MINISTRY OF ENERGY AND MINERAL RESOURCES

Regulatory Process Required to Support National CCS Regulation (Indonesia Case)

The 6th Meeting of The International Energy Agency CCS Regulatory Network
Paris, France, 27 – 28 May 2014

Ministry Of Energy and Mineral Resources
Agency of R&D for Energy and Mineral Resources

OUTLINE

1. Background
2. Milestones of Research and Development Agency of EMR Role on CCS Development in Indonesia
3. Proposed Roadmap for CCS Development in Indonesia
4. Developing Regulatory Framework for CCS Deployment in Indonesia
5. Closing Remarks

1. Background

CCS AS KEY MEASURES OF CO2 EMISSIONS REDUCTION

- Significantly increase of energy demand due to high economic and population growth is projected for a couple next decades
- Energy is still dominated by fossil particularly oil currently in which depleted continuously. Indonesia is endowed by huge amount of coal resources which might be used to match the high growth of domestic energy consumption
- GHG emissions from energy sector comes second largest after forestry sector recently, energy sector however drives a significant part of the emissions growth in the future. GHG emissions will swiftly grow alongside high energy development
- Anticipating soaring growth of CO2 emissions and considering availability of 60 huge sedimentary basins in Indonesia, CCS deployment in Indonesia is very strategic to be realized in order to participate also in global initiative for reducing CO2 emissions
- Peranan energi fosil yang tinggi akan berakibat kepada permasalahan emisi CO2

2. Milestones of Research and Development Agency of EMR Role on CCS Development in Indonesia

CCS Milestones in Indonesia

2003-2005

Sojitz & Mitsubishi:

Investigating CO_2 storage potential combined with EOR

2008

- **Joint Study with UK Government:**
  A first comprehensive study to identify CCS potential deployment in Indonesia
- **METI-Japan CCS**
- **KIGAM**

2009

Shell:

jointly develop detailed scopes for CCS Project's proposals that have potential to attract external funding

2010

Total Indonesie:

Multiyears joint research

At TOTAL field

2011

Identify a promising demonstration project in specific site

2012

MHI & JCOAL:

- **Schedule for CO2 Injection to Oil Fields**
- **Economical study for CO_2 EOR**

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SELECTED AREA FOR CCS PILOT PROJECT

Regional area

- South Sumatera

Specific Area for Pilot Project

- Source: Merbau Gas Gathering Station (CO_2 Removal Plant)
- Storage: Depleted oil and gas reservoirs surrounding Merbau GGS

Rationale

- Based on outcomes and recommendations from previous study with UK Government.
- Large presence of the industrial and power sector in South Sumatera.
- Large and various CO_2 sinks (depleted hydrocarbon reservoirs, and coal seams).
- Attractive for CO_2-EOR development
- South Sumatera has low density population.
- Existing infrastructure.
- Relatively stable geological setting from seismic and tectonic activity.

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CO_2 Sources Identification and Assessment

Focus on technically amenable to CO_2 capture

Merbau Gas Gathering Station - Early Opportunity

Overview

- Detailed inventory of facilities emitting CO_2 includes:
  - Power plant
  - Petroleum refinery
  - Cement Plant
  - Gas gathering station
  - Fertilizer plant
- Ranking and suitability assessment of CO_2 sources for capture technology
- Emissions estimates from industrial and energy sectors

