

Bioenergy and Biorefinery Conference - Southeast Asia

“Biofuel Potentials in Indonesia”

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Outline

- Indonesian Energy Situation and Position on Biofuel
- Potential market, resources, and production capacity
- Issues to be addressed:
 - Business environment (incentive, tax regulation, etc)
 - Policies and regulations (pricing policy, development policies and mandatory, biofuel standard regulation)
 - Land use competition (biofuel vs food and forestry);
- Dynamic model of future Indonesian biofuel development;
- Findings and Strategy.

Indonesian Energy Situation

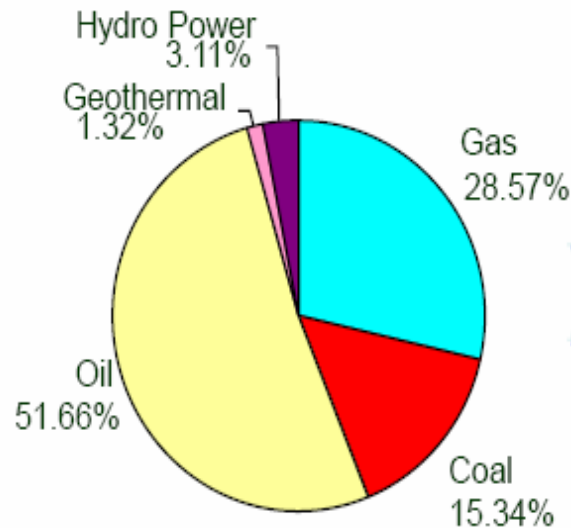
- GOI realized the importance of reducing oil import dependency → main focus of energy sector is “supply security”
- To full fill energy demand, Indonesia still relies on fossil energy, *new-renewable* is still low (4.5% or 44.55 mmboe in 2008).
- Presidential Decree no. 5/2006 (blue print of national energy management) has targeted that in 2025 share of energy mix:
 - *new-renewable* energi will increase to 17%
 - oil will decrease from 52 % to 20%
 - natural gas will increase 28 % to 30%
 - coal will increase from 15 % to 33%.
- New–renewable: bio-fuel 5% geothermal 5%, nuclear and others (hydro, solar, wind, CBM, etc) 5%, and liquified coal 2%.
- Energy mix is targeted based on cost & resource considerations → energy supply security

TARGET OF ENERGY MIX

(Presidential Regulation No. 5 of 2006)

move away from oil

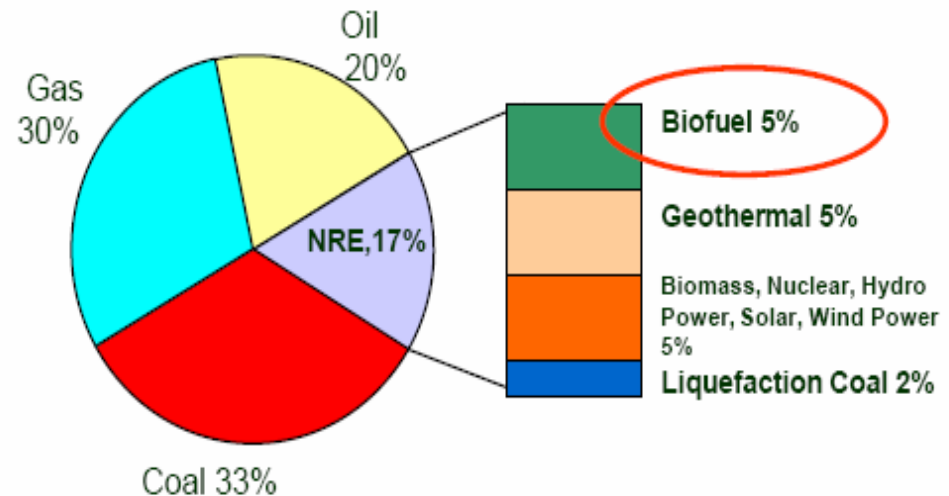
Primary Energy Mix 2006



Energy Elasticity = 1,8

NON FOSSIL ENERGY < 5%

Energy Mix 2025



Energy Elasticity < 1

NON FOSSIL ENERGY
New & Renewable Energy : 17 %

Indonesian Energy Resource Potential, 2009

Fossil Energy	Resources	Reserves (Proven + Possible)	Annual Production	R/P, year (*)
Oil	56.6 BBarels	8.2BBarels (**)	357 MBarels	23
Natural Gas	334.5 TCF	170 TCF	2.7 TSCF	63
Coal	104.8 Btons	18.8 Btons	229.2 Mtons	82
<i>Coal Bed Methane</i>	453 TCF	-	-	-

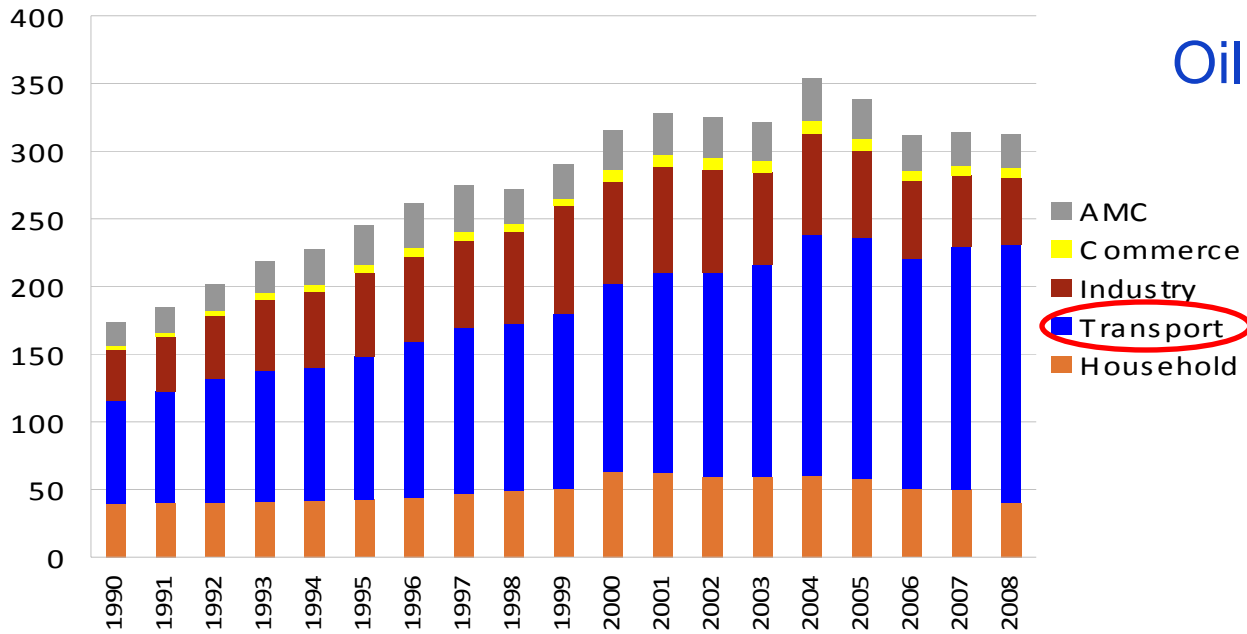
(*) assuming no new discovery; (**) including Cepu Block

New and Renewable Energy	Resources	Installed Capacity
Hydro	75.670 MW	4.200 MW
Geothermal	27.510 MW	1.052 MW
Mini/Micro Hydro	500 MW	86,1 MW
Biomass	49.810 MW	445 MW
Solar Energy	4,80 kWh/m ² /day	12,1 MW
Wind Energy	9.290 MW	1,1 MW
Uranium (***)	3 GW for 11 years*) (e.q. 24,112 ton)	30 MW

