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Impact Through Innovation
HIMPUNAN INDUSTRI PENGOLAHAN KELAPA
INDONESIA
PLATAFORMA
ASIA
REVITALISING THE INDONESIAN
COCONUT SECTOR
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# NEW INVESTMENT PATHWAYS

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Converting Senile Coconut to Bioenergy

Transition Finance Opportunity

Directing New Capital Toward Climate-Smart Sustainable Coconut Agribusiness


Kelapa sawit scale and ambition must be deployed to kelapa but how to finance the transition?

**Scaling of coconut planting materials requires investment in new capacity development but how to finance this cost?**


How do we finance
the transition
from this... ?


To this...
and how do we support the smallholders?

# Gasifying Senile Coconut Trees for Syngas Production

Gasifying the senile coconut estate offers a **triple bottom line solution** of renewable energy generation and biomass waste management to create the transition financing for plantation scale replanting and inti-plasma (NES) projects.

## Syngas is produced by converting biomass through gasification into a raw material


that can be used for various applications including **power generation, fuel production, biomethanol production and valuable chemicals.**

- Renewable Energy generation
- Biomass waste management
- Transition financing for plantation scale replanting and inti-plasma projects

# Crisis and Opportunity

## *The Strategic Inflection Point*

### Three pressing challenges:

- Replanting of 1+ million hectares of aging coconut plantations
- Reducing dependence on imported fossil fuels and burning fossil fuels
- Create scalable, inclusive green energy systems to support NDC's

**One solution answers all three:**

Gasifying senile coconut trees into syngas for domestic power generation and downstream chemicals processing.

**Replant 1.000.000+ hectares**
within a 3.5 million hec estate

**Reduce dependence on imported fossil fuels**

**Create scalable green energy systems**

# Clearing land for full sun planting systems

to accelerate coconut flowering and get faster productivity restoration. Intercropping starts after 3 years as agroforestry.

# Dual Impact

## Clean Energy & land Renewal

### Senile Coconut Trees

Energy Waste Today, Strategic Asset Tomorrow

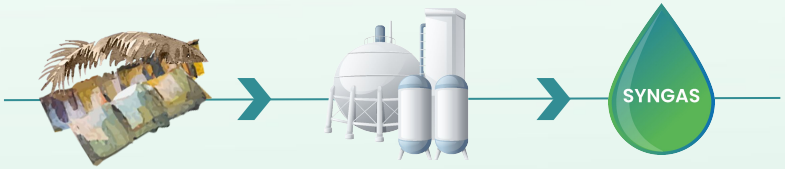
- Senile coconut trees are unproductive and block up land use for efficient replanting practices.
- Gasification converts this biomass into syngas as valuable raw material.
- Land becomes open for high-yield hybrids, replanting, and intercropping.
- Biochar and ash from gasification as soil conditioners and carbon removal.
- Senile tree harvests are staggered across plantation landscape to ensure continuous feedstock supply.

# Technical Feasibility

## Mature Tech, Local Feedstock

### Gasification Process

(Proven + Modular + Centralised)




### Feedstock

Upstream stems (trunk) root ball and leaves from harvested senile trees and including downstream processing wastes (husk).

### Technology

Downdraft or fluidized-bed gasifiers.

### Output

Clean syngas as raw material to produce biomethanol and other compounds essential to industrial and commercial markets.

**Technology is mature and developing and can support modular biomass processing into localized gasifier.**

# Senile Coconut Bioenergy Model to Biomethanol

Coconut Biomass

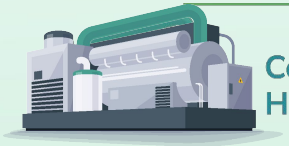
Gasification Technogy

Biochar

- $CH_4$ SNG Methane
- $H_2$ Hydrogen
- $NH_3$ Ammonia

SYNGAS

- Fischer Tropsch Fuel
- Mixed Alcohols
- Biomethanol / DME



Combined Heat and Power

High Temperature Heat

Co Firing

# Energy Yield & Commercial Case for 1 Hectare of senile coconut plantation

## Biomass Yield per Hectare

**75 tonnes**
of dry biomass
per hectare

=

**1.27 million MJ**
or 354,000 kWh
of energy


### Syngas Potential

> **165,000 Nm³** syngas per hectare
> **229,000 kWh** syngas energy

### Electricity Yield (20–30% Efficiency)

> **45,800–68,700 kWh/ha** of electricity

**Enough to power 30–40 Indonesian households per year per hectare or substitute liquid fuels**

## Commercial Case per Hectare

Indonesian Feed-in Tariff (FiT) for renewable electricity generally falls within the range of $0.145 to $0.25 per kWh. (Rp. 2,210 to Rp. 3,800 per kWh.)

| Scenario | Output | $ Price | $ / ha |
|---|---|---|---|
| Power Generation | 57.250 kWh | $0.10/kW | $5,725 |
| Direct Fuel Use (low) | 824.4 GJ | $8/GJ | $6,595 |
| Direct Fuel Use (high) | 824.4 GJ | $12/GJ | $9,892 |

## Downstreaming To Biomethanol

- 1 ton MeOH from 2 ton of biomass at around feedstock of 16-18MJ/kg.
- 75 ton per ha = 37.5 ton MeOH could translate to US$1,000/ton = US$37,500 / ha (indicating the Syngas downstreaming opportunity)

**Carbon Offset (0.9 kg $CO_2$/kWh avoided):**

- **Up to 60 tonnes of $CO_2$ avoided per hectare**

# From Senile Coconut Palms to Jet Fuel

*Unlocking Indonesia's Sustainable Aviation Fuel Potential*

# Gasifying 10,000 Hectares of Senile Coconut for Syngas and SAF Production


## Project Overview

**10,000** hectares of senile coconut trees

**South Sumatra**

Convert biomass into syngas for energy or sustainable aviation fuel (SAF).