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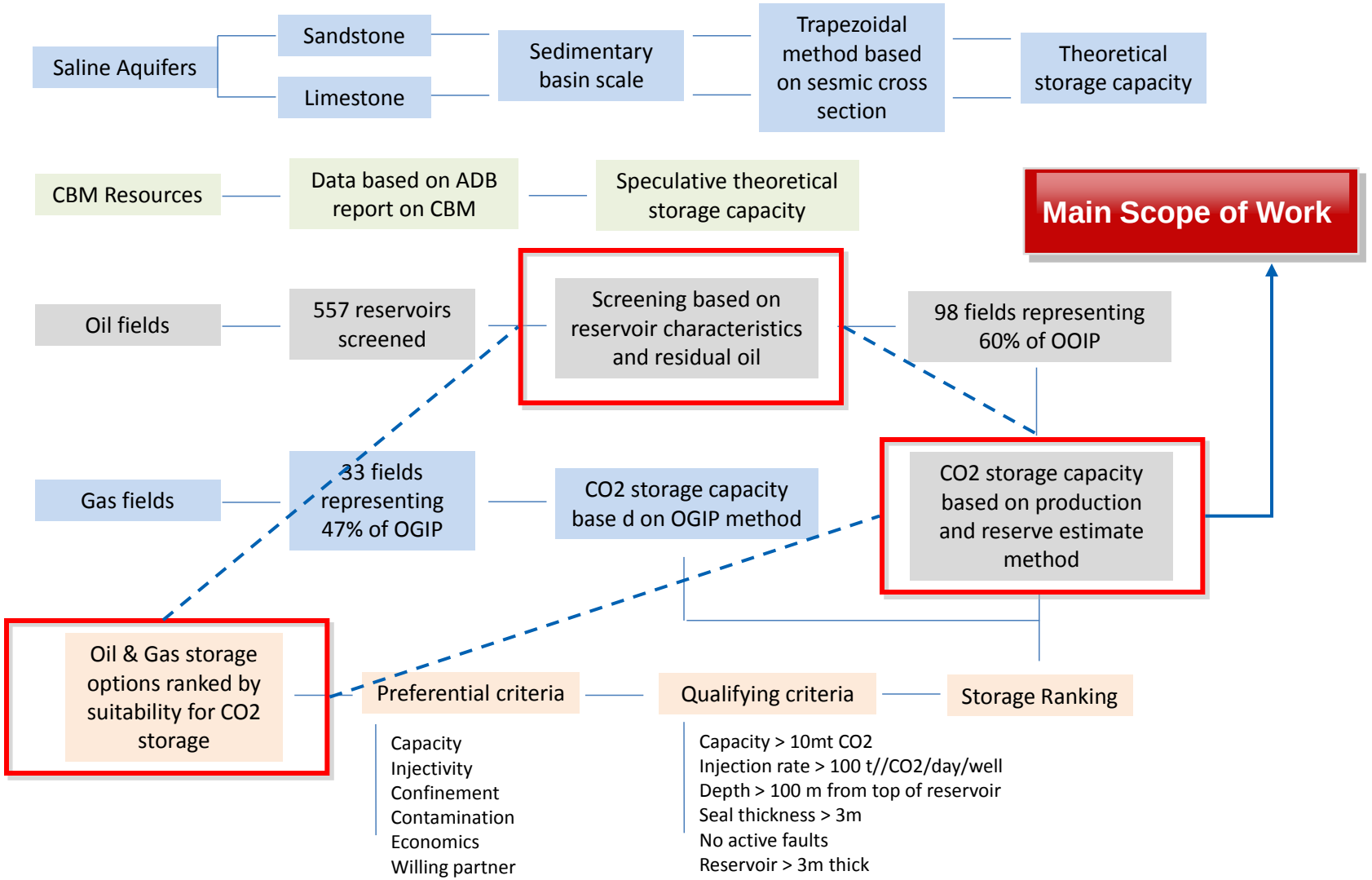
CO_2 Storage Screening and Capacity Estimates



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Linking the Sources and Storages (Sinks)

An integrated approach of assessing potential CCS-chain

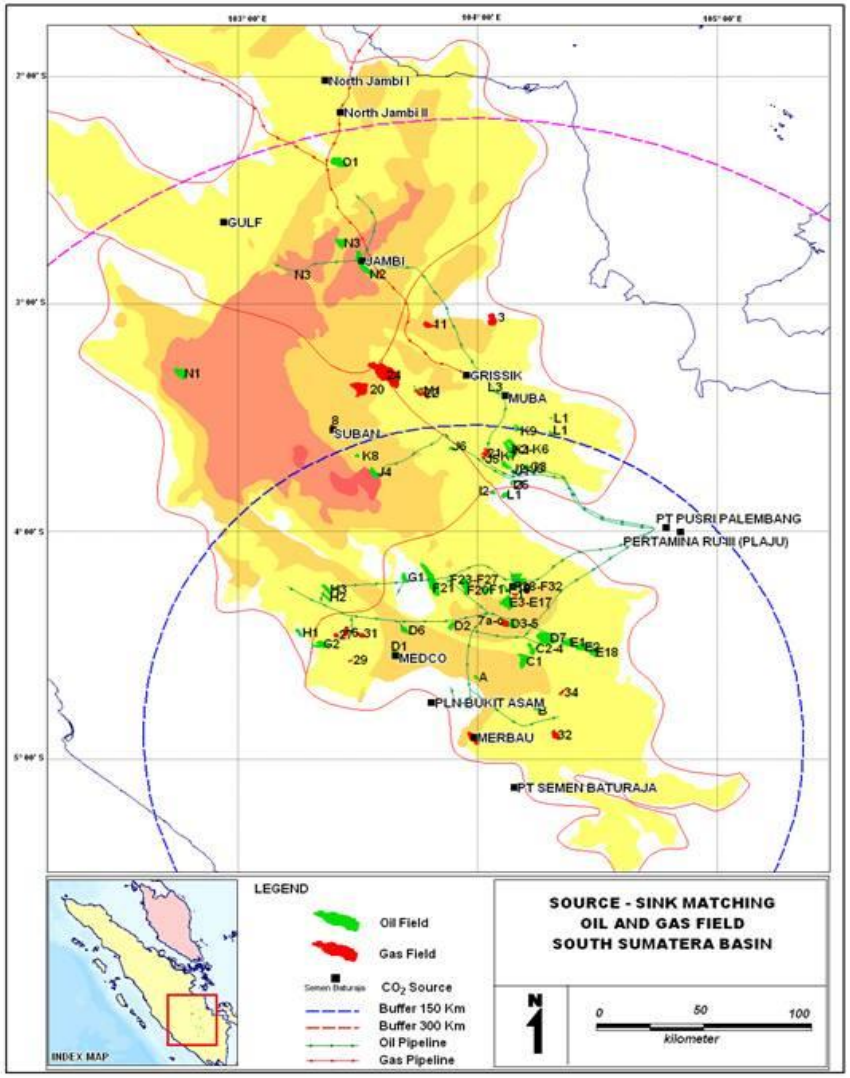
How we did source-sink matching

- A quantitative scoring system:
  - scores assigned based on proximity.
  - suitability score for the source.
  - suitability score for the sink.

