

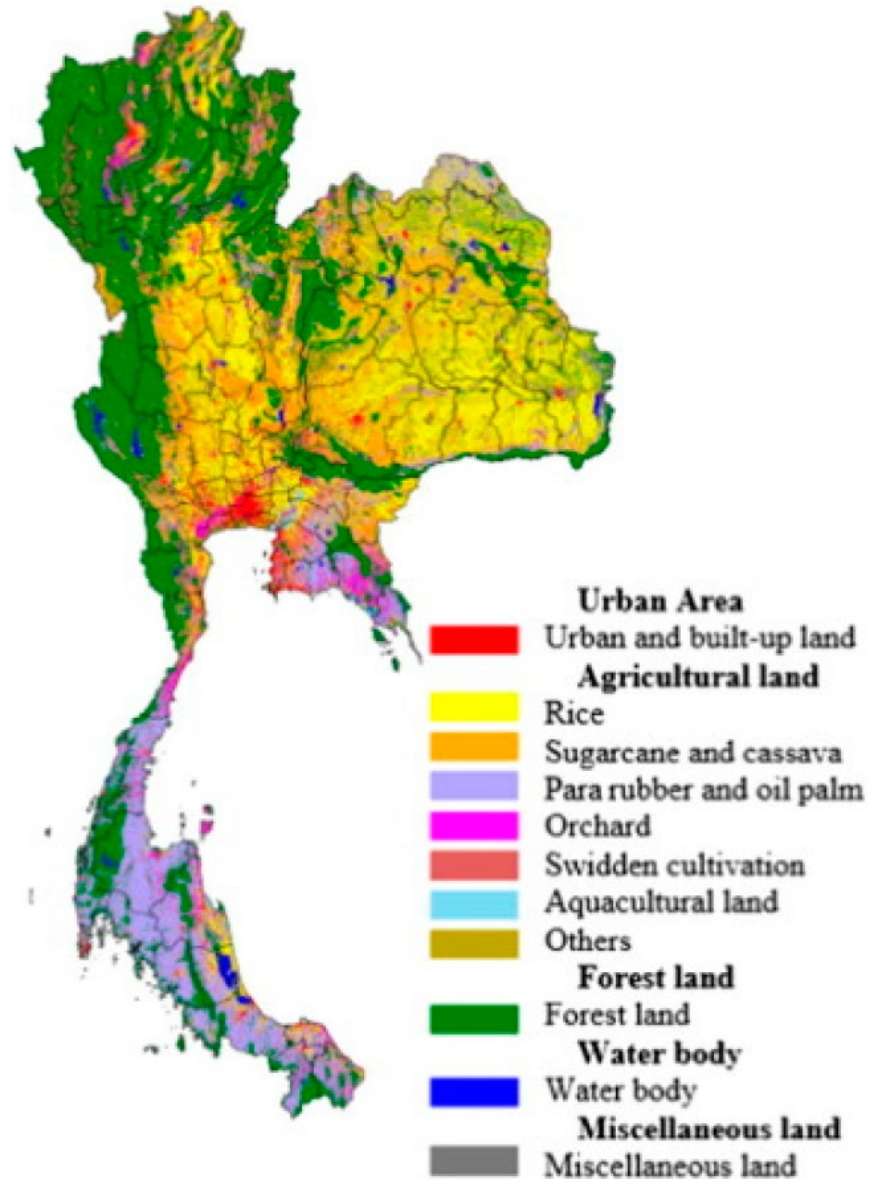
STATUS AND OUTLOOK OF BIOENERGY IN THAILAND

Suneerat Fukuda

The Joint Graduate School of Energy and Environment,
King Mongkut's University of Technology Thonburi, Bangkok, Thailand
E-mail: suneerat.pip@kmutt.ac.th

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Biomass potential

- Major economic crops include rice, sugarcane, cassava, para rubber and palm
- Considerable amount of biomass generated from agricultural & wood waste
- Mostly used for energy generation, but still some underutilized and potential fast-growing trees
- In 2017*
 - Generation (approx.) = 296 M tons
 - Remaining (approx.) = 160 M tons
 Top remaining includes rice straw, cane tops & leaves, corn leaves & trunks, palm EFB & frond & trunk, rubber wood root

Source: Hossen et al. (2020)

*Source: DEDE (2020)

Bioenergy production and utilization in Thailand

- For heat & power: mainly by direct combustion in industry (CHP), SPP & VSPP power plants and co-fired with coal in industrial boilers
- For heat & power via anaerobic digestion of organic wastes (wastewater from industry and livestock farm) & lignocellulosic materials (e.g., napier grass)



