



PT Geo Dipa Energi (Persero)



# Geothermal Direct Use in Dieng, Indonesia

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**Asia Clean Energy Forum 2020**





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- **Brief of Dieng Data**
- **Study on Direct Use in Dieng  
(Resources, Market Assessment,  
Challenge and Timeline)**
- **Strategic Values**

# Introduction



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Java Island



1

Located on Indonesia

2

PT Geo Dipa Energi (GDE) is SOE (State-Owned Company) as geothermal developer

3

Project D2P2 initiates on 2019

4

Source of funds for Dieng 2 & Patuha 2 (D2P2) are equity, ADB and CTF

5

Each unit of D2P2 has net capacity 55 MW

6

Dieng Unit 1 already operated since 2002 with generated power 60 MW





# Rationale

Geothermal direct use is the utilization of geothermal energy by using the heat to add value of commodity

Direct use in Indonesia has many challenges so that the progress looks stagnant such as the Masarang palm sugar

These study indicates direct use focused on Dieng due to the feasibility of resources and market

Direct use worldwide implement many viable applications and sustainable O&M such as Blue Lagoon, Iceland

Pre-Feasibility Study for Direct Use Dieng & Patuha finished on March 2019

Dieng area need engagement with the community especially through geothermal related activities



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# Brief of Dieng Area



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Mountainous area located on elevation > 1500 masl, average ambient temperature 14° to 23°C. Lowest at -9 °C on June 2019

Majority livelihood as a farmer, home industries related to agricultural and small medium enterprises related to tourism

Potential agricultural commodity consist of potato, carica, carrot, and herbal roots

Tourism attractive area such as Telaga Warna, Sikidang Crater, Arjuna Temple, Sikunir Hill, etc

Has annual event called Dieng Culture Festival with more than 150.000 visitors in 2019

10 (ten) villages on 2 (two) District relate to the development of expansion unit



# Resources (Geothermal Fluids) in Dieng



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## Manifestation

- 1 Sikidang crater has temperature approx. 90 °C with pH 2-3
- 2 Sileri crater has temperature approx. 80 °C with pH 6
- 3 Siglagah spring has temperature 70 °C with pH 6-7
- 4 Sipandu spring temperature approx. 80 °C with pH 6-7
- 5 Bitingan spring temperature approx. 65 °C with pH 6-7

## Waste Heat\*

### Most attractive

- 1 Brine from outlet separator T= 180 °C
- 2 Condensate from power plant

## Drilling Well

- 1 Not applicable

\* means normally the fluids injected through injection wells





# Market Assessment (Heater for Homestay)



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Random sampling from more than **30 homestay**

Majority of homestay has **5-10 rooms**, approx.30% of the homestay has more than 10 rooms

Currently using **LPG as energy source** for heater with estimated 8 kg/month/room equal to Rp 100.000

Potentially use the heat from geothermal fluids and transferred to fresh water for space heating and water heating.



# Market Assessment (Agricultural Processing)



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Dieng has massive production of potato and carica.

Findings on medium enterprises which process potato and carica

Currently using LPG as energy source for boiling or drying the food with estimated

Final product estimated

Wonosobo District produce  
**300 ton/year**

**8** Small Medium Enterprises

**9 - 600** kg/month

**0.5 - 5** ton/month





# Proposed Programme



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## Priority Programme

Based on Pre-FS which is technically acceptable & financially viable

1. Homestay (space and water heating)
2. Balneology / pools
3. Agroindustry (Carica Processing)

## Other Ideas

To be considered

1. Greenhouse
2. Coffee drying



# Result of Pre FS Direct Use



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No	Sector	Business	Purposes	Demand	Target	Financial	
1	Tourism	Hotel/Home stay	Space heating and water heating	Fresh warm water with T= 50 – 60°C	Hotel/Home stay/Home	<div>TOTAL CAPEX 0.46 M USD</div> <div>IRR 22%</div> <div>PBP 11 years</div>	Proposed thermal tariff 0.51 cent USD/kWt
2	Tourism	Balneology/Swimming pool/Spa	Water heating	Fresh warm water at T= 40 – 50°C	Cooperation with tourism	<div>TOTAL CAPEX 0.28 M USD</div> <div>IRR 25%</div> <div>PBP 8 years</div>	Proposed thermal tariff 0.36cent USD/kWt
3	Industry	Processed Candied Carica	1. Blanching	Blanching temperature 82°C-93°C for 3-5 minutes	Carica production for Wonosobo and SME	<div>TOTAL CAPEX 0.49 M USD</div> <div>IRR 22%</div> <div>PBP 9 years</div>	Proposed thermal tariff 0.75 cent USD/kWt
			2. Soaking	Hot water/air to maintain sugar solution at 60 - 65°C			
			3. Sterilization	Air/water T= 121°C for 15 minutes			
		Processed for skincare	1. Drying 2. Mixing	1. Hot air with T= 55°C 2. Hot air with T= 70°C	Cooperation with NZ government		



