Indonesian Climate Change Initiatives and Green Economy

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National Council on Climate Change -Indonesia (DNPI)

Jakarta, 17 January 2011

Outline

- **Climate Change Policy: International Context and National Response**
- Low Carbon Initiatives and Exercises: Lesson Learnt from the Ground
- Institutional Dynamics
- DNPI Initiatives
- Show Case: Eat Kalimantan Low Carbon Strategies

Assessment 1: The challenge to integrate international and national mitigation efforts: Some of the outstanding key issues

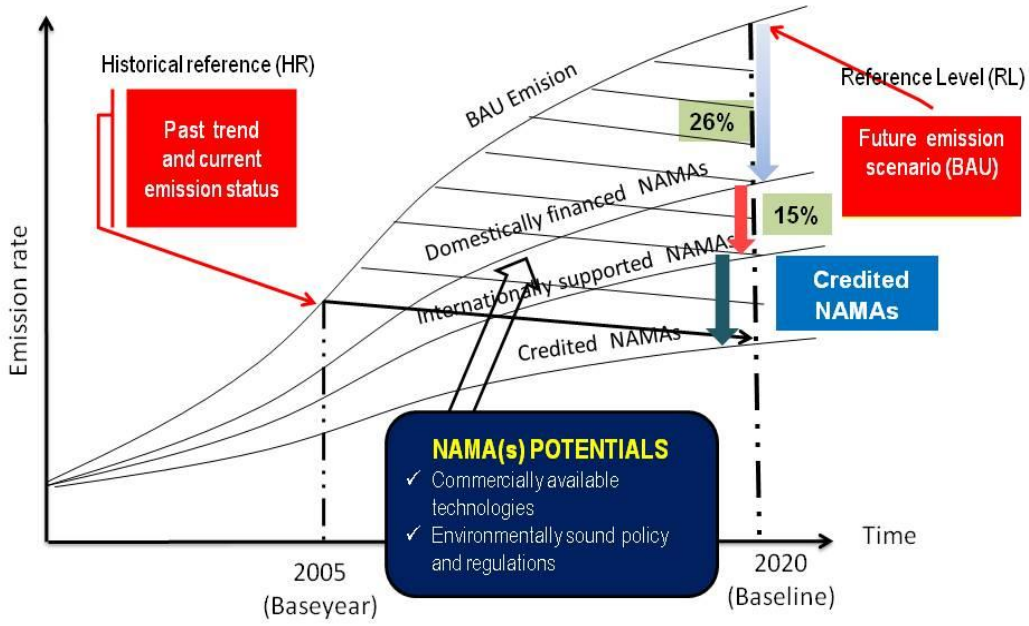
International Level	• **Pledges by developing country Parties (commitment) including its instruments** • **Range of emission allowances of developing country Parties** • **Registry and matching processes including its linkages with national level** • **MRV guidelines that would be developed by the Convention, its required processes at international and national levels, and level of support provided for developing countries** • **Climate finance**
National Level	• NAMAs key issues that should be solved in wide spectrum basis, including to develop a national forest reference emission level and forest reference level • National integrated processes for NAMAs establishment • Proposed financing scheme for NAMAs • Proposed policies, measures and incentives • MRV:(1). Possible coverage for MRV and its required mechanism (2). Identification of such associated required tools (3). Required national processess and its linkages to the UNFCCC processes (4). Institutionalization (5). Assignment of associated required institution

Sources: Dialog Pokja Mitigasi, as compiled by Hardiv, 2011

Assessmen 2: Emission Reduction Targets. Indonesian emission is expected to increase from 1.72 to 2.95 GtCO2e (2000-2020). Proposed National Action Plan on GHG Emission Reduction(RAN-GRK) consist of 70 programs distributed among various sectors .

Sectors	Emission Reduction Plan (Giga ton CO2e)		Agency
	26%	15% (total 41%)	
Forestry and Peat	0.672	0,367	Ministry of Forestry, Ministry of Environment, Ministry of Public Works, Ministry of Agriculture
Waste	0.048	0.030	Ministry of Public Works, Ministry of Environment
Agriculture	0.008	0.003	Ministry of Agriculture, Ministry of Environment
Industry	0.001	0.004	Ministry of Industry
Energy and Transportation	0.038	0.018	Ministry of Transportation, Ministry of Energy and Mining, Ministry of Public Works
	0.767	0.422	

Assessment 3: Related Key Issues should be resolved in wide spectrum basis through framing the dialogue, stakeholder engagement and consensus, and MRV as a governance instrument



NAMAs – National Appropriate Mitigation Actions

Framing the Dialogue

- To establish BAU baseline which is multi-sectoral business as usual as a basis for national mitigation actions: domestic (26%), international seeking support(15%) and credited NAMAs
- To select effective and efficient mitigation actions(least abatement cost) through integrated and inclusive processes at national and sub-national levels.
- To establish effective and efficient financial schema: public-private, market/non-market
- "Proof of Concept" in the framework of low carbon economy (LCE)/sustainable development

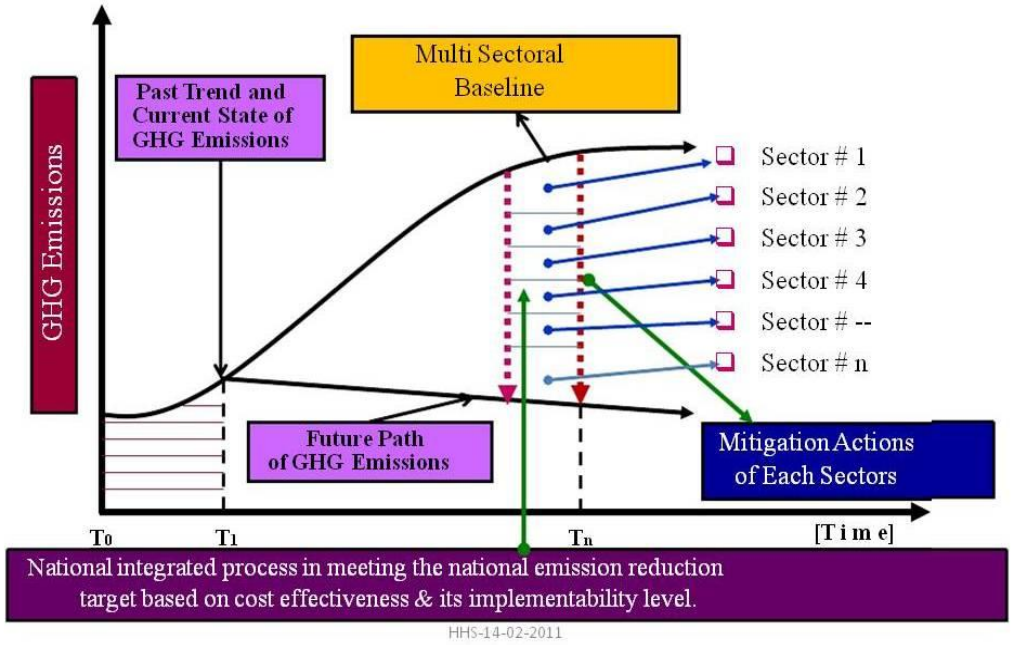
Stakeholder Engagement and Consensus on policy and technical issues

- Ministries/line agencies, NGOs, etc.

Governance

- MRV as a means to measure commitment and performance
- MRV as a means to facilitate coordination and planning, i.e database development

Assessment 4: Translating the Convention into National Development Plan ..



Article 3.4 of the Convention

The Parties have a right to, and should, promote sustainable development. **Policies and measures** to protect climate system against human-induced change **should be integrated with national development programmes**, taking into account that economic development is essential for adopting measures and address climate change

Integrate Climate Change Program into National Development Plan

- National integrated processes in meeting the national emission reduction target based on cost effectiveness and its implementability level
- Meeting the national emission reduction target as a contribution to global coherent mitigation efforts through NAMAs has been part of other pillars: in poverty eradication, job creation and social and economic development
- Institutional arrangement at national and sub-national level

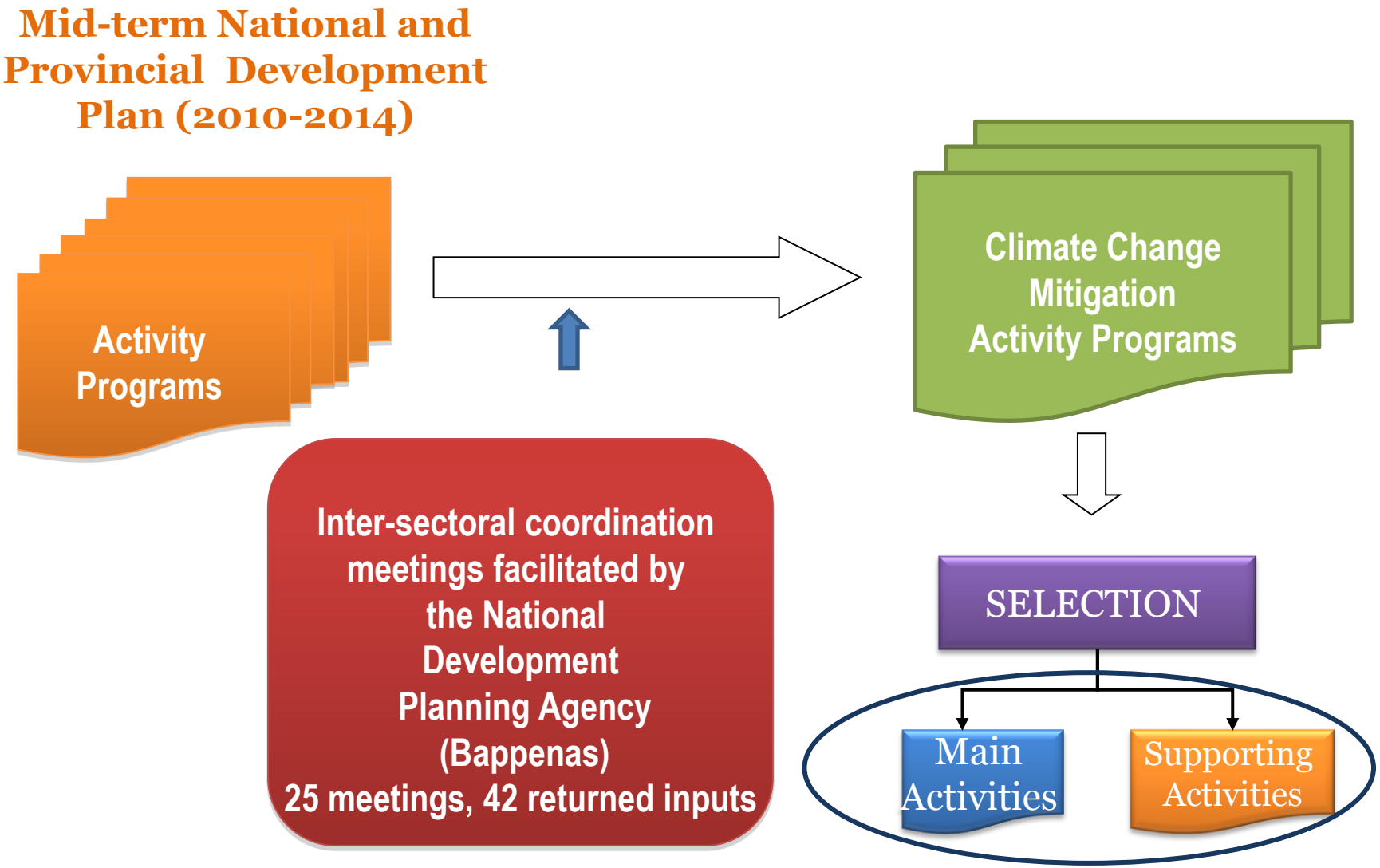
Assessment 5: Submission: Proposed NAMAs to be implemented in Indonesia, (FCCC/AWGLCA/2011/INF.1)

- Indonesia is the first developing country in the world to voluntary reduce its GHG emissions up to 26 per cent by 2020.

- The emission reduction would be achieved through, inter alia:
  - Sustainable peat land management;
  - A reduction in the rate of deforestation and land degradation;
  - The development of carbon sequestration projects in forestry and agriculture;
  - The promotion of energy efficiency;
  - The development of alternative and renewable energy sources;
  - A reduction in solid and liquid waste;
  - Shifting to low-emission modes of transport.

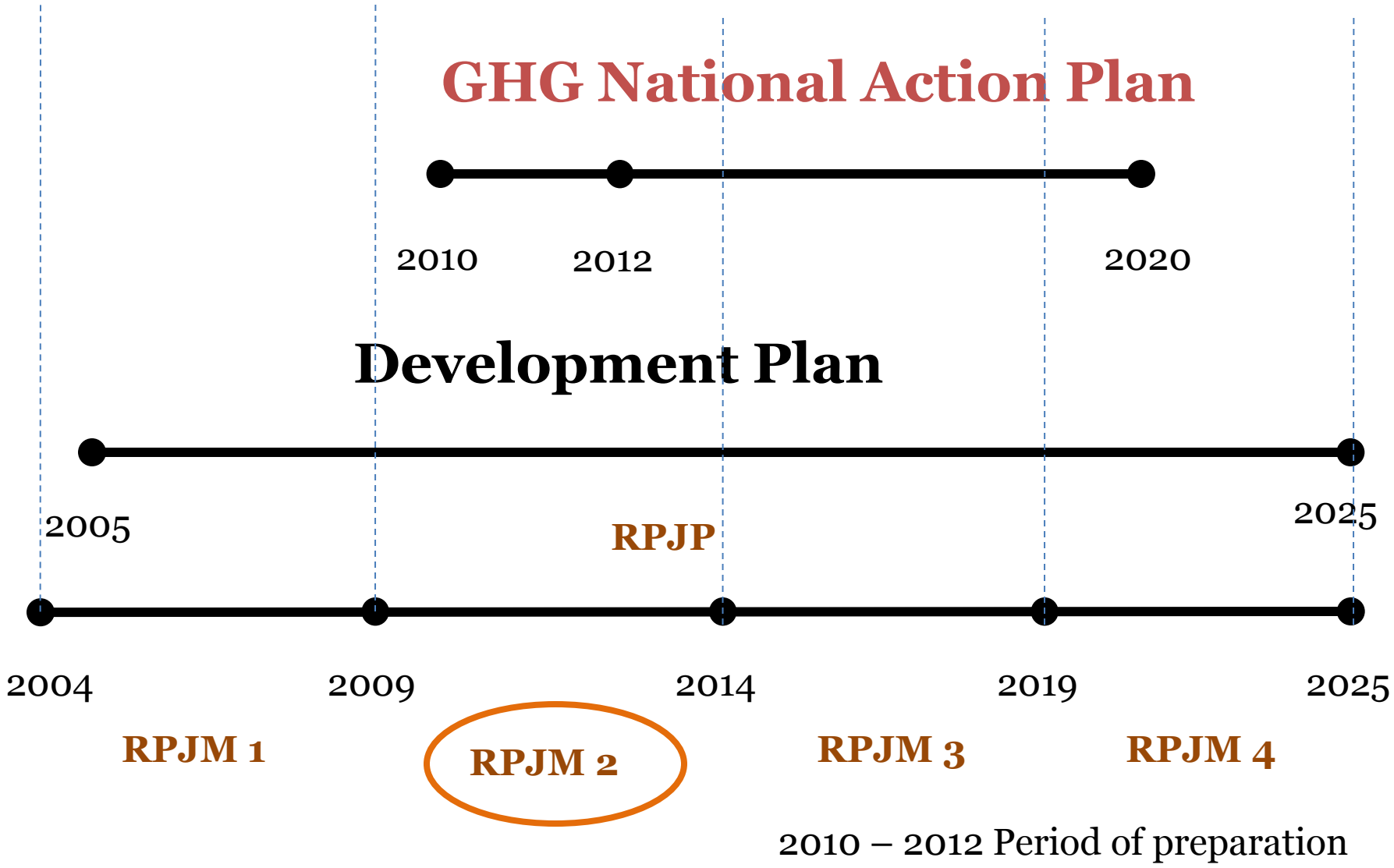
- To translate this commitment, Indonesia is now working on national emission reduction action plan, aimed at achieving the aforementioned emissions reduction, would be equipped with a measurable, reportable and verifiable system in order to ensure that each action receives the necessary level of funding

