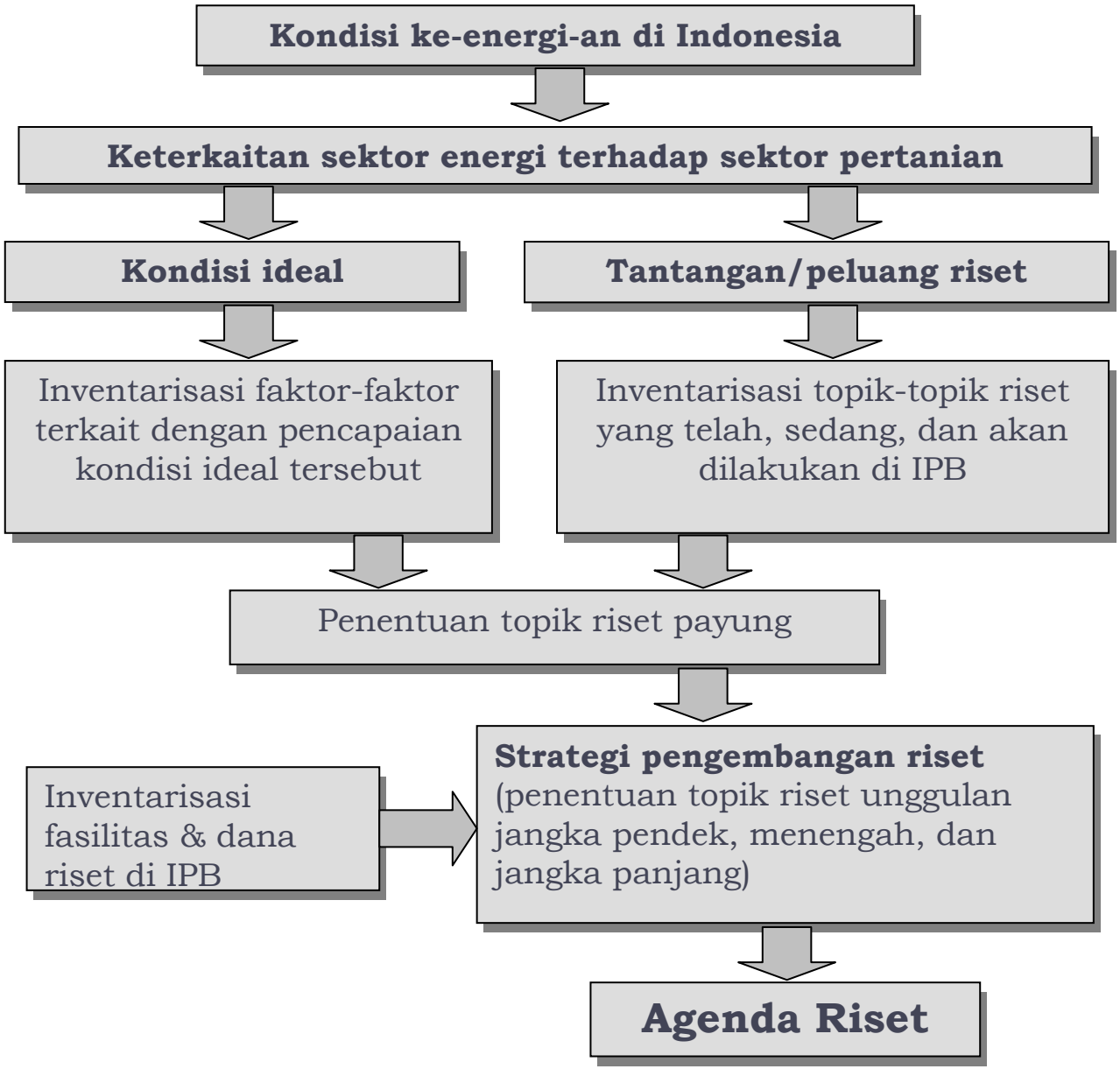
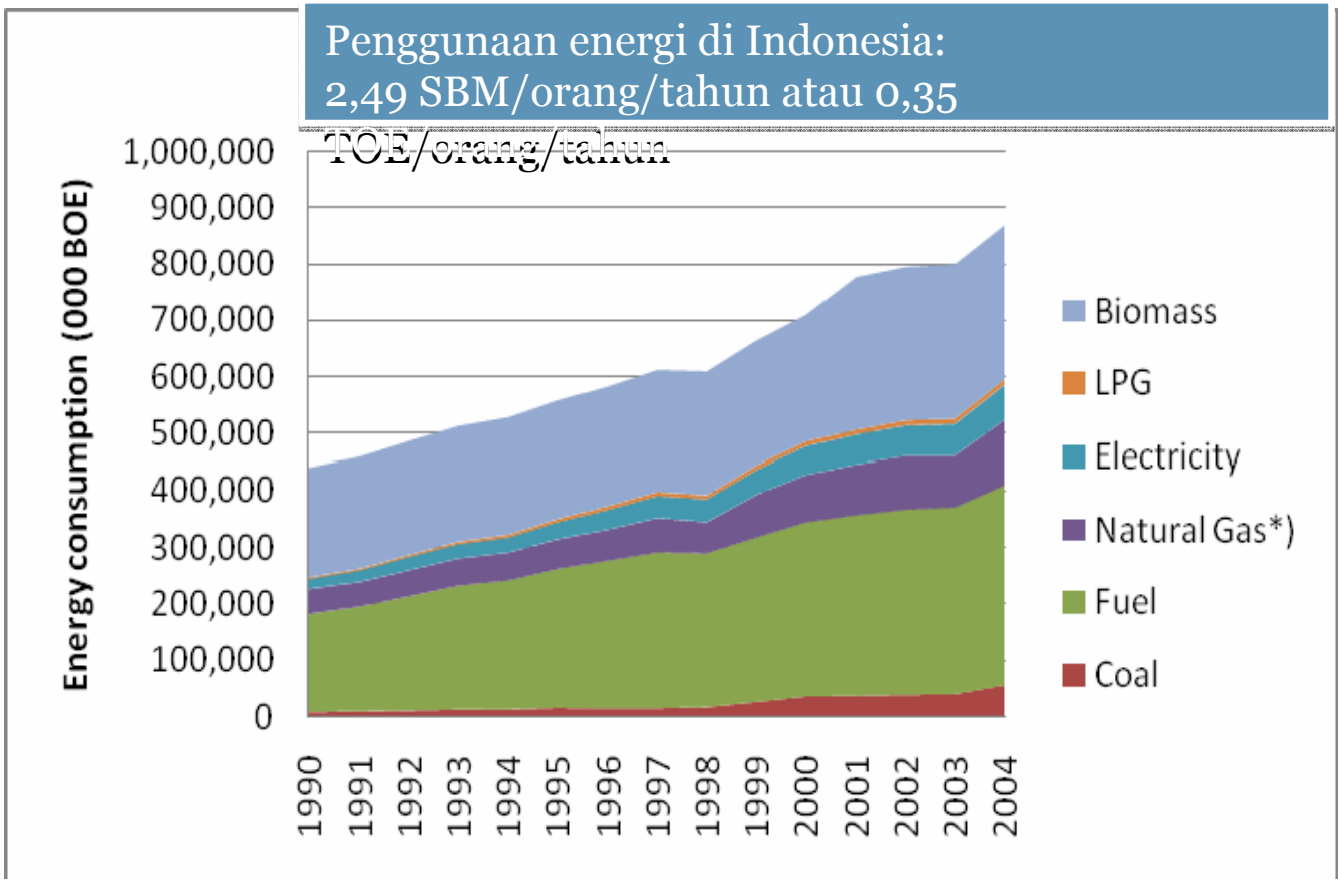
Hak Kekayaan Intelektual dan Agenda Riset Strategis IPB Bidang Energi