# Challenges



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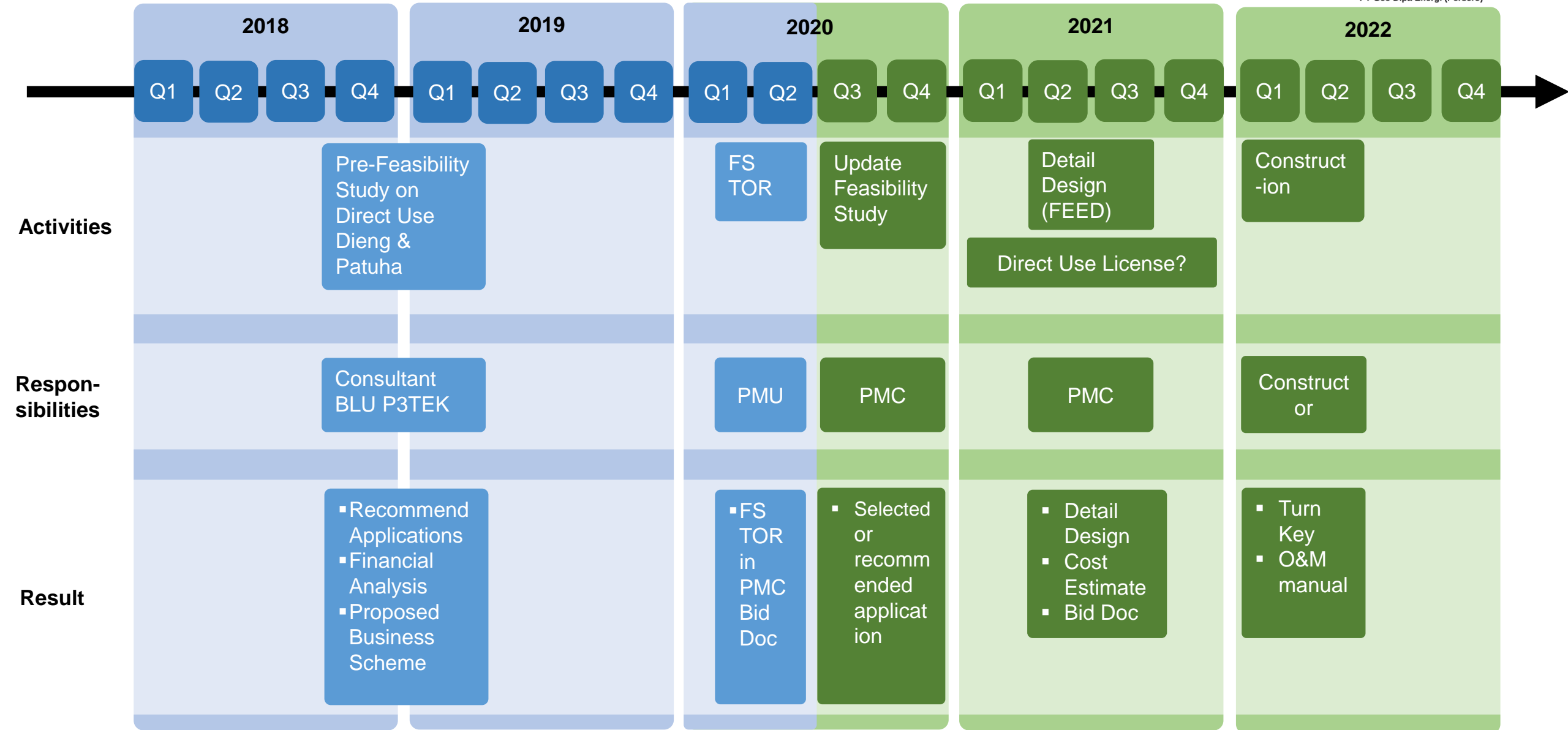
- 1 Cooperation scheme with local government or enterprises
- 2 To be confirmed about the Direct Use License (Ijin Pemanfaatan Langsung / IPL) from Ministry of Energy and Mineral Resources or other related license document as per regulation
- 3 Communication to community (acceptance)
- 4 Sustainable Operation and Maintenance (O&M) which is not interfere the power plant



