GEOTHERMAL ENERGY UTILIZATION FOR CROP PROCESSING

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Research on R.E. in

Center for Energy Conversion & Conservation Techn.

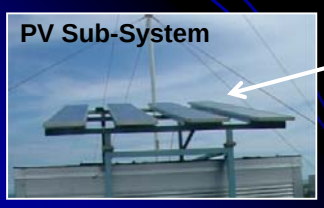
PV - Solar Home System

PV - Isolated Grid

PV - Grid-connected

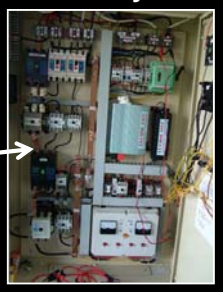
Wind Power Sub-System

Hybrid Power System



PV Sub-System

Control System



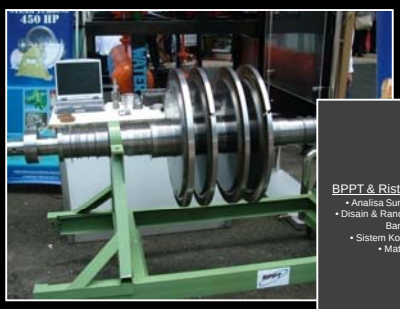
Research on Geothermal Energy in

Center for Energy Conversion & Conservation Techn.

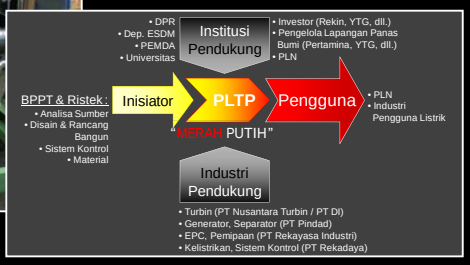
Geothermal Energy Utilization :

1. Electricity → Small Scale Geothermal Power Plant

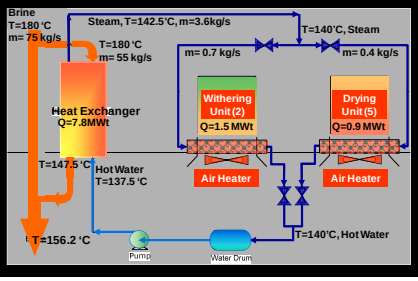
Binary Cycle Tech.



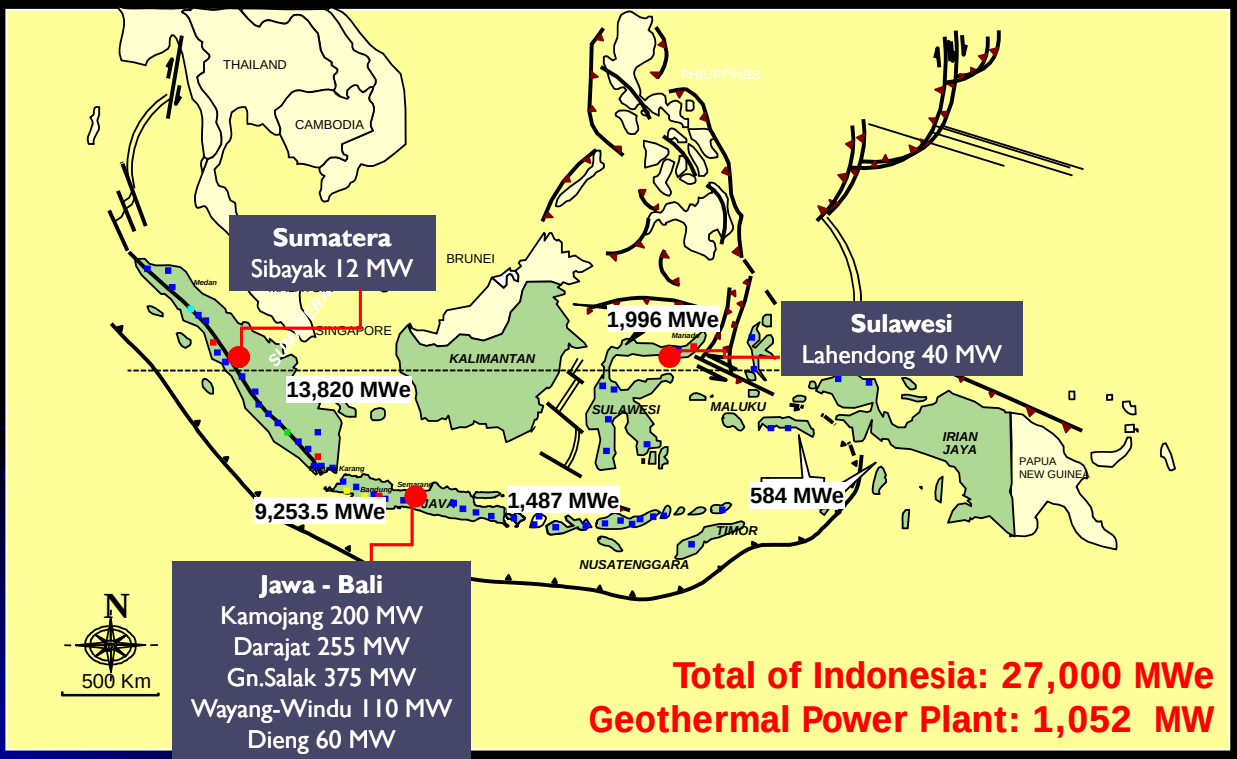
Back Pressure Turbine Tech.