***) Only at Kalan – West Kalimantan

Source: Data and Information Center, MEMR, 2010

Million barrel



Oil Fuels Consumption



Notes:

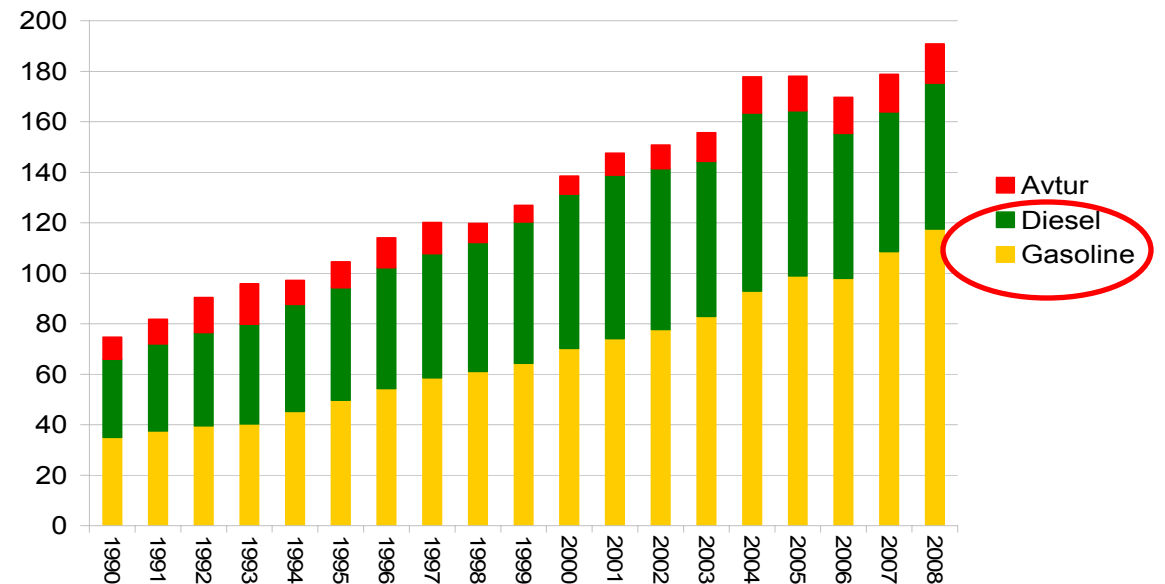
- Mostly used in transport
- Household demand will decrease significantly, substituted by LPG

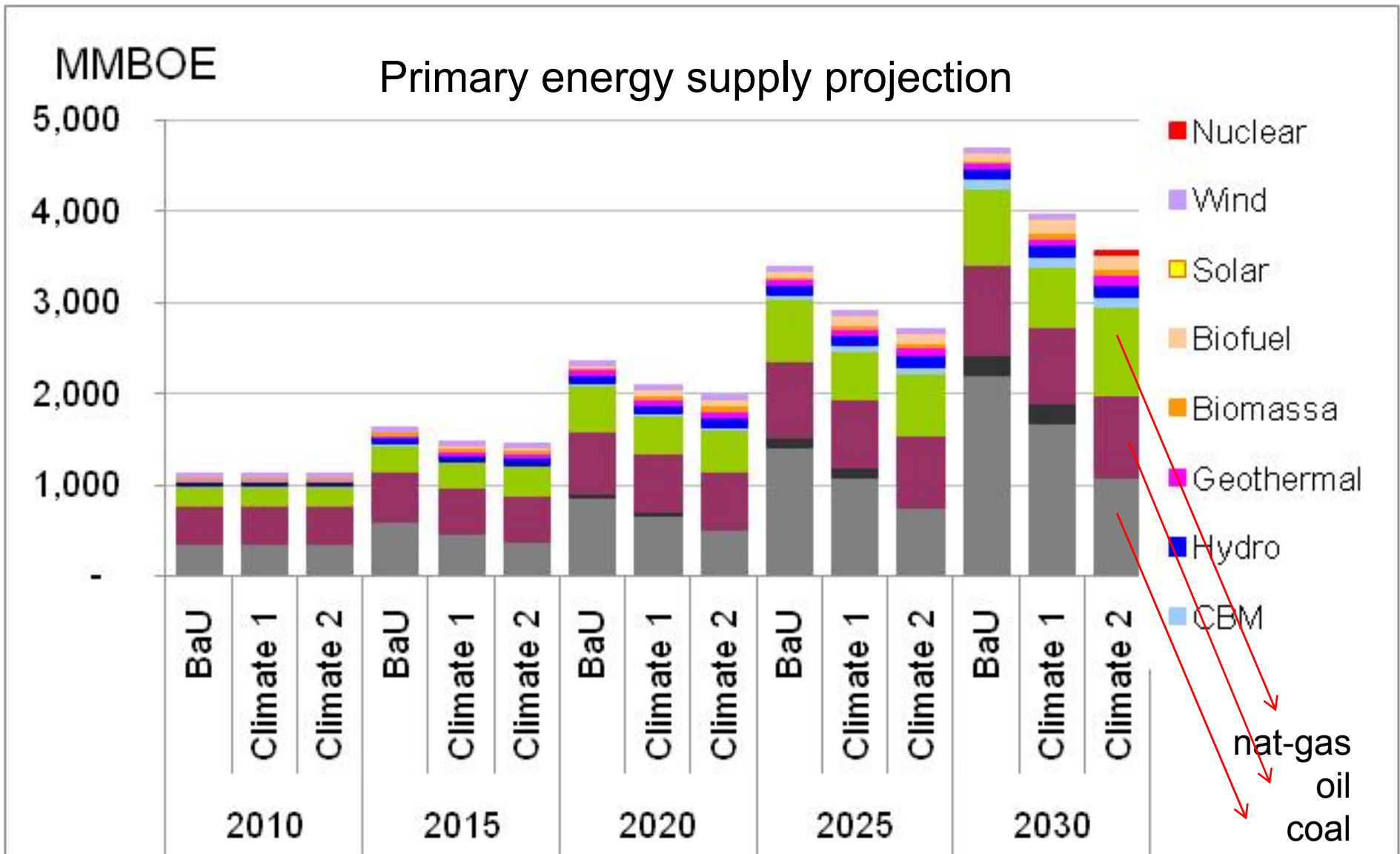
Transportation fuels



Note: Other transport fuels (gas, electricity and other liquid fuels) are much smaller

Million barrels





Biofuel share in 2030: BaU 1.8% (82 million KL); Climate-1 4.2% (166 million KL); Climate-2 4.8% (170 million KL)

Indonesian Position on Biofuel

A. The rationale of biofuels development

Developed countries:

- Energy supply security (resource scarcity)
- Greenhouse (CO₂) gas emission abatement commitment
→ “climate change” consideration

Developing countries:

- Energy security (reducing oil import)
- Improving balance of payment
- Jobs creation
- Poverty alleviation
- greenhouse (CO₂) gas emission abatement
→ “climate change” consideration

B. The rationale of biofuels development in Indonesia

- Indonesia has changed from 'oil exporter' to 'net oil importer'
- Country's potential to supply biofuel feedstock is high; area for planting biofuel feedstock is available, agroclimate is appropriate for biofuel plants
- Biofuel technology begin to be mastered by Indonesian
- Biofuel industry has potential to create large employment including farmers and therefore could function as one of the drivers of national economy
- Biofuel has high export potential
- Biofuel is one of renewable energy that is developed to meet energy security and 'non-binding commitment' on climate change GOI committed:
 - to reduce 26% of GHG emissions from the BaU in 2020
 - further, to reduce 41% with international support.

