

# Low Carbon Society Scenario Toward 2050 INDONESIA

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## SUMMARY

Low Carbon Society (LCS) is relatively new concept in Indonesia. Currently, there is no official document containing roadmaps to achieve LCS target. However, there are several government initiatives that are in line with and supportive to the LCS concept. One of the key initiatives is setting up voluntary GHG emission reduction target (ERT) of 26% below BAU in 2020, and 41% depending on international support. With the 26% ERT, the expected emission in 2020 will be 74% above the 2000 Emission level or 23% above the 2005 emission level, while with 41% ERT, the expected emission in 2020 will be 39% above 2000 Emission level or 2% below the 2005 emission level.

Government of Indonesia (GoI) has designed sectoral policies for achieving these reductions, and for the unilateral action the resources have already been included in the sectoral budgets. Based on estimation of emission in the SNC (Second National Communication under the United National Framework Convention on Climate Change), the main source of GHG emission in Indonesia is from Land Use Change and Forestry (LUCF) and peat land. These sectors contributed to about 50% of the total emission while energy sector only contribute to about 20%. Under the BAU emission projection, in 2020 these sectors are still main source of emission, however, contribution of energy sector increase significantly to about 30%.

In LUCF, emission resulted from deforestation and forest degradation that occurred in forest area and mostly by so-called unplanned drivers: forest fire, illegal logging, and forest encroachment. Planned drivers include conversion of forest to non-forest area (APL) for establishment of agriculture plantation, transmigration areas, and establishment of new districts, development of new rice fields, and large-scale mining activities. In the future, about 22.7 Mha of forest area is still available to be converted to non-forest area through planned deforestation (Table 1).

Table 1. Forested and non-forested land in forest and non-forest area of Indonesia in 2007

Land cover condition	Conservation Forest (HK)	Protection Forest (HL)	Production Forest (HP)	Convertible Forest (HPK)	Non-Forest Area (APL)
Forested	14,365	22,102	38,805	10,693	7,960
Non-Forested	4,009	5,622	18,404	11,057	44,163
Unidentified	1,502	2,328	3,706	981	2,216
Total	19,876	30,052	60,915	22,732	54,339

Source: BAPLAN (2008)

To reduce rate of emission from this sectors, GoI has set up a number of policies and programs. The key policy is to allow for swapping the status of forest from one category to another category (Government Regulation PP 10/2010). With this policy, the status of forested convertible forest can be changed to non-convertible forest, thus the forested land in this forest category can be saved or conserved. And, the status of non-forested production forest can be changed to convertible forest to meet the need of land for future development. The area of non-forested production forest (HP) is much higher than forested convertible forest (Table 1). The other key policy is to establish Forest Management Units (FMUs) in all forest area of Indonesia. With this policy, it is expected that none of forest areas are open accessed, so that the unplanned drivers can be managed and minimized. The other government regulation, PP 11/2010 on abandoned land will also push implementation of sink enhancement activities.

The Policy Working Group for the Ministry of Forestry has developed three scenarios to envision Indonesian development paths related to LCS. First is designated as BAU scenario, which assumes that

all convertible forest irrespective of forested or non-forested will be converted into non-forest area (APL), while the rate of unplanned deforestation and forest degradation will follow the historical data with slower rate as a result of the establishment of FMUs. However, the number of FMUs that can be established under the BAU is only 30% of the total considering the availability of the national funding. Similarly the rate of land rehabilitation and establishment of timber plantation also follow the historical condition, but the survival rate of tree from the land rehabilitation programs will increase linearly with the establishment of FMUs. The second scenario, the status of half of the forested convertible forest will be changed to non-convertible forest. The program for the establishment of FMUs will be focused in hotspot areas (area with high deforestation but with high intact forest) and institutional strengthening program is improved. The third scenarios, the status of three fourth of the forested convertible forest will be changed to non-convertible forest. With support of international, all FMUs can be established in all forest area of Indonesia. Following the second scenario, in 2020 the emission from this sector will decrease significantly to about 63% of the BAU emission. In the third scenario, after 2020 this sector will become net sinker. It can offset the emission of other sector by about 37 million ton of CO<sub>2e</sub> per year.

Similar to the LUCF, the energy sector also developed tree scenarios. First is BAU which assumes that current development trend and society orientation will continue until 2050. What is meant by orientation is peoples lifestyles and activities that has implication to the generation of CO<sub>2</sub> emissions. Second scenario is designated as Countermeasure 1 (CM1), which assumes that economic development will be the same as BAU but the society is more efficient in energy utilizations compared to the BAU. The society is depicted as calmer, slower, and nature oriented. This scenario is regarded as moderate development path. Third scenario is designated as Countermeasures 2 (CM2), which assumes that Indonesian economy will grow at much higher rate compared to those of the BAU but more efficient and less carbon energy systems. This scenario assumes that Indonesia is to reduce significant emission to comply with world's LCS target (0.5 ton C per capita) in 2050, where the society is depicted as more active, quick changing, and technology oriented. This scenario is regarded as high development path.

Indonesia's future energy and associated emissions projections according to the three envisioned development scenarios can be summarized as follows:

- Under BAU scenario, current CO<sub>2</sub> emissions level of energy sector is projected to increases substantially from 82 million tons-C in 2005 to 1184 million tons-C in 2050 (increase 14.4 times).
- Under CM1 scenario, CO<sub>2</sub> emissions level of energy sector is projected to become 617 million tons-C (7.5 times higher than 2005) or it is 48% lower than the BAU. The largest reduction potential would come from industrial sector followed by transportation, residential, and commercial sectors.
- Under CM2 scenario, CO<sub>2</sub> emissions level of energy sector would become 181 million tons-C (85% less than BAU) despite higher economic size.

Several actions to achieve LCS target in reducing CO<sub>2</sub> emission can be grouped as the following:

- Clean Energy: utilization of renewable and less carbon emitting energy types and technology in residential/commercial;
- Low Carbon Lifestyle: efficiency improvement through appliances technology and society behavior in residential/commercial;
- Low Carbon Electricity: more renewable energy, efficient power generation (pulverized to sub-critical, supercritical, and integrated gasification combined cycle (IGCC) equipped with carbon capture and storage (CCS), and decreasing losses in T&D of electricity grids;
- Low Carbon Fuels Industry: energy shift (toward renewable and less carbon emitting fuels), efficiency improvement of industrial processes, equipments, and appliances;
- Sustainable transport: transport mode shift (more mass rapid transport utilization), fuel shift (to renewable and less carbon emitting fuels), reducing trip generation and trip distance (improvement infrastructure, telecommunication, information access), traffic management, efficiency improvement.

The development of scenarios of these two sectors is independent each other. For the future study, the development of the scenarios for these sectors will be integrated.