Armansyah H. Tambunan
Institut Pertanian Bogor

Sistematika Penyusunan ARS



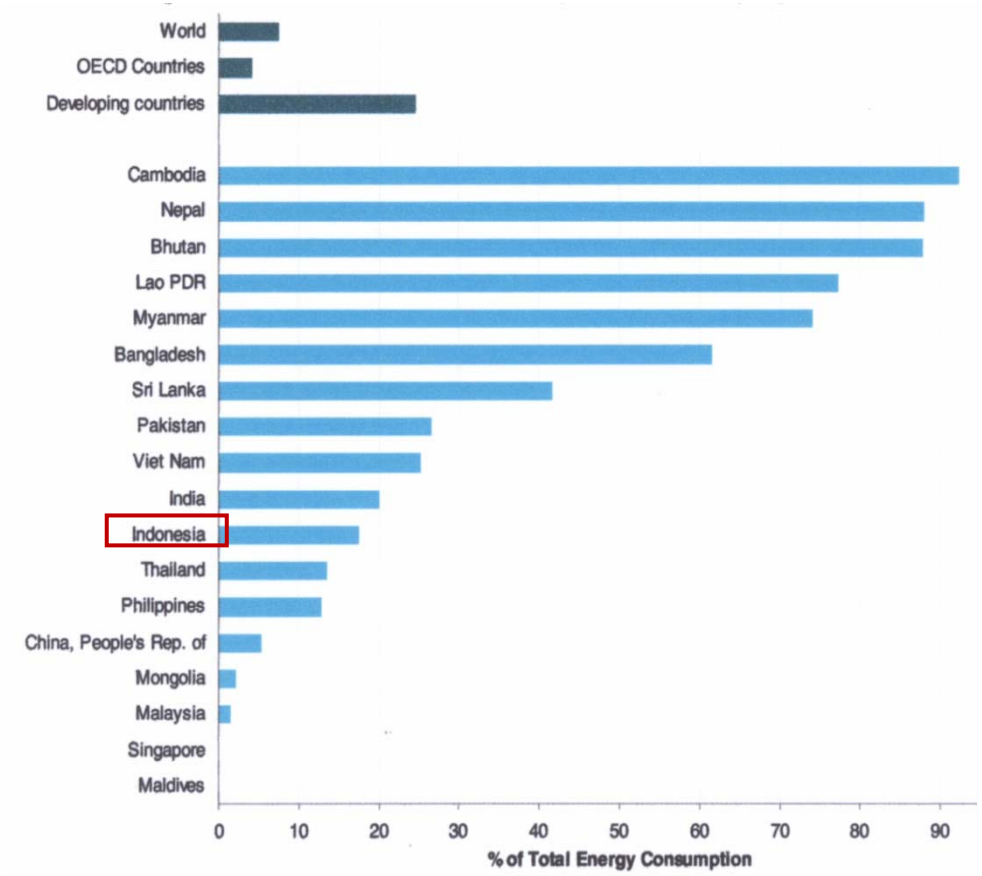
Konsumsi Energi Final di Indonesia

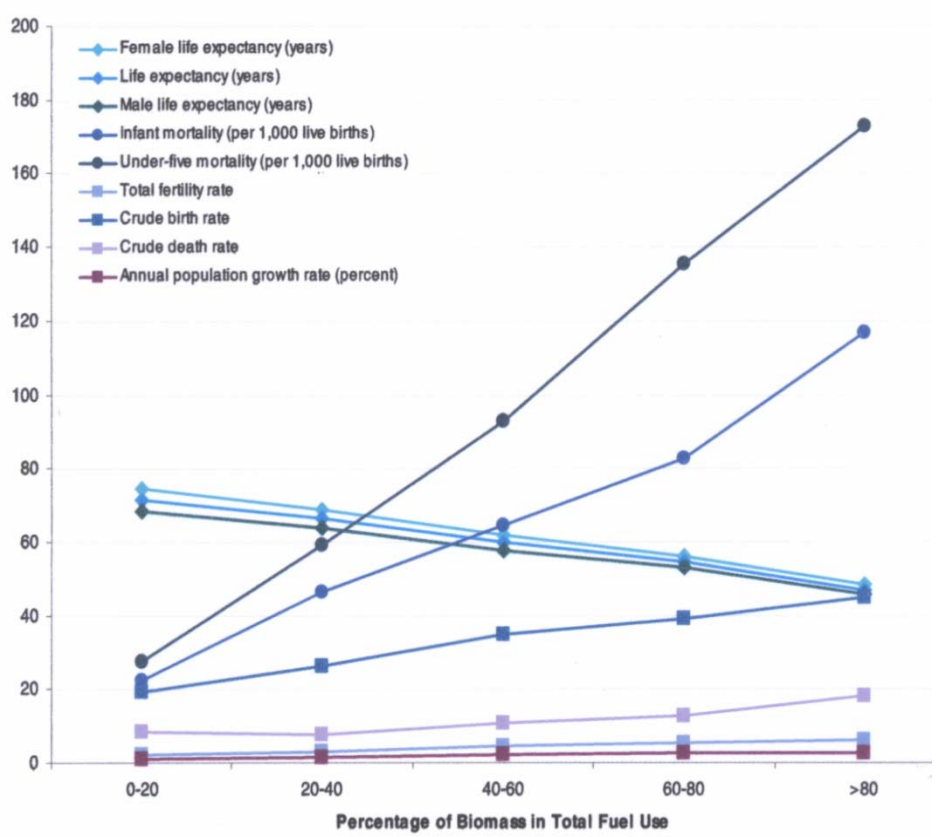


(Statistics of Energy Economics, 2007)

1. Pertumbuhan konsumsi energi sebesar 6,4% per tahun (1990-2004)
2. Dominasi energi fosil masih tinggi
3. Energi biomassa berperan 31% terhadap konsumsi energi