Assessment 6: Emission reduction plan has been integrated into national development plan through inter-sectoral and stakeholders consultation processes



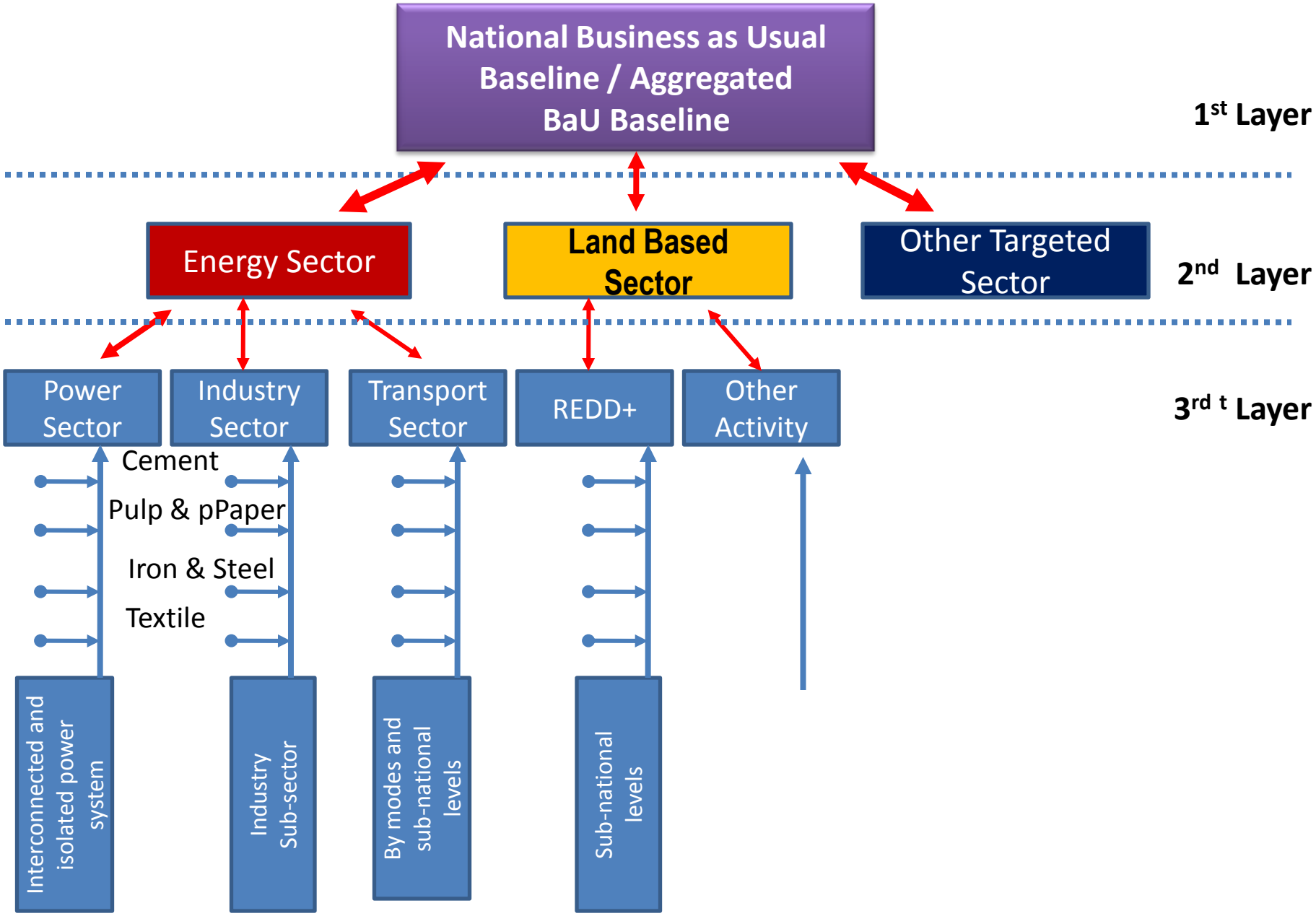
Source: Bappenas(2011)

Assessment 7: Time frame of NAMAs is included in the long-term and mid-term national and sub-national development plan covering three periods of plan



RPJP = The long-term national development plan, RPJM = Mid-term national development plan
Source: Bappenas(2011)

There is a need to establish integrated national BAU baseline as a basis to derive emission target reduction trough top-down and bottom-up processes



The Challenge in integrating national GHG Inventory Report into MRV system as part of national mitigation actions achievement

Source: IPCC Guidelines, 2006

Existing Institutional Arrangement

- Ministry of Environment (MoE) is a focal point for National Communication reporting to be reported through National Council on Climate Change (DNPI)
- National Planning Board (Bappenas) is responsible for developing National Action Plan on GHG reductions (supposed t be NAMAs) through ministerial coordination processes
- National GHG Inventory System(SIGN) is under development and will be integrated into national MRV system.

Potentials for integrated System

- The planned to establish REDD+, MRV and financial agencies
- New Act on Geographic Information among other regulations.

Assessment 8: The various MRV capabilities among agencies show that another challenge in developing integrated system, including technical capacities, resources as well as institutional development.

	Tasks/Department	Ministry of Forestry: International relationship	Ministry of Forestry: Forest production	Ministry of Forestry: Planologi	Ministry of Forestry: Forest protection and natural conservation	Ministry of Forestry: Land rehabilitation and social forestry degradation and climate change control	KLH: Degradation and climate change control	KLH: International relations	Lapan: Remote sensing	MoA: Soil research institute	Bappenas: National resources and environment	Bakosurtanal: All agencies (base-line services)	DNPI: All agencies	BPN: All agencies	BKPRN: All agencies
M	Land use/land use change			✓								✓		✓	✓
M	Land cover/land cover change			✓			✓		✓			✓			
M	Biomass above ground			✓											
M	Biomass below ground									✓					
M	Dead wood			✓						✓					
M	Litter			✓						✓					
M	Soil/peat									✓	✓				
M	Forest conservation				✓										
M	Carbon enhancement					✓									
M	SFM		✓												
M	Degradation					✓			✓			✓			
M	Compile inventory			✓			✓					✓			
M	REDD+ projects														
R	International	✓					✓	✓	✓	✓			✓		
R	Domestic			✓					✓	✓		✓	✓		
R	Donor	✓					✓	✓					✓		

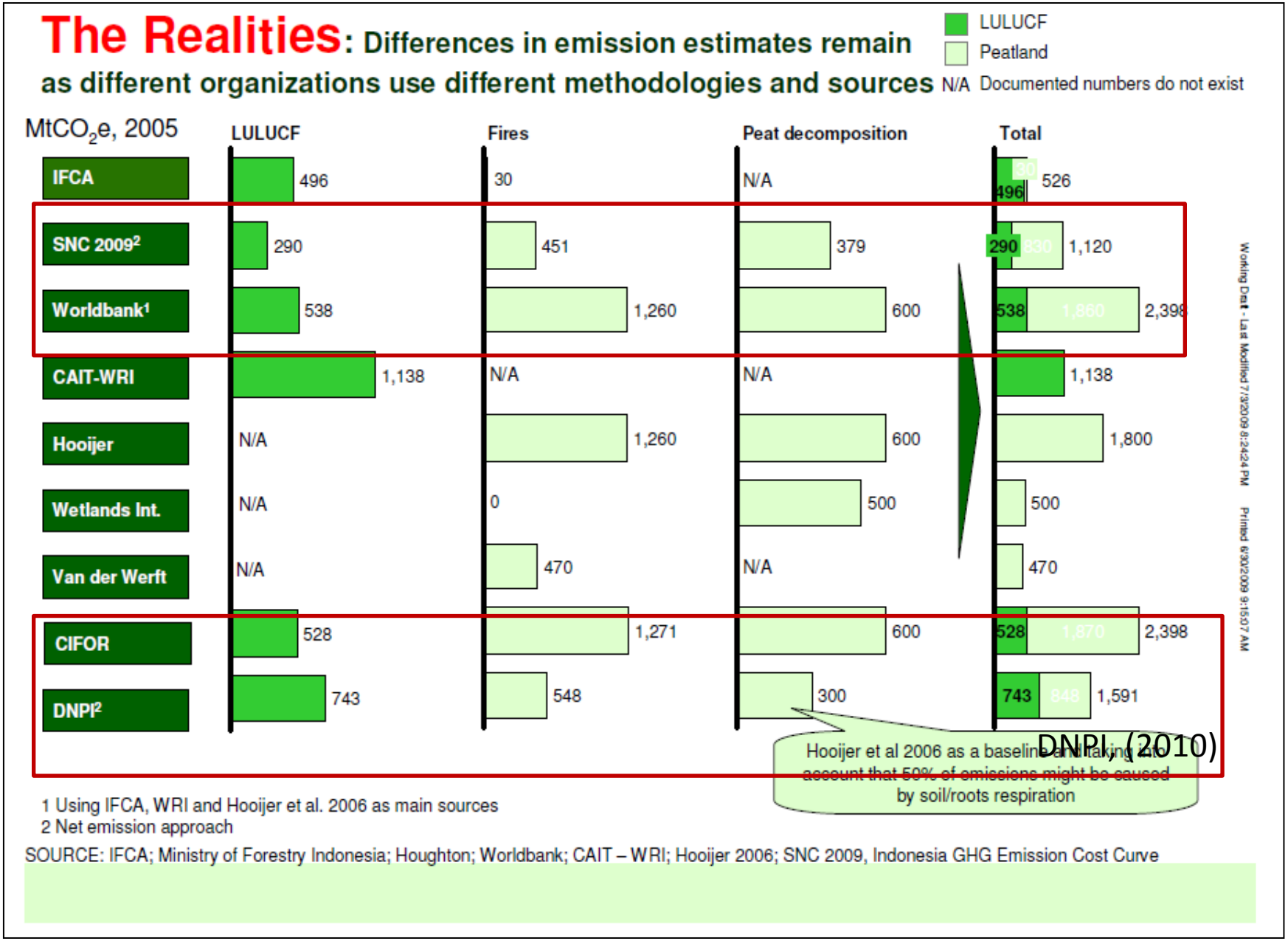
Source: Satgas REDD+(2010)

Assessment 9: Indonesia has collected a lot of data, but significant gaps exist to reach national monitoring system. Also uncertainty of the available data, especially on peat.

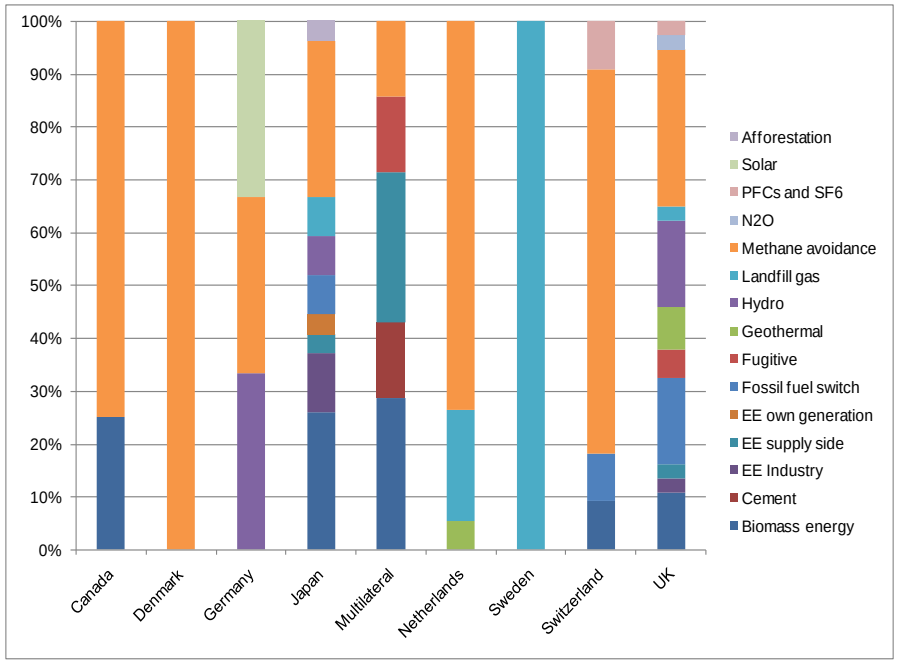
Assess-ment criteria \ Data type	Land cover change	Forest management	Biomass above ground	Biomass below ground	Forest types	Forest growth
Quantity/sample size						
Geographical reach						
Quality						
Improvement levers	▪ Semi-annual reporting ▪ Fire monito-ring data ▪ SAR/Lidar to avoid cloud problems ▪ Ground truthing and more high resolution photos for verification and identifi-cation of forest type	▪ Greater details covering all districts compared to ongoing sampling approach to establish national forest mgmt database	▪ Larger data samples ▪ Data needed for APL land and East Indonesia ▪ Reporting protocols to ensure con-sistent data collection ▪ Destructive sampling is the most accurate method	▪ Larger data samples ▪ Soil sampling protocols to guide collection sampling methods and ensure consistency	▪ More up-to-date data from high resolution remote sensing ▪ Ground truthing for validation	▪ Long-term monthly rain-fall and temperature data ▪ DEM data ▪ Soil data ▪ Solar radiation data

SOURCE: IAFCP, ICRAF, DNPI

Data uncertainties stem may stem from: assumption, methods, technology used, et, i.e emission from peat.