Pro-con of biofuel development in Indonesia

Biofuel development → **Reduce oil dependence**
(but it is not the only outcome)

Consequences:

Economy (jobs, export/import)

Food vs. Fuel

Environment (GHG, local, biodiversity)

Social

Sustainability

MARKET POTENTIAL OF BIOFUELS

The types of biofuels to be developed in the country includes:

- biodiesel to substitute petroleum-based diesel,
- bioethanol to substitute petroleum-based gasoline,
- biokerosene to substitute petroleum-based kerosene,
- pure plant oil (PPO) to substitute diesel in power stations.

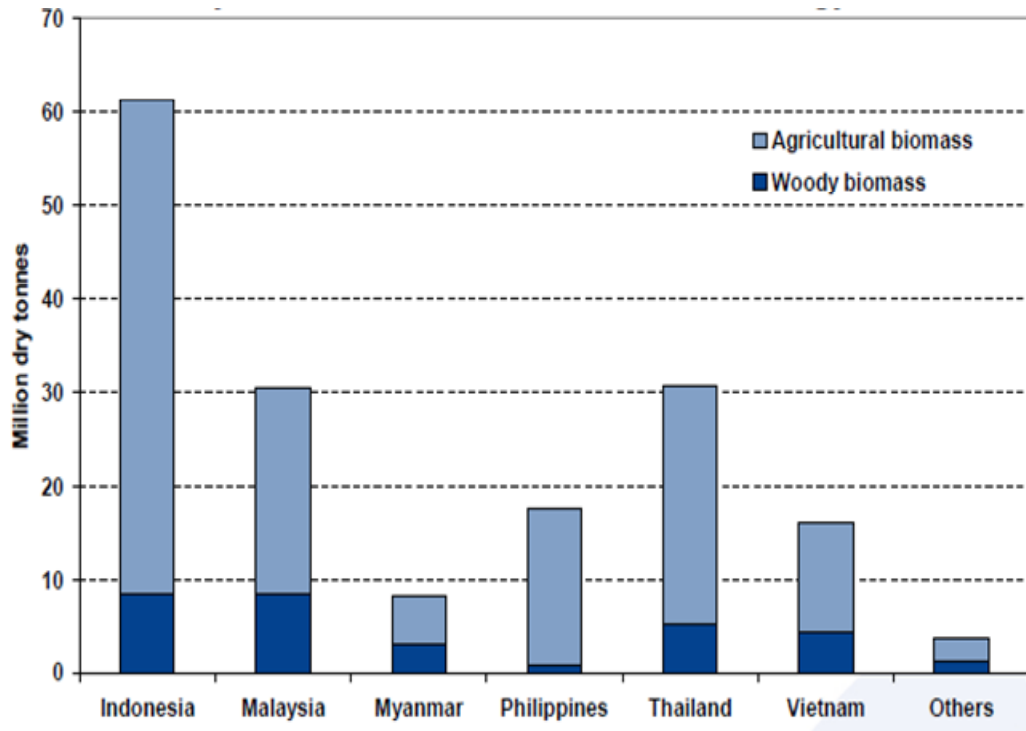
Biofuel Development Target, million kilo liters

Fuel	2005 - 2010	2011 - 2015	2016 - 2025
Biodiesel	2.41 (10% of diesel)	4.52 (15% of diesel)	10.22 (20% of diesel)
Bioethanol	1.48 (5% of gasoline)	2.78 (10% of gasoline)	6.28 (15% of gasoline)
Biokerosene	1.0	1.8	4.07
Pure Plant Oil	0.4	0.74	1.69
Total Biofuel	5.29	9.84	22.26 (*)

+ export target: 11 million KL

(*) 5% in national energy mix

**Total investment (+ export target) for 33 million kL: ± 3 billion
USD**



Biomass Resources Potential in ASEAN Countries

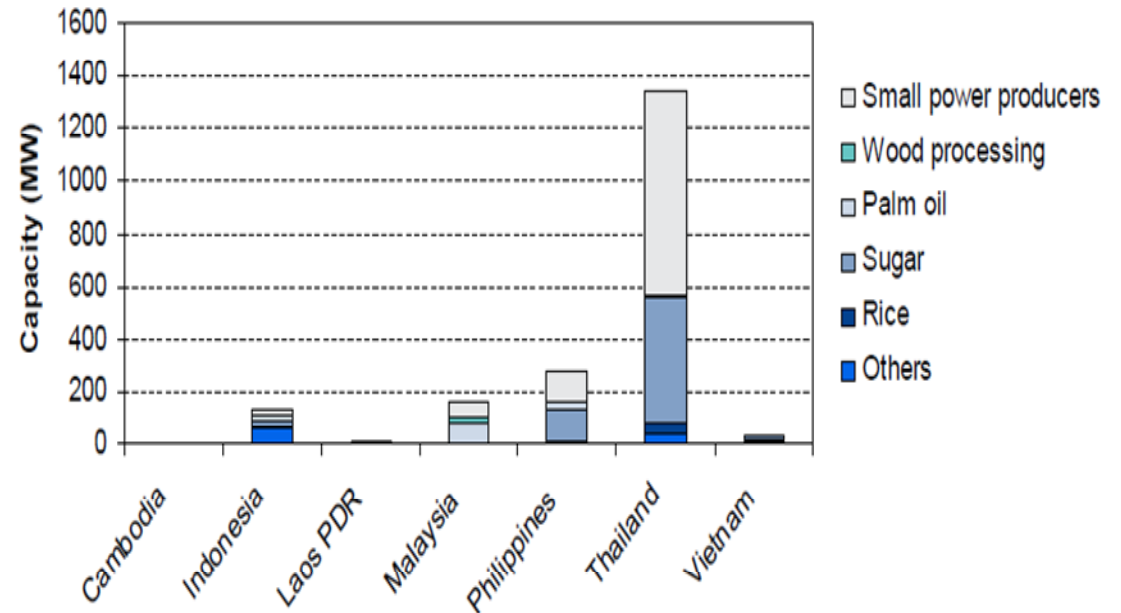


[Sources:
Saku Rantanen (Pöyry), 2009]

Large Potential is still unutilized!