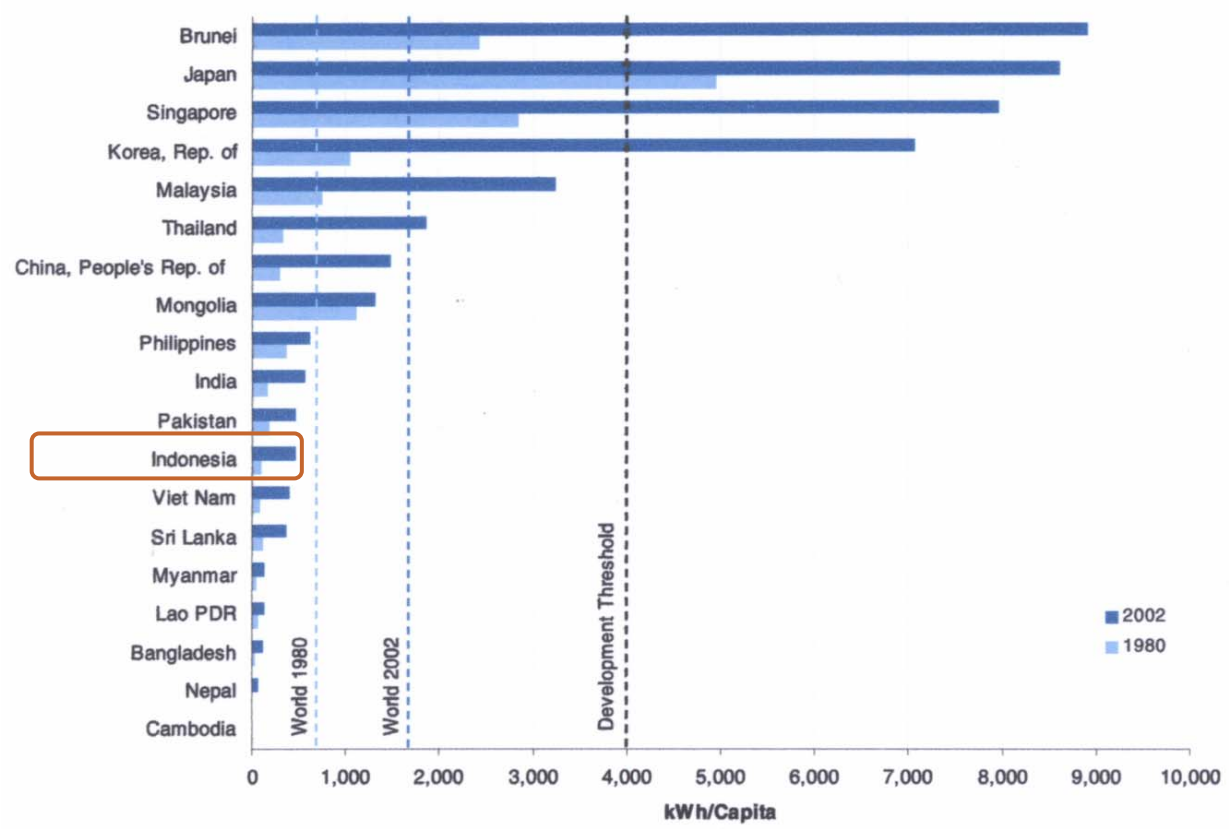
Konsumsi biomasa tradisional





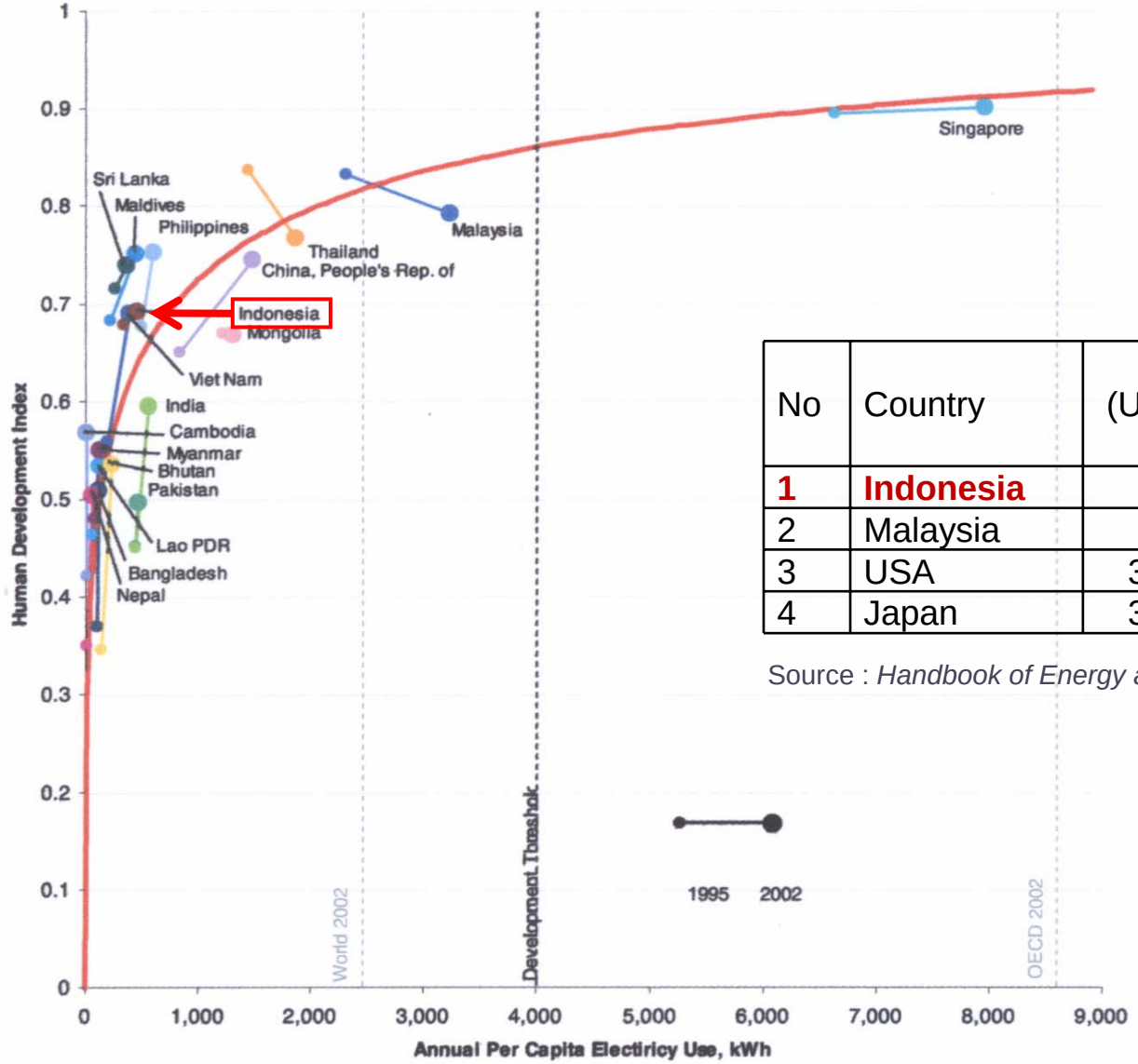
1. Peran biomassa terhadap konsumsi energi total: 30-40%.
2. Penggunaan biomassa secara tradisional: 20% dari total konsumsi energi

