Pembangunan Berbasis Karbon Rendah di Indonesia
Pada Sektor Energi

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Question

• “Is it technically possible to meet the growing global demand for energy, using only clean and sustainable energy sources and technologies that will protect the global climate?”

• In other words, can a concerted shift to the sustainable energy resources and technologies that are available today meet the more than doubling of global energy demand projected by 2050, while avoiding dangerous climatic change of more than 2 degrees Celsius above pre-industrial levels?

Results

• The technologies and sustainable energy resources known or available today are sufficient to meet this challenge, and there is still sufficient time to build up and deploy them, but only if the necessary decisions are made in the next five years.

• Yet it is clear that the economic policies and governmental interventions needed to propel this transition are not now in place, or even in prospect in most cases. This is a matter to which the world needs to give urgent attention.
Six Solutions for Emission Reduction

1. Breaking the Link between Energy Services and Primary Energy Production

2. Stopping Forest Loss

3. Concurrent growth of Low-Emissions Technologies

4. Developing Flexible Fuels, Energy Storage and New Infrastructure

5. Displacing High-Carbon Coal with Low-Carbon Gas

6. Carbon Capture and Storage

Three Imperatives

1. **Urgency.** Delays will make the transition to a low-carbon economy increasingly expensive and difficult, with much greater the risks of failure. The case for early, decisive action is overwhelming.

2. **A global effort.** Every country has a role to play, in response to the scale and the type of challenges arising in its territory.

3. **Leadership.** Action is needed by governments of the world to agree targets, to collaborate in effective strategies, and to influence and co-ordinate the investment of the many trillions of dollars which will be spent on energy developments in the coming decades in any event, so that future needs are met safely and sustainably.
Kesimpulan

• Climate Solutions yang dibuat oleh WWF’s Global Energy Task Force dapat menjadi salah satu referensi dalam membuat skenario LCD
• Tetapi tidak sepenuhnya aplikatif untuk setiap negara karena setiap negara memiliki spesifik kondisi serta trend emisi yang berbeda
• “There is no “silver bullet” that will solve all the problems for every country”. Sehingga masing-masing negara perlu mengembangkan skenario pembangunan yang rendah karbon sebagai respon terhadap terjadinya perubahan iklim

Bagaimana Posisi Indonesia?

Kebutuhan vs. Keterbatasan

• Negara berkembang menuju negara maju
• Laju pertumbuhan ekonomi yang cukup tinggi
• Laju kebutuhan energi meningkat lebih cepat daripada laju pertumbuhan ekonominya
• Keterbatasan daya dukung alam

Komitmen vs Implementasi

• SBY dalam G20 Summit di Pittsburgh: “Indonesia will reduces 26% by 2020 total GHG emission compared to BAU emission 2005”
• Kebijakan Energi Nasional: sampai 2025, 83% energy mix masih didominasi oleh energi fosil terutama batubara
• R&D teknologi yang masih terbatas
• Kabinet baru vs. peluang baru?
LCD: Peluang bagi Indonesia

- Sektor energi sebagai bagian penting dalam roda pembangunan Indonesia perlu menerapkan opsi Low Carbon Development dalam pengelolaannya
- Laju kebutuhan energi yang terus meningkat sementara ketersediaan pasokan terbatas menyebabkan insecurity dalam penyediaan dan pemanfaatannya
- Sehingga bagi Indonesia LCD urgent untuk dilakukan dalam hal meningkatkan ketahanan energi di dalam negeri sekaligus memperlambat laju pertambahan emisi karbon secara global.

Studi DNPI yang sedang berjalan mencakup 6 sektor yang paling penting dari perspektif Perubahan Iklim

- Sektor yang dipilih merupakan sumber emisi terbesar dan berpotensi melakukan pengurangan emisi
- Emisi, faktor-faktor pendukung pengurangan dan biasa akan dinihlai secara berurut berdasarkan data-data lokal terbaik yang tersedia
- Asumsi-asumsi secara rinci telah diprediksi dalam perkalian dengan lebih dari 150 orang waktu lama pemerintah, LSM, para donor dan perusahaan swasta
- Studi ini diproyeksikan untuk selesai pada akhir tahun
Emisi Indonesia diperkirakan meningkat dari 2.3 Gt menjadi 3.6 GtCO\textsubscript{2}e antara tahun 2005 dan 2030.