2. Direct Use → Crop Processing, etc.



GEOTHERMAL RESOURCES

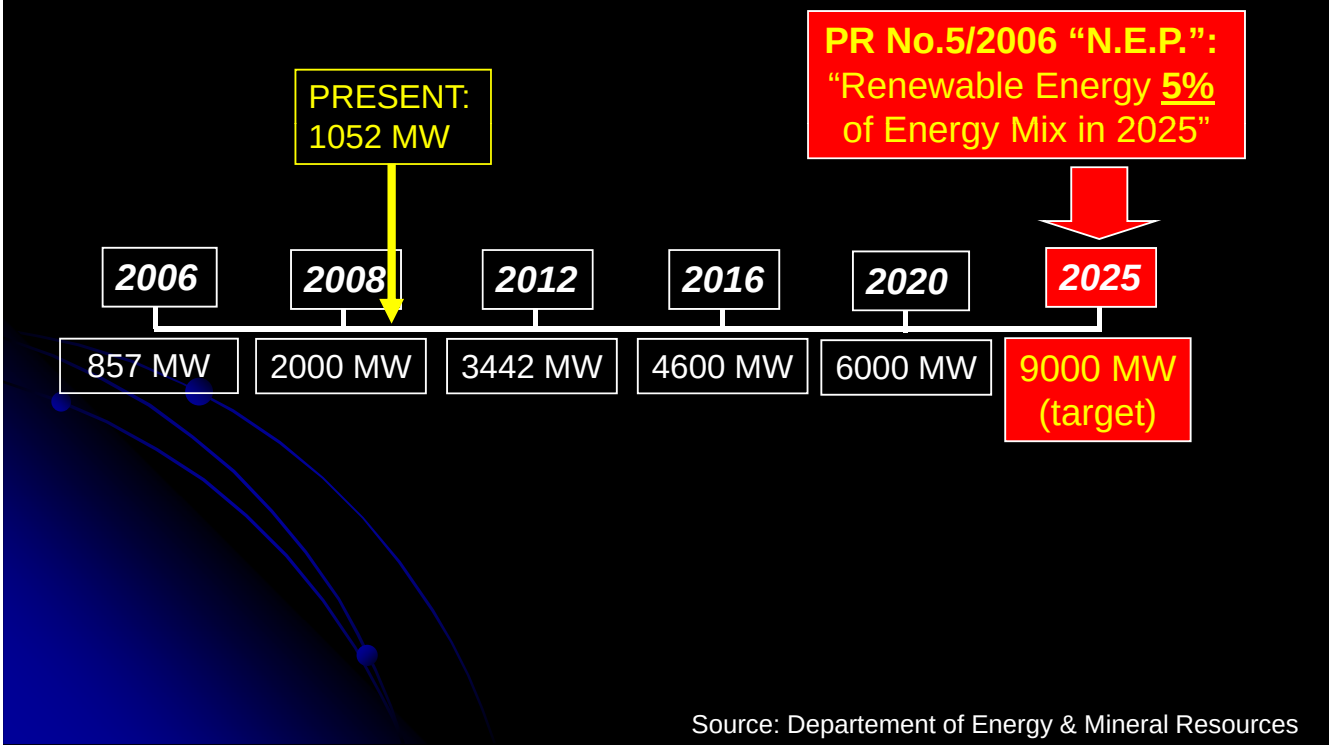


Total of Indonesia: 27,000 MWe

Geothermal Power Plant: 1,052 MW

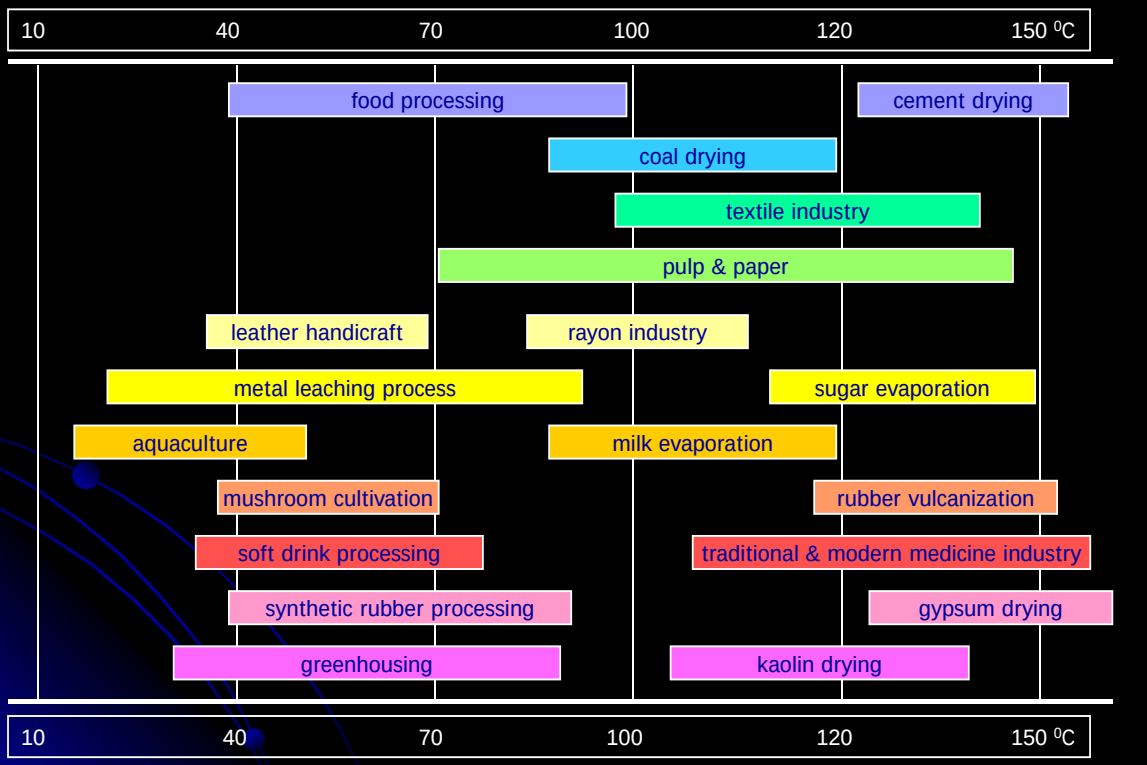
Source: PERTAMINA

DEVELOPMENT ROADMAP



Source: Departement of Energy & Mineral Resources

DIRECT USE APPLICATIONS



(Dickson & Fanelli, 1990)

