

# Business Plan

## Energy from Palm Waste



### PRESENTER

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# Executive Summary

FAH Power Ltd

Moto : Renewable for a Better Life

Asahan. North Sumatera, Indonesia.

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**Concept:** Producing electrical power from the waste of palm oil factory in North Sumatra, Indonesia. Power Plant capacity is 9.75 MW. Palm Waste (EFB) as source of energy. Location: Asahan, North Sumatra Indonesia.

**The Market opportunity:** The area north Sumatra is one of the most deprived in Electrical supply in Indonesia. The poor people in this area spending much of their money for alternative energy source to meet their daily needs. By meeting the demand of electricity in rural area of a developing countries creates a multi million dollar potential market

# Executive Summary

**Business model:** By extracting power from palm waste can electrify remote villages as well as it will enhance national grid capacity. Moreover, the cost per unit is also less compared to conventional power sources. The business strategy is to sell electricity to national grid in long term basis. Last but not least this will promote Indonesia to use renewable energy sources.

**Target Markets:** Our Primary market is the national grid company with long term contract. Its very clear that national company is suffering to provide electricity in remote places.

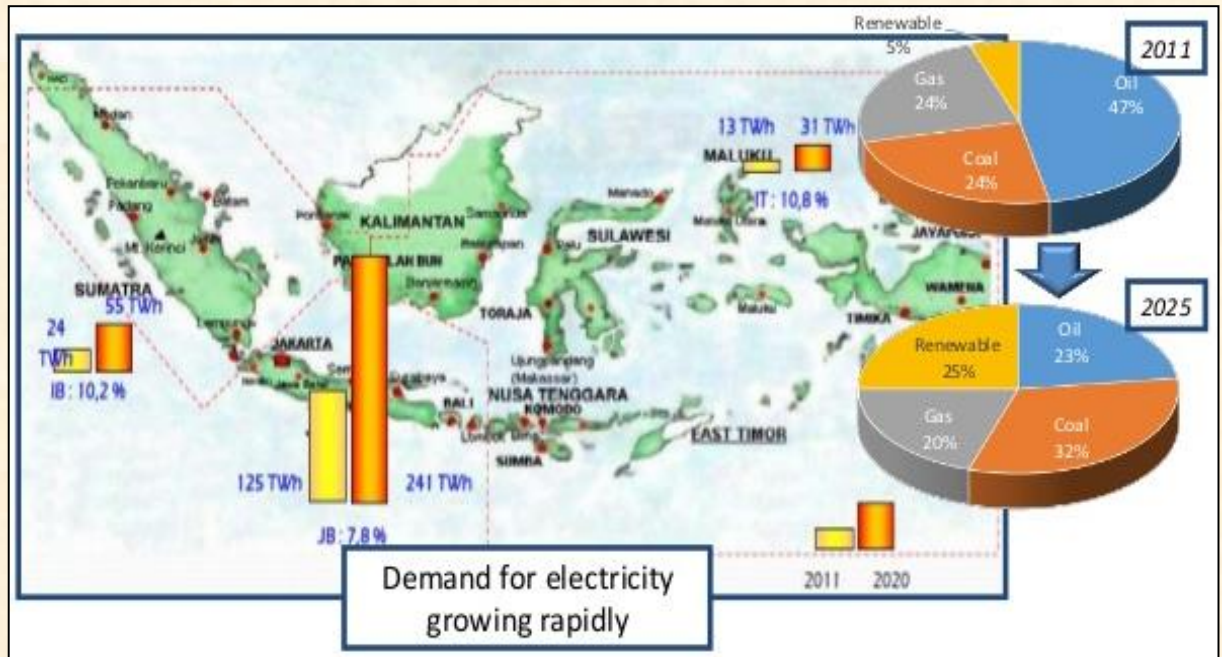
**Management Team:** The founders of this company all are from Asia. They have first hand experiences in Energy sector and also sound academic background to cope technical and business issues.

**Financial Projections :** With total investment 15000000 Euro, Own Financing 40% and Bank Financing 60%. Payback Period 7 years. Main Revenue is Electricity and Ash for soil fertilizer as other Revenue.

**Social Return on Investment :** We are expecting notable improvement in education, earning potential, productivity , better health etc. from access to electricity.