# Timeline



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# Strategic Value

## Society

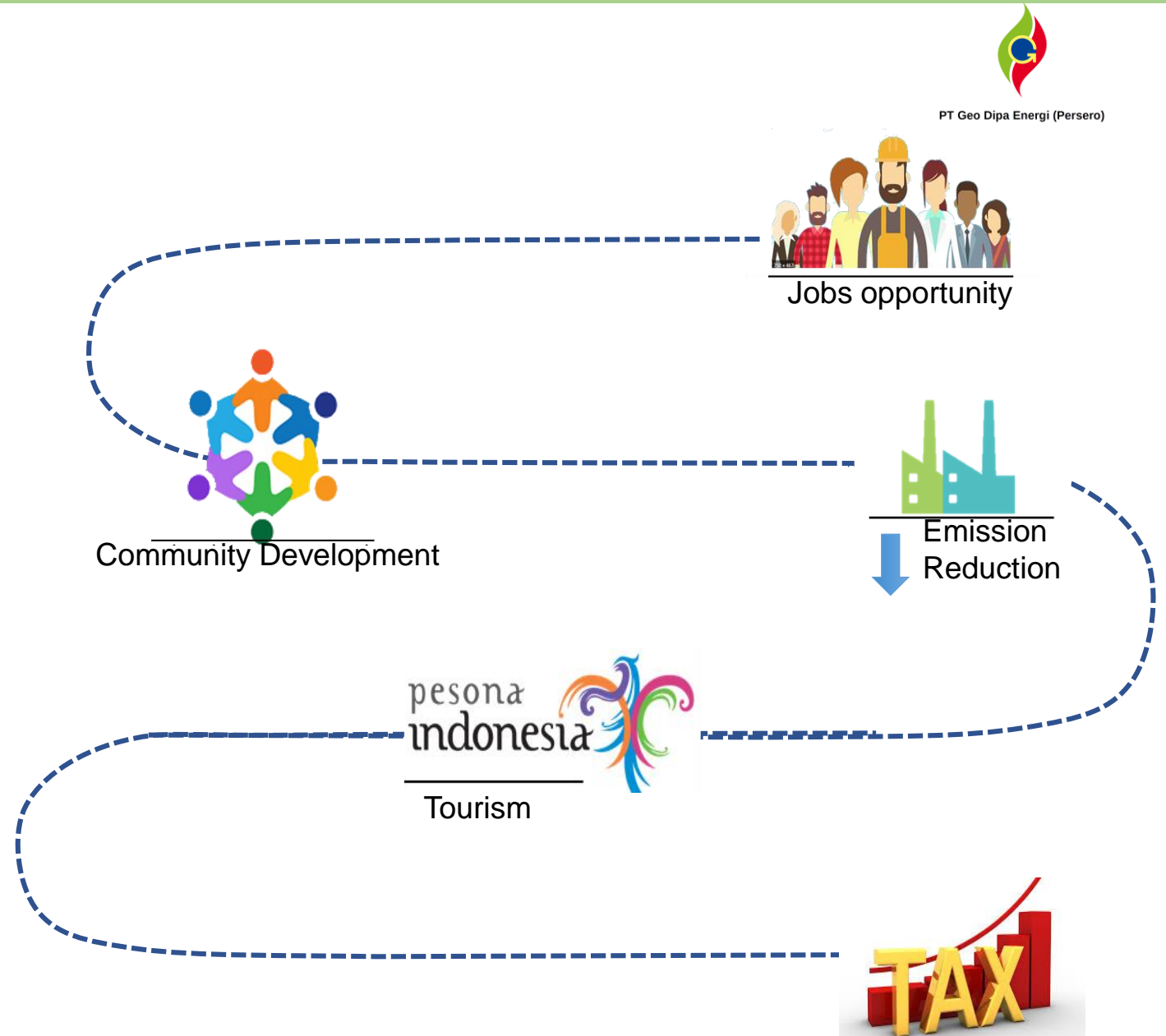
- Effected to economical of surrounding society by the increasing the job opportunity which may affect the prosperity and purchasing power
- Enhance the sense of belonging of geothermal to the society