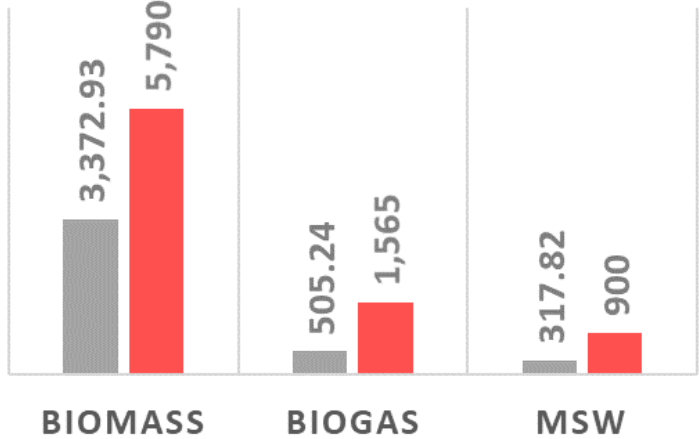
Bioenergy production and utilization in Thailand

- For transport fuels:
 - Bioethanol (mainly from molasse & cassava) and blended with gasoline (mandate E10 and blended up to E85)
 - Biodiesel or B100 (mainly from palm oil) and blended with diesel (mandatory selling B10 but also B7 available)
- Biomass pellets (mainly wood pellets from fast growing trees, rubber wood, wood sawdust with initiatives of agricultural pellet and black pellet)
 - For domestic use – selected industries, government promotion for boiler fuel switching
 - For export – white and black pellets

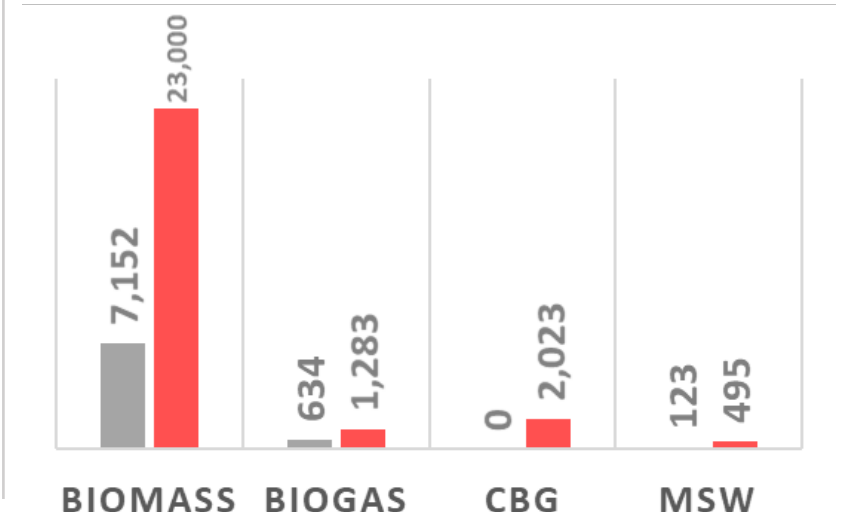


Bioenergy Status and Target

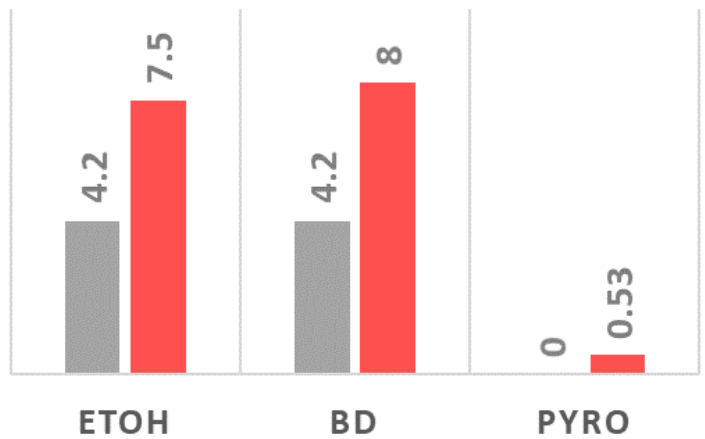
Power (MW)



Heat (ktoe)



Liquid biofuels (MLPD)



Installed capacity in 2018
 AEDP targets in 2037 (AEDP2018)

Power purchasing price (as of December 2019)

MW installed	FiT (THB/unit)			Years of support	FiT Premium (THB/unit)
	FiT _F	FiT _V ⁽¹⁾	FiT		Specially allocated zone ⁽²⁾
1) Biomass					
< 3 MW	2.61	2.2382	4.8482	20 years	0.5
≥ 3 MW	2.39	1.8736	4.2636	20 years	0.5
2) Biogas (energy crop)					
Mixed with waste < 25%	2.79	1.9369	4.7269	20 years	0.5