# Background

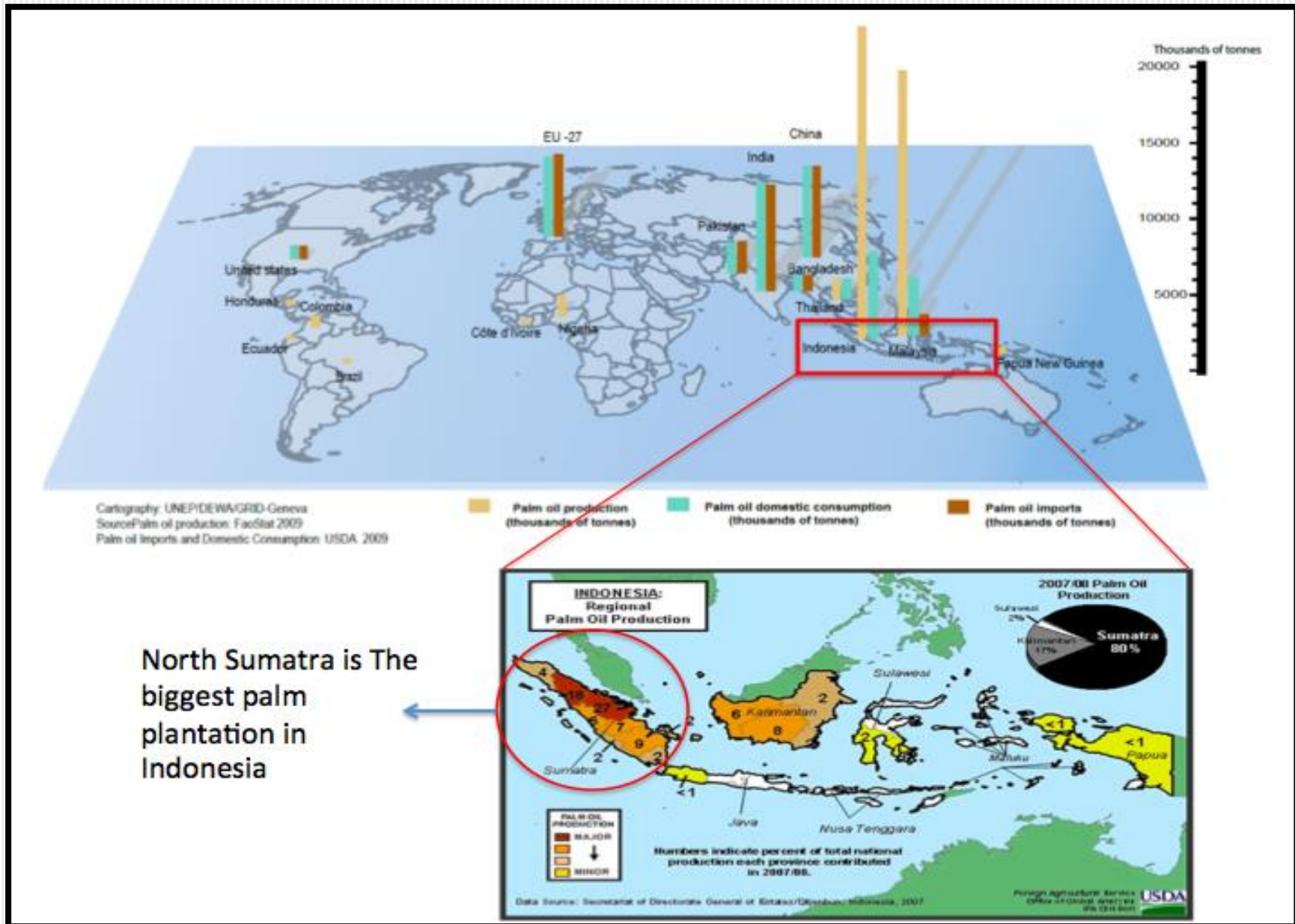
- Indonesia's Positive economic outlook → with average economic growth 7% per year
- Large and expanding market for electricity → Indonesia Electricity use per Capita is 623 KWH/year (lower than average countries). Still huge room of improvement.



Source: GIFT's Global Leader Program , West Java and Jakarta, Oct 2013

- Government support for renewable energy → Feed in Tariff (FIT) Scheme.
- Large and untapped biomass resource → Indonesia has Biggest are of Palm Plantation in the World.
- Energy from Palm waste is relatively new → Business as First mover always give advantage and pioneer for a new business.

# Background



# Project Description

Energy from Palm Waste (Empty Fruit Bunch)

Location: Asahan. North Sumatera, Indonesia

Power Plant Build 9.75 MW using Palm Waste as Fuel sources. Two unit steam turbine power plant. Each capacity 5 MW.

Total investment: 15000000 Euro

Revenue: From selling electricity to National Grid.