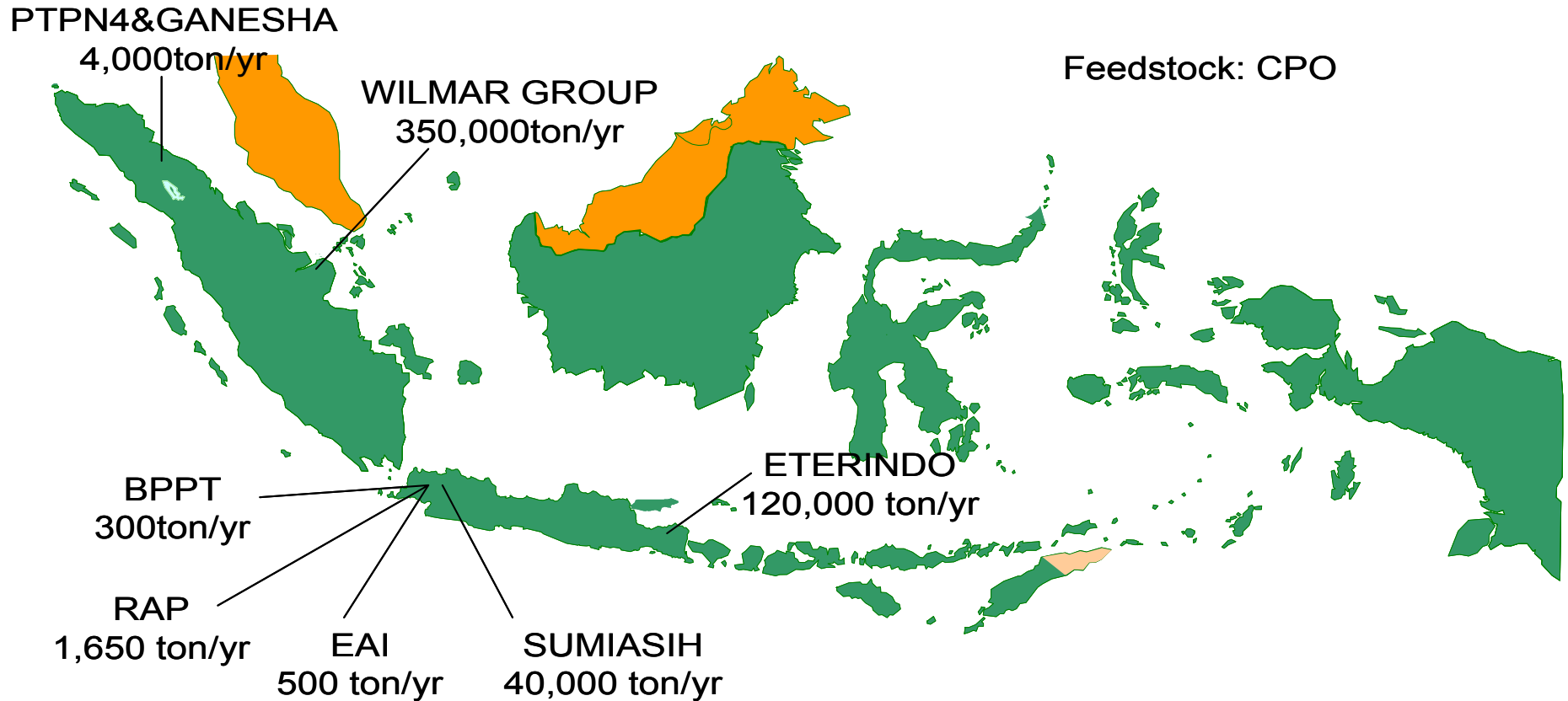


Source:
Saku Rantanen (Pöyry), 2009



Production Capacity of Biodiesel

TOTAL 520,000 kilo liters/year (April 2007)

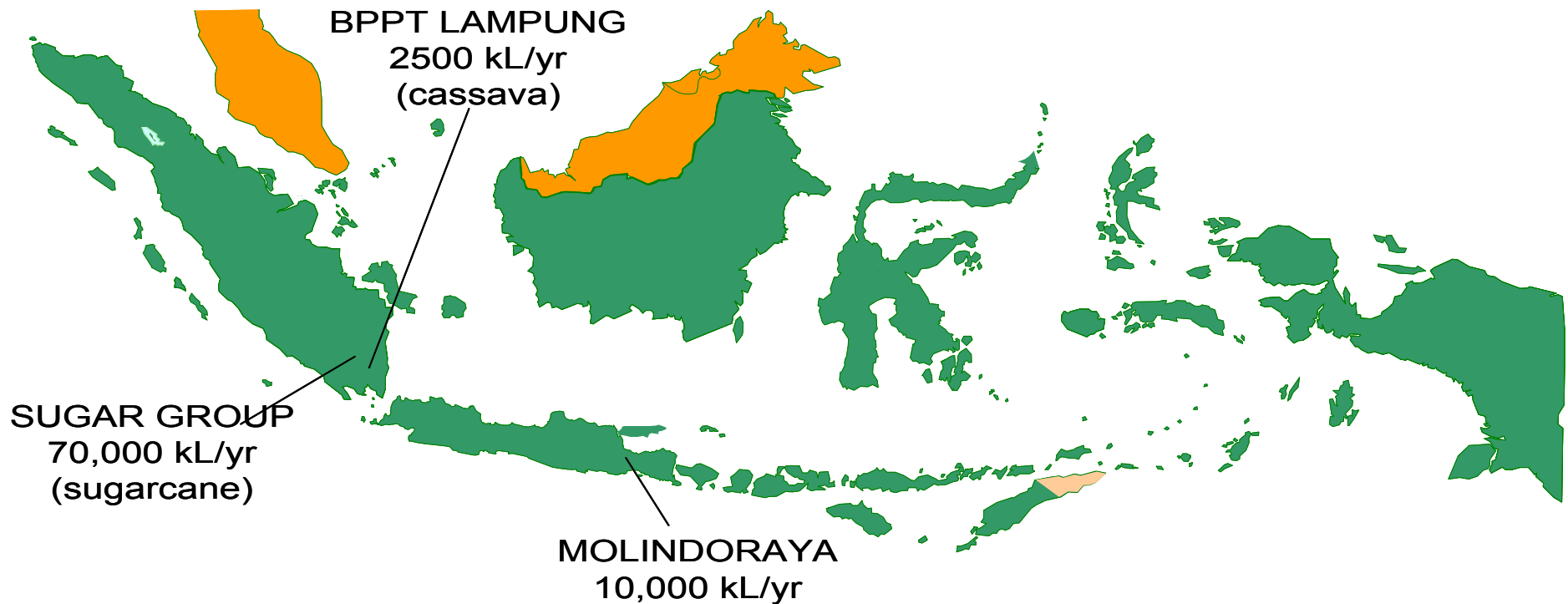


Plan 2007-2011: additional 3.6 million ha (palm oil & jatropha)
= 4 million kL/year

Biodiesel (CPO base) in 2010: 3,1 million ton (~ 3,6 illion kilo liter); with CPO and first generation in 2050: 30 Mton (219 MMBOE) in 2050. Needed: consistant policy → to develop 2nd generation

Production Capacity of Bioethanol

TOTAL 82,500 kilo liters/year (April 2007)



Plan 2007-2010: additional 1.1 million ha (cassava and sugarcane)
= 2 – 2.7 million kL/year

Future development: 300 thousand Kliter (~ 1,8 MMBOE/year) → molasses
Needed: other sources (sugar cane, cassava, nipah, aren, sagu, etc and 2nd generation technology (biomasa/selulosic based and micro algae)

Issues to be addressed

1. Biofuel industry characteristic is different with that of petroleum-based fuel industry (large and efficient system); new regulatory approach is needed to provide better business environment for biofuel industry
2. Biofuel development require cross sectoral cooperation
3. The current market rule of biofuel is not supportive to the development of domestic biofuel market (there is subsidy for biofuel, but it is not-sufficient for biofuel business profitable)
4. Unlike petroleum refineries, which is usually large size/unit, biofuel production system in Indonesia will be much smaller in size per unit and distributed throughout the countries.
5. Therefore, regional autonomy policy, regional government is also expected to play major role in biofuel development