Perbandingan emisi Indonesia terhadap emisi global:

- 2005: 600, 20, 850, 1,030
- 2020: 2,820, 540, 850, 1,160
- 2030: 3,590, 750, 850, 1,230

Batu bara diperkirakan menjadi sumber energi yang terbesar, sehingga total emisi BAU meningkat tujuh kali lipat emisi GRK tahun 2030.

Pembangkitan listrik TWh:
- 2005: 55 (44%), 971, 414, 360 (65%), 110, 746
- 2020: 122, 414, 629 (65%), 110, 344
- 2030: 55, 971, 629, 746

Geothermal, Clean tech lainnya, fosil, kuasa lainnya, Batu bara

Observasi kunci:
- Sementara kapasitas Pembangkit Panas Bumi terus membesar secara absolut, porsinya parpas bumi dalam keseluruhan pembangkit listrik masih tetap rendah.
- National Energy Outlook mencerminkan peningkatan sumater energi dari minyak ke batu bara untuk mengurangi fluktuasi harga yang disebabkan oleh harga minyak yang bertumbuh-ubah.

LCD’s Pathways: WWF-Indonesia *)

Objectives
• To develop low carbon economies scenario for Indonesia especially focus on energy sector and forestry sector.
• To identify opportunities for climate change adaptation and mitigation for energy and forestry sector in Indonesia
• To develop National Climate Solutions for Indonesia

Methodology (Energy Sector)
• Applying LEAP (Long-range Energy Alternatives Planning) system, a model that is based on energy accounting system
• Disaggregation of data due to lack of data in micro level
• Using Handbook of Energy of DEMR as a main references, other statistics as a balancing
• Classifying in 3 (three) major sub sectors:
  • Demand
  • Transformation
  • Production of primary energy

*) Kajian masih dalam proses pengerjaan

Assumptions & Scenarios

Assumptions
• Period of observation and projection 2005 - 2050
• All technology not yet CCS (not including nuclear)
• Economic and population growth based on assumption in Outlook 2008
• Electrification ratio by 2025 based on RUKN 2008 – 2027. In 2040, it is assumed will reach 100%.

Scenarios
• Base Case Scenario
  Presenting projection of energy demand based on current intensity of utilization in every sector.
• Low Carbon Scenario – DSM
  Presenting projection of energy demand that have included energy efficiency options in the planning.
• Low Carbon Scenario – Extensive
  Combination of the two scenarios above with RE utilization in the power generation.
Comparation of Final Energy Demand:
Base Case vs. DSM

Base Case vs. Low Carbon w/ DSM
Fuel: All Fuels

![Bar chart showing billion barrel of oil equivalents over years from 2005 to 2050, comparing Base Case and Low Carbon - Demand scenarios.]

Projection of CO₂ Emission

CO₂ Emission: Base Case vs. Low Carbon w/ DSM
Fuel: All Fuels, GWP: All GWPs

![Line chart showing billion kilograms of CO₂ emission over years from 2005 to 2050, comparing Reference and Low Carbon - Demand scenarios.]
Preliminary Result**)

- The growth of final energy demand increase averagely by CAGR 6% pa
- If energy efficiency options is implemented extensively, the growth of energy demand will decrease become 4% pa
- The most significant impact of energy efficiency is on the industrial and transportation sector
- To reach elasticity of demand less than 1 (Target KEN 2025), it is important to implement energy efficiency along with fuel switching.
- The decreasing of emission in electricity sector is caused by the higher utilization of natural gas and also geothermal and microhydro.

**) Hasil ini belum final