GIS Map Platform

Overlaying the following information:

- Existing Pipeline network
- Identified CO_2 sources
- Screened oil and gas reservoirs



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3. Proposed Roadmap for CCS Development in Indonesia

WHY WE NEED A CCS ROADMAP?

The roadmap will provide an analytical footing that enables:

- Stakeholders to move forward on specific actions,
- Address unidentified key issues, and
- Take timely action.

CCS DEPLOYMENT STRATEGY

STAGE 1

Pilot

- 50-100 tonnes per day of CO_2 over several months
- Knowledge of reservoir performance to support financing and designing a Demo project. (18,000 – 37,000 ton per year)

STAGE 2

Demonstration

- Larger quantities of CO_2 injected into many wells continuously over many years
- 500-1,000 tonnes per day or more of CO_2 injected over 10 + years.
- Confirmation of long-term successful CO_2 storage to support financing and construction of at least one full scale commercial operation

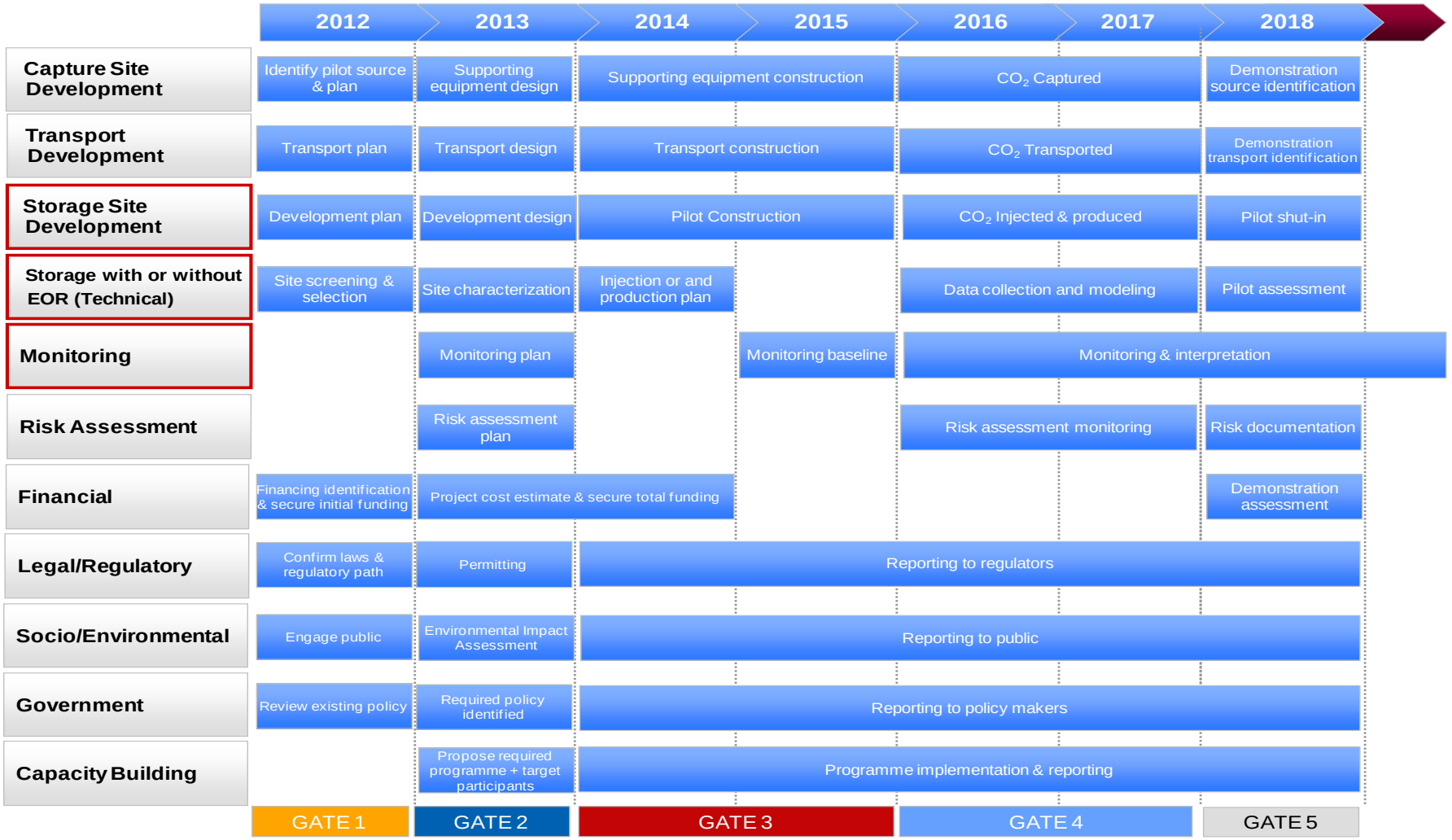
(180,000 – 370,000 ton per year)