Deploy bioenergy revenues as transition financing for replanting coconut.

## Strategic Fit for Indonesia

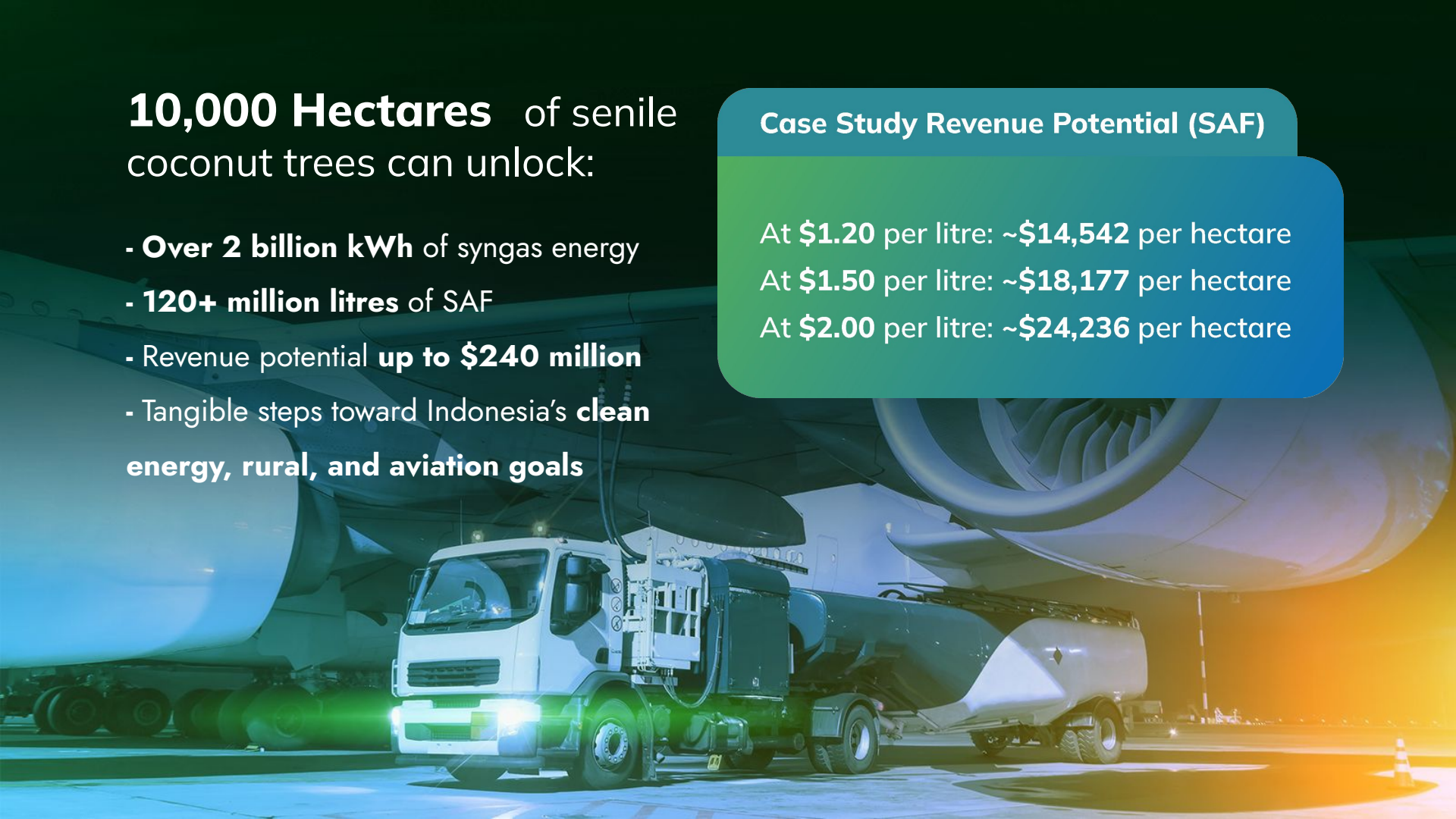
| | |
|---|---|
| **Energy Imports** | Domestic clean syngas replaces fossil fuels |
| **Coconut Replanting Gap** | Clears blocked land, provides transition finance (inti-plasma) |
| **Rural Development** | Creates local value chains and jobs |
| **Net-Zero Goals** | Significant carbon offset potential (VCM & NDC's) |
| **Waste Management** | Turns biomass waste into national energy assets |

**10,000 Hectares** of senile coconut trees can unlock:

- **Over 2 billion kWh** of syngas energy
- **120+ million litres** of SAF
- Revenue potential **up to $240 million**
- Tangible steps toward Indonesia's **clean energy, rural, and aviation goals**

**Case Study Revenue Potential (SAF)**

At **$1.20** per litre: **~$14,542** per hectare
At **$1.50** per litre: **~$18,177** per hectare
At **$2.00** per litre: **~$24,236** per hectare



**Indonesia has the senile coconut trees**

**The technology exist**

**The need to unlock transition finance is urgent**

**Power up coconut by transforming a coconut crisis into an energy and economic solution.**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Thank You

# Supporting Notes :

Replanting 10K hectares requires around 1.5m to 2m viable seedlings

Replanting experience in other territories in senile estates supports the case for clear sun planting and later introduction of intercropping and shade crops for land use optimisation.

*In 1997, (28 years ago) a credible study estimated that 50% of Indonesian coconut palms, or 185.6 million trees, were old and unproductive.*