Assessment 10. MRV applications based on international investment in carbon projects, CDM, and bilateral arrangement in Indonesia



Source: DNPI (2011)

Snapshots

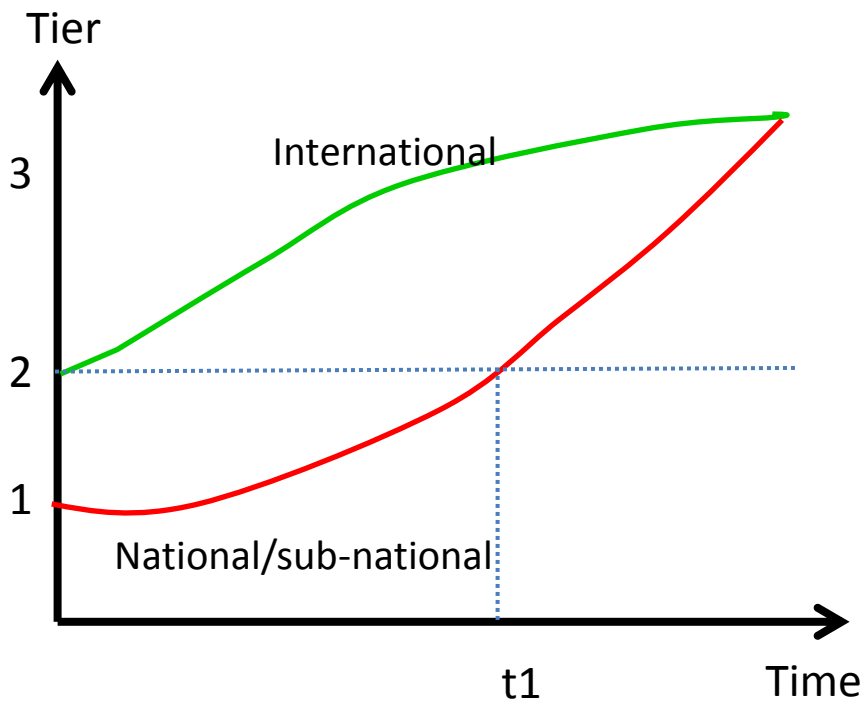
- **Clean Development Mechanism (CDM):**
  - 157 projects have already got LoA
  - 72 registered projects
  - 25 new proposal (under evaluation)

- **Feasibility Study for Bilateral Offset Credit Mechanism funded by Japan Government:**
  - 2010: 30 projects in 13 countries, 8 projects in Indonesia
  - 2011:50 projects in 18 countries, 18 projects in Indonesia

- **Voluntary Carbon Market (VCM)**
  - voluntary carbon market) is a carbon market not constituted by compliance to reduce emission but by the voluntary intention of the buyer to reduce its carbon footprint
  - More than 20 Indonesian projects in VCM pipeline and all employ Voluntary Carbon Standard (VCS) methodologies.
  - Total VER that already issued is more than 1,000,000 tVER.

- **Other Project Initiative.**
  - Katingan, etc.

Assessment 12: Matching the Needs: Options and on-going DNPI's initiatives



- **MRV should be incorporated into national mitigation actions framework**
  - Mitigation action across sectors, sub-national level
  - Resource allocation and tracking
  - Harmonization and Synchronization with national and global reporting
  - Trustworthy and verifiable information for further policy and market uptake/buy-in
- **Comprehensive step-wise approaches**
  - Assessment of lesson learned (from lack, gaps, mismatches)
  - Assessment of institutional and legal arrangements as a basis to further MRV agency development
  - MRV "Proof of Concept"

- **DNPI Initiatives**
  - Indonesia Climate Change Center (ICCC)
  - Bilateral cooperation with Japan

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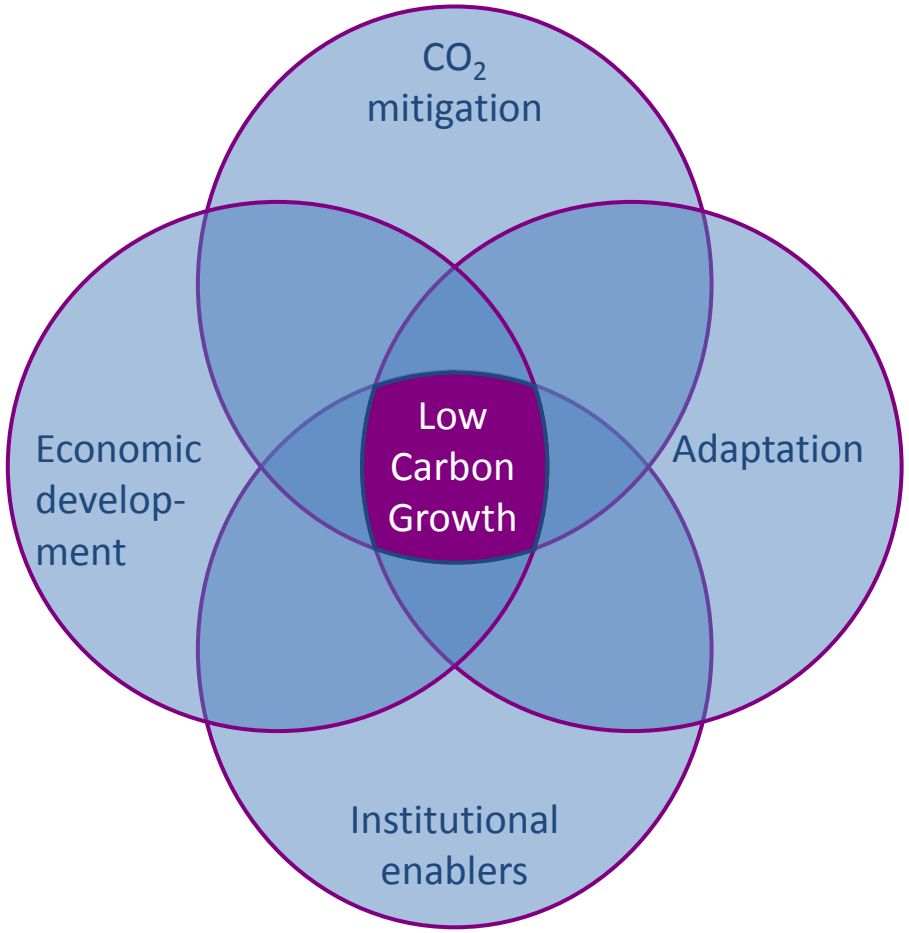
Indonesia is charting a green growth plan which will ensure sustainable economic growth with a smaller carbon footprint

"We are devising an energy mix policy that will reduce our emissions by 26% by 2020. With international support, we are confident we can reduce emissions by as much as 41%"

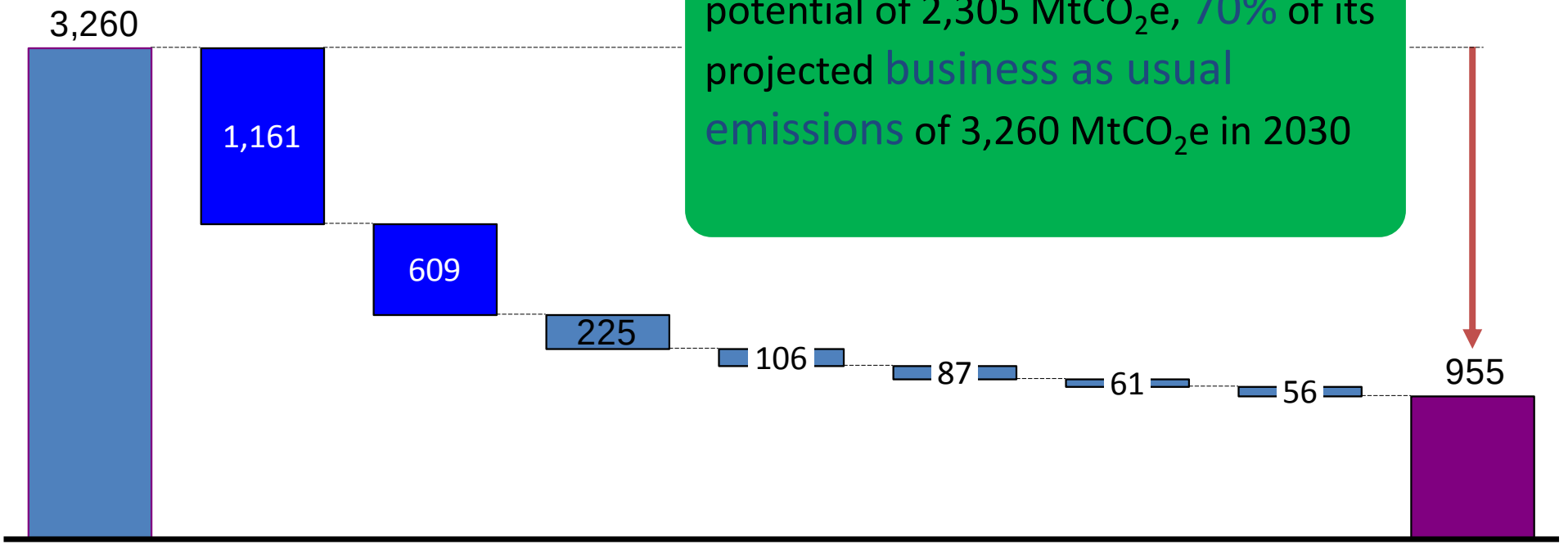
Three provinces have responded by developing green growth strategies with DNPI



The potential to reduce emissions is representing up to 5 percent of global abatement needed

Projected abatement potential

Million tons, CO_2e



Indonesia has a total reduction potential of 2,305 $MtCO_2e$, 70% of its projected business as usual emissions of 3,260 $MtCO_2e$ in 2030

	Total abatement	LULUCF (1)	Peat (2)	Power (3)	Agriculture (4)	Transport (5)	Petroleum (6)	Other	Remaining emissions
Percent of total reduction potential		50	26	10	5	4	3		

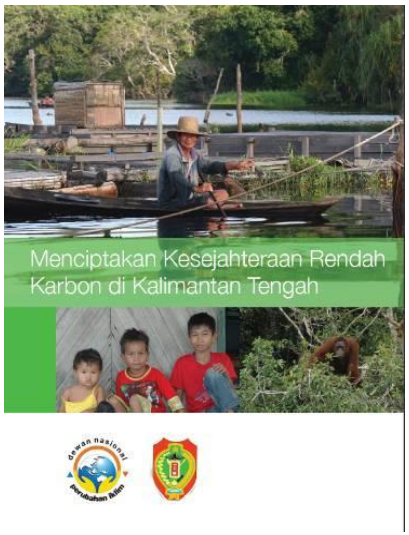
SOURCE: DNPI Indonesia GHG abatement cost curve

Detailed low carbon growth strategies have been developed

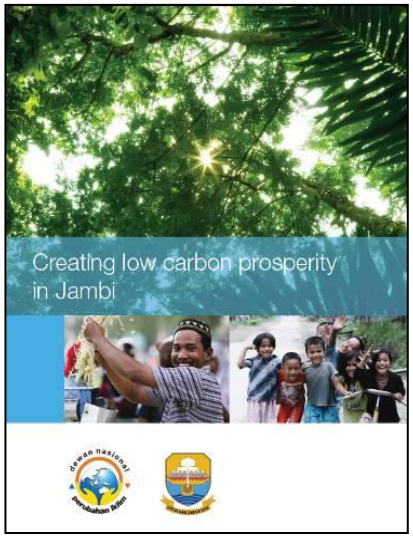
Low-Carbon Growth Plans

Indonesia

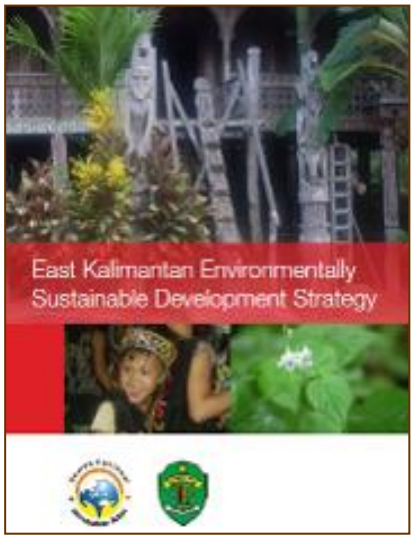
Kalteng



Jambi



Kaltim



Key elements of LCGS

Sustainable economic development strategy

- Competitive strengths and weaknesses
- New sources of growth

Sector strategies

- Abatement opportunities, pilot projects, policies required
- Palm oil, forestry, agriculture, coal, oil & gas

