degree	Globally mitigation to achieve 2°C target; CO ₂ emissions budget between 2011-2050 for China ≤ 300 Gt ; Low-carbon development with consideration of energy conservation, renewable energy development and the potential of nuclear power.
1.5 degree	Globally mitigation to achieve 1.5°C target; CO ₂ emissions budget between 2011-2050 for China ≤ 250 Gt ; Further mitigation based on the 2C scenario; Rapid development of CCS applied in both power generation and industry sector.

Findings and Discussions

- **Mitigation measures and actions not only address climate change, but also promote social, economic and environmental aspects of sustainable development**
 - Under the scenario of achieving the 2°C climate mitigation target, some related sustainable development goals are expected to be reached simultaneously in China
 - including clean energy access, environmentally-friendly and innovative infrastructure, and sustainable production and consumption, improve sustainably under the mitigation pathway, with some being completely achieved
- **The linkage analysis among energy transition, climate mitigation and SDGs are still in first stage of related researches**
 - only address some IAEG-SDG indicators, which are relevant from the national perspectives
- **It is challenging for China to reach carbon neutrality goal**
 - The carbon neutrality goal might already be stronger than the 2°C target for China
 - It would be relatively easier to achieve carbon neutrality by 2060 under 1.5 degree scenario
- **Integrating energy transition, climate mitigation, and achieving SDG policies and actions could make achieving these multiply goals more efficiently**
 - More opportunities could be presented by looking at linkage indicators among energy transition, climate mitigation and SDGs. The linkage indicator could present some specified co-ordination among policies and actions for different goals

