Bio-energy, CCS and BECCS: Options for Indonesia
Expert Meeting: Exploring International funding Mechanisms

The Climate Context of Bioenergy in Indonesia: Options and Challenges

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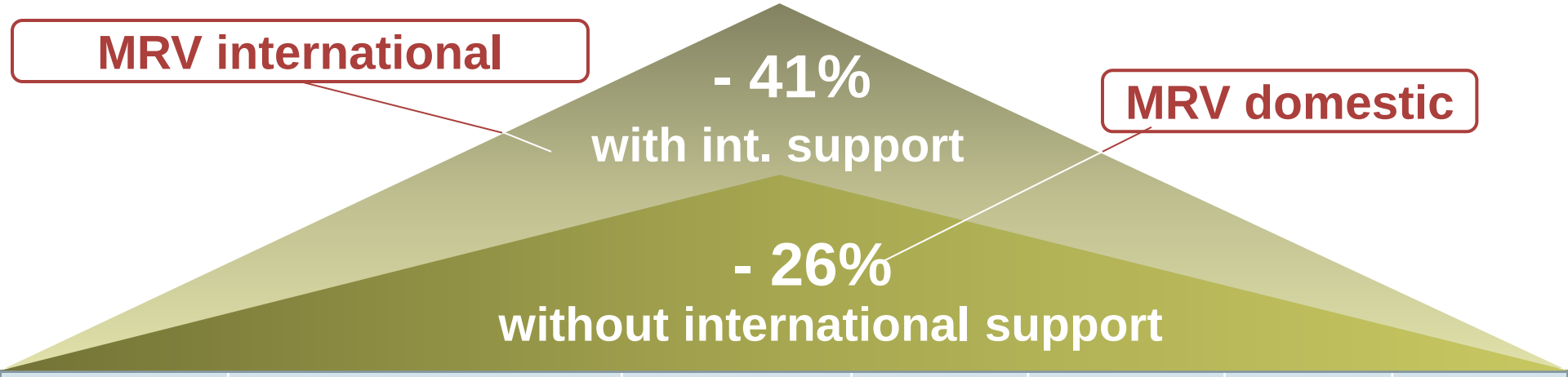
National Action Plan on GHG emission reduction (RAN-GRK)

www.sekretariat-rangrk.org

Mitigation targets compared to BAU in 2020:



Sector allocations	Forestry + Peat	Agriculture	Power - energy	Transport	Waste	Industry
Actions now	REDD+ / RPJM, sector strategic 5 year plans					

GHGS EMISSION REDUCTION PLAN IN INDONESIA

Sector	Emission Reduction (Giga ton CO2e)		Total	Action Plan
	26%	15% (Total 41%)		
Forestry and Peat Land	0.672	0.367	1.039	• Forest and land fire control, • Water network management, • Forest (HTI, HR) and land rehabilitation, • Illegal logging eradication, • Avoidance of deforestation, • Public empowerment.
Waste	0.048	0.030	0.078	• Waste and 3R management • Integrated waste management in rural areas
Agriculture	0.008	0.003	0.011	• Intros low-emission rice varieties, • Efficiency of irrigation water, • Organic fertilizer
Industry	0.001	0.004	0.005	• Energy efficiency, • Renewable energy utilization, etc
Energy and Transportation	0.038	0.018	0.056	• Biofuel utilization, • High efficiency standard for oil engine, • Quality of road and mass transportation, • Demand Side Management, • Energy efficiency, • Renewable energy development
Total	**0.767**	**0.422**	**1.189**	

The RAN-GRK Process Sept 2011 until now

- Presidential Decree 61/2011 in September 2011 anounced
- Bappenas established RAN-GRK Sekretariat
- Capacity Building for all 33 Provinces took place in the first 6 months
  - How to establish the dynamic baseline
  - How to outline the plans, how to use the various models:
    - Energy sector: LEAP model
    - land-based sector: LUWES model
    - Waste: Simple-model
- Provinces coordinate and set up their plans with consultation of their respective districts (bottom up approach)

Where are we now one year later?

- only 9 provinces have finished their plans

What is still needed?