District strategies

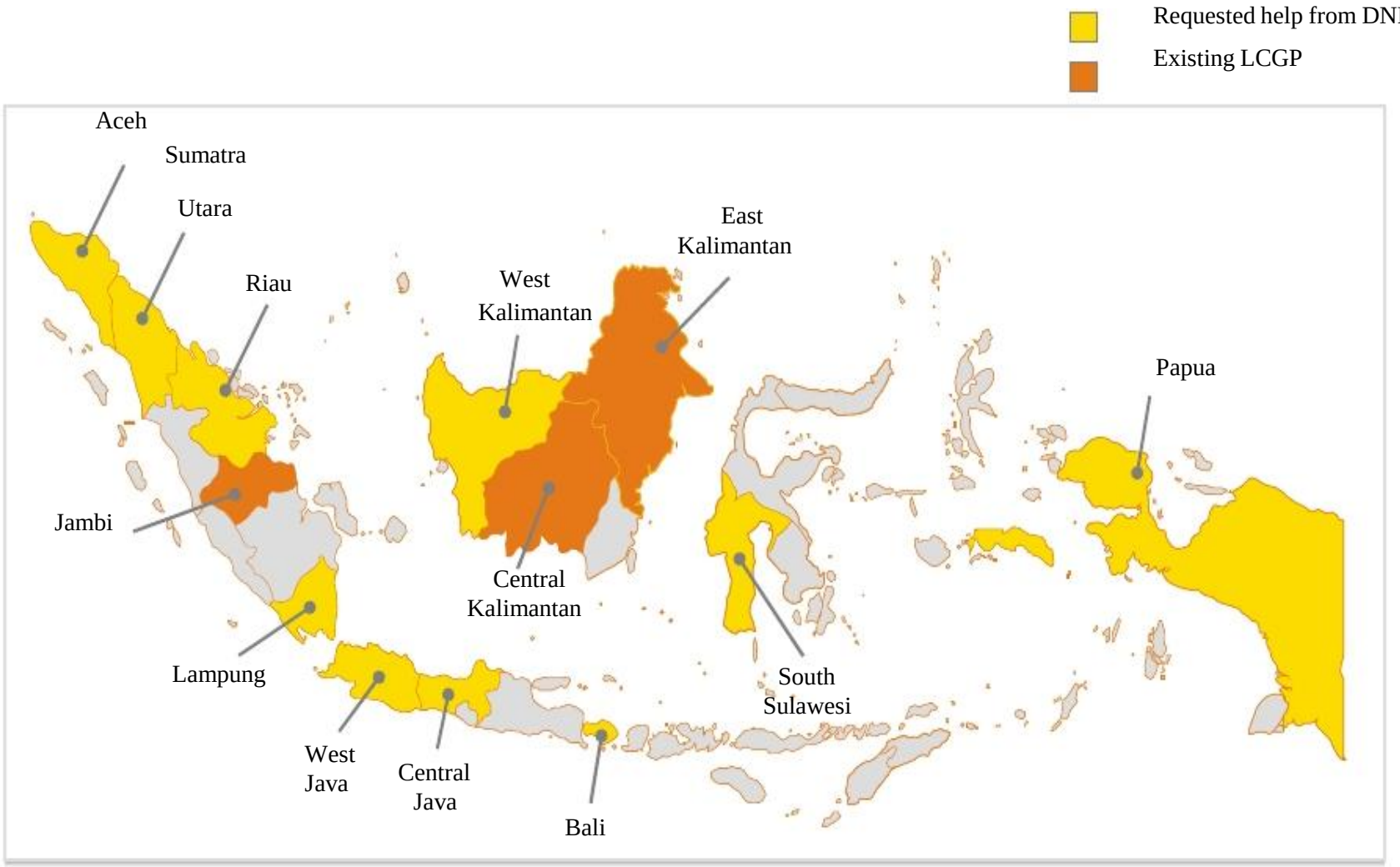
- District's size and land use
- Emissions and potential for abatement
- GDP and employment

Implementation and enablers

- Detailed action plan
- Critical enablers required
- Estimate of total costs

SOURCE: DNPI; Pemda Kaltim, Pemda Kalteng, Pemda Jambi

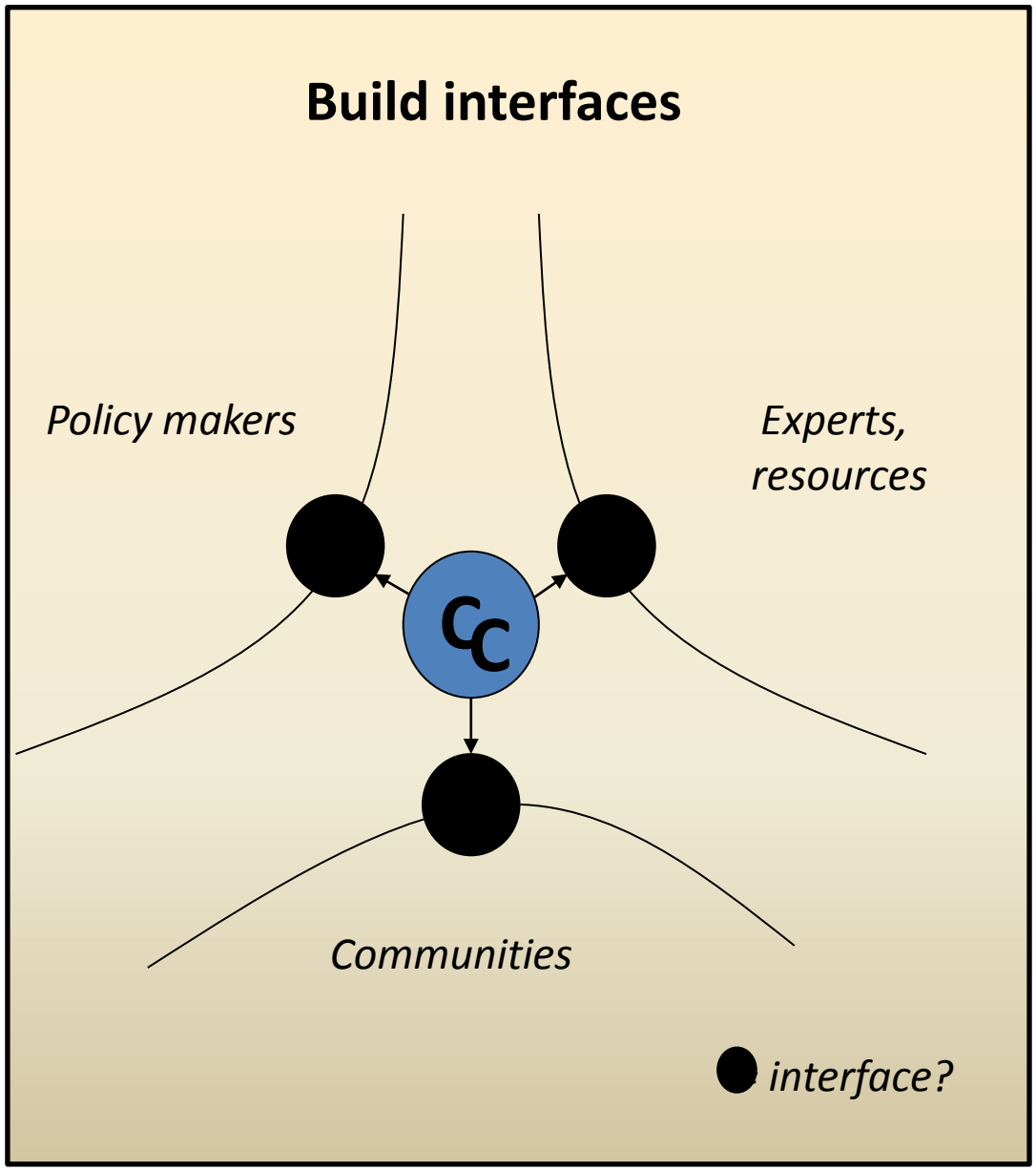
The Council's work with Central Kalimantan, East Kalimantan and Jambi has led to other provinces requesting low carbon growth strategies



SOURCE: DNPI

Spatial Plan as a means to build interfaces among key stakeholders

- A comprehensive **spatial plan** provide the means to measure and monitor the changes.
- Spatial plan also allows **aggregate cross-disciplinary information** about individual locations in seeking sustainable production and consumption options that might influence interrelationship.
- As a means to build **a consensus** among stakeholders.
- In responding to CC issues, **spatial plan adjustment** is needed to include emission reduction plan.



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What we've learned and Challenges to Spatial Planning

Ideas of Low Carbon Development

- There is a potential window of opportunity in driving economic growth while mitigating GHG emission reduction
- Low carbon growth thinking has not been reflected in the traditional spatial planning process
- Approved spatial plans and the ones being under discussion will maintain those provinces on high deforestation pathways

Recommendations related to Spatial Planning

- Revision of spatial planning process through the inclusion of low carbon economic development components
- Inclusion of land titling to allow a more efficient use of non-forest land within and without the *"kawasan hutan" ("non forest areas")*
- Connect spatial and economic development plans to achieve emission reduction and economic development targets

Community Engagement

- Create a culture of openness in tacking the issues and mitigation options
- Build a platform of participation through overarching approach:(1) policy dialogue, tools, community engagement and public awareness
- Foster the dialogue and continual improvement

Boundaries of solution to focus on integrating low carbon development strategy into spatial planning

What we are solving for

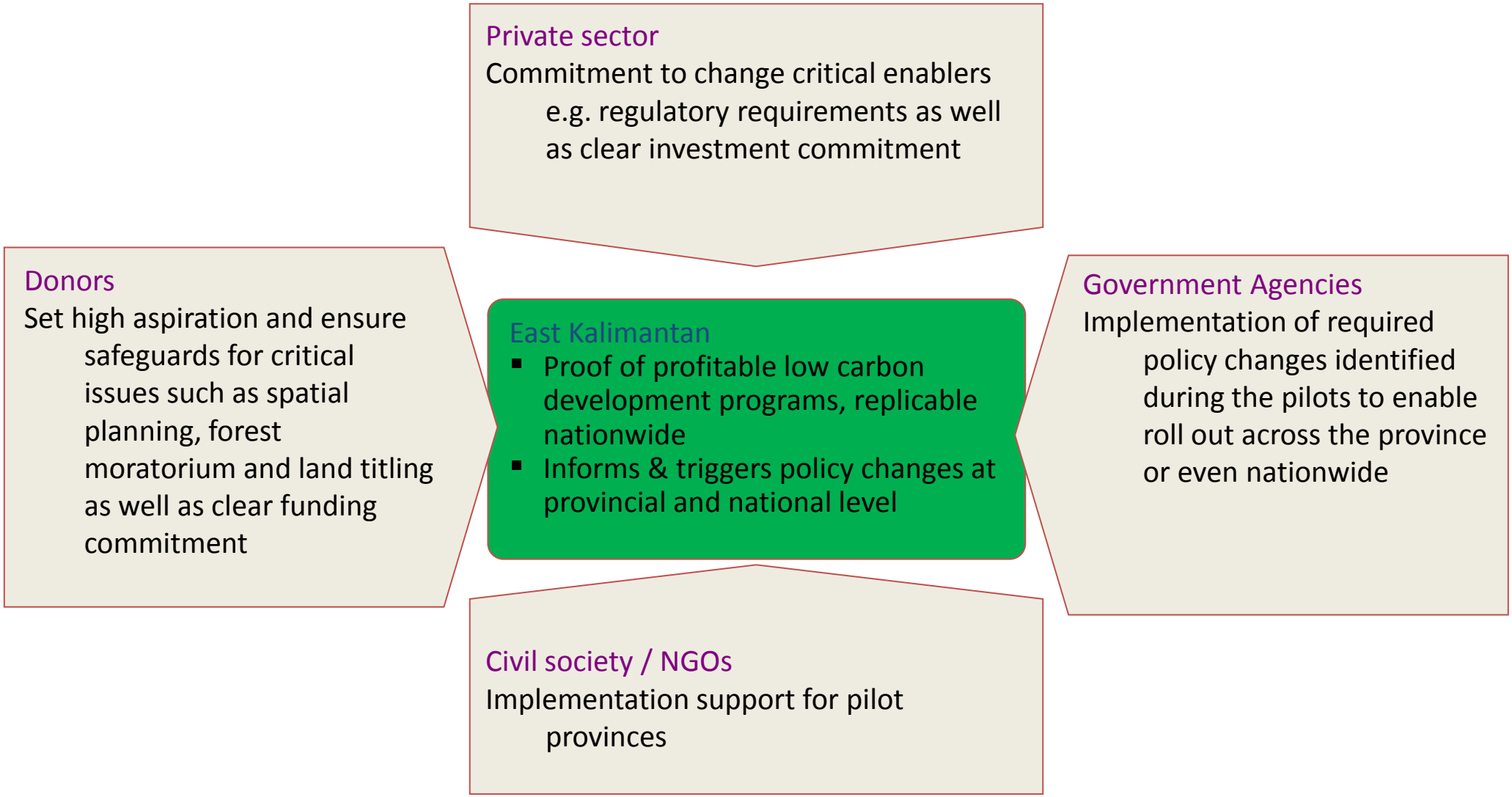
- How the **spatial plans can better support low carbon development** and a reduced deforestation scenario
- A high level **fact-base for identifying potential** to reduce deforestation that is driven by legal land status
- A strong basis to convince **local governments** that spatial planning needs to be **focused on low carbon development**
- **What needs to change:** highlight and revise policies and regulations that currently impede optimal spatial plans

What we are NOT solving for

- **Complete re-work of the spatial planning process** from A to Z
- Spatial planning **beyond the scope of protecting carbon** – e.g. infrastructure development, job creation, watershed management
- A detailed **hectare by hectare articulation** of exact areas which will require revision to land status'
- The final or 'complete' **solution to Indonesia's moratorium**
- A **secured commitment from each Kabupaten** to a revision to their spatial plans

SOURCE: DNPI; Kaltim Green

Delivering impact in East Kalimantan relies on multiple partners



SOURCE: Kaltim Green

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Climate Change Policy Dynamics

- Presidential Instruction No. 10/2011 on **Forest Moratorium.**
  Development of REDD+ schemes including Indicative Moratorium maps
- Presidential Decree No. 25/2011 on **National Task Force for REDD+**
  REDD+agency and related institutional development (finance and MRV)
- Presidential Regulation No. 61/2011 on **National Emission Reduction Plan** (RAN-GRK). Covering 70 programs for 26/41% emission reduction plan across five main sectors(agriculture, forestry and peat, energy and transportation, industry, waste and other supporting activities)
- Presidential Regulation No. 71/2011 on **National GHG Inventory System .**Regular information on th level, status and trend of GHG emission change and absorption, including national, and subnational carbon stock as well as GHG emision reduction

Some Questions to be answered

- How are policies and strategies related to low carbon economy integrated between the local, provincial and national levels? How is this integration also carried out among different priority themes, such as agriculture, development, environment, etc?

- What kinds of technologies and technology management systems can be adopted to provide alternative livelihoods and income streams for the local communities in order for them to generate income beyond subsistence levels?

- How can a fair financing and incentive structure be developed that can address the needs of the key stakeholders at the local level?

- In order to address the problems related to low carbon economy, what kinds of institutional arrangements be put in place in order to achieve collective/consensus goals by ensuring community engagement and dialogue?

Challenges: A robust foundation?

- (a) the existing data gaps, (b) a common/agreed understanding of the definitions and concepts that are being used, (c) setting the goals of land use and land use change (d) creating a baseline/reference point against which future action can be planned and progress measured.