GEOTHERMAL RESOURCES FOR DIRECT USE

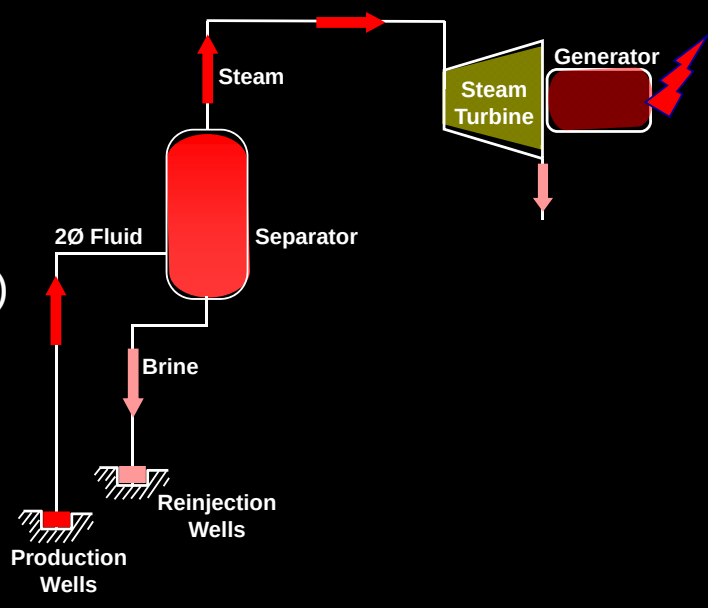
1. Natural geothermal well

2. Shallow geothermal well

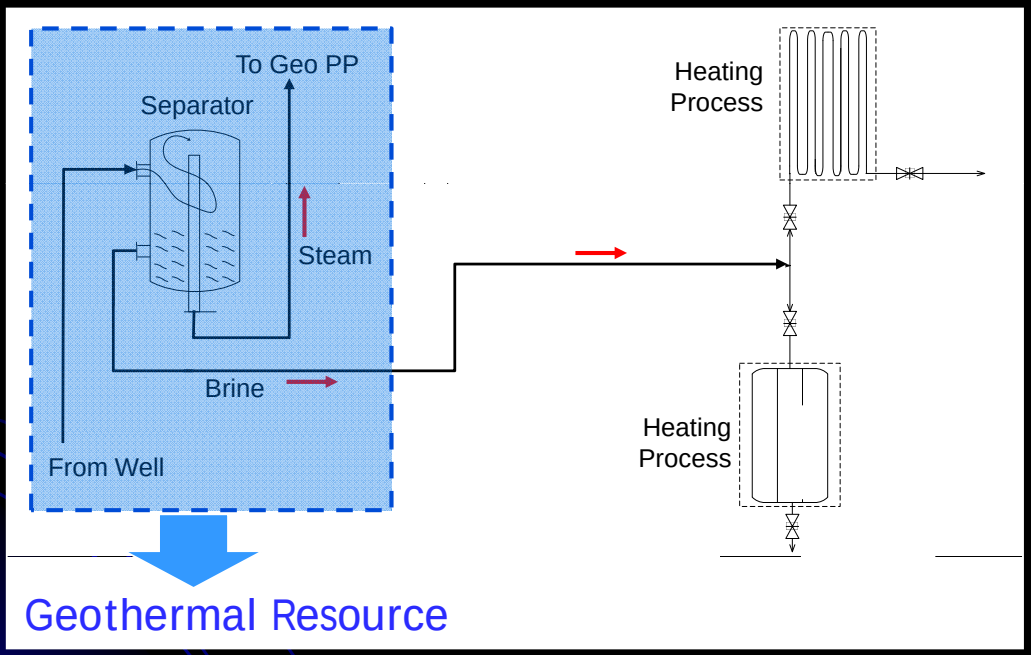
GEOTHERMAL RESOURCES FOR DIRECT USE

3. Small capacity geothermal well

4. Brine (separated hot water)

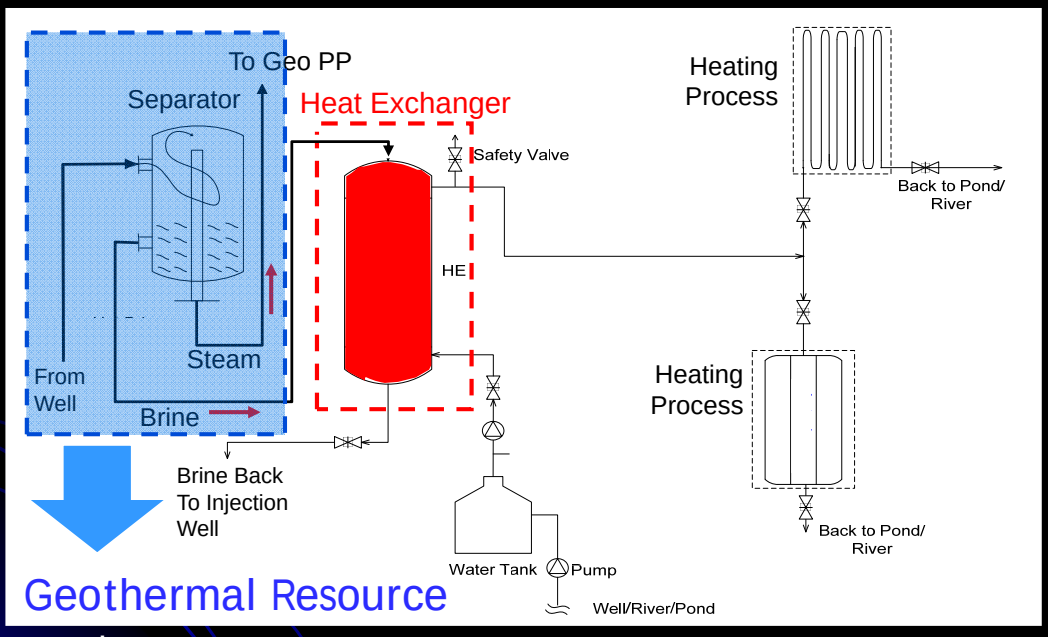


CONCEPT OF DIRECT USE TECHNOLOGY



can be :
- small capacity well
- natural well, etc.