- Review of the plans (correctness, gaps, next steps of priority setting comparison, follow up actions)

Challenges already foreseen:

- Very few energy related projects in the plan
- Energy efficiency options in industry do not tap potentials
- Feasibility of many proposal are doubtful, Relation to GHG Reduction targets speculative

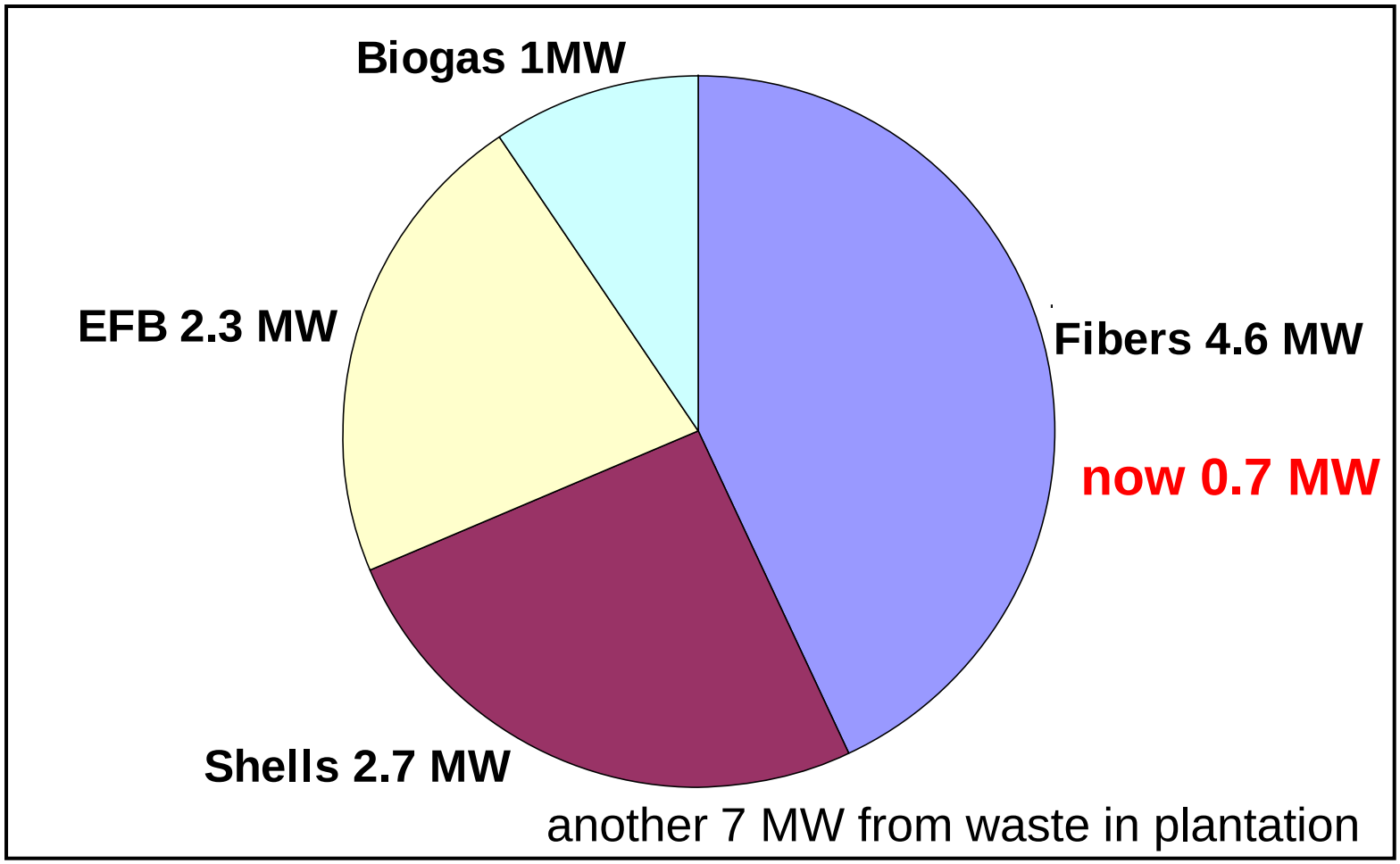
GIZ own estimates for biomass related energy projects

Sector	Production	Resources	Power capacity potential[a]
Palm oil mills	20 million ton CPO	Shell, EFB, biogas from POME	> 4500 MW
Sugar mills	35 million ton crushed cane	Bagasse	> 800 MW
Rice mills	68 million ton paddy	Rice husk	> 1500 MW
Tapioca processing	220 plants ? (capacity: 400 – 800 ton ? cassava/day)	Biogas from waste water	≈ 500 MW