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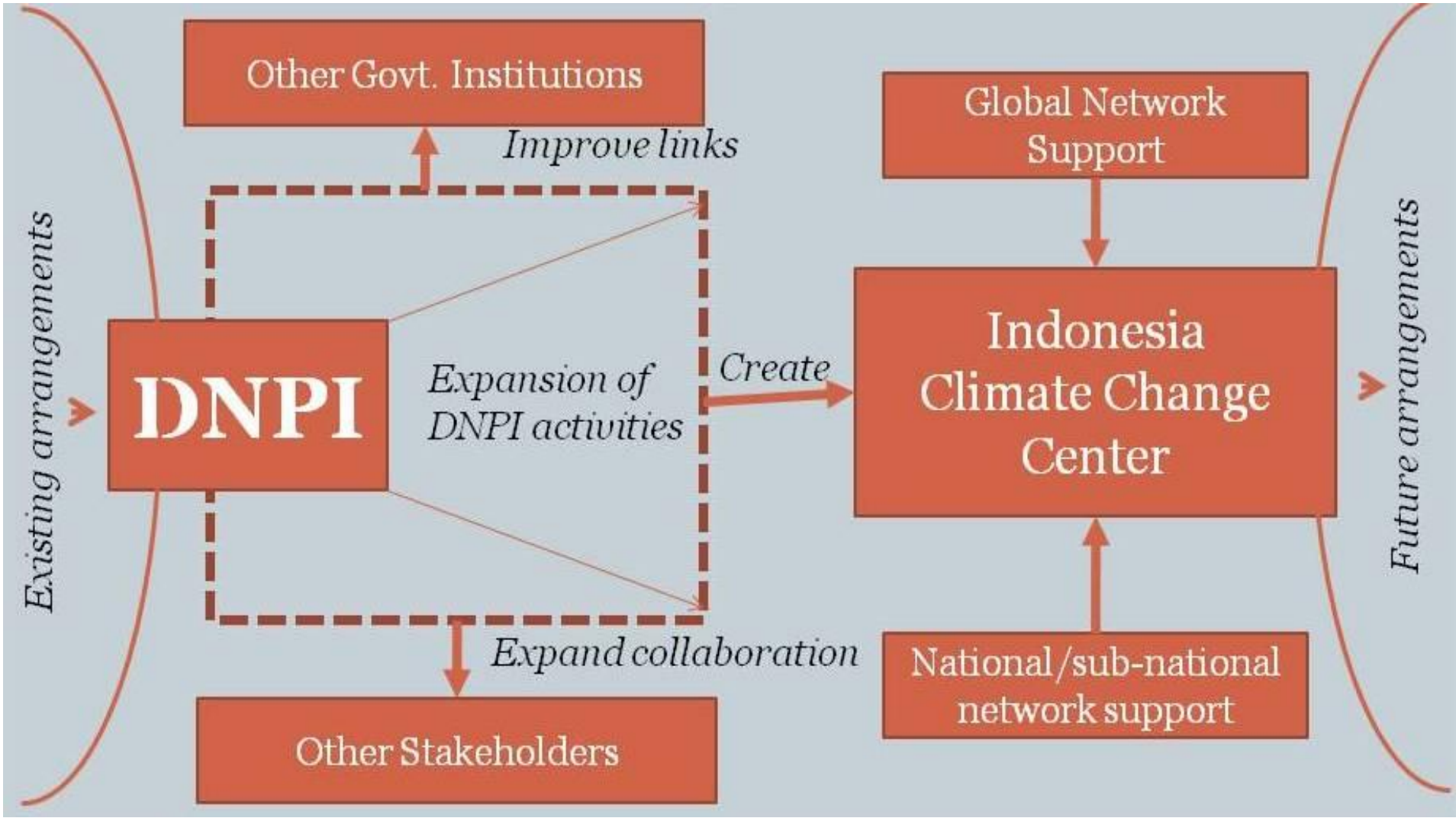
DNPI Initiatives to promote low carbon economy and related issues

- **Series of Policy and Technical Dialogue:** MRV, low carbon economy, policy and modelling, expert briefings on mitigation related issues, geo-spatial technology, 100 villages mapping initiative; green investment, innovation and productivity ; service reform dialogue on CC(SEREDI)
- **Indonesia Carbon Update Network (ICU-Net),2010:** low carbon economy, green Innovation, policy and assessment, geospatial technology, knowledge Warehouse, open source initiative, MRV and ICU-net portal(www.indonesiacarbonupdate.net)
- **Sapporo Initiatives:** strategic integrative research in the framework of low carbon economy; integration of science and capacity building efforts in economy-wide climate change mitigation research; geo-spatial technology; a new approach on mobilizing and deploying financial/technical resources (GO, private)
- **Asia Forum on Carbon Update (AFCU-Net),:** networking and collaborative efforts on low carbon economy, technology and capacity building for scientific communities in the Asian region.
- **South East Asia Network on Climate Change Focal Pointe (SEAN-CC), UNEP.**
- **Indonesia Climate Change Center (ICCC) (US-Indonesia Comprehensive Partnership)**

Expanding activities to support policy assessment and policy coordination: data integration, scenarios development and networking through Indonesia Climate Change Center(ICCC)



DNPI Initiatives to promote low carbon economy and related issues (con't)

- Portal for Climate Change information, accessible by all.
- Center work focus is in four areas, or research clusters: peatland and peatland mapping, low emission development strategies(LEDS), Climate Resilience, MRV for climate financing
- Assemble, maintain and disseminate an accessible single source of Climate Change information.
- Ensure that the scientific and technical work of the Government Ministries is coordinated to produce a unified approach to addressing and minimizing the impacts of climate change.
- Governance:
  - Steering Committee comprised of representatives from GOI Ministries sets priorities for Center scientific and technical work.
  - Research Cluster Expert Working Groups – world class experts, 8 national 7 international – identify best available science, determine data gaps and create research agenda to fill the gaps, analyze and distill information, develop policy briefs
  - Policy recommendations are considered by Steering Committee for adoption

UPCOMING EVENT

Date and Venue: Panghegar Convention Center, Bandung, 15-17 February 2012

Programme

- **Substantive Meetings and Networking Program on Climate Change Issues:** Policy Update, research and technology, user group meetings, programs/projects update, technical consultation, investment forum, launching of AFCU portal, micro assessment initiatives, financial engineering of CC incentives, legal instrument development and promotion of "carbon neutral".

- **Networking and Knowledge Warehouse**: Asia Voice on Climate Change, www.asiaforumcarbonupdate.net, green investment, innovation and productivity forum.

- **Public Outreach and Awareness**: mobile exhibition,, "Indonesia Mengayuh", social events

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- Low Carbon Economy and Spatial Planning Context
- Lesson Learned
- Institutional Dynamics
- **Show Case: East Kalimantan**

Optimized land use for East Kalimantan





Discussion document

January 2011

East Kalimantan carbon stock distribution above and below ground

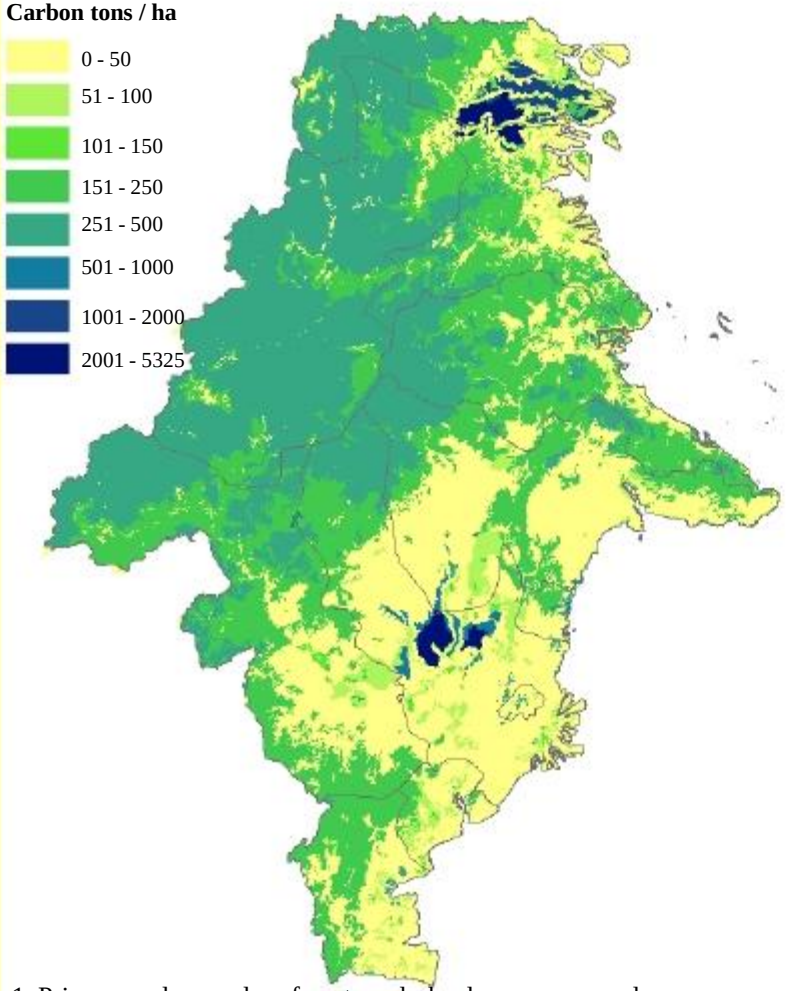
Carbon from Peat
Carbon from Vegetation

Carbon from vegetation and peat, 2009

tons of carbon / ha

Above ground and peatland

Carbon tons / ha



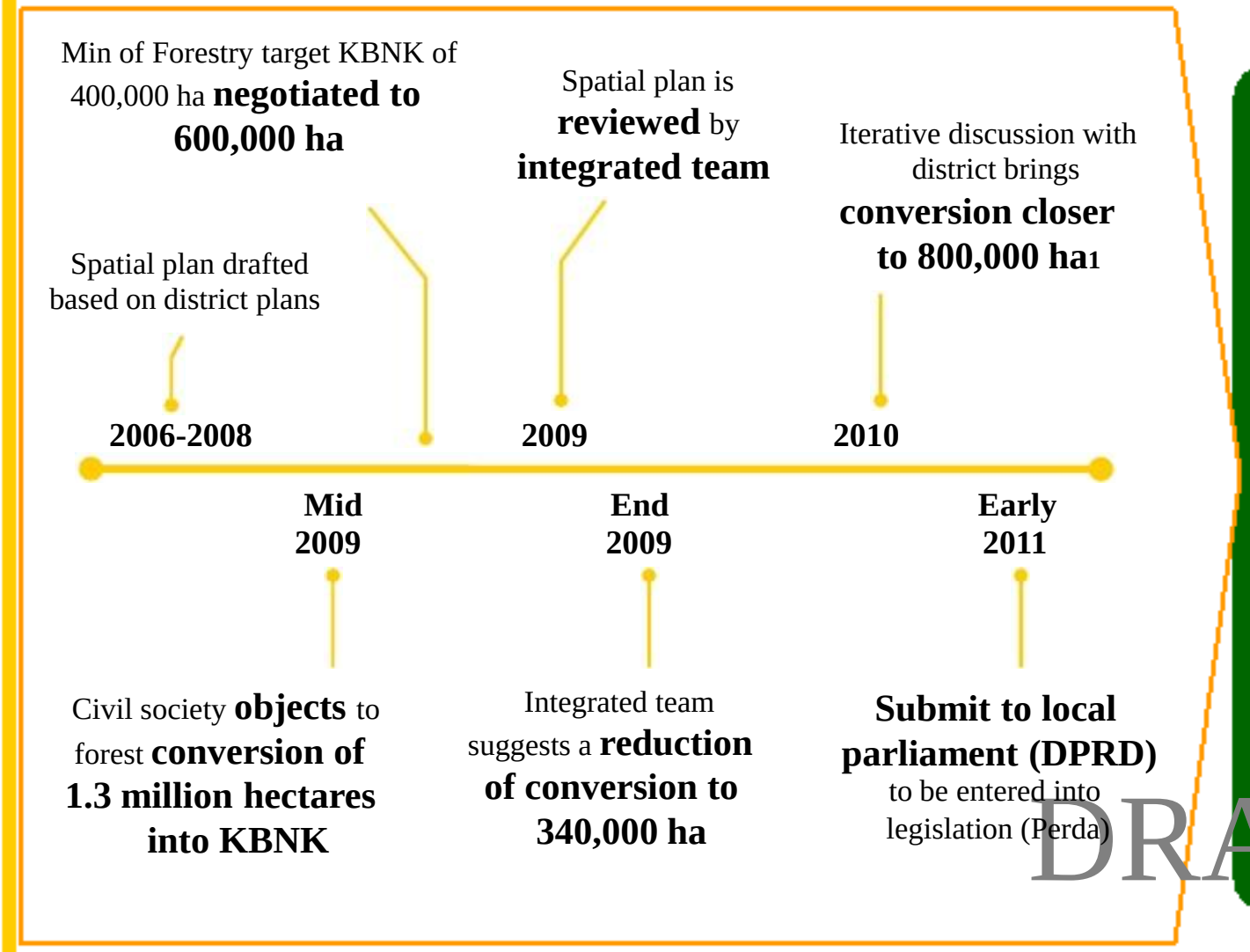
Forest cover and carbon stock per district, 2009

	Standing forest[1] Million ha	Forest cover Percent	Carbon Mton
Kab. Berau	1.7	80	457
Kab. Bulungan	1.1	70	434
Kab. Kutai	0.8	29	508
Kab. Kutai Barat	2.6	69	728
Kab. Kutai Timur	1.1	39	364
Kab. Malinau	3.7	96	1,103
Kab. Nunukan	1.2	78	879
Kab. Pasir	0.5	50	147
Kab. Penajam Paser Utara	0.1	22	26
Kota Balikpapan	0	21	3
Kota Bontang	0.1	37	23
Kota Samarinda	0	1	3
Kota Tarakan	0	28	2
Total	12.8	64	3,611 / 1,065

1 Primary and secondary forest on dryland, mangrove and swamp

SOURCE: ESRI, Ministry of Forestry – Rep. of Indonesia, Wetlands International; team analysis

East Kalimantan RTRW: Original proposal for 1.3 million ha forest conversion to KBNK has been reviewed down to ~800,000 ha



The spatial planning process was started prior to emission reduction targets set by the Presiden, and therefore may not fully capture those targets