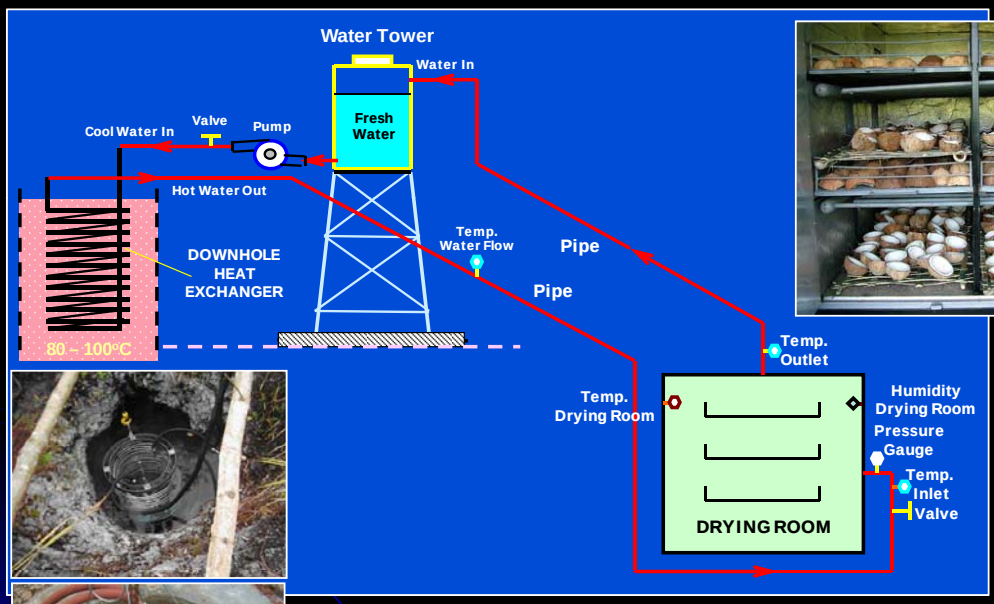
CONCEPT OF DIRECT USE TECHNOLOGY



can be :
- small capacity well
- natural well, etc.

DIRECT USE APPLICATIONS

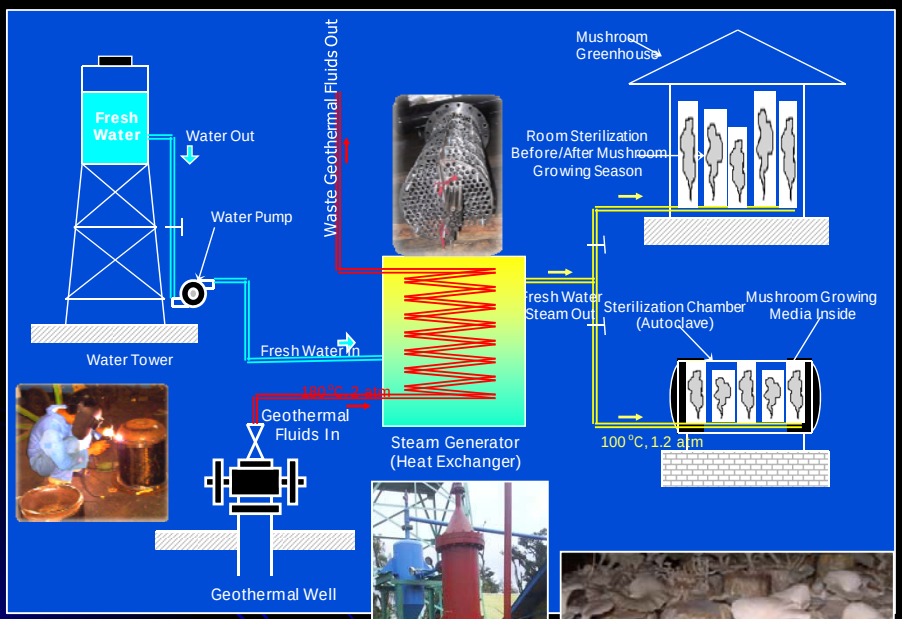
1. Natural/shallow geothermal well for copra/cocoa drying