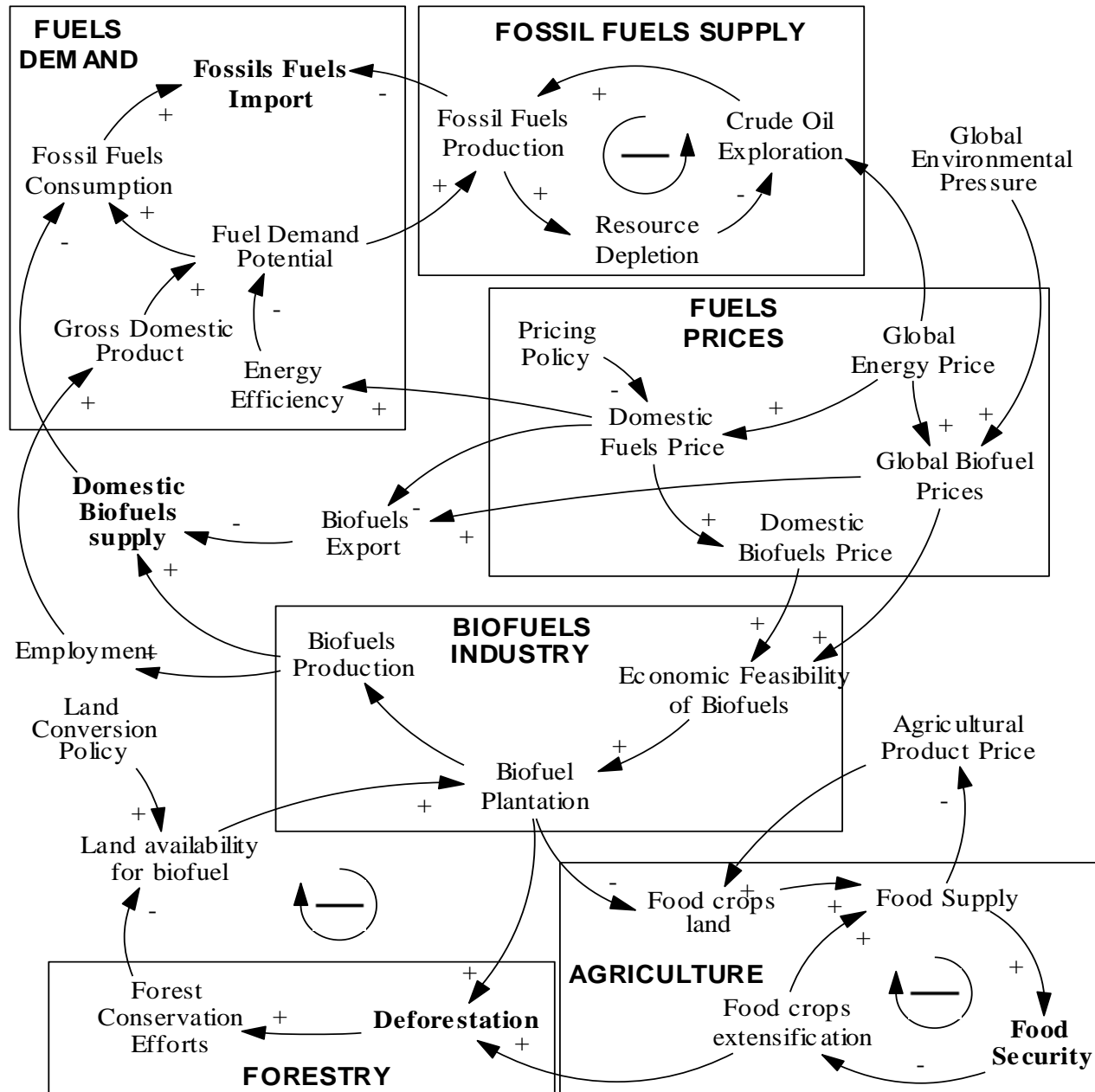
Business Environment

1. Biofuel development is promoted, several regulations exist:
 - biofuel mandatory (MEMR decree No. 32/2008) concerning supply, utilization, trade, and obligation for biofuel utilization in several sectors (transport, industry, and power sectors),
 - the obligation will be implemented in stages, i.e. transport 1% in 2009 and increase up to 15% in 2025;
2. Incentive is given as tax holiday for import of RE technologies
3. Income tax facility and accelerated amortization for investment in specified business sector or areas (Government Regulation No.1/2007), where renewable is included in this category.
4. Credit facility for bio-energy development and revitalization of plantation (Minister of Finance Decree No.117/PMK.06/2006)
5. Credit facility for investment & working capital for activities that support efforts to achieve food & energy security, including biofuel development (Minister of Finance Decree No.79/PMK.05/2007).

Policies and Regulations

1. Latest pricing policy: GOI is in the process of reducing subsidy for petroleum fuel and formulate subsidy for biofuel (industries consider the subsidy is too small to make the biofuel can compete with petroleum and the biofuel business profitable and attractive).
2. Government strategic policies on biofuel development:
 - Presidential instruction 01/2006: *order relevant ministries and regional government to support biofuel development program*
 - Presidential decree 10/2006: *national team for acceleration of biofuel development for poverty alleviation and job creation.*
3. Regulations on standard supporting biofuel development policy:
 - National Standard for Biodiesel SNI 04 –7182 –2006
 - National Standard for Bioethanol SNI DT27–0001–2006
 - Biodiesel Specification for Domestic Market - Director General for Oil and Gas Decree No. 13483K/24/DJM/2006

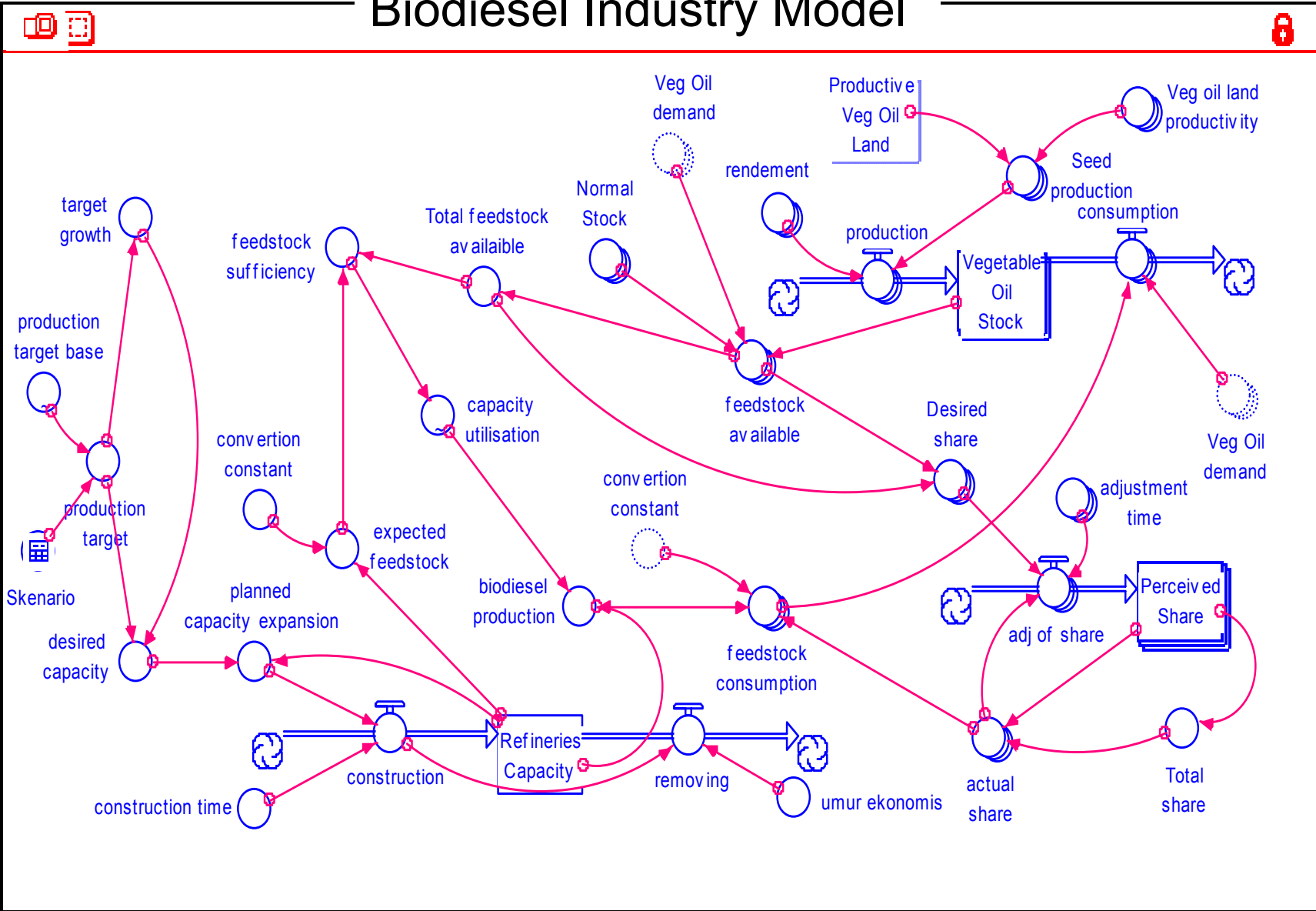
Land Use Competition (Biofuel Development vs Food & Forestry)