Note:

- (1) FiT rates will be used for projects that COD within 2019. After 2019, FiT_V rates will continuously increase by core inflation.
- (2) Projects in Yala, Pattani, Narathiwat and 4 districts in Songkhla, i.e. Chana, Tepa, Saba Yoi and Nathawee District

Sustainable bioenergy

- Bio, Circular, Green Economy (BCG) Model
 - ✓ Sustainable development
 - ✓ Grassroot economy
- New S curve industry
 - ✓ Biofuels & Biochemicals

Some strategic action plans/ projects

- Fuel switching (burner modification)
- Community based biomass power plant
- Energy from napier grass (CBG to replace NG and cooking gas)
- Reduction of open burning (the case of sugarcane leaves)

Fuel switching (burner modification)

- Pilot project by DEDE to provide support for burner modification in 100 factories
- Financial support for 30% of investment cost but < 2MB
- Replacing fossil-based fuels (LPG, diesel, HFO) to biomass pellet

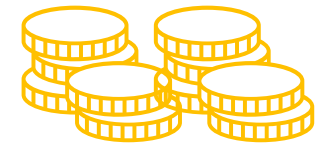
Arawan Packaging, Lampun province



1,388,400 L/y @12 THB/L
16,660,800 THB/y



3,159,000 kg/y @3 THB/kg
9,477,000 THB/y (43% reduction)



7,183,800 THB/y
(PBP = 8 months)
With support
(PBP = 6 months)

รูปแบบ

โรงไฟฟ้าชุมชน

เพื่อเศรษฐกิจฐานราก



โครงการโรงไฟฟ้าชุมชน ถูกสานต่อภายใต้การทบทวนหลักเกณฑ์ และเงื่อนไขทั้งหมด เพื่อให้ชุมชนได้รับประโยชน์สูงสุด ภายใต้หลักสำคัญคือ

1. เกษตรกรได้รับการประกันราคา 
2. ไม่กระทบต่อค่าไฟฟ้าของประชาชน 

การร่วมทุน ประกอบด้วย 2 กลุ่ม

1. กลุ่มผู้เสนอโครงการ

(ภาคเอกชน หรือภาคเอกชน ร่วมกับองค์กรของรัฐ) สัดส่วน 90%



2. กลุ่มวิสาหกิจชุมชน

(มีสมาชิกไม่น้อยกว่า 200 คนหรือเรือน)

ที่จดทะเบียนเป็นนิติบุคคล ถูกต้องตามกฎหมาย

สัดส่วน 10% (เป็นหุ้นบุริมสิทธิ)

ซึ่งเป็นผู้ปลูก/ จัดหาพืชพลังงาน ให้แก่โรงไฟฟ้า



ที่มา : กรมพัฒนาพลังงานทดแทนและอนุรักษ์พลังงาน กระทรวงพลังงาน ปี 2563

Community based biomass power plant

- Energy policy for the local economy with objective to increase the community's quality of life and build energy security
- Pilot project to procure electricity from community-based VSPP power plants

**75 MW
Biomass**
(≤ 6 MW each)

**75 MW
Biogas**
from energy crop with < 25% organic waste
(≤ 3MW each)

- Ensured benefits to local community
 - ✓ Using locally available fuels. Participating farmers will get a guaranteed price.
 - ✓ 10% of ownership (shared profit) must be under a community enterprise or community enterprise network.

Energy from napier grass

- Napier grass: 375 – 625 tons/ha/year at 45-60 days harvest period
- Options for energy production
 1. Electricity to domestic grid
 2. Pelletized biomass for exporting (also for other agriwastes)
 3. Compressed biogas (CBG) to decentralized station
- Methane yield = 190 – 270 m³ per ton VS for the case of @45 days



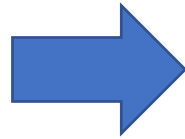
Source: Pruk Aggarangsi (2014)
www.erdicmu.ac.th

Reduction of biomass open burning

- The case of sugarcane leaves



Burning tops & leaves
Manual harvesting



Machine harvesting
No burning (biomass obtained)

“No burning” policy to reduce PM2.5
Price incentive for unburned cane
Increased mix of cane leaves in boilers

Future of bioenergy

- Government promotion on biomass utilization
- Private sector turns to use more and more biomass
- More biomass utilization by various technologies
- Sustainable supply chain needed
- Sustainable bioeconomy

JGSEE PILOT PLANT

อาคารปฏิบัติการบัณฑิตวิทยาลัยร่วมด้านพลังงานและสิ่งแวดล้อม



Thank you
for your kind
attention