Tingkat penggunaan listrik per kapita



1. Penggunaan energi listrik di Indonesia 509 kWh/orang/tahun
2. Tingkat pelistrikan diperkirakan 63%

Konsumsi listrik vs HDI



No	Country	GDP (USD/kapita/ tahun)	Konsumsi Listrik (kWh/kapita/th)
1	**Indonesia**	**695.00**	**407.00**
2	Malaysia	3,699.00	2,731.00
3	USA	32,601.00	8,944.00
4	Japan	35,277.00	11,708.00

Source : *Handbook of Energy and Economic Statistic in Japan, 2003*

Tingkat penggunaan listrik dunia tahun 2003 adalah 2,465 kWh/cap, dengan HDI 0.741

Pembangunan manusia vs konsumsi listrik

- 1,000 kWh/capita → people subsist in abject poverty, barely able to meet their 8–9 megajoule (MJ)/day survival requirements;
- 2,000 kWh/capita → required to sustain a mix of modern technological components in an otherwise agricultural society;
- 3,000 kWh/capita → results in a high level of socioeconomic development;
- 4,000 kWh/capita → enables the high development plateau of HDI = 0.9 to be reached;
- 5,000 kWh/capita → modern technological societies without regional disparities or excluded minorities typically require;
- 6,000 kWh/capita → the highest forms of developed societies can function

1. Dari persfektip energi, sebagian besar penduduk Indonesia (khususnya di perdesaan) berada pada keadaan subsisten dan sulit berubah
2. Diperlukan upaya peningkatan dan pemerataan konsumsi listrik untuk dapat membangun masyarakat

Kondisi Krisis

Keadaan kontradiktif:
persediaan energi berkurang pada saat peningkatan konsumsi masih sangat diperlukan

- Sumber daya energi cenderung dimanfaatkan untuk mendapatkan devisa dari pada untuk menggerakkan perekonomian rakyat
- Ketergantungan terhadap sumber energi fosil masih sangat tinggi
- Pemerataan akses terhadap energi masih rendah

Optimalisasi peran pertanian sebagai pemasok pangan dan energi

Pertanian sebagai pemakai (konsumen) energi dan pertanian sebagai pemasok (produsen) energi, khususnya energi biologik (bio-energy

Tujuan penyusunan Agenda Riset Strategis (ARS):

1.mengarahkan penyusunan program-program riset yang realistis dan inspiratif yang mampu memobilisasi pihak terkait (*stakeholders*);

2.memberikan arahan bagi opsi kebijakan yang perlu dilakukan IPB; serta

3.menjamin IPB dengan kompetensi yang dimilikinya sebagai *leader* di bidang bioenergi di Indonesia.

Agenda Riset Strategis IPB:

- Perencanaan energi pertanian
- Pengembangan bioenergi

Perencanaan energi pertanian

Perencanaan Energi Produksi

- Perencanaan energi untuk sarana produksi pertanian (pupuk, benih, agrokimia)
- Konservasi energi pada sistem produksi tanaman pangan
- Pengembangan alat dan mesin pertanian berenergi terbarukan.

Perencanaan Energi Pengolahan

- Pengembangan mesin-mesin pascapanen berenergi terbarukan
- Pengembangan sistem audit energi pada industri pengolahan hasil pertanian

Sektor penggunaan energi

Sektor	Konsumsi (ribu BOE)	(%)
Industri (termasuk pertanian)	323.493	37
Transportasi	179.936	21
Rumah tangga	314.688	36
Komersial	26.589	3
Lainnya	27.959	3
TOTAL	872.665	100

Temasuk biomassa

Sumber: Dept. ESDM, 2008

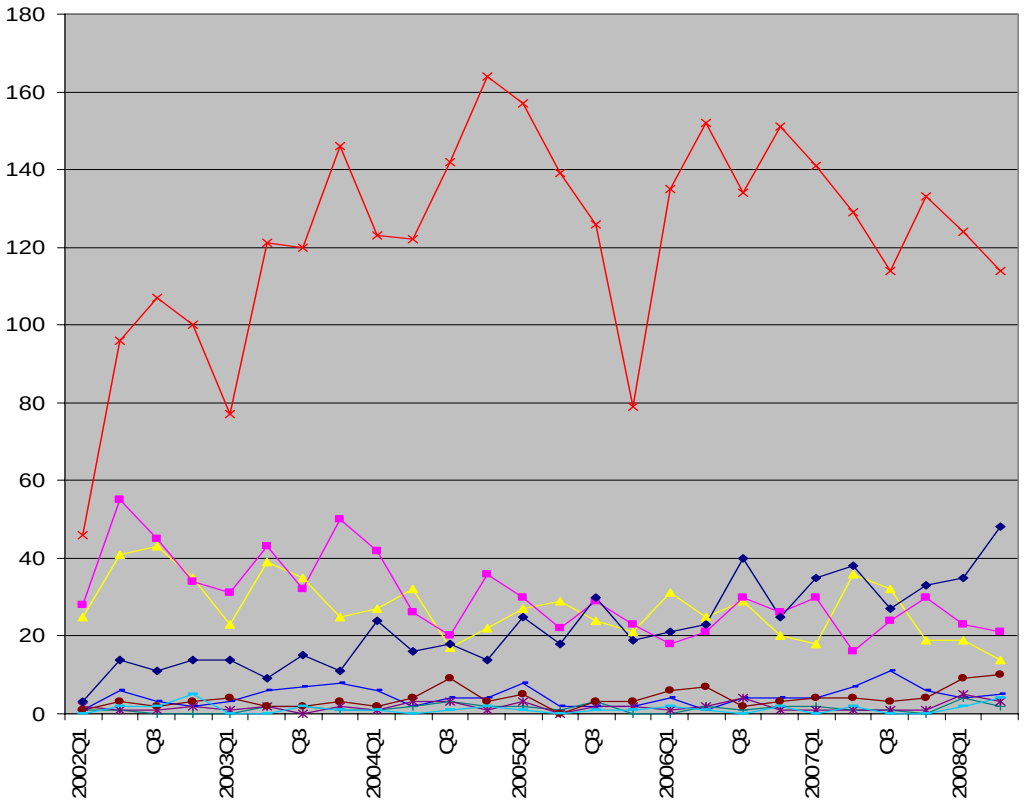
Sektor pertanian di Indonesia hanya menggunakan 1,38% dari total konsumsi energi komersial pada tahun 2004 (sebagai acuan: pertanian pada umumnya menggunakan 2%-8% total energi, tergantung pada tingkat mekanisasi)