## Environmental

- The utilization of geothermal will decrease fossil fuel utilization
- Increasing the National Determined Contribution in greenhouse gas emission (Paris Agreement)

## Government

- Synergy with local government to optimize the utilization of geothermal especially direct use
- By the increasing of tourism may has multiplier effect to economic sector also affect the tax increases
- To be discussed as per regulation





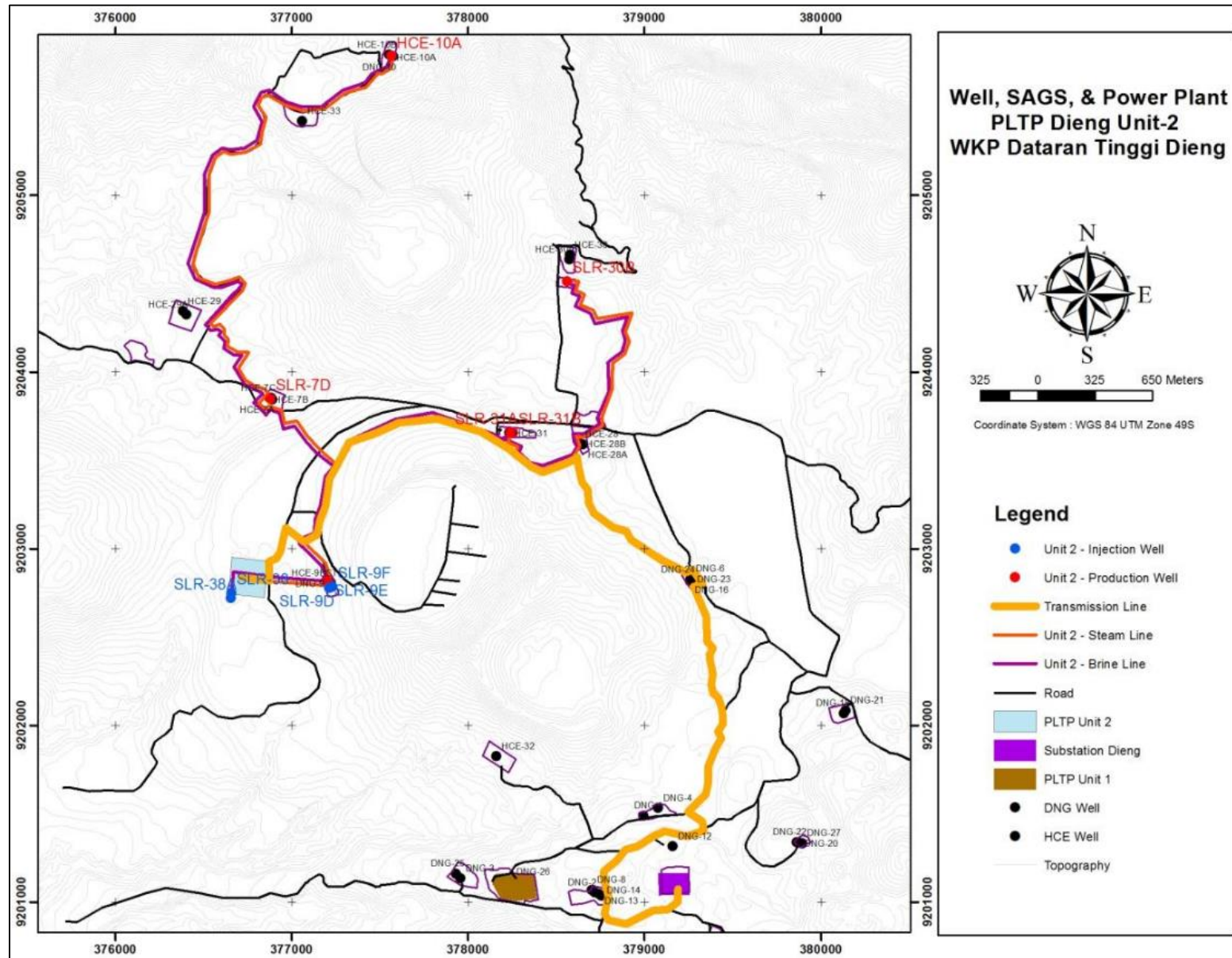
**Thank you**



# Layout of Dieng



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Well pad (Separator)



Power Plant

# Lindal Diagram