STAGE 3

Commercial

- Very large quantities of CO_2 captured from one or more sources injected into one or more locations for a very long time period
- 2,500 -5,000 tonnes per day CO_2 captured and injected over 20+ years.
- Capture and store sufficient quantities of CO_2 to substantially reduce Indonesia's CO_2 emissions (1 – 2 million ton per year)

PROPOSED ROADMAP FOR CCS DEPLOYMENT IN INDONESIA



4. Developing Regulatory Framework for CCS Deployment in Indonesia

LEGAL AND REGULATION FRAMEWORK FOR CCS DEPLOYMENT IN INDONESIA

- Indonesia strong commitment in reducing CO2 Emissions, however there is no specific law and regulation for supporting CCS deployment
- Current condition on policy and regulation for encouraging CO2 emissions reduction
- Assessing the impact of CCS implementation in terms of electricity tariff
- The need for global common understanding and agreement on CO2 emissions reduction encouraging the deployment of CCS

GREENHOUSE GASSES EMISSION REDUCTION COMMITMENT

Climate change and GHGs emission reduction become national priorities

President RI commitment in G-20 Pittsburgh and COP15 to reduce GHGs emission by 2020

Pres Reg No. 71/2011
GHG Inventory and MRV

Domestic Efforts

26% (767 mln Ton)

41% (26%+15%)

Domestic and Internationl Support

Pres. Reg No. 61/2011
RAN-GRK

- Forestry, Peat Land and Agriculture (680 mill tonne)
- Energy & Transportation (38 million tonne)
- Industry (1 million tonne)
- Wastes (48 million tonne)

Through renewable energy, energy efficiency and clean energy technology implementation

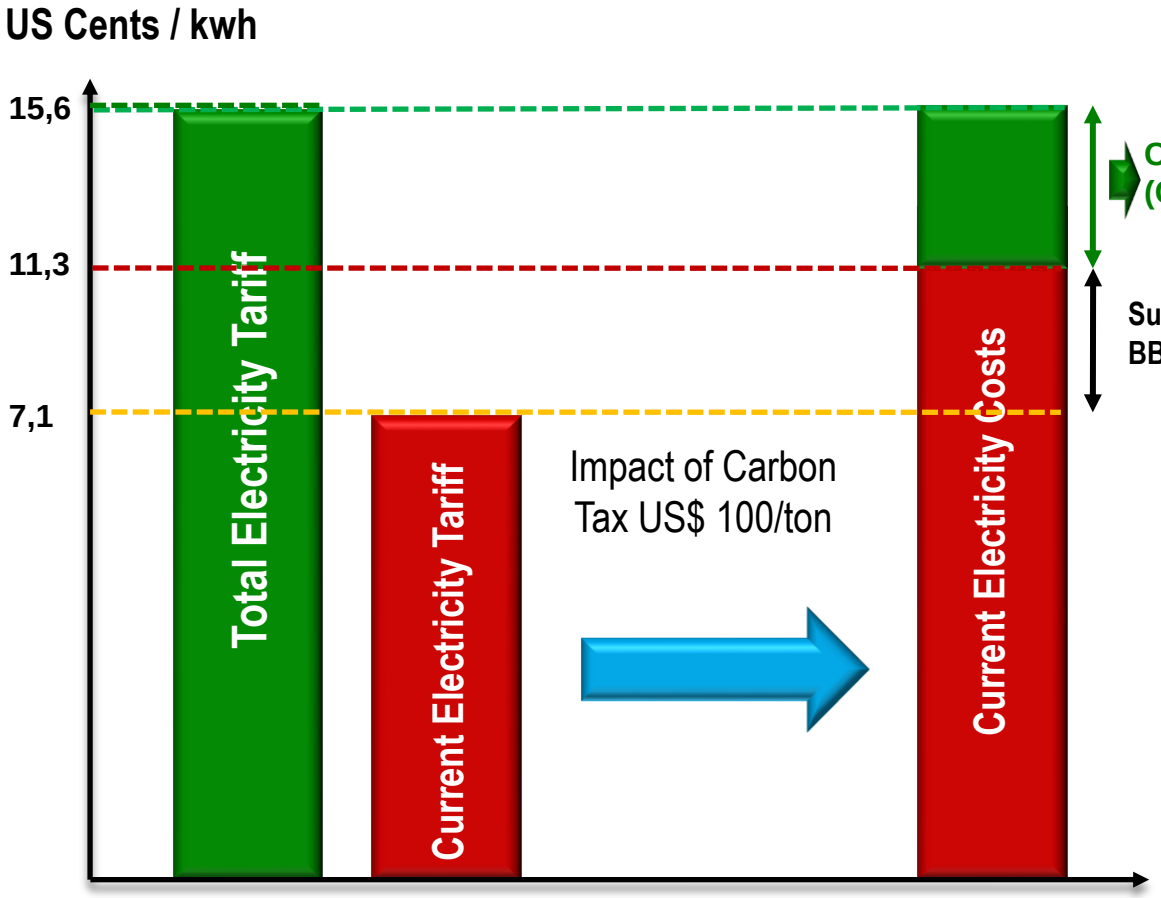
CURRENT CONDITION ON POLICY AND REGULATION FOR ENCOURAGING CO2 EMISSIONS REDUCTION