Main Revenue → Electricity

Other Revenue → Ash for Soil Fertilizer

# Company Profile

•Name: FAH Power, Ltd

•Stockholders:

- Own State electric company: 2.4 million Euro
- Fadli: 1.2 million Euro
- Amil: 1.2 million Euro
- Habib: 1.2 million Euro

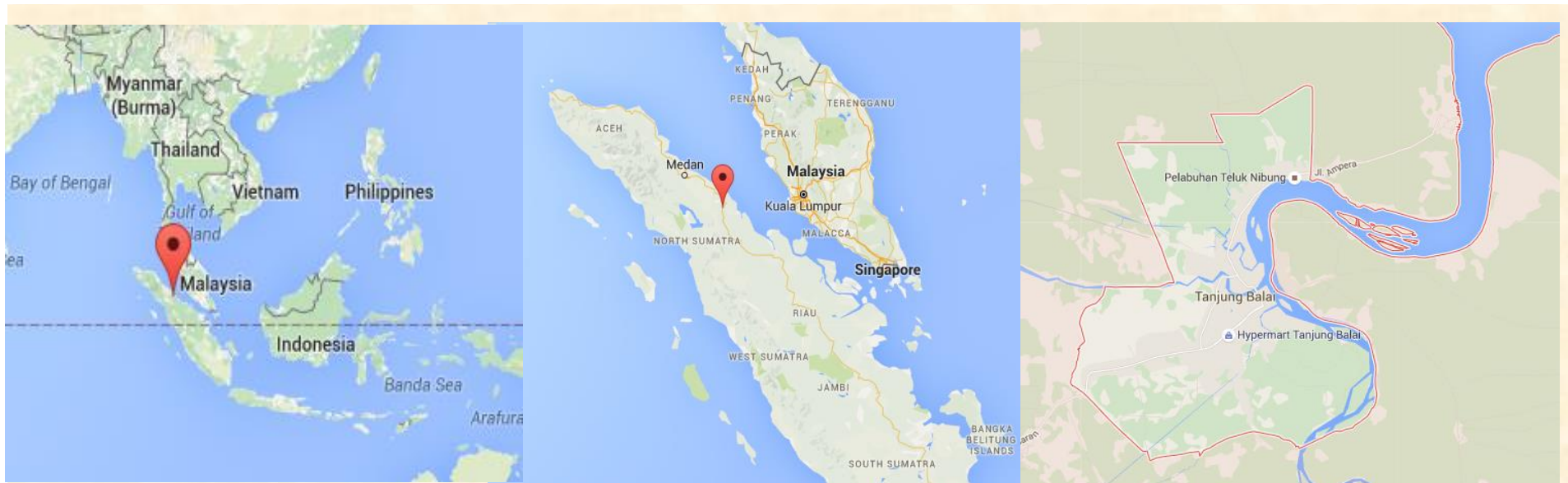
• Minimum Equity to own a limited Company according to UU No. 40/2007 Indonesian Government is 5000 Euro.

• If Business Sustainable, the Company plans to offer Initial Public Offering after 5 years operation. The Fresh equity needed to build new Power Plant.