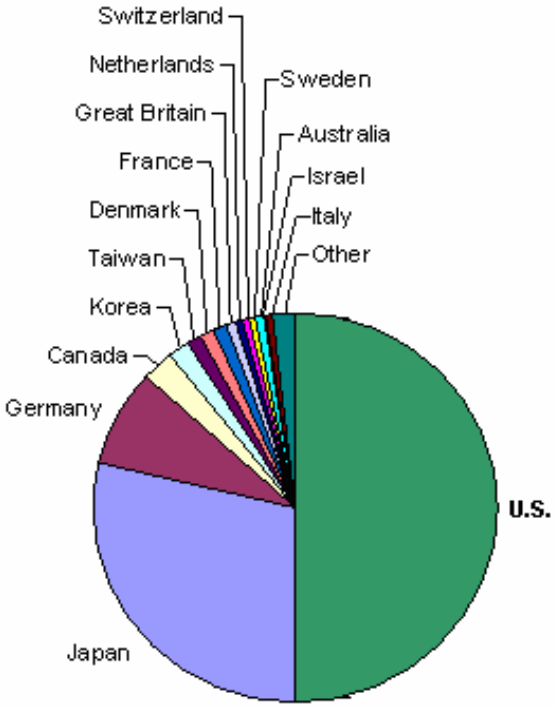
Sumber energi baru dan terbarukan di Indonesia

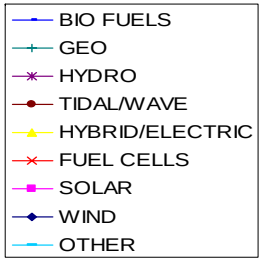
RE resource	2005	2025
Geothermal	807 MW	9.500 MW
Microhydro	84 MW	500 MW (On Grid), 330 MW (Off Grid)
Solar Energy	8 MW	80 MW
Wind Energy	0,5 MW	250 MW (On Grid), 5 MW (Off Grid)
Biomass (electricity)	302 MW	810 MW
Biodiesel		5% total diesel oli consumption (4,7 mio KL)
Gasohol		5% total gasoline consumption
Bio Oil		2,5% total consumption of fuel oil and IDO

- Sumber energi terbarukan dapat dimanfaatkan untuk meningkatan pasokan energi ke sektor pertanian
- Sifat alamiah energi terbarukan: Penggunaan secara spesifik lokal dan setempat, kecuali biomassa

Clean Energy Patent Growth Index







Arah Teknologi

Pemenuhan Kebutuhan Energi untuk Mencapai Millennium Development Goals

Energy need	Fuels required	Fuels displaced	MDGs served							
			1	2	3	4	5	6	7	8
Cooking, food preparation, storage, transportation, etc.	LPG, kerosene, natural gas, biogas, electricity, petrol, diesel, CNG.	Fuelwood, crop residues, dung, charcoal.	√		√	√	√		√	
Lighting, appliances, motive power, machinery, etc.	Electricity	Kerosene, batteries, manual and animal power.	√	√	√			√		√
Agro/food processing, irrigation, productive enterprises, etc.	Electricity, diesel, mechanical wind and hydro.	Manual and animal power.	√	√	√		√		√	

Goal 1: Eradicate extreme poverty[25] and hunger
Goal 2: Achieve universal primary education
Goal 3: Promote gender equality and empower women
Goal 4: Reduce child mortality
Goal 5: Improve maternal health
Goal 6: Combat HIV/AIDS, malaria and other diseases
Goal 7: Ensure environmental sustainability
Goal 8: Develop a Global Partnership for Development

Pengembangan bioenergi

Agenda riset pengembangan bioenergi disusun mengikuti urutan rantai produksi, sebagai berikut :