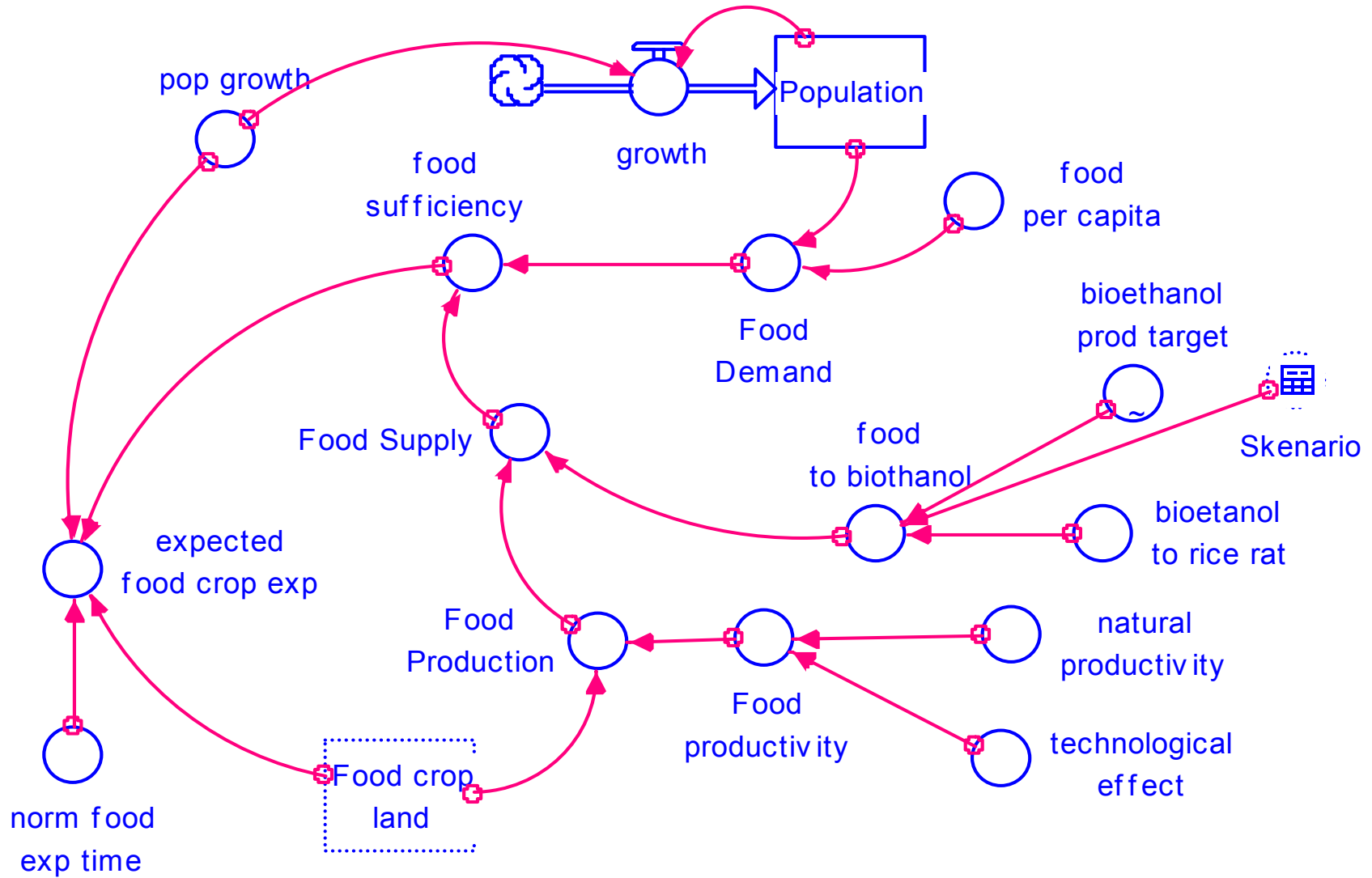
System Dynamics Model of Indonesian Biofuel Development