*Company logo*

# Project Location



*Indonesia*

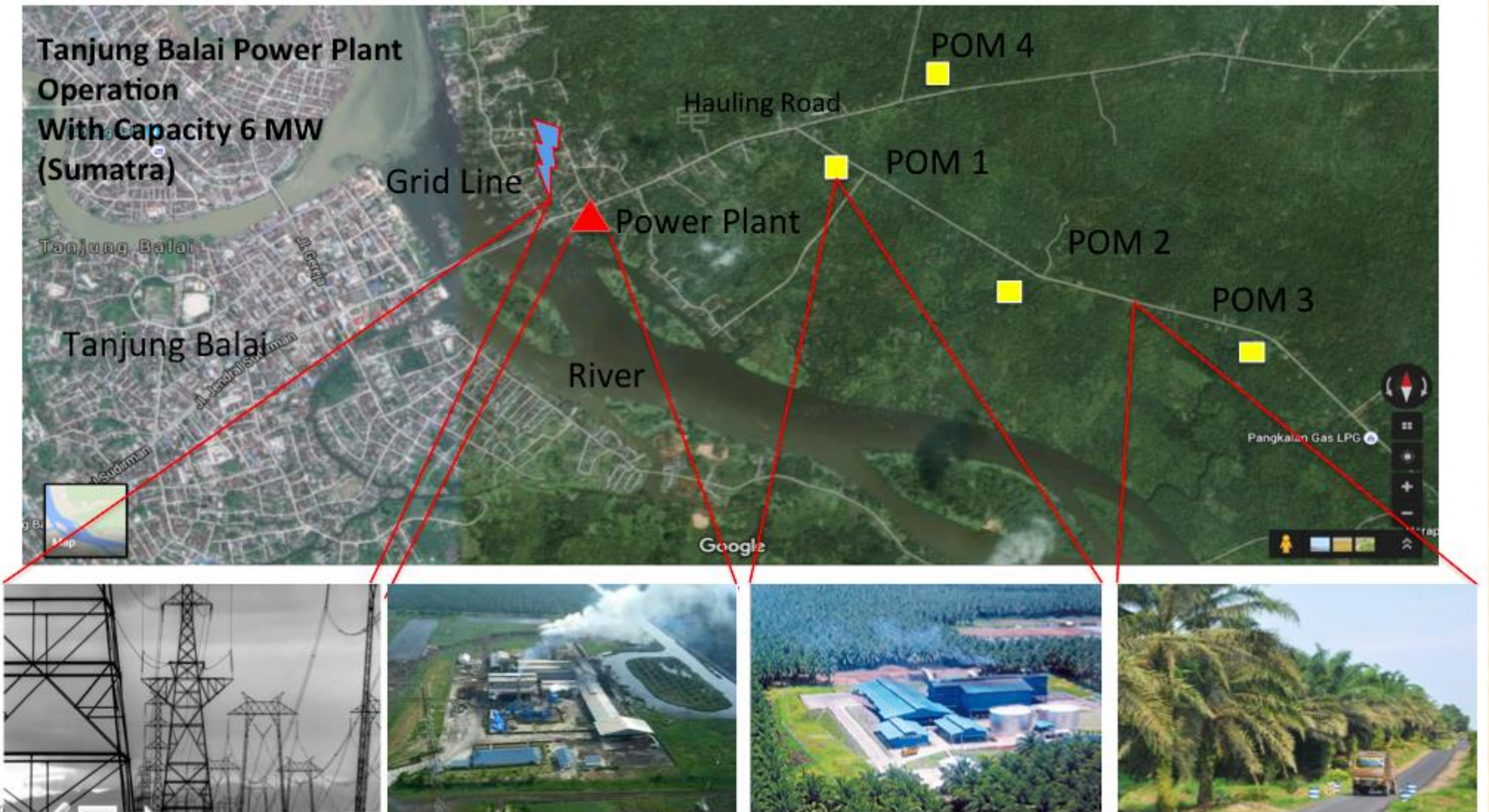
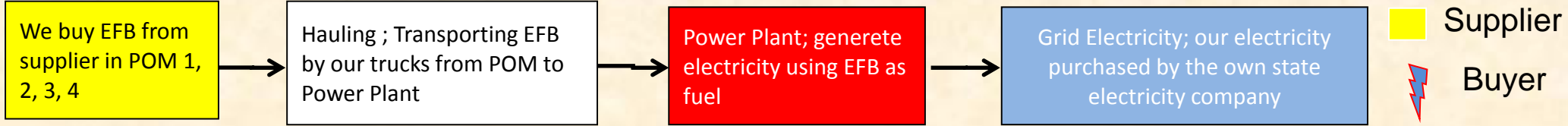
*North Sumatra*

*Project: Beside Asahan River*

- Project Location : Asahan, North Sumatera
- Tanjung Balai as nearest city, home for approximately 700.000 populations. (see Map)
- Distance from nearest city 7 KM. (see Map)
- Asahan River for Power Plant cooling fluid. (see Map)
- Power Plant surrounded by approximately 8 Palm of Oil mills. (radius 50 KM).