- A complex and long term project like CCS will require comprehensive and complicated arrangements which should be supported by well defined laws and regulations.
- The laws and regulations on CCS should reflect cost and benefit for the entity as well as the benefit to the national as well as the local government
- At present no law on CCS available in Indonesia. Several regulations under oil & gas reflect similarity for CCS arrangements, however the existing regulations are not sufficient to motivate industry to make strategic investments in CCS
- Even though there is no specific regulation for CCS, current regulation for promoting renewable energy and energy conservation can be perceived as an initial step for supporting CCS deployment
- Indonesia intensifies the development of renewable energy and improvement of energy efficiency aiming at reducing oil dependency. It is however resulting in significant CO2 emissions reduction and might match the 26% reduction target. Consistently maintaining policy instruments for encouraging renewable energy development is similar to implementing targeted deployment of CCS as one of IEA policy framework for CCS deployment
- ....
- Current condition on policy and regulation for encouraging CO2 emissions

CURRENT CONDITION ON POLICY AND REGULATION FOR ENCOURAGING CO_2 EMISSIONS REDUCTION (Continuation)

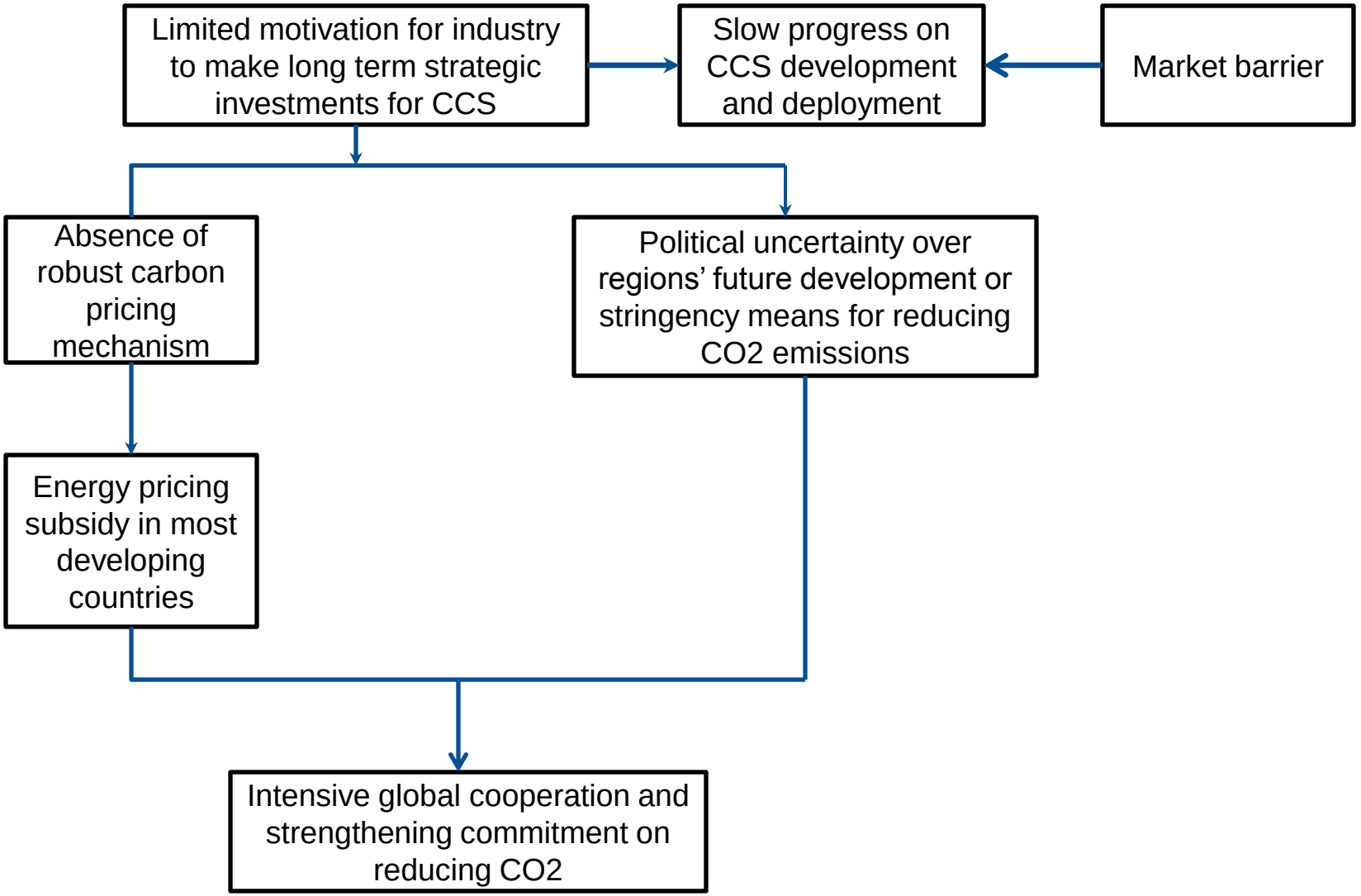
- Indonesia intensifies the development of renewable energy and improvement of energy efficiency aiming at reducing oil dependency. It is however resulting in significant CO_2 emissions reduction and might match the 26% reduction target. Consistently maintaining policy instruments for encouraging renewable energy development is similar to implementing targeted deployment of CCS as one of IEA policy framework for CCS deployment
- Incentives for Renewable energy development
- Dedicated legislation on CCS is desirable. To follow up it, R&D Agency for EMR has been proposing the implementation of roadmap for CCS deployment in Indonesia and development of CCS pilot project

