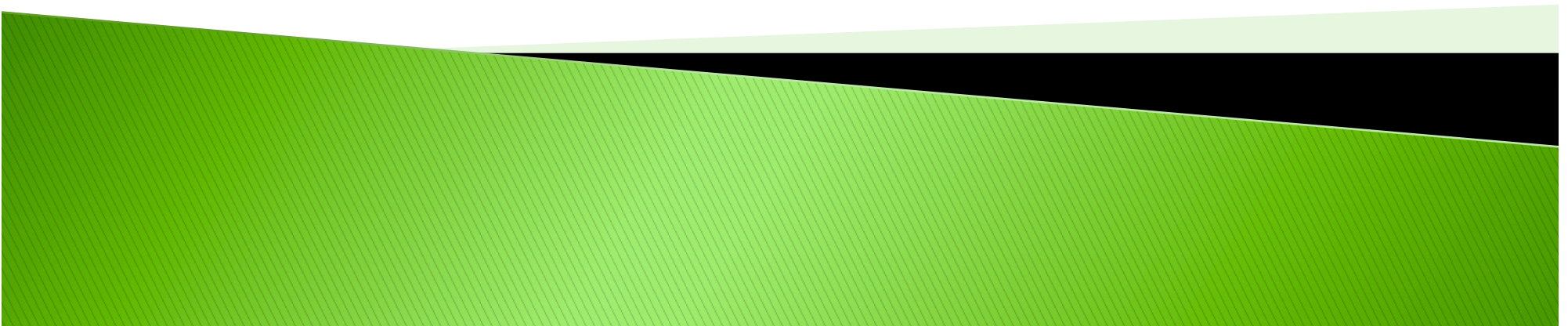


Rapid deployment of industrial biogas in Thailand: Factors of Success

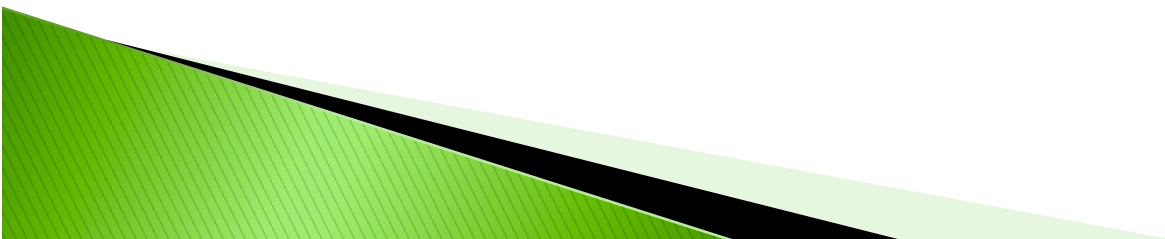
Joost Siteur

ECEEE Summer Study
September 2012



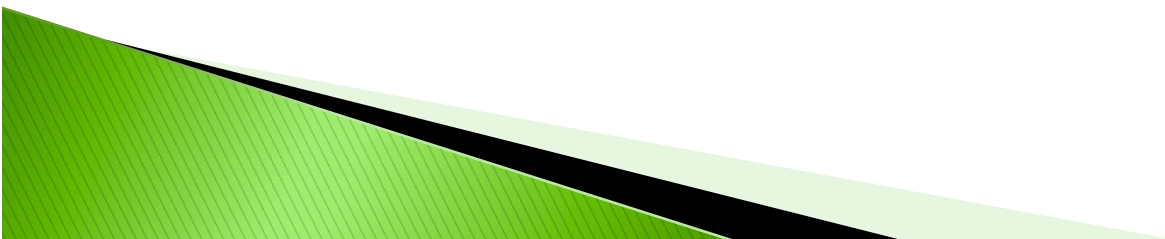
Background

- ▶ More than 100 industrial biogas plants built in last 10 years
- ▶ Biogas has increased energy efficiency and competitiveness for starch and palm oil mills
- ▶ 10 years ago difficult to obtain financing, now local banks provide loans