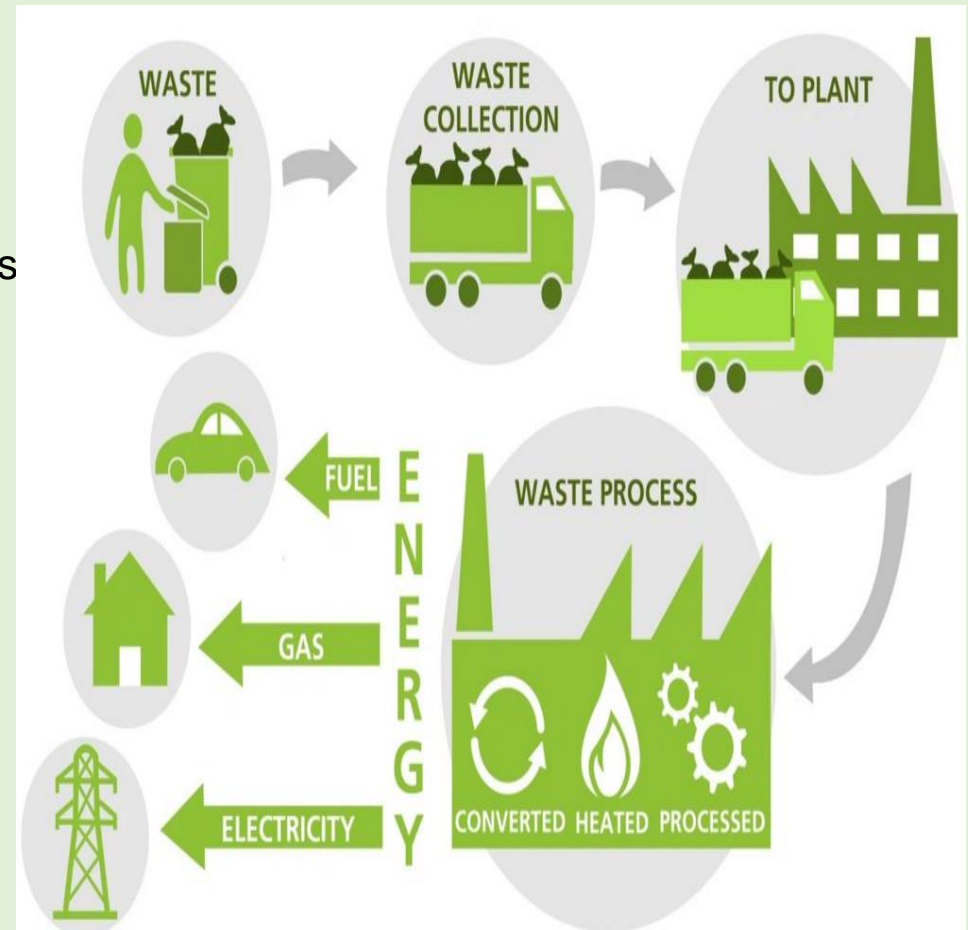


# Business Process



# Production – Why Palm Waste?

- Over 7 million hectares in cultivation
- 500+ Palm Oil Mills in operation
- Estimated 11 GW Potential of Biomass
- FIT price in Indonesia for Biomass (6.5 to 12 cents EUR/KWH), average 9.5 cent EUR/KWH
- The buyer is State Electricity Company
- (contracted 15 years agreement)
- Carbon tax in Indonesia 10 Eur/ton CO<sub>2</sub>
- 0.87 TON CO<sub>2</sub>/MWH



# Production - Palm

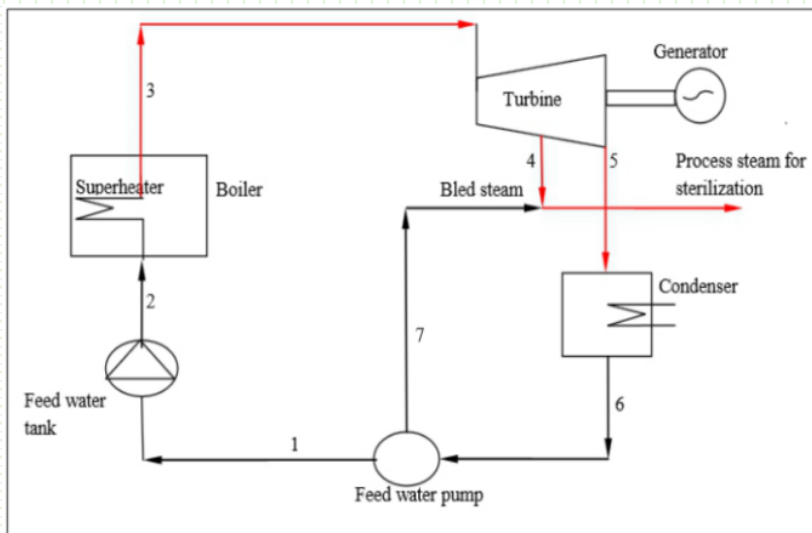


- EFB are a primary waste stream created as the result of palm oil production
- Palm Oil Mills (POM) are enthusiastic about getting rid of what they consider a costly waste stream.

# Production - (Empty Fruit Bunch) to energy



- Typically they dump EFB back in plantations creating areas for pests and fungi that threaten future yields whilst also hampering plantation management



*Schematic diagram of a thermal power plant*

- Energy conversion using thermal power plant scheme with Empty Fruit Bunch (EFB) as Fuel to produce steam.

# Technical Issue - Production

Average Caloric Value Palm Waste/Empty Fruit Bunch (EFB) is 1800 MJ/Ton

Overall Combination of Boiler, Generator and system Efficiency is 30%

Fuels Feed/hour is 6.5 Ton/hour

Energy generated per hour after times by Efficiency 9.75 MW

Challenge of using EFB as fuel : High Moisture content, Hi level of Potassium, clinker at furnace.

Production time 24 hours/day and 365 days/year.