IMPACT OF IMPLEMENTATION OF CCS POLICY ON ELECTRICITY TARIFF (CARBON TAX : US$ 100/TON)



1. Average electricity tariff in 2013: Rp 820/kwh; electricity costs: Rp 1300/kwh; kurs: Rp 11500/$
2. Average CO2 emissions of coal power plant: 870 gram CO2/kwh
3. Component electricity subsidy: almost 40% (end of 2013)
4. Implementation of Carbon tax at US$ 100/ton for enabling the deployment of CCS resulting in the double of current electricity tariff.
5. Removing electricity subsidy by increasing electricity tariff is politically difficult

THE IMPORTANT ROLE OF STRONG GLOBAL COMMITMENT FOR CCS DEPLOYMENT



Thank You

THANK YOU

http://www.litbang.esdm.go.id
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http:// www.tekmira.esdm.go.id
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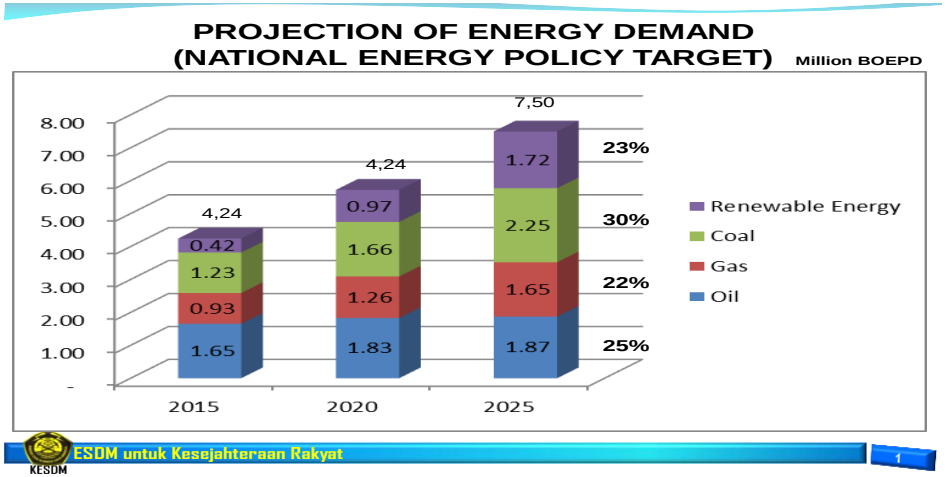
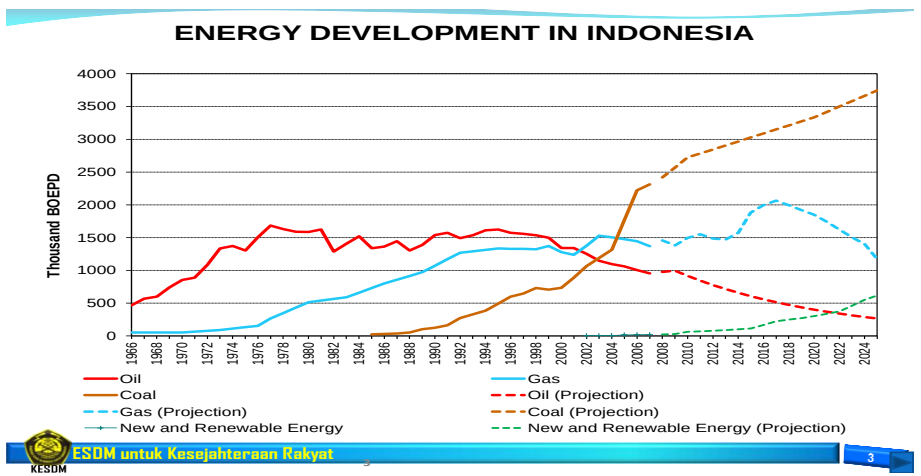
ENERGY SECURITY CHALLENGES IN INDONESIA