Results

Energy and CO₂ emissions Pathway

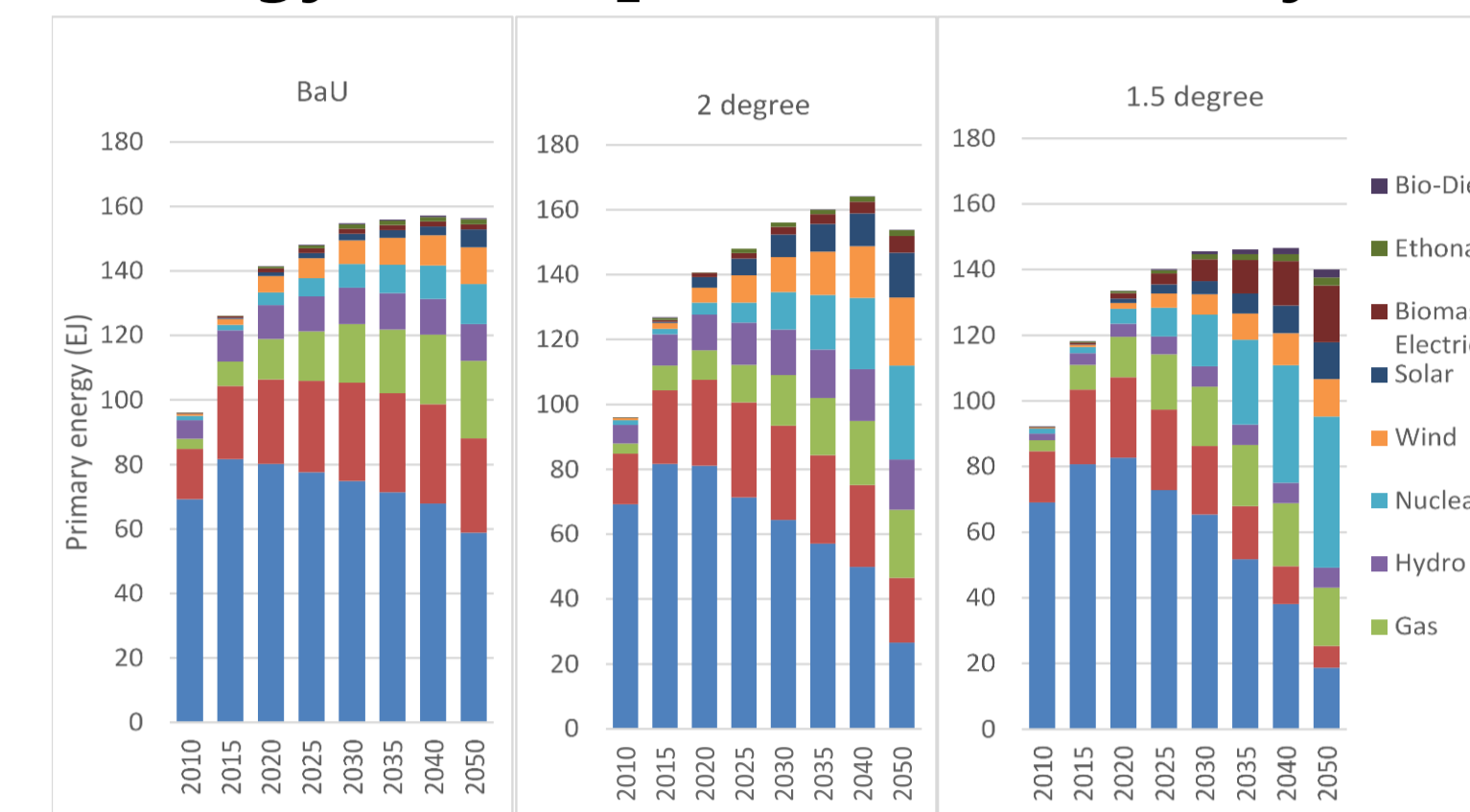


Figure 1 Primary energy demand

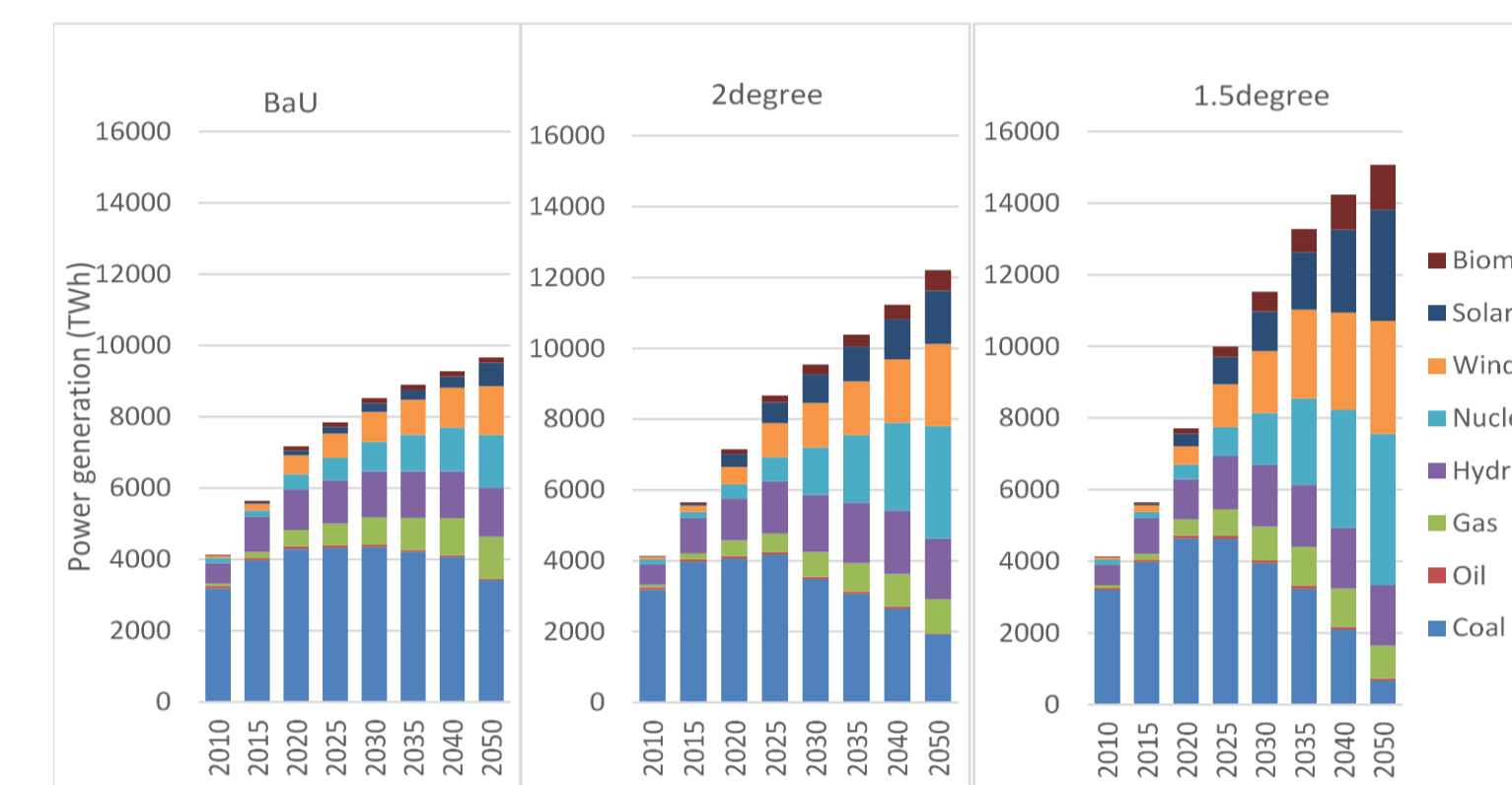


Figure 2 Power Generation

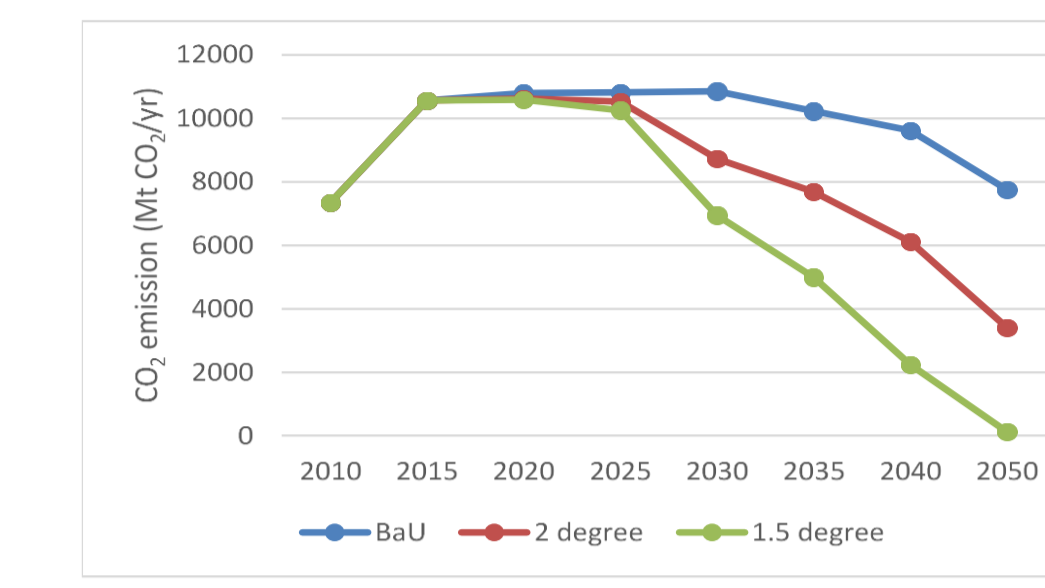


Figure 3 CO₂ emissions and CCS

Quantified indicators of selected SDGs

- The dissemination and availability of clean and modern energy increases (see Figure 4-(a)).
- The renewable energy proportion in primary energy doubles by the year 2030 from the year 2015 (see Figure 4-(b)).
- Energy efficiency increases with energy intensity dropping about 63% compared with its 2010 level (see Figure 4-(c)).
- The efficiency of material utilization clearly increases. The domestic material consumption per unit of GDP is only 26% of the 2015 level in the target year 2030, and the material consumption per capita decreases by about 34% (see Figure 4-(e) and (f)).
- In infrastructure construction, transportation capacity improve significantly (see Figure 4-(g) and (h)).
- With the proportion of low carbon technologies increasing, the CO₂ emissions per unit of value added is projected fall to 1/3 of the 2015 level by 2030 (see Figure 4-(d)).
- In terms of sustainable production and consumption, the efficiency of natural resources utilization continues to increase (see Figure 4-(i) and (j)).
- The domestic fossil fuel consumption per unit of GDP decreases by 60% in 2030 compared with 2015, and the recovery amount of various industrial products also increases (see Figure 4-(k)).
- Number of other aspects are also moving in a sustainable direction. In the 2 degree scenario, the emission of air pollutants, such as primary PM_{2.5}, NO_x, SO₂ and mercury, are significantly reduced (see Figure 4-(l)).
- The reductions would have an obvious impact on the prevention of morbidity and mortality (IAEG-SDG indicator 3.4.1) caused by outdoor air pollution. The increase in the share of residents with access to clean energy can have beneficial effects on the prevention of morbidity and mortality (IAEG-SDG indicator 3.9.1) caused by indoor air pollution.