# Production – Business Process

## FLOW PROCESS



## Power Plant



## Grid Line



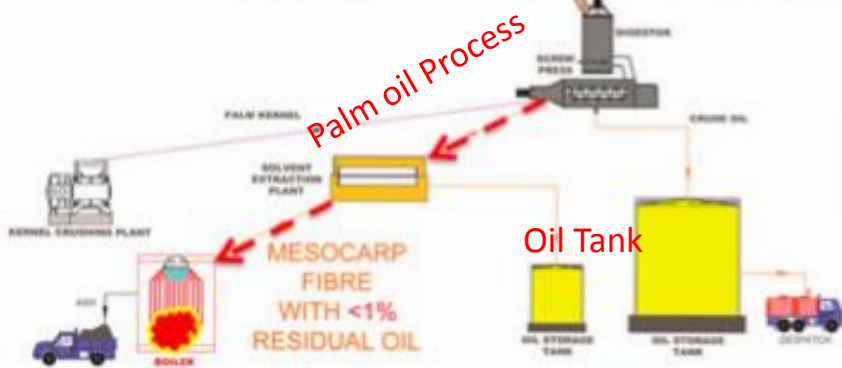
## Dumping



## POM



## EFB



## Hauling



# Risk and Mitigation

<b>Type of Risk</b>	<b>Mitigation</b>
Strategic Risk	Government owning 40% of Company's common stocks. Rigid rule of new competitor
Compliance Risk	Company has fulfilled Indonesia's law
Financial Risk	Company does stress test financial stress test. Worst case and Best case scenario
Raw Material Risk	Purchase raw materials not from one supplier. FAH Power has contract with some of suppliers near from Power Plan
Marketing Risk	According from Indonesia's National Law. Indonesia has only one own state electric company. FAH Power has long term contract with them
Operational Risk	Professional Worker. Scheduled Maintenance
Other Risk	Company insured the asset with national reputable insurance company

# Main Revenue

- Main Revenue → From Electricity Sales
- FIT by Indonesian Government 0.095 EUR/KWH  
(<http://www.iea.org/policiesandmeasures/pams/indonesia/name-43000-en.php>)

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Joule Waste</b>	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010	1.80E+010
<b>Ton</b>	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
<b>Day hours</b>	24	24	24	24	24	24	24	24	24	24	24
<b>Year day</b>	365	365	365	365	365	365	365	365	365	365	365
<b>Efficiency</b>	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
<b>Production rate</b>	50%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
<b>Power produce KWH</b>	42,705,000	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300
<b>Price EUR/KWH</b>	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095
<b>Sales (USD)</b>	4,056,975	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974

## Note:

1. In first year we predict 50% production as there will be many challenges. Later years we predict 93% of a total years hour. We assume approximately two weeks time for each machine maintenance in a year.
2. We have taken 30% plant efficiency.
3. Palm waste supply approximately 6.5 ton per hour.



# Total Other Revenues

. Other Revenue :

→ **From Ash (Soil Fertilizer) Sales)**

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Ton EFB	28,470	56,940	56,940	56,940	56,940	56,940	56,940	56,940	56,940	56,940	56,940
10% Ash	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Ash Ton	2,847	5,295	5,295	5,295	5,295	5,295	5,295	5,295	5,295	5,295	5,295
Ash Price	30	30	30	30	30	30	30	30	30	30	30
Sales (EUR)	85,410	158,863	158,863	158,863	158,863	158,863	158,863	158,863	158,863	158,863	158,863

## Note:

- . Ash contain more Potassium. Very suitable for soil Fertilizer.
- . Selling Price 30 USD/Ton. (<http://corn.agronomy.wisc.edu/Management/pdfs/a3635.pdf>)

→ **From Selling Depreciated Vehicle in 2021**

- . 25% of New Vehicles Price = 25% x 480,000 Euro

# Investment Cost and Depreciation

	Unit Price	Quantity	Total Price	Depreciation years	Depreciation Cost
<b>Fixed Assets:</b>					
- Land	1,000,000	1	1,000,000	0	0
- Building	700,000	1	700,000	20	35,000
Truck	15,000	20	300,000	5	60,000
Excavators	70,000	4	280,000	5	56,000
Inventories	200,000	1	200,000	5	40,000
<b>Plant Component:</b>			0		0
- Turbine and Boiler	2,000,000	1	2,000,000	10	200,000
- Environmental treatment	970,000	1	970,000	10	97,000
- Electrical equipment	2,500,000	1	2,500,000	10	250,000
- Mechanical equipment	3,500,000	1	3,500,000	10	350,000
- Piping and hardware	1,000,000	1	1,000,000	10	100,000
- Water treatment system	750,000	1	750,000	10	75,000
- Other (contingency)	1,500,000	1	1,500,000	0	0
Contractors Fee	300,000	1	300,000	0	0
<b>TOTAL in Euro</b>			<b>15,000,000</b>		<b>1,263,000</b>

# Project Financing

- Total investment 15,000,000 USD
- Financing:
  - Bank : 60% of Total Investment
  - Own : 40% of Total Investment
- Interest Rate → 7% per year
- Loan Period → 10 Years.