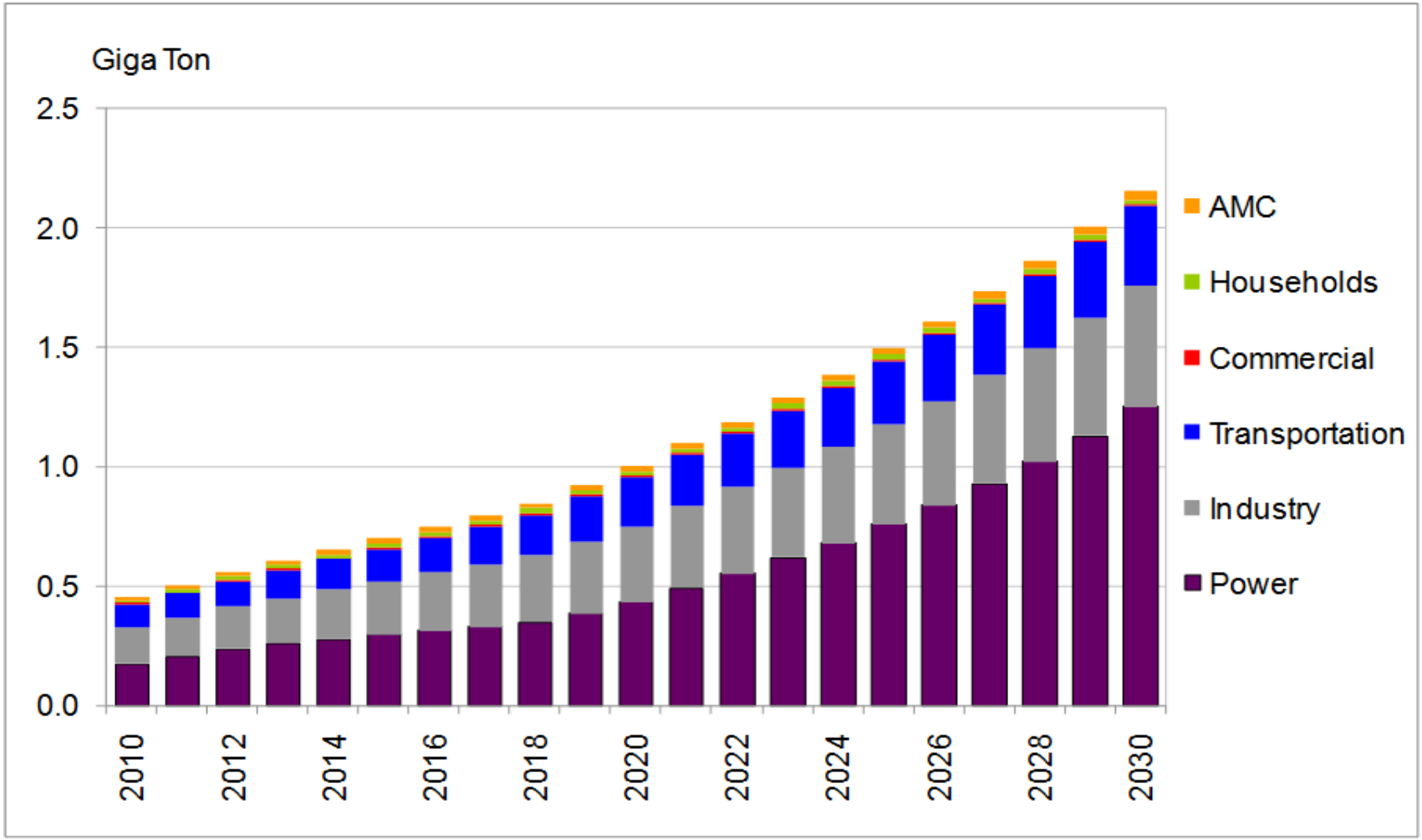
PROJECTION OF INDONESIA ENERGI BALANCE ON 2025

THOUSAND BOEPD

ENERGY TYPE	DEMAND (1)	DOMESTIC SUPPLY (2)	SURPLUS / DEFICIT
Oil	1870 (25%)	400	-1470
Gas	1650 (22%)	800	-850
Coal	2250 (30%)	3750	+1500
Renewable Energy	1720 (23%)	750	-1250
	7500 (100%)	5700	-1800