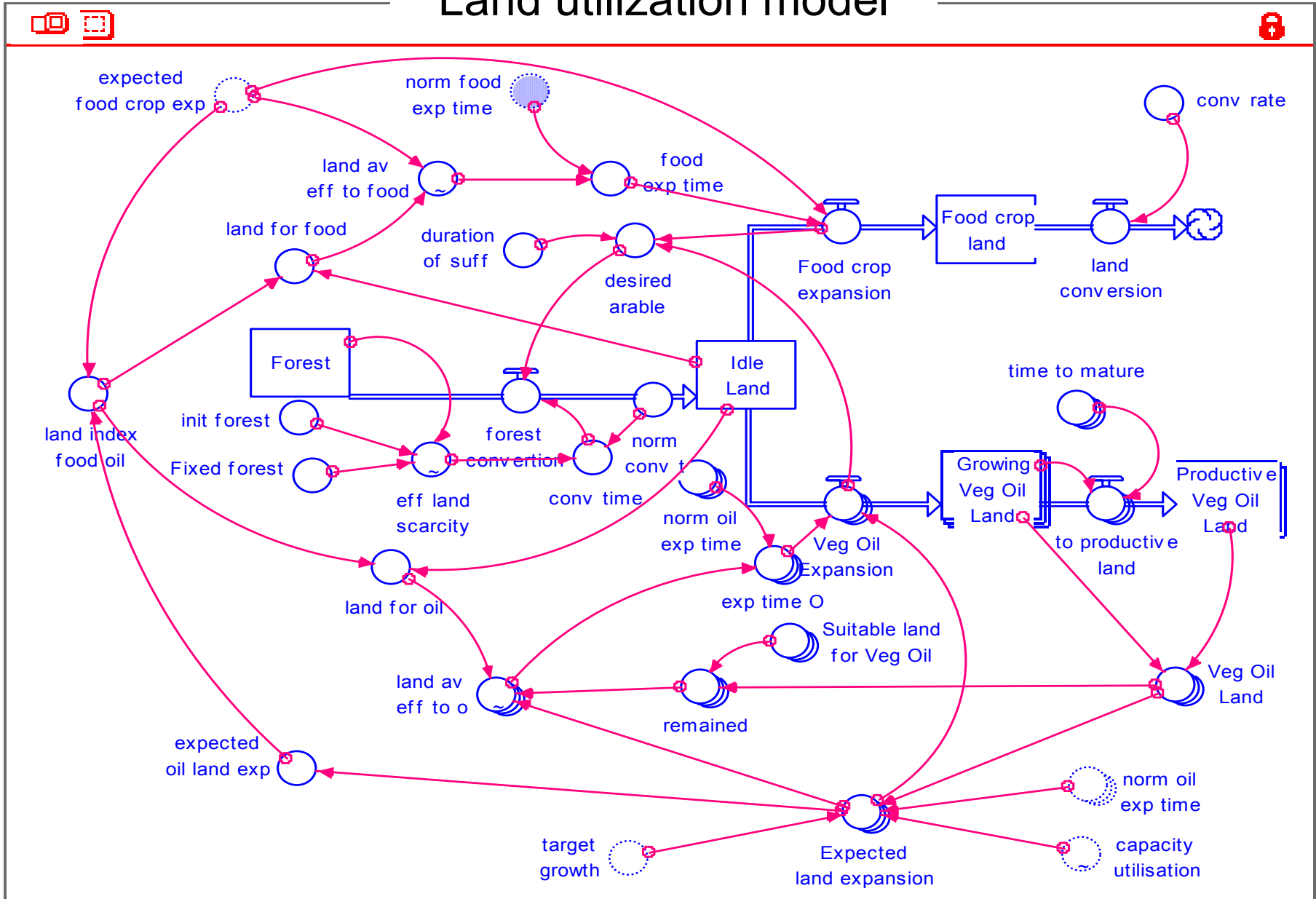
Biodiesel Industry Model



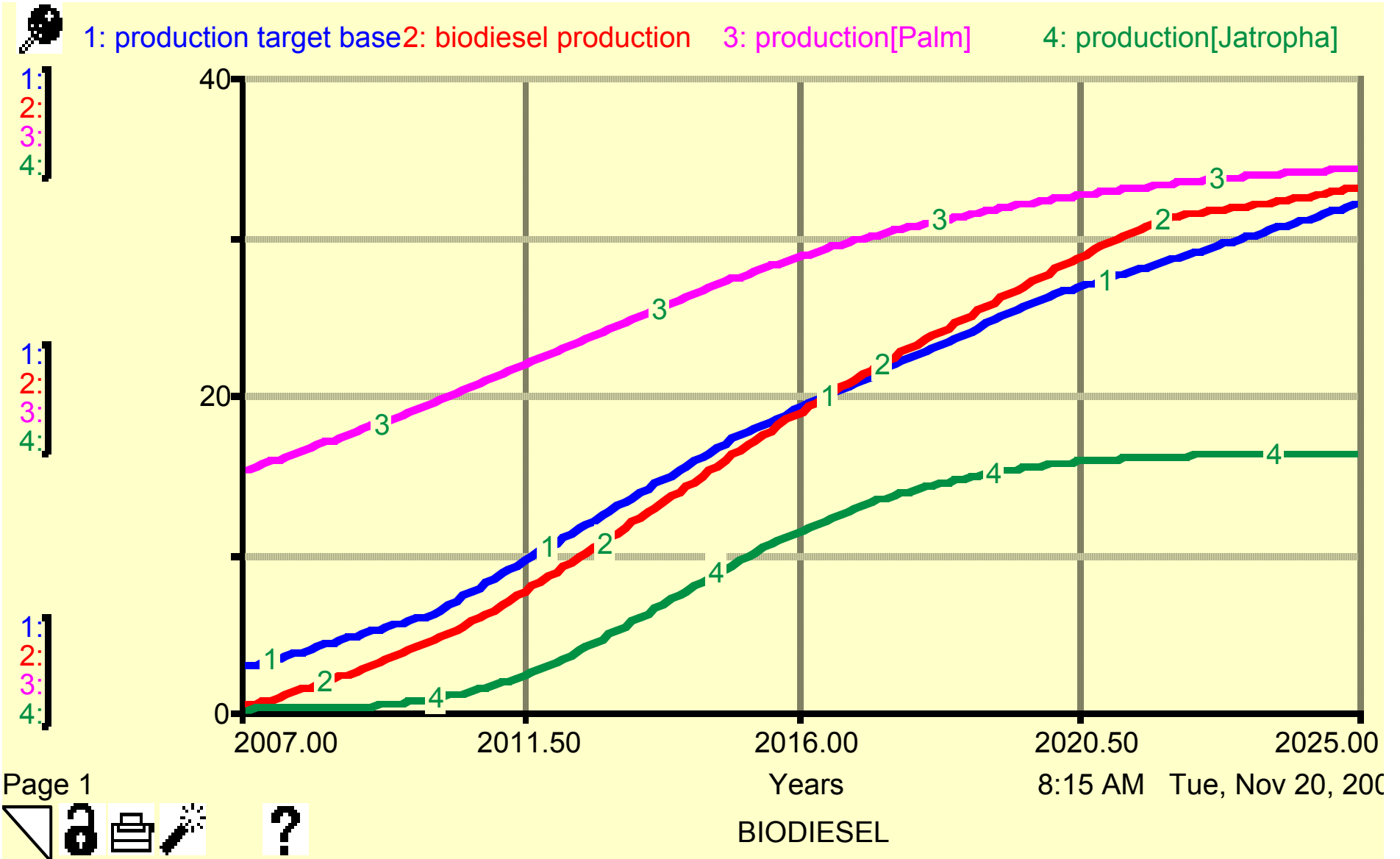
Food sector model



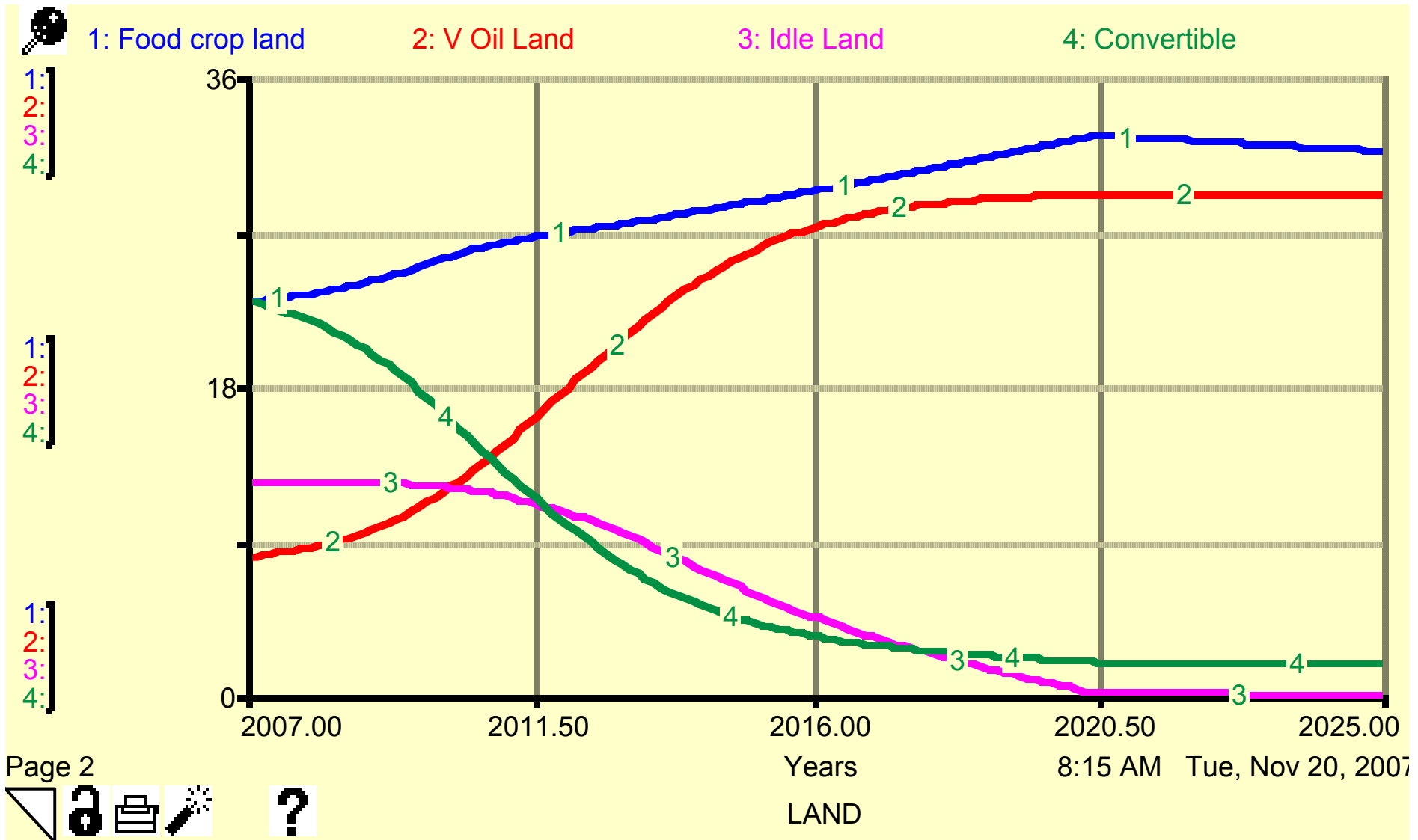
Land utilization model



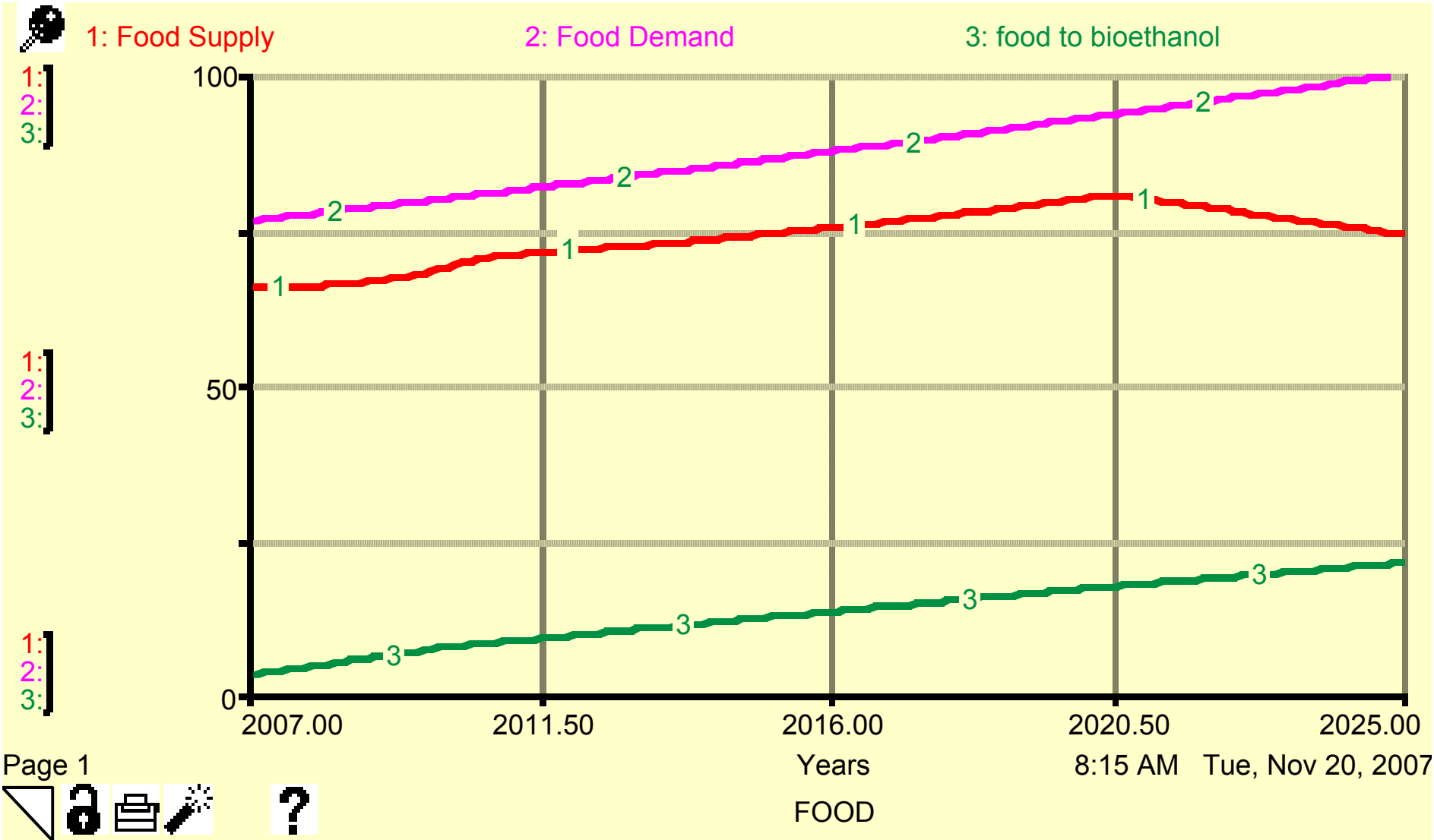
Biodiesel development projection



Impact of biodiesel development on land use and availability



Impact of biofuel development on food supply



Finding of the system dynamic model

1. Government's production target in 2025 could be achieved, with a consequence that there will be competition between land use for food and for fuel; food production has to sacrifice → import
2. To minimize food vs fuel competition, Indonesia has to enhance R&D activities for improving productivity of food production and biofuel production technologies
3. To decrease demand in land use for biofuel production:
 - Indonesia has to begin developing technologies that is not land-demanding (2nd generation technology from wastes).
 - In addition, Indonesia has to begin consider the development of biofuel feedstock that is planted in water (*micro algae*)

Indonesia Biofuel Development Strategy

1. Investment and financing scheme for biofuel supply business
 - prioritize investment to party that is ready with biofuel feedstock plant
 - encourage private sector in biofuel investment (domestic/abroad)
 - establish special financing for biofuel feedstock development
2. Pricing policy/mechanism for feedstock to biofuel products that is supportive to biofuel development.
3. Increase local content/component for biofuel development
 - capacity building to master biofuel technology
 - encourage the use of domestic product in biofuel businesses
4. Improve feedstock supply system and production infrastructure
 - Assign jatropha curcas, sugarcane, cassava, coconut and palm oil as the main plants for feedstock of biofuel and in the mean time search and develop other potential biofuel plants
 - Ensure the availability of support systems of biofuel production including quality seeds, fertilizers and methanol

5. Establish biofuel market rule:
 - Establish quality standards of biofuel as “special fuel”
 - Establish simple procedures for biofuel quality testing
 - Establish simple regulation to include biofuel as part of existing petrofuel market system
 - Assign standby buyer (off taker) for biofuel feedstock& product
6. Accelerate land acquirement for biofuel feedstock production
 - use idle, critical, and convertible production forest land (11 million ha).
 - use inactive (idle) plantation land
7. Increase regional government and community participation:
 - facilitate the establishment of Nucleus-Plasma plantation scheme for biofuel plantation
 - develop business scheme that maximize added value to community
 - include biofuel development in regional development budget
8. Prioritize national biofuel supply security: impose domestic market obligation or export tax for securing domestic biofuel supply while maintaining national and business interest considerations



Thank You

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