- Primary energy demand would keep increasing in the coming decades
- Fast electrification and the development of non-fossil fuel energy are the main measures for CC mitigation
- CO₂ emissions peak would be advanced from around 2030 in baseline scenario to between 2020 and 2025 under the mitigation scenarios
- CO₂ emissions are projected to achieve near zero-emission under the 1.5 degree scenario around 2050, with rapid development of CCS technologies

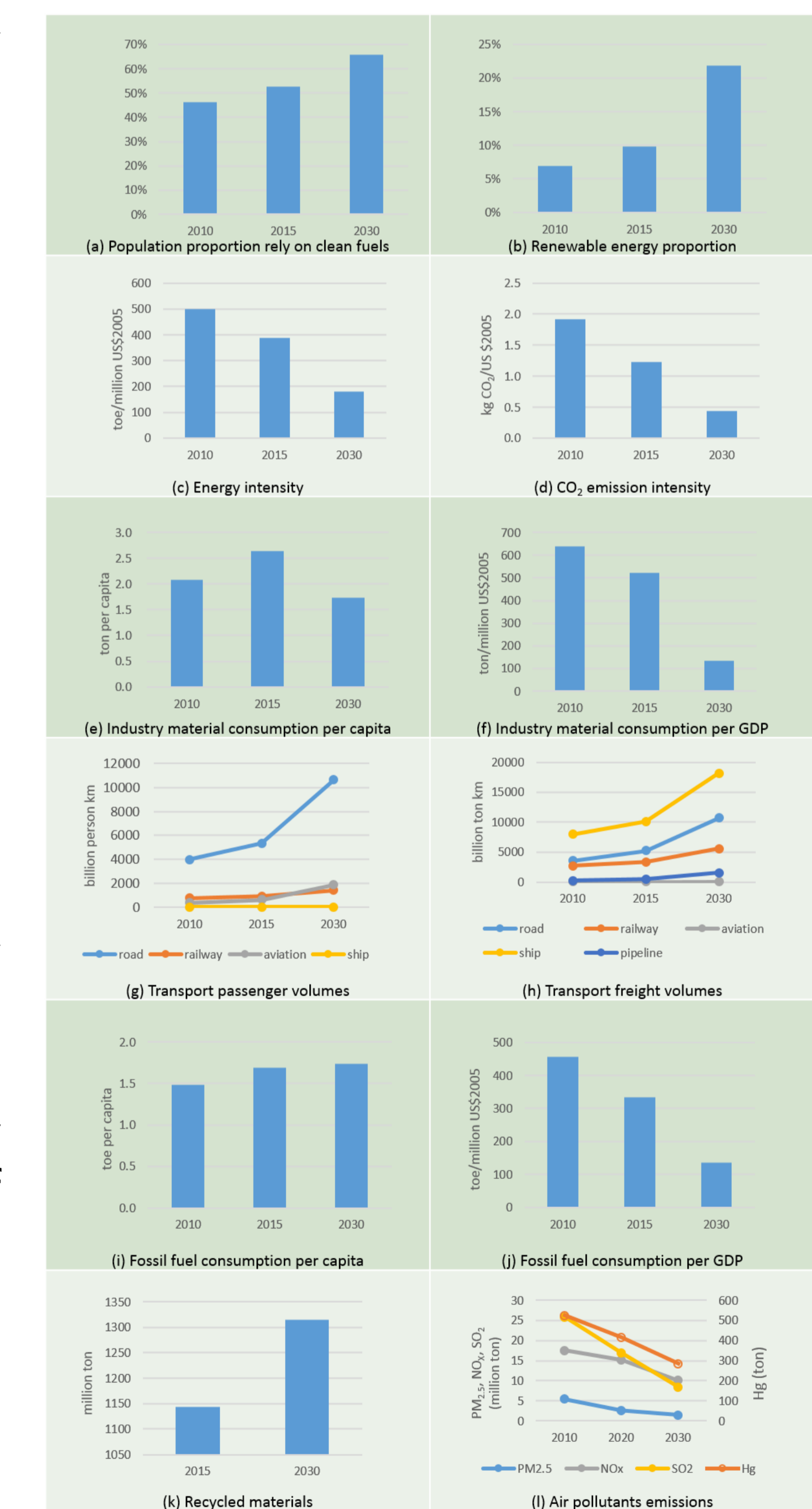


Figure 4 Summary Results of the selected SDG indicators and some other variables in the 2 degree scenario