Year	Balance of Debt	Interest Rate (%)	Interest Cost Paid (Euro)	Annual Repayment (Euro)
2016	9,000,000	7%	630,000	900,000
2017	8,100,000	7%	567,000	900,000
2018	7,200,000	7%	504,000	900,000
2019	6,300,000	7%	441,000	900,000
2020	5,400,000	7%	378,000	900,000
2021	4,500,000	7%	315,000	900,000
2022	3,600,000	7%	252,000	900,000
2023	2,700,000	7%	189,000	900,000
2024	1,800,000	7%	126,000	900,000
2025	900,000	7%	63,000	900,000

# Labor Cost

- Minimum worker's wage in Indonesia 250 Euro/Month
- 8 hours working each shift

Job Description	Man Power	Salary (Eur/Month)	Month	Salary (Eur/Year)
Operator (Truck and Excavator)	80	667	12	640,000
Top Management	3	3,000	12	108,000
Management	7	2,000	12	168,000
Professional	10	1,333	12	160,000
Administration	20	1,000	12	240,000
Personal Driver	10	400	12	48,000
Security & Helper	10	400	12	48,000
<b>Total Labour Cost (Euro)</b>	140			<b>1,412,000</b>

# Carbon Tax

.Carbon Price in Indonesia → 0.01 EUR/KG CO<sub>2</sub>

(<http://www.thejakartapost.com/news/2014/04/29/carbon-tax-indonesia-time-act-now.html>)

.Carbon produced → 0.8 KG/KWH

([http://www.siame.gov.co/siame/documentos/documentacion/mdl/03\\_VF\\_Bibliografia/Biodiesel/indonesia.pdf](http://www.siame.gov.co/siame/documentos/documentacion/mdl/03_VF_Bibliografia/Biodiesel/indonesia.pdf))

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Carbon Price Euro/KG CO <sub>2</sub>	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Carbon Produced KG/KWH	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Electricity Produced (KWH)	42,705,000	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300
Total Carbon Tax (Euro)	341,640	635,450	635,450	635,450	635,450	635,450	635,450	635,450	635,450	635,450

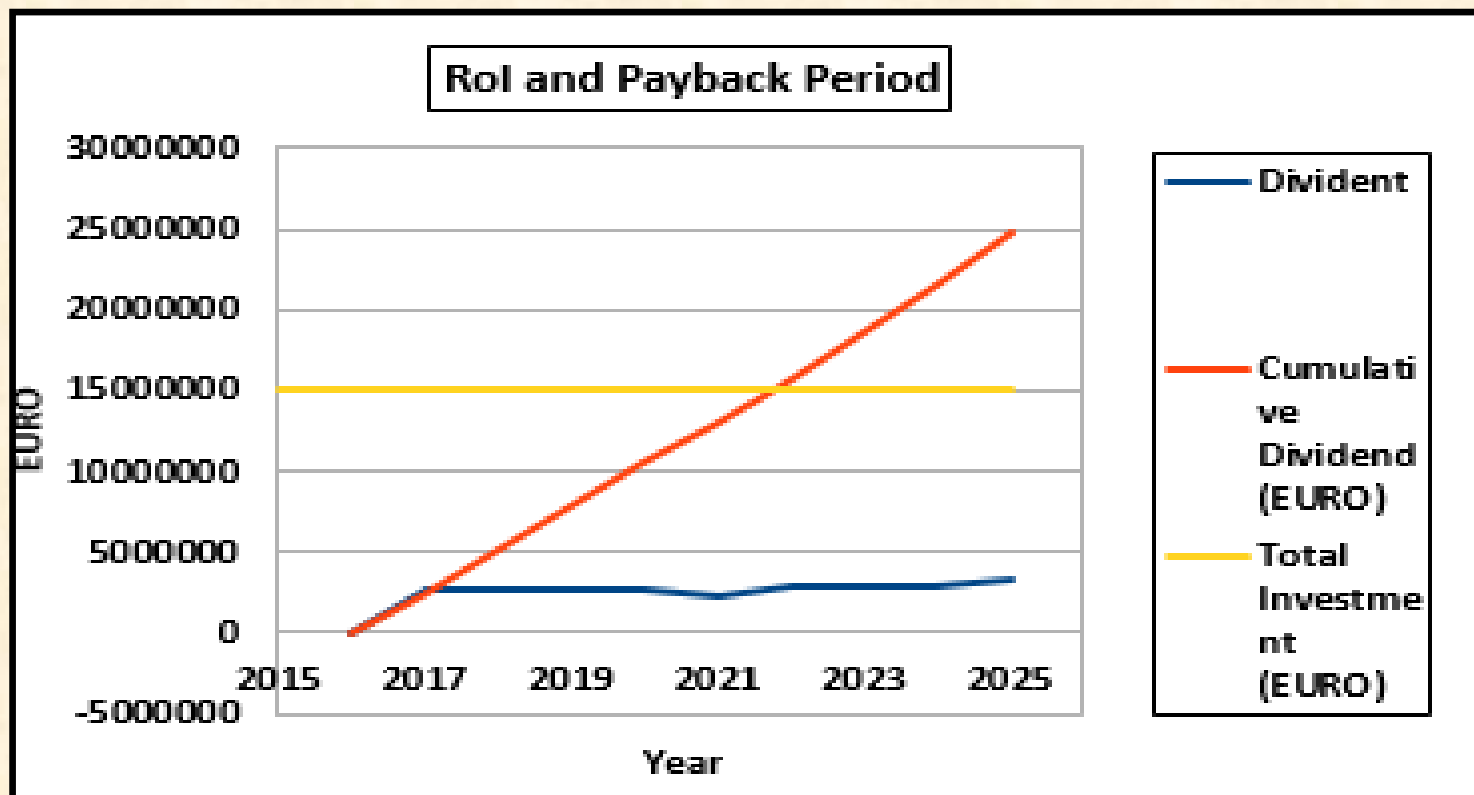
# Cash-flow Statement (Euro)