Lampung Geothermal Field

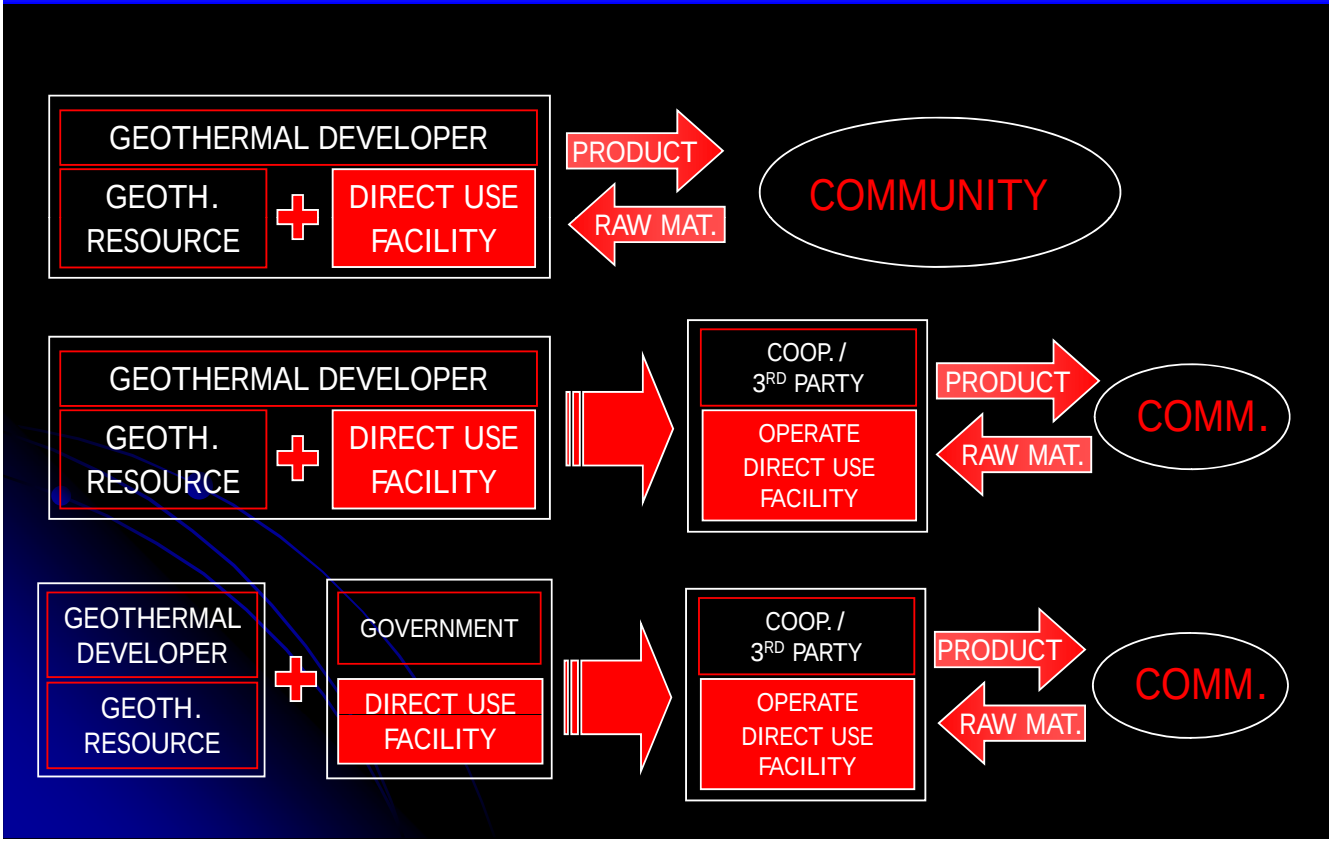
DIRECT USE APPLICATIONS

2. Small capacity geothermal well for mushroom cultivation



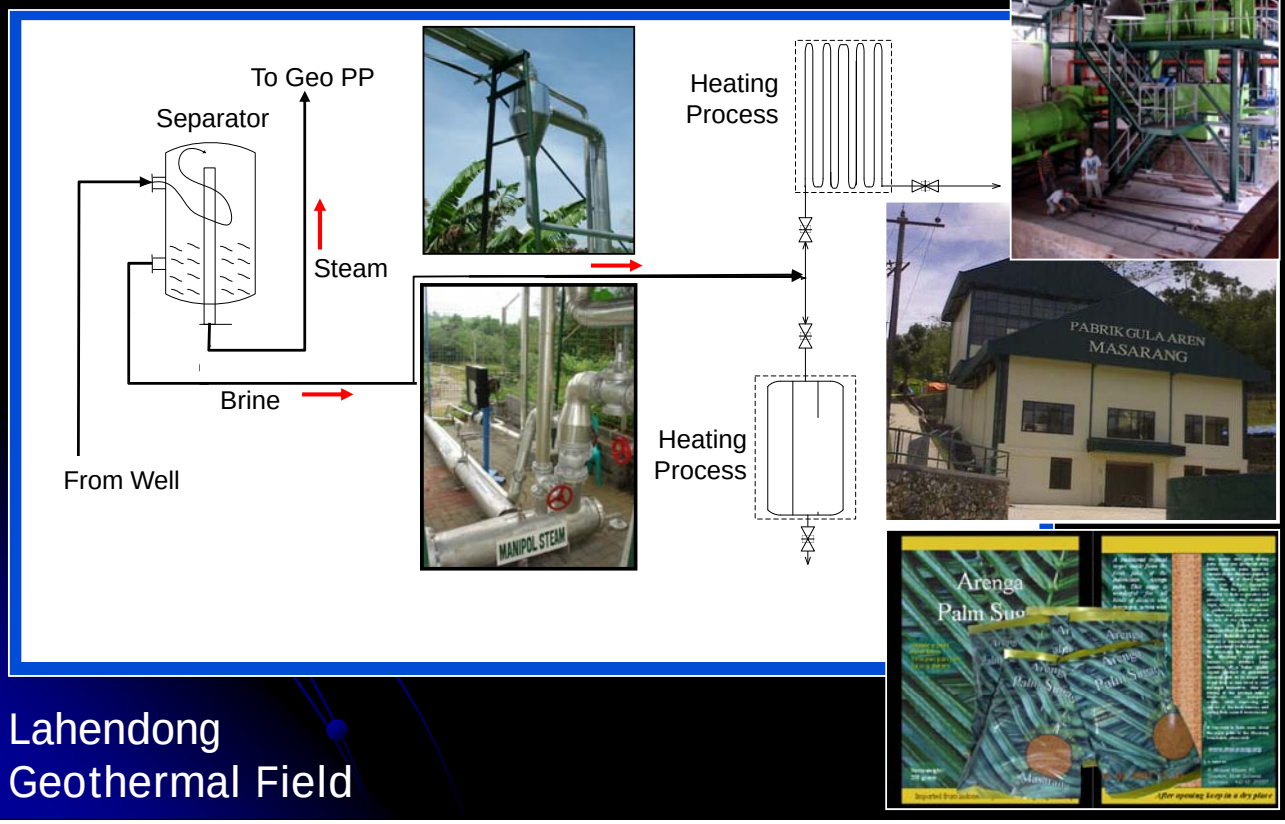
Kamojang Geothermal Field

MANAGEMENT SCHEME FOR COMMUNITY DEVELOPMENT



DIRECT USE APPLICATIONS

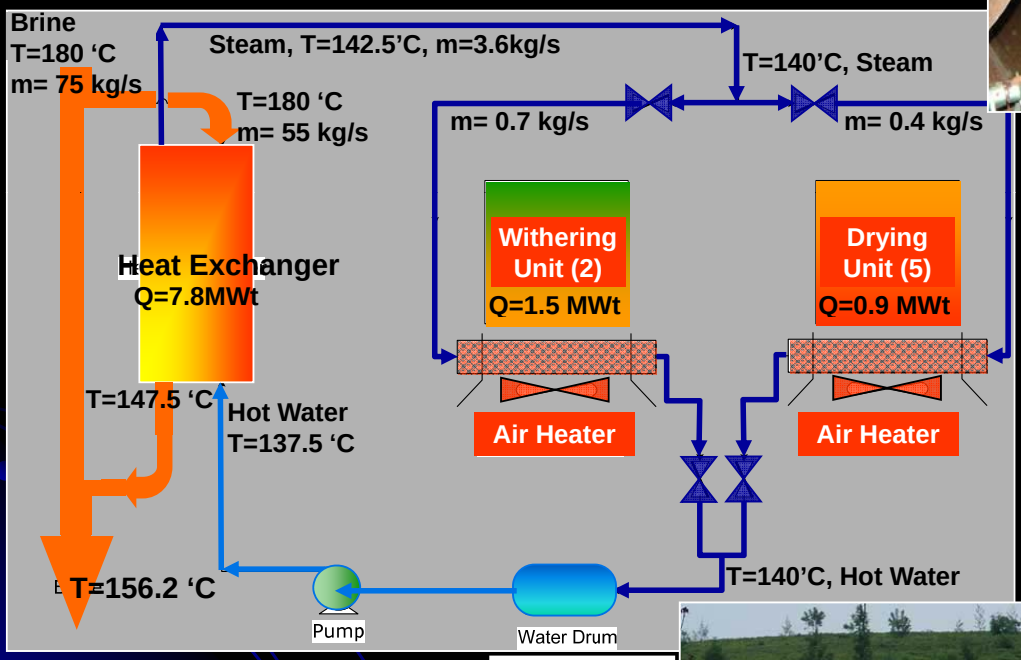
3. Brine for palm sugar processing



Lahendong Geothermal Field

DIRECT USE APPLICATIONS

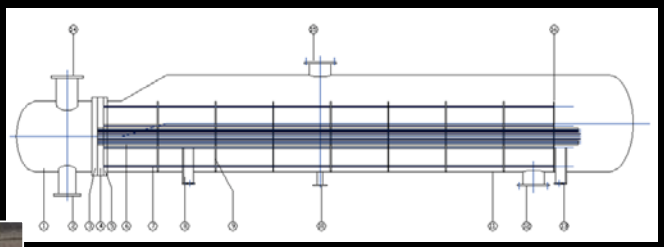