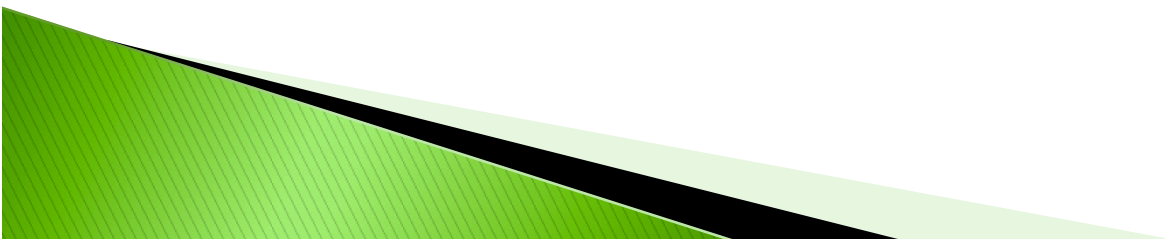
Industrial Biogas

- ▶ Waste water typically treated in open lagoons
- ▶ High organic content suitable for biogas
- ▶ Industries rely on Heavy Fuel Oil and grid electricity
- ▶ Biogas significantly reduces energy costs and environmental impacts



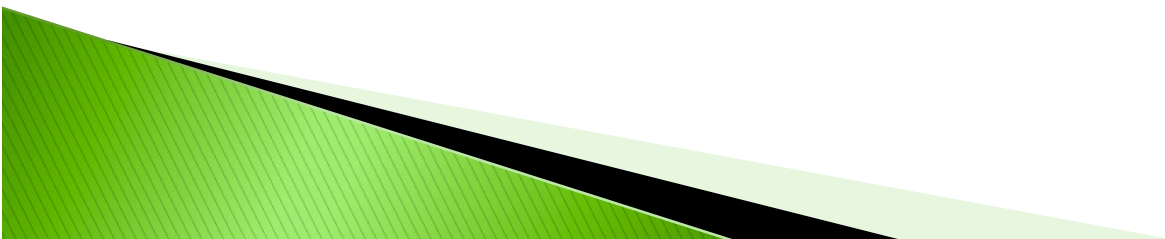
Policies & Regulations

- ▶ ENCON Act (1992)
 - Compulsory and voluntary programs to stimulate energy conservation in factories and buildings
 - ENCON Fund
- ▶ Private sector power producer programs
- ▶ Alternative energy development plan (2012–2021)



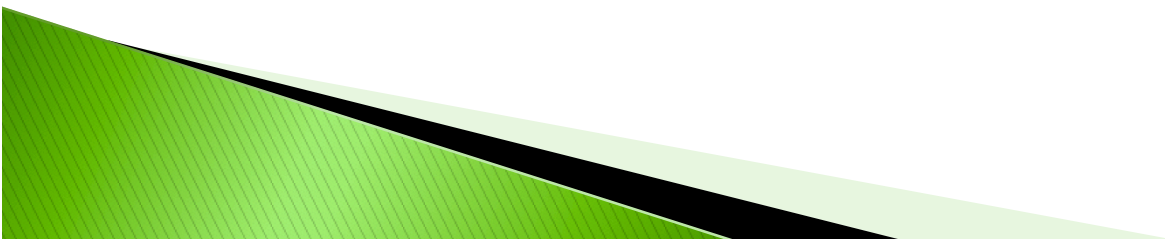
ENCON Fund

- ▶ Funded by the Petroleum Fund, based on a levy on the domestic sales of fossil fuels
- ▶ Supports multiple EE and RE programs:
 - 30% Subsidy Program
 - Energy Efficiency Revolving Fund
 - Tax incentives