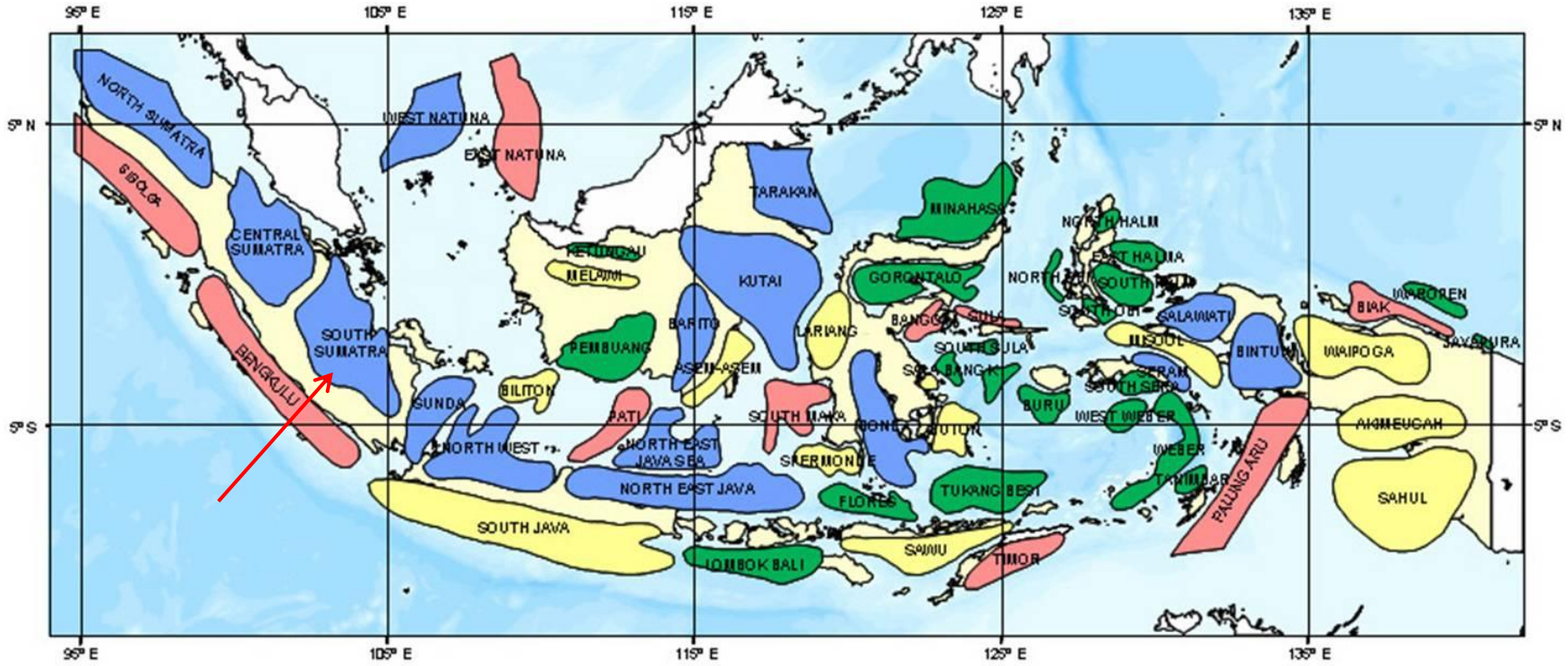
Note :
(1). Source: National Energy Agency (DEN)
(2). Source: ARDEMR Projection (2013)

NATIONAL GREENHOUSE GASSES EMISSION: FROM ENERGY SECTOR



Source: Indonesia Second National Communication under the UNFCCC , November 2009

60 TERTIARY SEDIMENTARY BASINS IN INDONESIA



IMPROVING RE-BASED ELECTRICITY GENERATION

Solution to increase purchasing price by ***feed-in tariff*** (FIT) method:

1. **New Regulation of** FIT:
   - Biomass Power Plant increase from Rp 656/kWh to Rp 1.325/kWh (multiply by factor).
   - Geothermal Power Plant maximum US$ 9,7 cent/kWh to US$ 10 – 18,5 cent/kWh.
2. **Other new FIT (under GOI assessment) :**
   - Mini/Micro Hydro Power Plant increase from Rp. 656/kWh to Rp. 975 – 1.050/kWh.
   - City Waste Power Plant increase from Rp.1.398/kWh to Rp. 1.450 –1.798/kWh.
   - Solar Power Plant around Rp. 1.880 – 3.135/kWh.
   - Wind Power Plant around Rp. 1.250 – 1.810/kWh.

INCENTIVES FOR RENEWABLE ENERGY DEVELOPMENT

Tax and Fiscal Incentives:

- Minister of Finance Regulation No 21/PMK.011/2010 on tax and customs facility for renewable energy:
  - ✓ Income tax: reduced net income for 30% of total investment, accelerated depreciation, imposition income tax on devidend paid to foreign taxable at 10%, and compenstation for losses in certain circumstances
  - ✓ Value added tax exemptions for taxable goods, machinery and equipment for renewable energy utilization
  - ✓ Import duty exemptions for goods and machinery for development and capital investment
  - ✓ Tax borne by government.
- Minister of Finance Regulation No 130/PMK.011/2011 on Provision of exemption facilities or income tax reduction for RE based industries
  - ✓ Exemption of corporate income tax for 5-10 tax year
  - ✓ Reduction of corporate income tax: 50% of income tax payable for 2 tax year.
- Biofuel subsidy: Rp 3000-3500/liter on top of fuel subsidies