[a] = own early estimation

Waste to Energy: Example Palm Oil

Electricity Generation Potential = 10 MWel



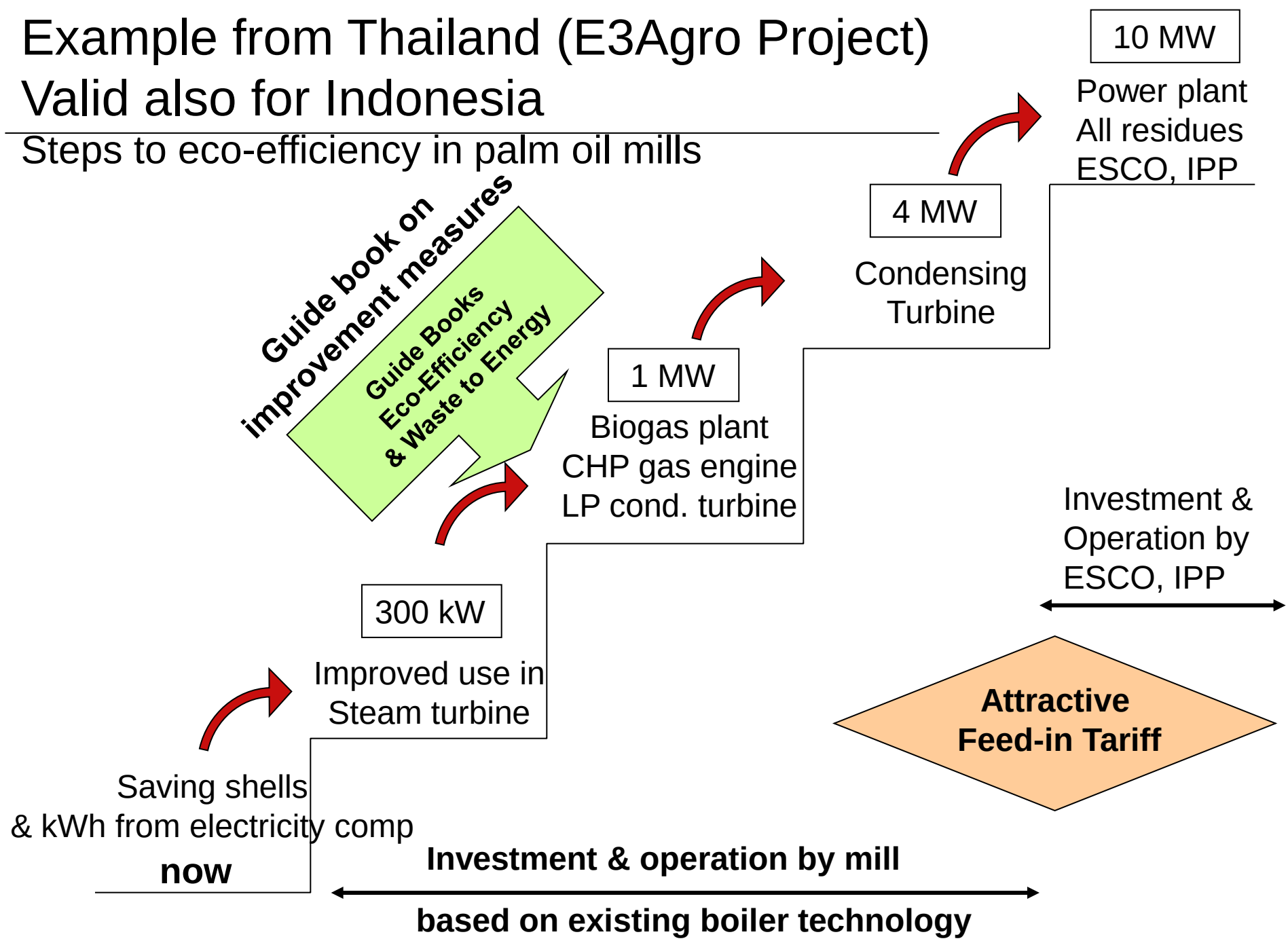
Technology Options

Biomass to Energy

- ❑ covered lagoon with agitator
- ❑ tank reactor with new catalyst
- ❑ organic rankine cycle
- ❑ HP steam turbine for bagasse utilization
- ❑ dry fermentation
- ❑ EFB gasification
- ❑ cogeneration on and off grid

Example from Thailand (E3Agro Project)
Valid also for Indonesia

Steps to eco-efficiency in palm oil mills



Potential benefits

- Streamlined procedures lead to reduced cost and accelerated dissemination of RE
- Reduced fossil fuels, increased energy security
- Cost reduction for national utility PLN
- Reduction of green house gas emissions
- Better energy supply for rural areas
- Higher productivity for agro-industry
- Development of Indonesia’s RE sector
- Job creation in the RE sector
- Innovation and market development