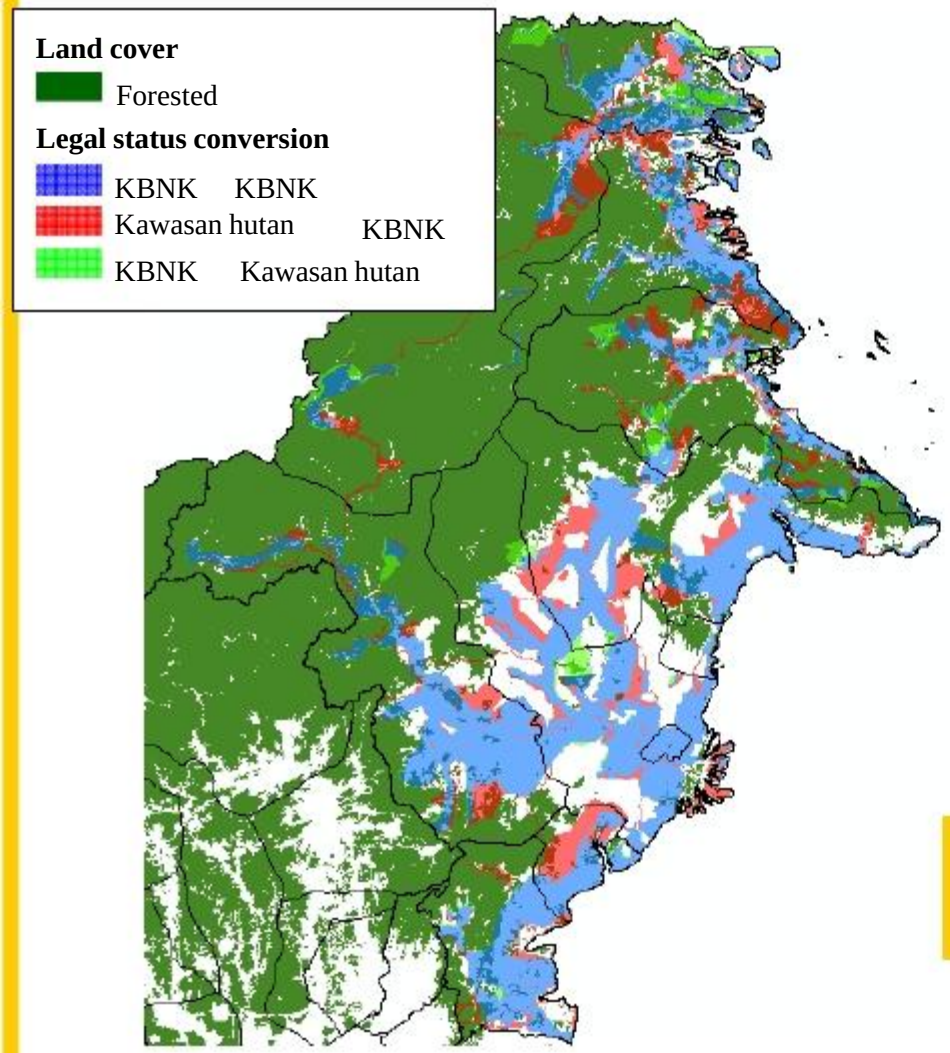
Approving these plans now may "legalize" development plans that place forest at risk

1 Exact conversion target not yet finalized or announced (January 2011); based on stakeholder interviews

SOURCE: team analysis

Changes to legal status during the spatial planning process do not appear to consider actual land cover

Legal status evolution of KBNK between RTRW 1999 and draft RTRW 2009



There is **limited correlation** between **conversion of legal status** and **actual land cover**

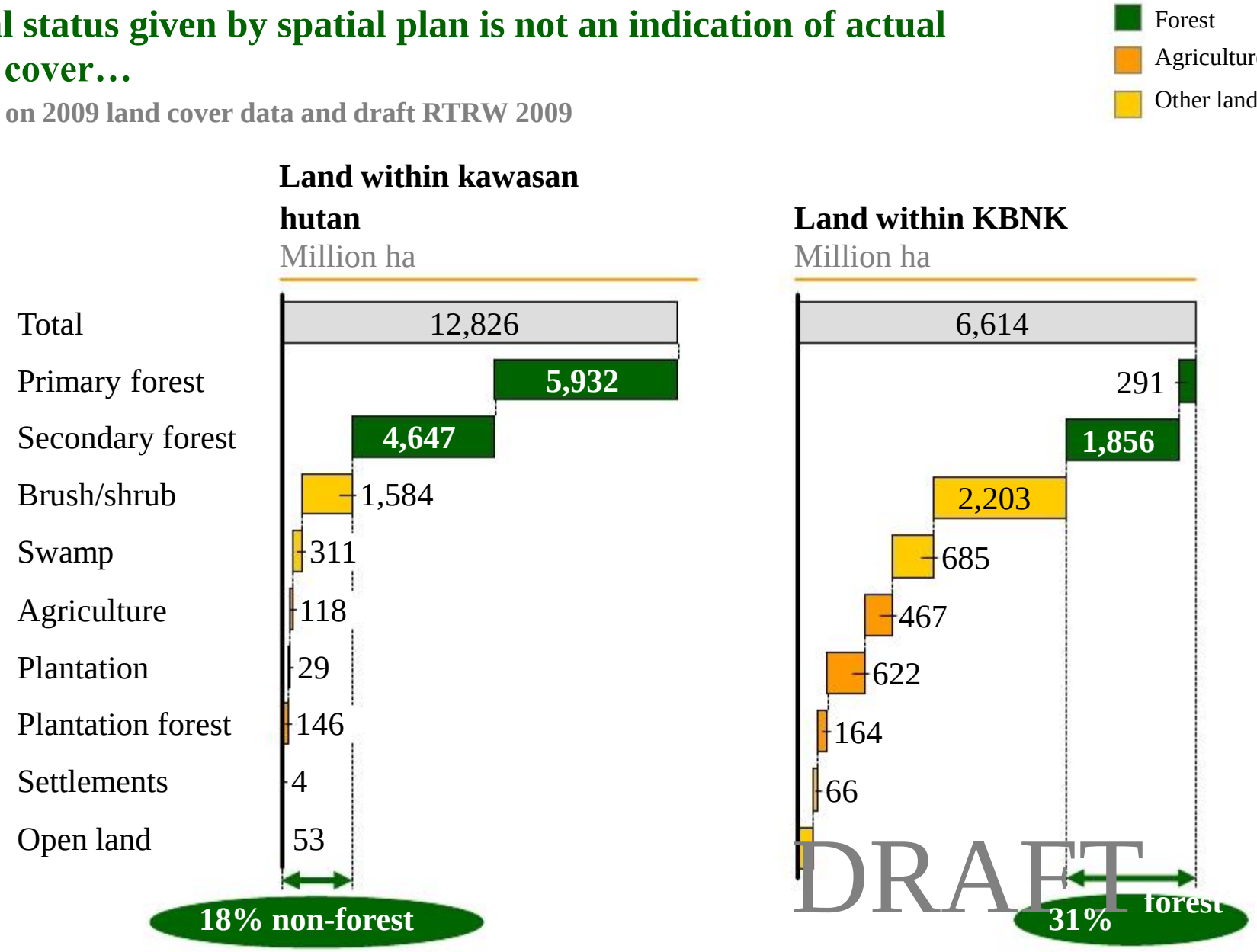
- **Legal status** changes do **not consider vegetation** e.g. some deforested land is returned to kawasan hutan while forested land is converted to KBNK
- There is **more** land **converted into KBNK** than there is land returned to kawasan hutan

Legal status may need to be rationalized by considering actual land cover

SOURCE: RTRW 2008-2027 (initial draft); Min of Forestry land cover data 2009; Kawasan hutan map (MoF); Team analysis

Legal status given by spatial plan is not an indication of actual land cover…

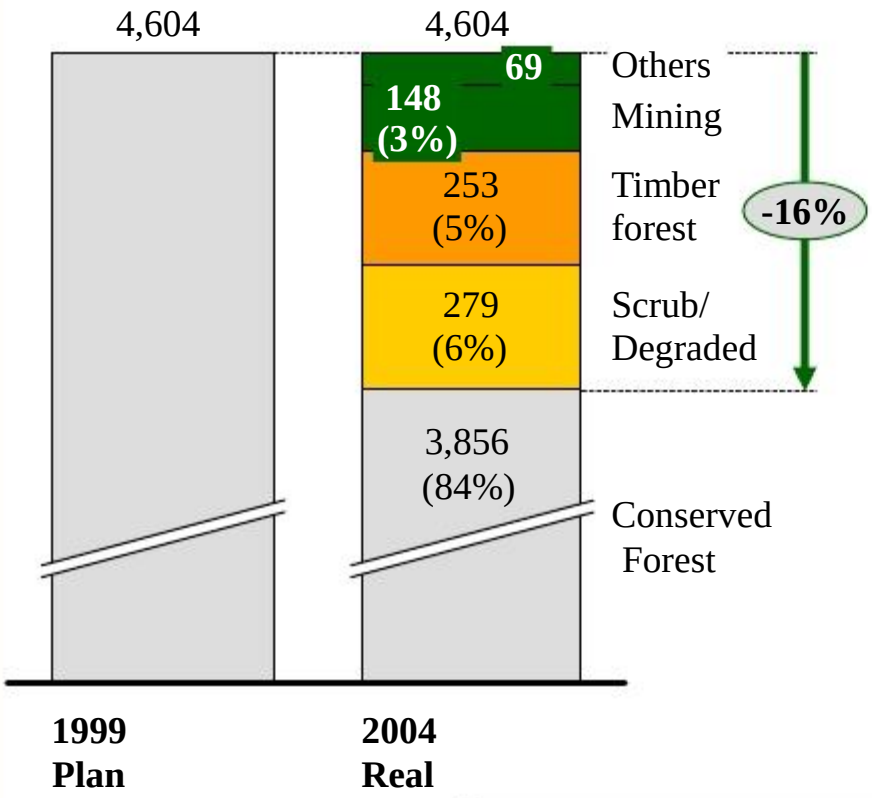
Based on 2009 land cover data and draft RTRW 2009



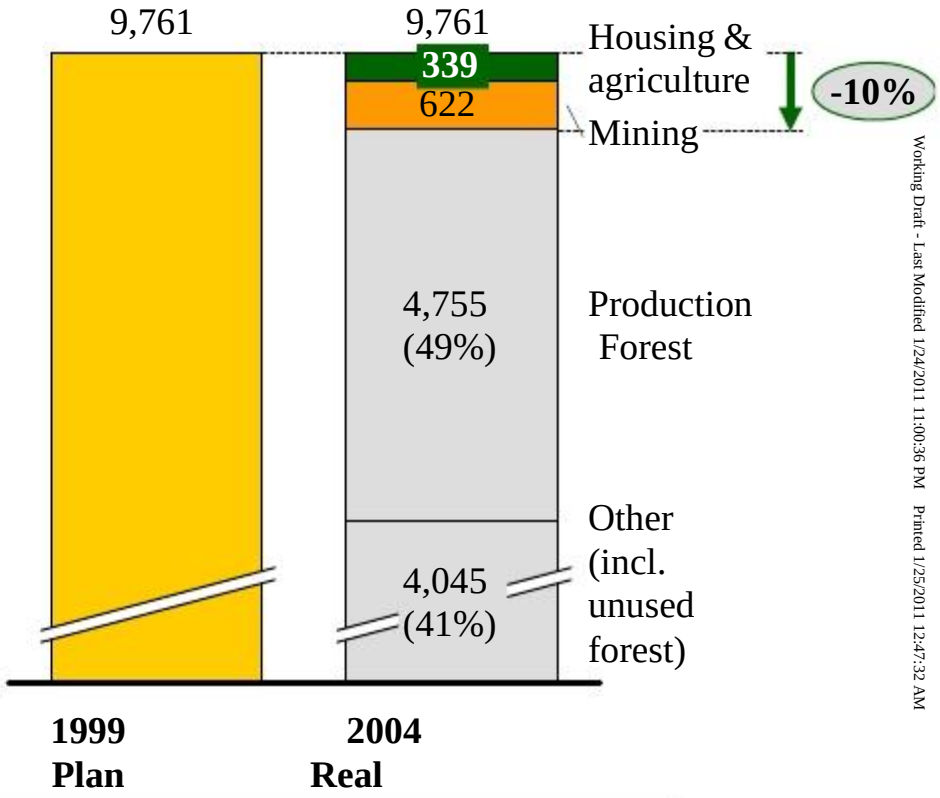
SOURCE: Draft RTRW 2010-2030 (2009); Ministry of Forestry Land Cover 2009

…and actual development on the ground does not adhere to planned land use

Land use in Conservation Forest
000 Ha



Land use in Production Forest
000 Ha



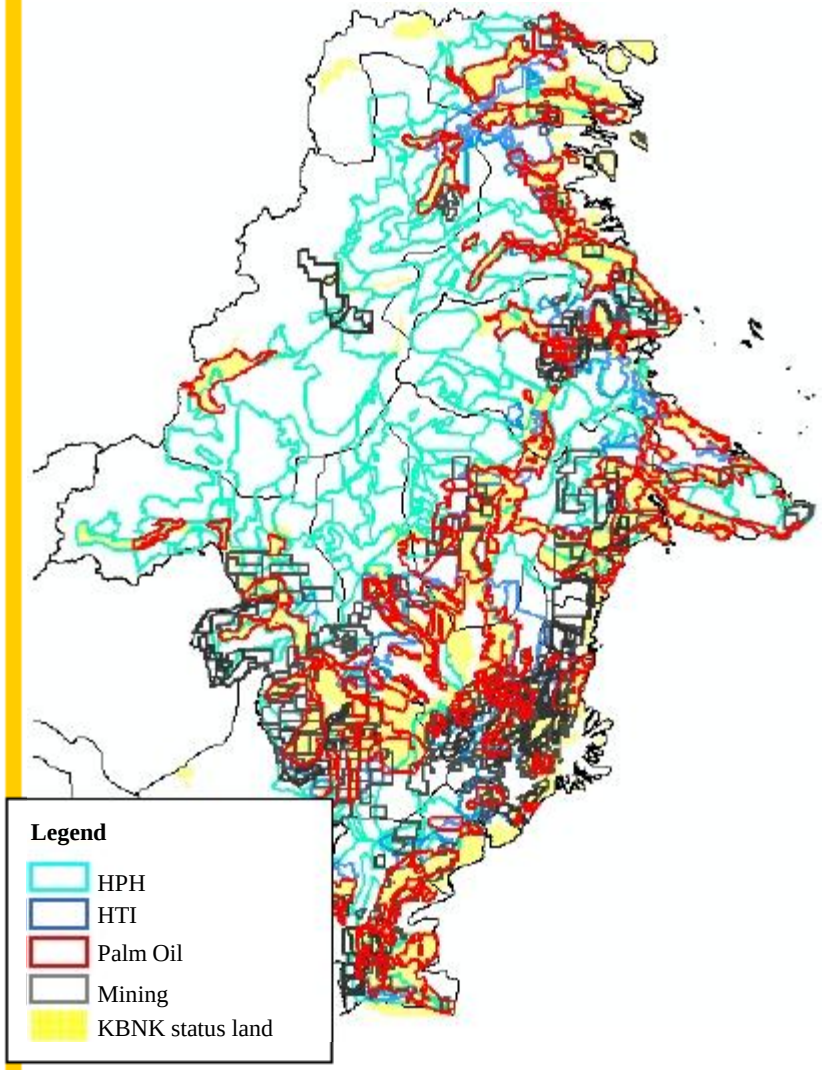
Potential discrepancies due to

- Illegal activity e.g. by settlers and non-concession holders
- Errors in data records between central and kabupaten
- Pressure to local authority to grant development despite not having originally planned for it