3. Brine for tea drying in PTPN VIII

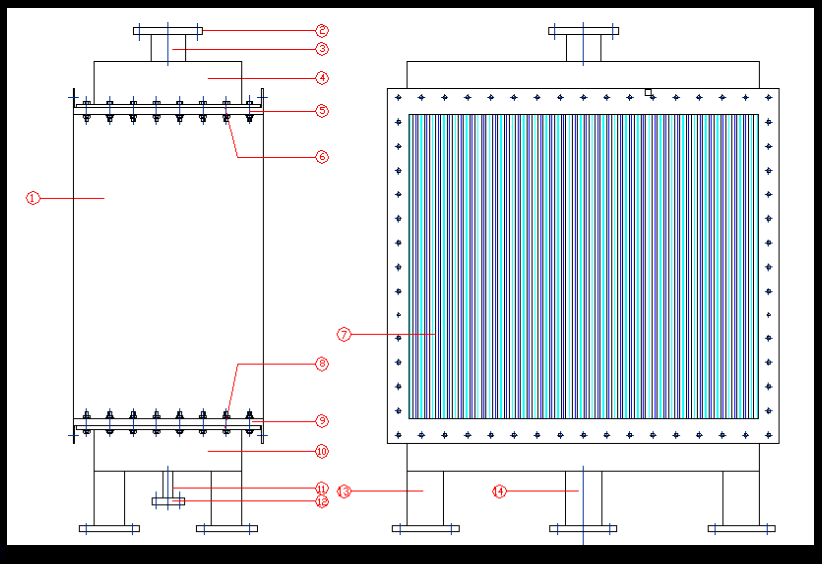


Wayang Windu
Geothermal Field

DIRECT USE APPLICATIONS

3. Brine for tea drying in PTPN VIII





Wayang Windu
Geothermal Field

PERHITUNGAN KEEKONOMIAN

Untuk membandingkan BIAYA ENERGI antara penggunaan IDO dan BRINE
→ Menghitung potensi penghematan SUBSTITUSI IDO

Asumsi :

- Harga *Brine* : 0,2 cent USD/kWh
- Capacity Factor : 70%
- Nilai Tukar Rupiah : 1 USD = Rp.9.500,-