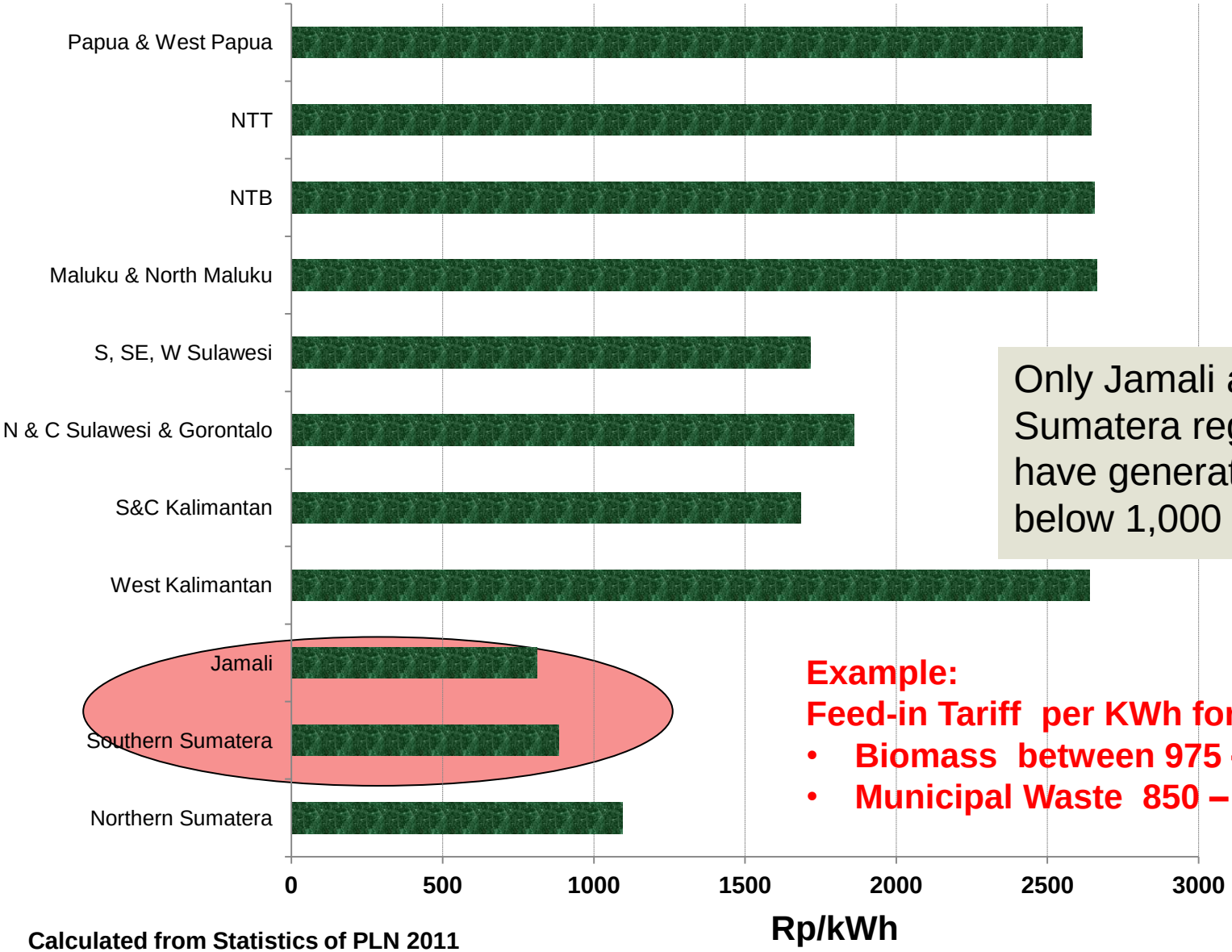
Why are the potentials not tapped?

- No options and link made to reduce green house gas emissions
- No regulation and support procedures / incentives for Agro-Industries are available to become more efficient and to use their own waste

The ongoing consequences:

- high energy production cost for industries and PLN, low productivity of industries, low competiveness
- Energy supply for rural areas is heavily based still on fossil fuels and energy security is low
- Indonesia's RE sector nearly non-existent
- Clever people start to export the waste to other countries

The Feed-in Tariff relates to PLN Generation Cost per Region



Only Jamali and southern Sumatera region have generation cost below 1,000 Rp/kWh

Example:
Feed-in Tariff per KWh for

- **Biomass between 975 – 1325 Rp.**
- **Municipal Waste 850 – 1398 Rp.**

Calculated from Statistics of PLN 2011

Next steps in 2012 / 2013

- Min of Finance: Elaborate Financial Scemes for the RAN-GRK Implementation
- Bappenas: Make the ICCTF fit for the matching funds
- Provinces and Districts: Intergrate approved plans into the budget plans
- Line ministries: provide additional incentives to speed up implementation

But is that enough? What could be additionally done?

- Min of Finance: Outline an incentive sceme based on the GHG Reduction and carbon foot print reduction
- Ministry of Industry/ Min of Energy: Use Voluntary partnership agreements between Government and Industries to finance good examples
- Donors: Finance pilot project for BECCS

Terima Kasih