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Production (KWH)	42,705,000	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300	79,431,300
FIT Price	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095
Revenue from Electricity	4,056,975	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974	7,545,974
Other Revenue	85,410	158,863	158,863	158,863	158,863	278,863	158,863	158,863	158,863	158,863
Depreciation Cost	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000	-1,263,000
<b>Labor Cost</b>	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000	1,412,000
Raw Material Cost	142,350	264,771	264,771	264,771	264,771	264,771	264,771	264,771	264,771	264,771
Operational Cost	1,564,700	1,564,701	1,564,702	1,564,703	1,564,704	1,564,705	1,564,706	1,564,707	1,564,708	1,564,709
Financing Cost	630,000	567,000	504,000	441,000	378,000	315,000	252,000	189,000	126,000	63,000
Carbon Tax	341,640	635,450	635,450	635,450	635,450	635,450	635,450	635,450	635,450	635,450
Administration Cost	202,849	377,299	377,299	377,299	377,299	377,299	377,299	377,299	377,299	377,299
<b>Total Cost</b>	4,293,539	4,821,221	4,758,222	4,695,223	4,632,224	4,569,225	4,506,226	4,443,227	4,380,228	4,317,229
Loss Carrier Forward										
<b>Profit before tax</b>	-236,564	2,724,752	2,787,751	2,850,750	2,913,749	3,255,611	3,039,747	3,102,746	3,165,745	4,241,494
Tax 30%	0	817,426	836,325	855,225	874,125	976,683	911,924	930,824	949,724	1,272,448
Profit After Tax	-236,564	1,907,327	1,951,426	1,995,525	2,039,625	2,278,928	2,127,823	2,171,922	2,216,022	2,969,045
Cash flow (Net Profit + Depreciation)	1,026,436	3,170,327	3,214,426	3,258,525	3,302,625	3,541,928	3,390,823	3,434,922	3,479,022	4,232,045
Repayment Credit	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000
Re-Investing						480,000				
<b>Dividend</b>	126,436	2,270,327	2,314,426	2,358,525	2,402,625	2,161,928	2,490,823	2,534,922	2,579,022	3,332,045

**Total dividend cumulated over 10 years : 22,571,080 Euro**

# ROI and Payback Period

- Total Investment 15 million Euro
- Payback Period 7 years, in year 2022.
- Year 2021, capital expenditure. Vehicle Purchase. 480.000 Euro



# Conclusions

1. Our project is a combined solutions for the farmers, government, business and the habitation.
2. Payback Period is 7 years.
3. This business is relatively new in this region, so we may face some challenges. We have to prepare for that.
4. After few years if we found everything working well and as the supply is high we can even expand our business in this area.
5. The limit for feed in tariff for a power plant is below 10 MW. So initially we limit our production in this range.



# References

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