1.Penyediaan Bahan Baku Biomassa
2.Pengembangan Teknologi Proses
3.Pengembangan Biosurfaktan untuk Meningkatkan Produksi Minyak Bumi
4.Manajemen Rantai Pasokan dan *Sustainability*
5.Pemanfaatan Energi Gelombang Permukaan dan Angin Laut

Biofuel as emerging technology

First-generation biofuels are biofuels made from sugar, starch, vegetable oil, or animal fats using conventional technology

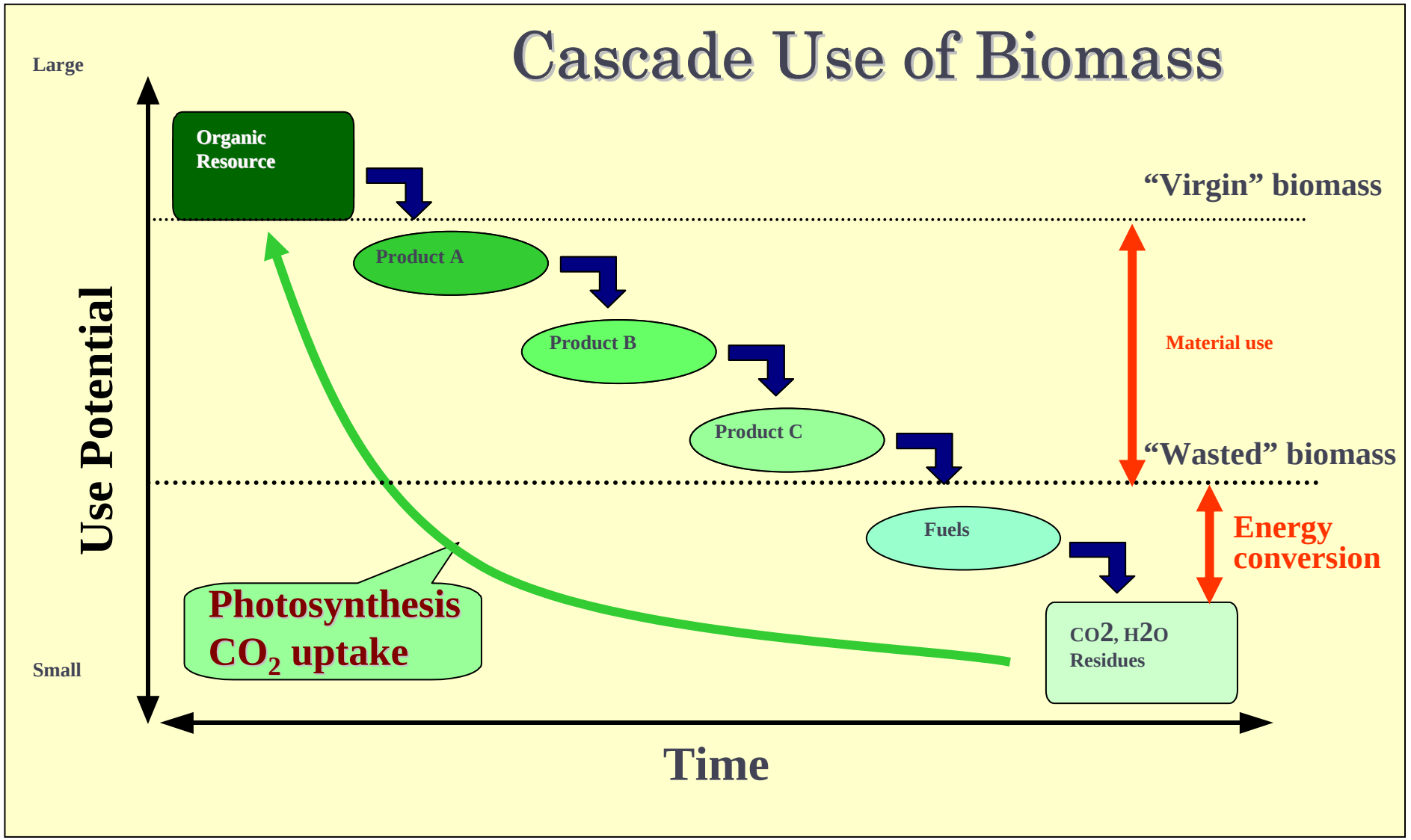
Second generation (2G) biofuels use biomass to liquid technology, including cellulosic biofuels from non food crops. Under development: biohydrogen, biomethanol, DMF, Bio-DME, Fischer-Tropsch diesel, biohydrogen diesel, mixed alcohols and wood diesel

Third generation biofuel, is a biofuel from algae. Algae are low-input, high-yield feedstocks to produce biofuels

Permasalahan yang masih dihadapi oleh industry dalam pengembangan biodisel, diantaranya adalah:

1.Peningkatan dan penjaminan mutu biodiesel
2.Stabilitas penyimpanan biodiesel
3.Pemaksimalan manfaat lingkungan biodiesel

Arah Teknologi



Patent Application **20080274528**

Kind Code **A1**

Dixon; Richard A. ; et al. **November 6, 2008**

BIOFUEL PRODUCTION METHODS AND COMPOSITIONS

Abstract

The invention provides methods for increasing the level of fermentable carbohydrates in a biofuel crop plant such as alfalfa or switchgrass, by modification of the lignin biosynthetic pathway. Also provided are plants prepared by the methods of the invention. Methods for processing plant tissue and for producing ethanol by utilizing such plants are also provided.