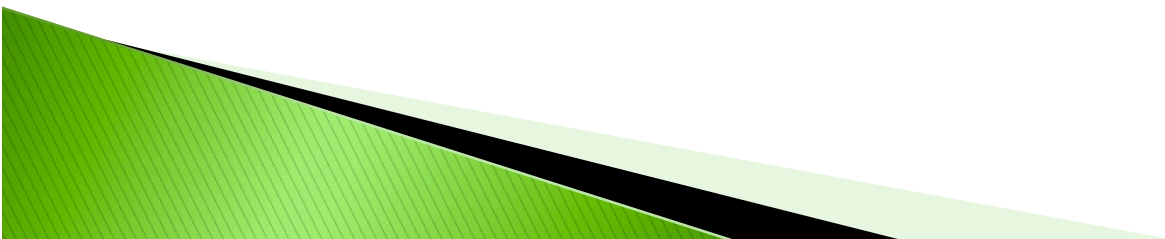
Very Small Power Producer (VSPP)

- Distribution utilities obliged to purchase electricity generated from RE up to 10 MW
- Retail tariff + 'Adder' (€ 0.7–1.2 cents / kWh for biogas)
- Currently on hold, FiT scheme under preparation



Initial Biogas Developments

- ▶ Livestock biogas since 1950s
- ▶ Early 2000s government supported projects at starch mills
- ▶ First fully commercial project in 2003:
 - BOOT
 - All equity



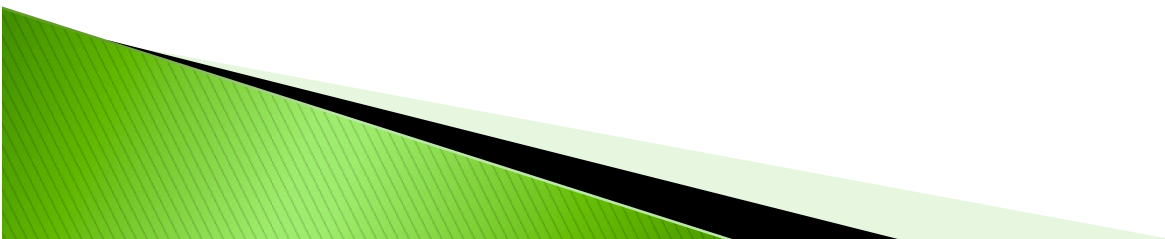
Biogas Boom

- ▶ 50 plants at starch mills, 60 at palm oil mills
- ▶ Initially BOOT, later mostly turn-key
- ▶ Sharp increase in biogas power sales (71 biogas projects, total 113 MW, 216 MW under development)
- ▶ Limited attention to performance, scope for enhancements



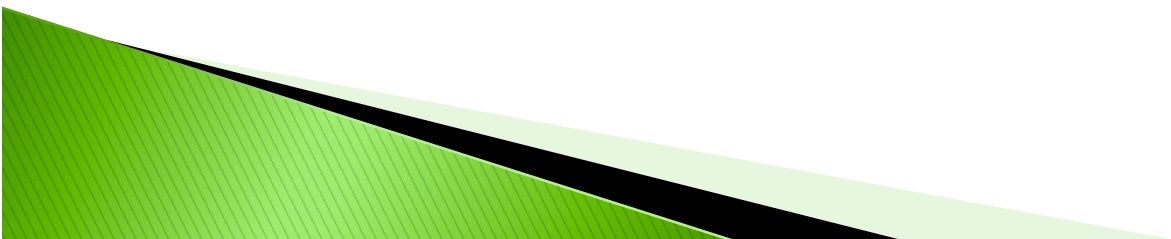
Sources of Financing

- ▶ Public Funding
 - Direct subsidies
 - Revolving Fund
- ▶ Local banks
- ▶ Private capital
- ▶ Carbon finance



Main Driving Factors

- ▶ Government support
- ▶ Strong industrial sector
- ▶ Very Small Power Producer program
- ▶ Carbon finance
- ▶ Thailand investment climate



In Conclusion

- ▶ Government support instrumental, but not necessarily sufficient
- ▶ Most finance provided by local banks, but as asset-based corporate finance
- ▶ Rapid uptake of technology but limited focus on performance