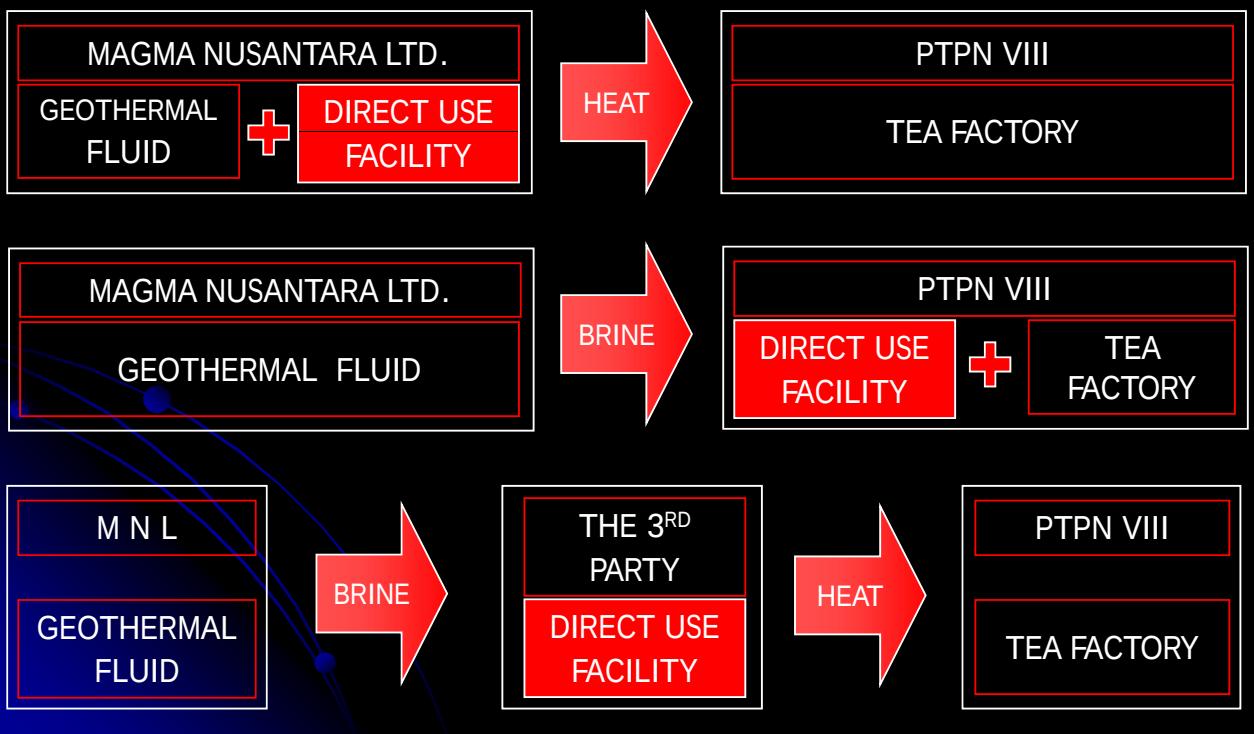
Hasil Perhitungan :

- Produksi Panas : 61.320 MWh
- Biaya Brine : 122.640 USD = Rp. 1.165.080.000,-

Biaya IDO	Biaya BRINE	Penghematan
Rp. 4,5 M	Rp. 1,2 M	Rp. 3,3 M (74%)

BUSINESS SCHEME

BUSINESS - TO - BUSINESS



LESSONS LEARNT

1. Geothermal direct use for crop processing is technologically proven.

2. However, some geothermal developers are still reluctant to apply direct use.

3. It is very important to establish sustainable community based business development model.

RECOMMENDATIONS

1. Geothermal direct use is suitable for non-cash & income-generating community development program.

2. Government regulation on geothermal direct use development (com-dev program, pricing policy, etc.) must be issued soon in order to accelerate the geothermal energy utilization for direct use applications.

THANK YOU

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