SOURCE: Draft RTRWP 2009

Slated land use development in forestry, mining and palm oil sectors cover 7.2 million hectares forest…

Distribution of current licenses (2009)

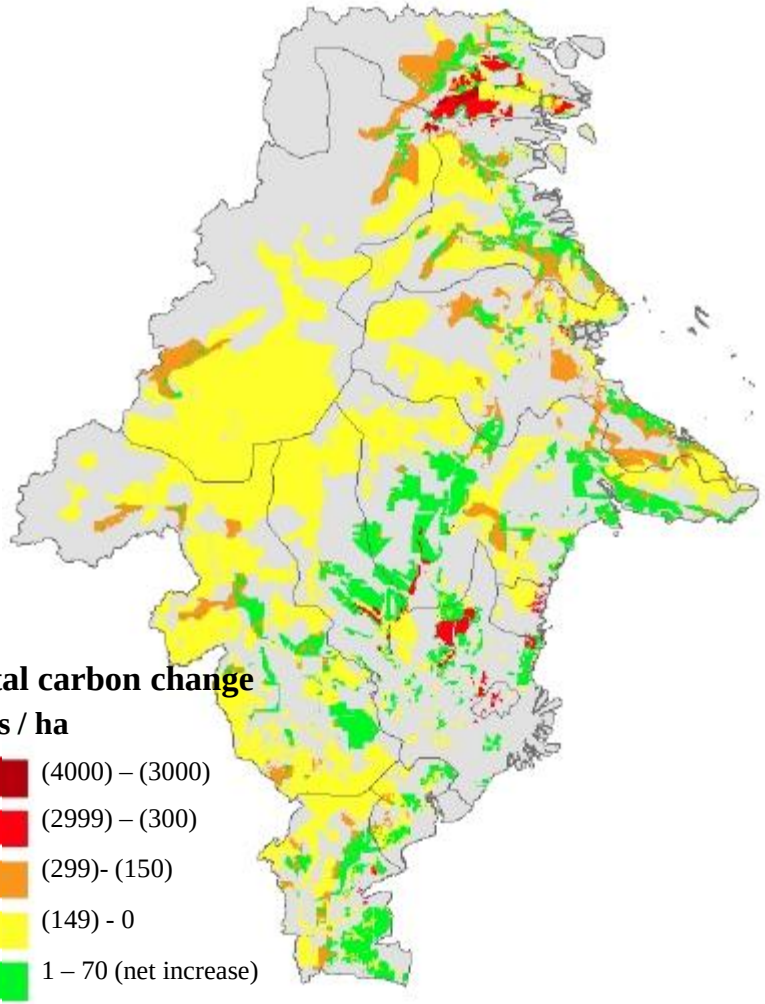


	Forest area Mn ha	Peat area Mn ha	Total area Mn ha
Forestry			
HTI	0.4	0.05	0.8
HPH	4.1	0.09	4.8
Mining	1.4	~0	3.1
Palm oil	1.3	0.13	2.8
	7.2	0.3	11.5

SOURCE: ESRI, Ministry of Forestry – Rep. of Indonesia, Wetlands International; Daemeter Consulting; team analysis

…under these plans, East Kalimantan could potentially lose up to almost 680 million tons of carbon by 2030

Change in vegetation and peat carbon under allocated licenses
tons of carbon / ha



Per hectare carbon stock loss by 2030
Low: <150 tC per ha
Average: 150-300 tC per ha
High: >300 tC per ha

		Total carbon loss by 2030 Million ton
Timber		
HTI	**Average** on vegetation **High** on peat	**169**
HPH	**Low** carbon stock loss	**187**
Mining	**Low** carbon stock loss	**71**
Palm oil		
Forested	**Average** on vegetation **High** on peat	**264**
Degraded	**Small net increase** in carbon stock (up to 70 tC per ha)	**(13)**
		680

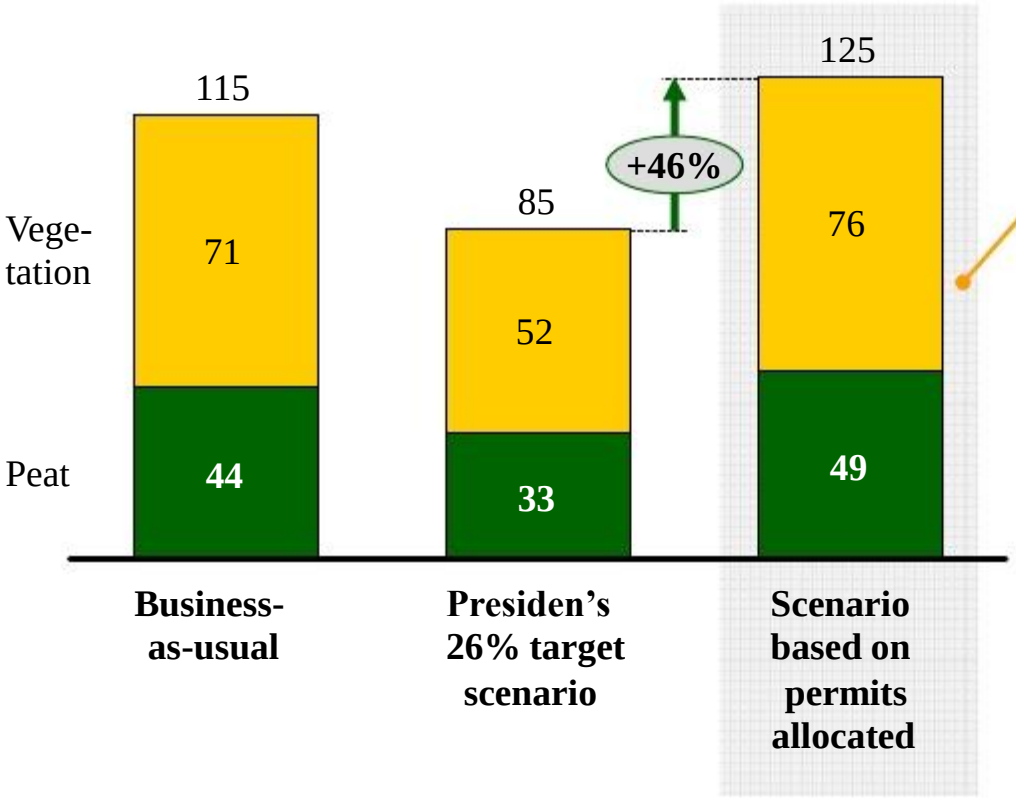
SOURCE: ESRI, Ministry of Forestry – Rep. of Indonesia, Wetlands International

Emissions estimated from land use could be 46% above the Presiden's target

PRELIMINARY

2030 emissions from land use changes in palm oil, mining and forestry[1]

MtCOe per annum



Emissions scenario from **current allocated permits** could lead to:

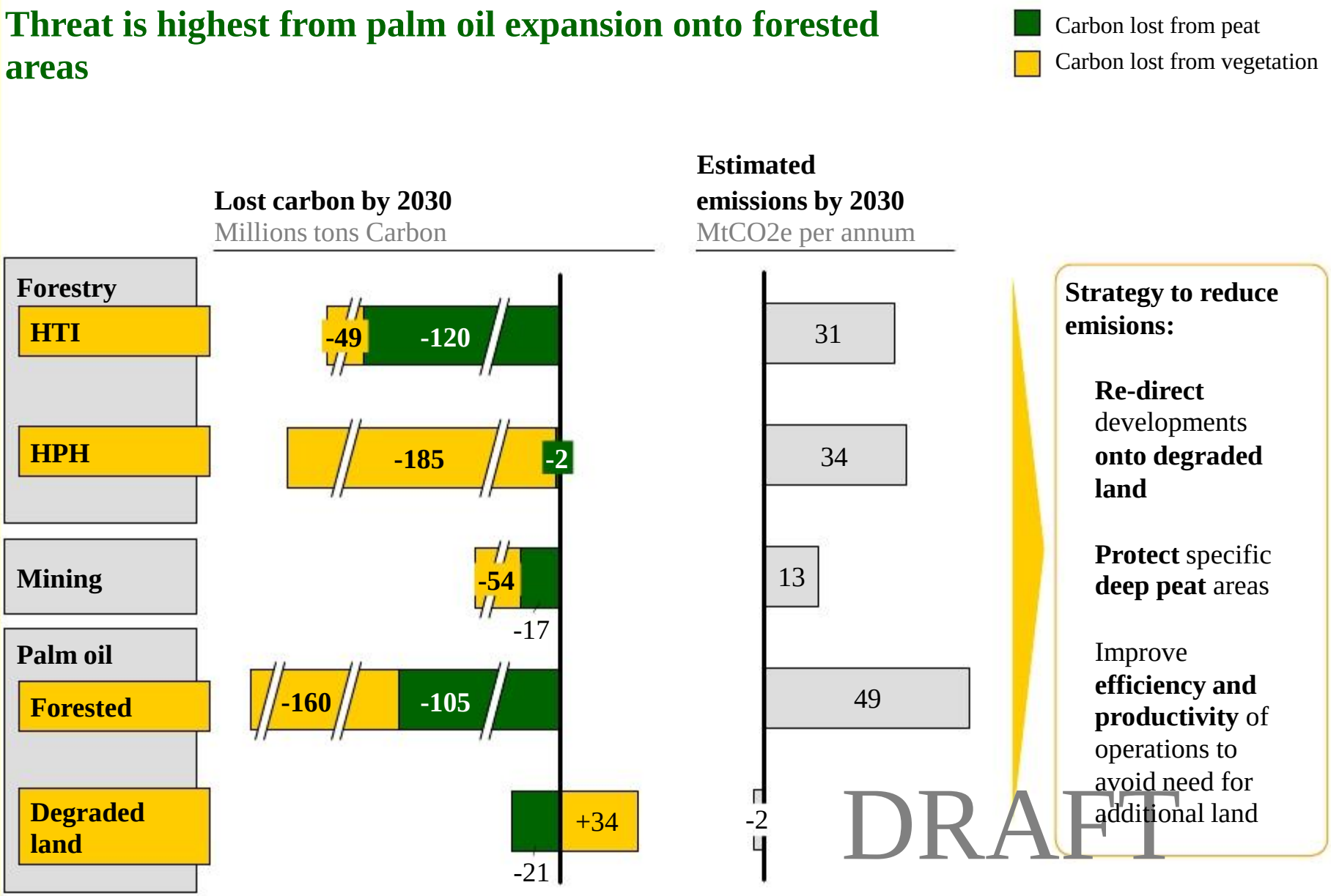
- Emissions **8% higher** than the **business-as-usual** scenario
- Emissions **46% higher than Presiden's target** by 2030

DRAFT

1 From palm oil, mining and timber production sectors; includes deforestation and peat degradation only (excludes forest degradation and peat fire. Assumes a carbon to CO2e conversion factor of 3.67 and a linearized carbon stock loss over 20 year period

SOURCE: Team analysis

Threat is highest from palm oil expansion onto forested areas



Strategy to reduce emisions:

- **Re-direct** developments **onto degraded land**
- **Protect** specific **deep peat** areas
- Improve **efficiency and productivity** of operations to avoid need for additional land

1 Net reduction in CO2e emissions due to sequestration of carbon by new palm oil plantations on previously degraded lands

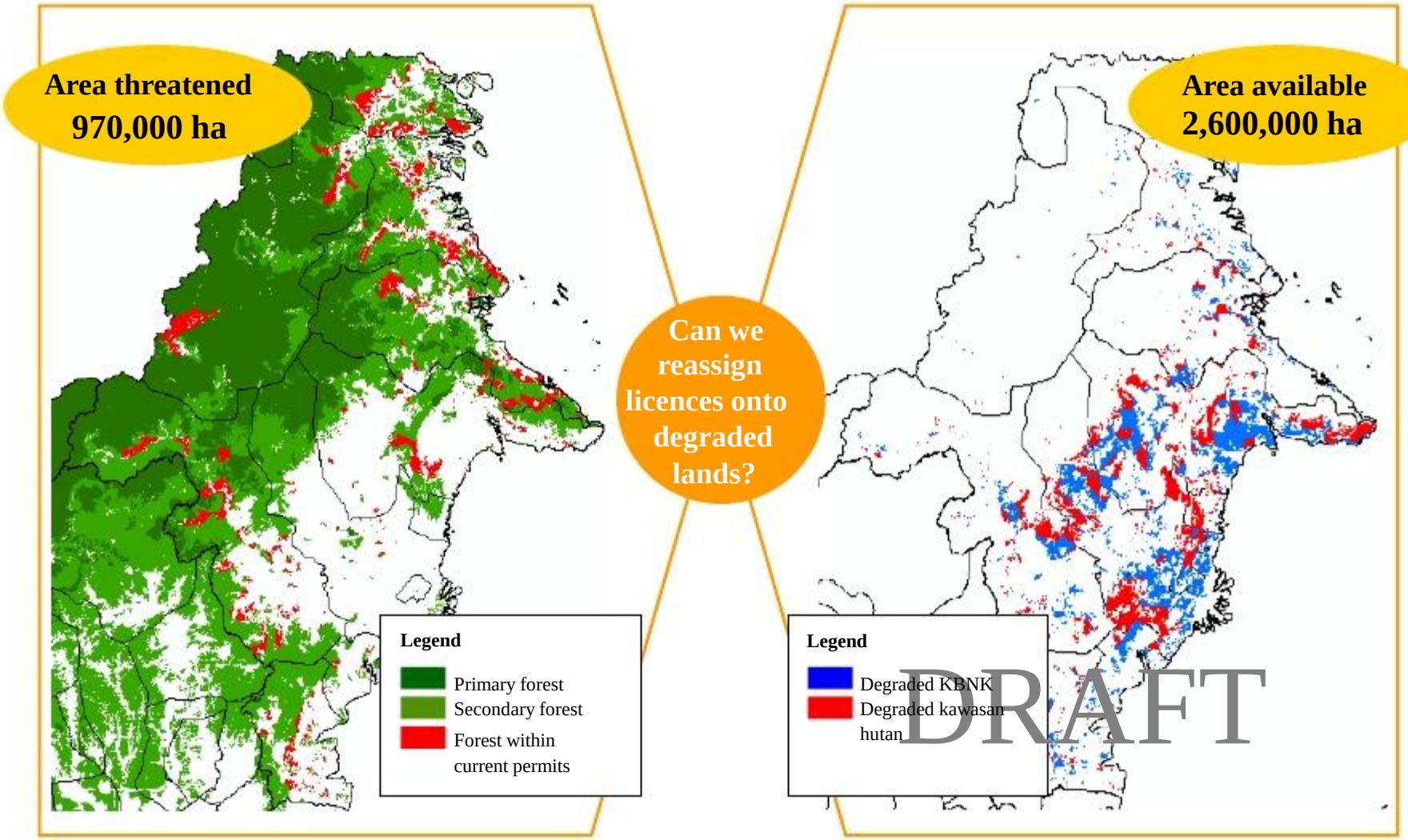
SOURCE: ESRI, Ministry of Forestry – Rep. of Indonesia, Wetlands International