Inventors: **Dixon; Richard A.**; *(Ardmore, OK)* **; Chen; Fang**; *(Ardmore, OK)* **; Wang; Zengyu**; *(Ardmore, OK)*

Patent Application **20080250700**

Kind Code **A1**

Tremblay; Andre Yves ; et al. **October 16, 2008**

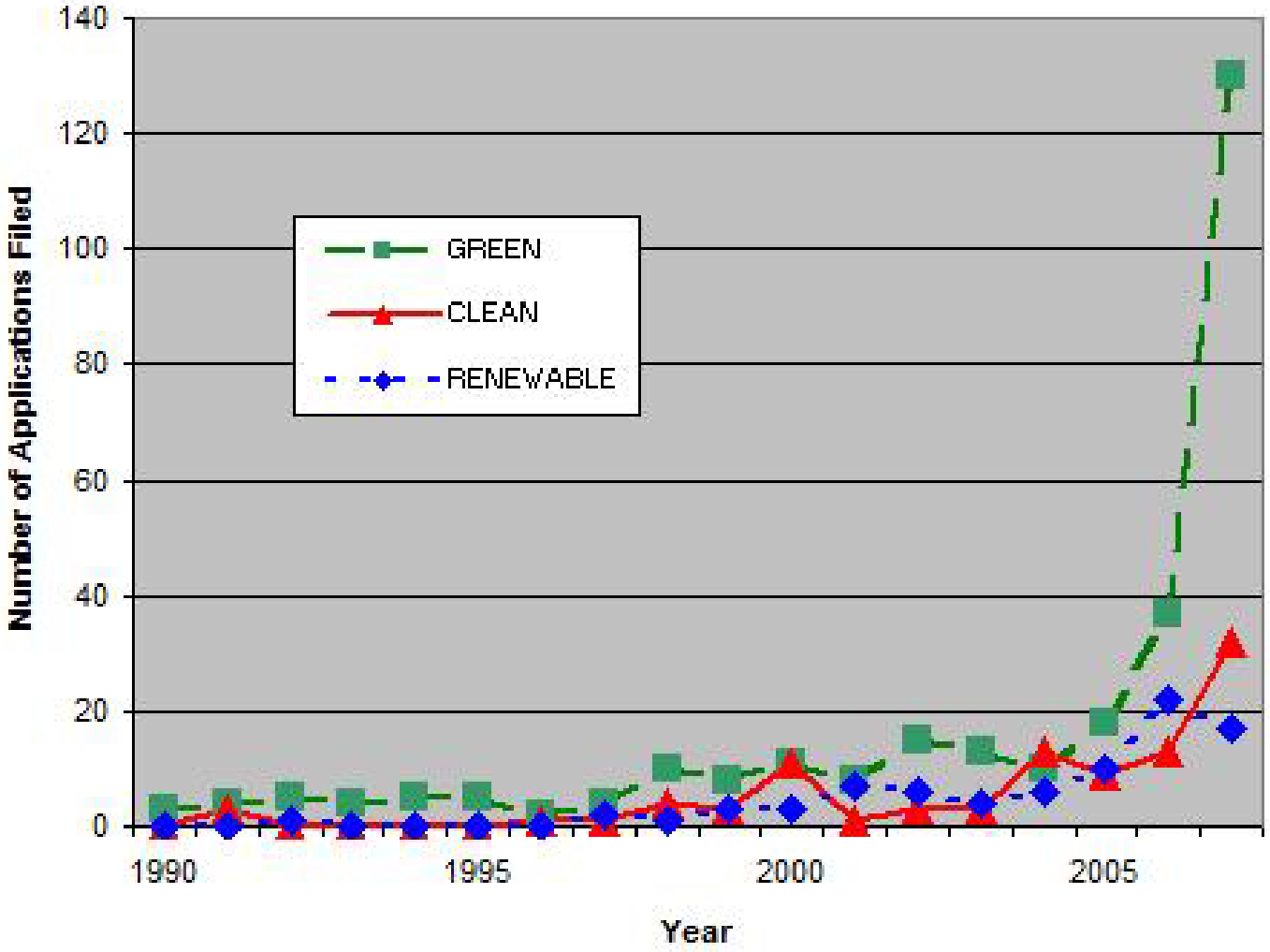
APPARATUS AND METHOD FOR BIO-FUEL PRODUCTION

Abstract

An apparatus for the production of a bio-fuel or a bio-fuel additive from plant-derived oils, animal fats or a mixture thereof, suitable for use in a diesel engine is disclosed. The apparatus comprises a porous membrane for separating a reaction mixture from a permeate, the reaction mixture comprising an alcohol, a feedstock comprising plant-derived oils, animal fats or mixture thereof, and a catalyst for converting said feedstock to a bio-fuel or a bio-fuel additive, wherein said porous membrane is substantially impermeable to the feedstock and substantially permeable to said bio-fuel or bio-fuel additive. A method using said porous membrane in the production of a bio-fuel or a bio-fuel additive is also disclosed

Inventors: **Tremblay; Andre Yves**; *(,)* **; Dube; Marc Arnold**; *( )*

Trend terminologi aplikasi paten

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