Contents

Using degraded land to substitute forest under threat could avoid emissions from deforestation

Forest under threat by current licenses

Degraded land by current land cover and criticality



SOURCE: RTRW 2008-2027 (initial draft); Min of Forestry land cover data 2009; Kawasan hutan map (MoF); Team analysis

1 Amount of degraded land available will depend on definition used

PRELIMINARY

All degraded land

All degraded land

2.57 million ha

Low carbon stock
Medium to high criticality

All degraded land in KBNK

KBNK only

1.34 million ha

Low carbon stock
Medium to high criticality
Legal status: KBNK

All unassigned degraded land

No existing permits

560,000 ha

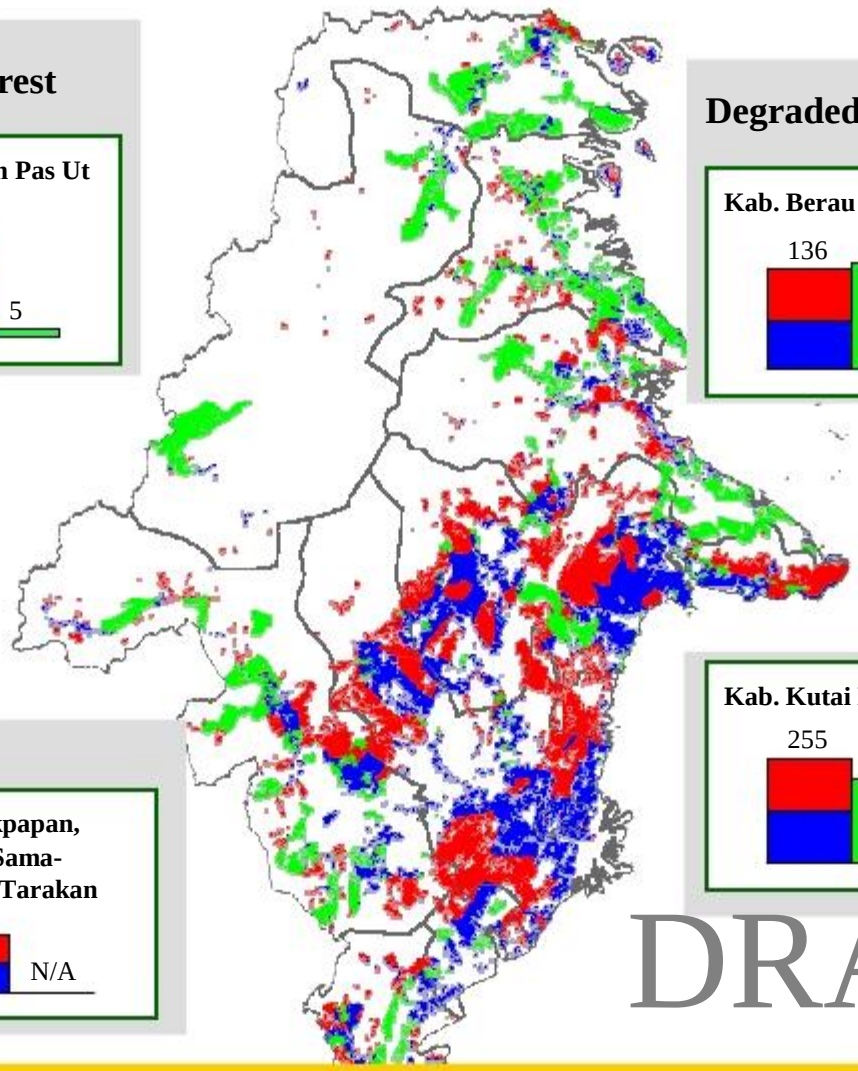
Low carbon stock
Medium to high criticality
Legal status: KBNK
No existing permits
Palm oil suitability

Different definition yields different availability of degraded land

SOURCE: Ministry of Forestry; Ministry of Agriculture; draft RTRW 2009; Bappeda; team analysis

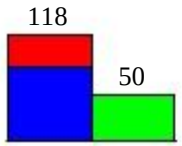
2 There is imbalance of deforestation risk with distribution of degraded land

'000 ha, only considering minimum 500 ha parcels



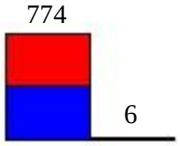
Degraded land > threatened forest

Kab. Pasir

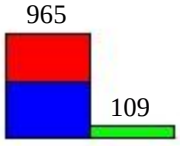


Kab. Penajam Pas Ut

Kab. Kutai Karta



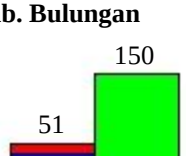
Kab. Kutai Timur



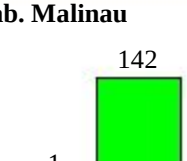
Degraded land < threatened forest

Kab. Berau

Kab. Bulungan

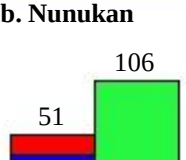


Kab. Malinau



Kab. Kutai Barat

Kab. Nunukan



No risk

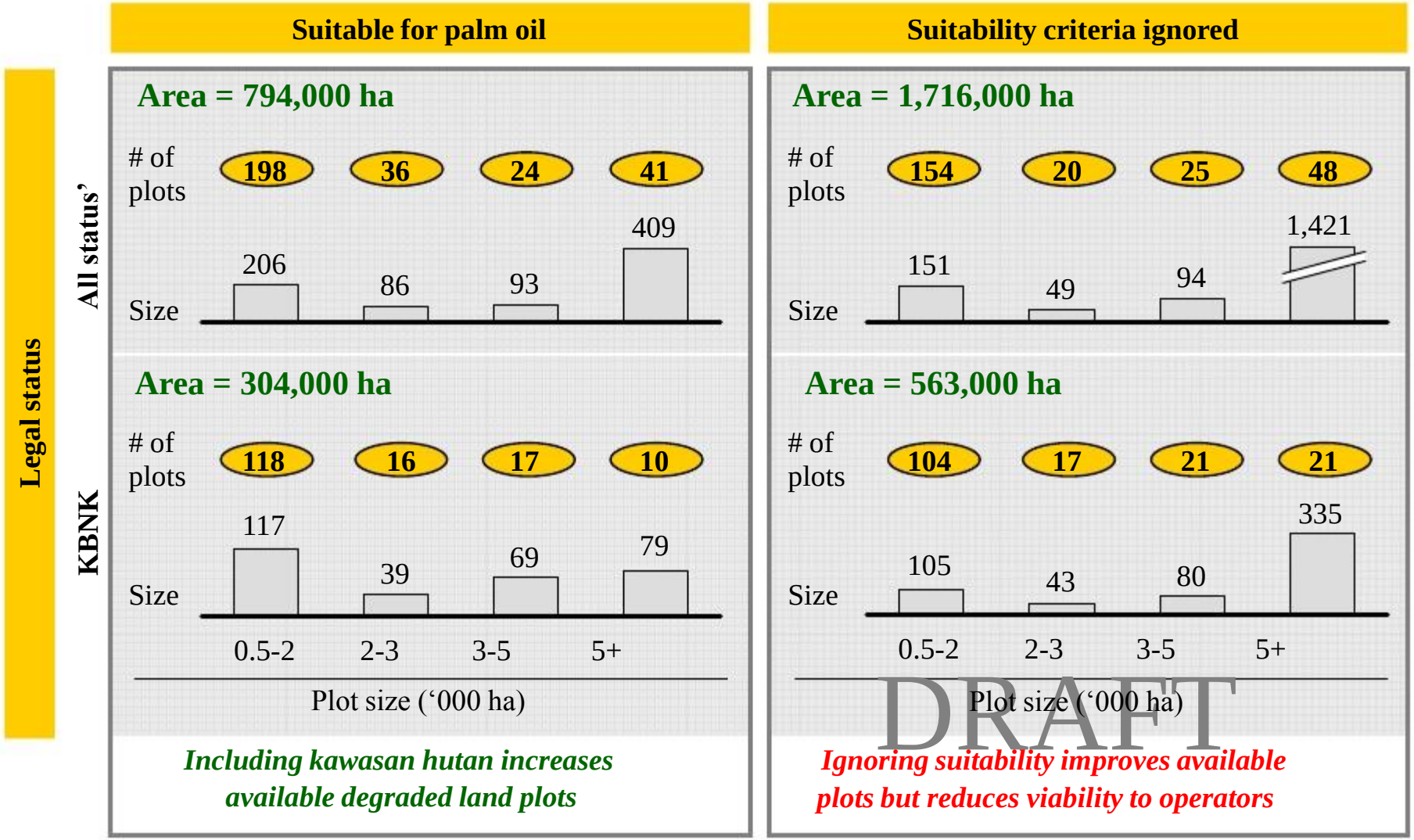
Kota Balikpapan, Bontang, Samarinda and Tarakan

Districts may need to 'trade' development opportunity with each other

SOURCE: Ministry of Forestry; Ministry of Agriculture; draft RTRW 2009; Bappeda; team analysis

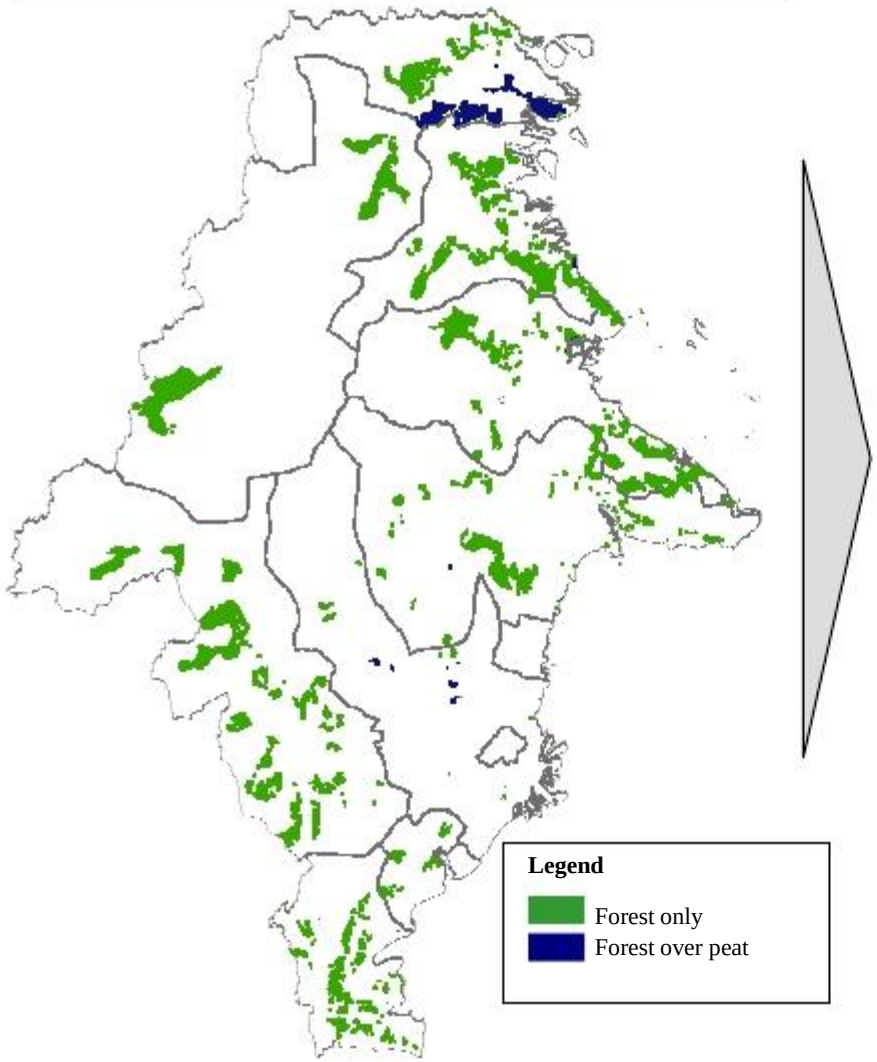
3 Inclusion of kawasan hutan considerably improves amount of degraded land available

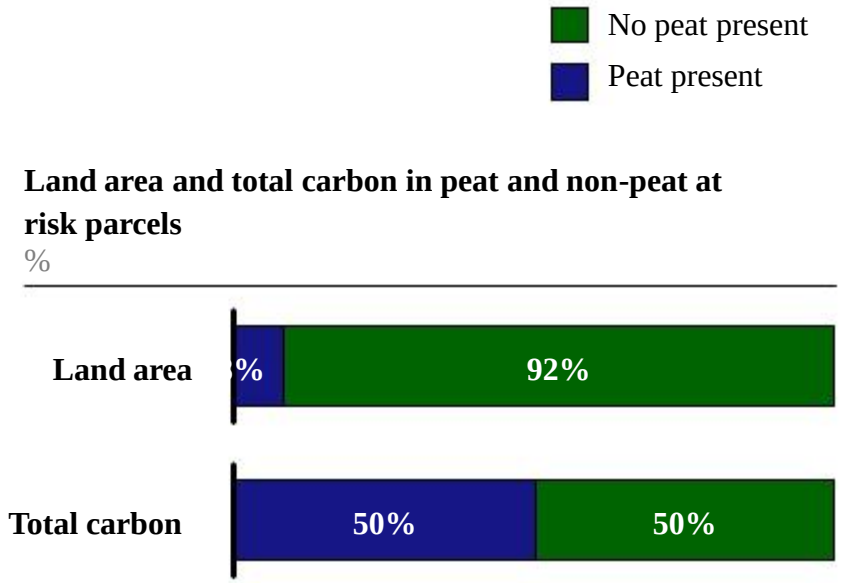
'000 ha, only considering minimum 500 ha parcels



4 50% of the carbon stock risk can be avoided by moving only 8% of the concessions on deep and very deep peatlands

Distribution of forest and peat at risk





SOURCE: Source