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Targets for development

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Geothermal Capacity Building Program Indonesia - Netherlands



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1 INTRODUCTION

1.1 BACKGROUND

Work package 3 focuses on the use of low and medium enthalpy geothermal energy (up to 200°C). One important application is direct use: geothermal heat is used directly for heating purposes. The main advantage is that the energy efficiency is very high. Next to direct use, the geothermal heat can also be used for cooling (by using sorption cooling machines) or electricity production (by using ORC-like technology). In this report, a list of promising targets will be identified. The focus of the study is on West-Java. Lessons learned can be used in other areas of Indonesia as well.

1.2 METHODOLOGY

To select the most promising targets, the steps below are followed. Each step will be discussed in more detail.

1. Resource assessment
2. Market survey
3. Rank targets
4. Select targets

1.2.1 Resource assessment

In the resource assessment, availability of geothermal heat sources in West Java is studied. Heat sources studied are surface manifestations, sedimentary basins and geothermal waste heat. The results of the resource assessment can be found in the Geocap report “WP 3.01 – Resource assessment”.

1.2.2 Market survey

In the market survey, the market potential is studied. To do so, the potential heat sources identified in the resource assessment are used as a starting point. For each heat source, the surrounding area is studied for suitable markets. Also, the heat demand and the heat sources are matched, based on temperature and distance. The result is a list of promising targets. The list is repeated in paragraph 2.1. More details on the market survey can be found in the Geocap report “WP 3.02 – Market Survey”.

1.2.3 Rank targets

The list of potential targets are ranked. More details can be found in paragraph 2.2.

1.2.4 Select targets

The most promising targets are selected. Selected targets will be studied in more detail within the Geocap programme. More details can be found in paragraph 2.3.

2 TARGET SELECTION

2.1 LIST POTENTIAL TARGETS

In WP 3.02 - Market survey, a list of potential targets were determined. The table below gives an overview.

Table 1: Potential targets in West Java

No	Demand		Source	
	Company/region	Type	Location	Type
1	PO Gunt	Soya Powder	Gunung Salak	Geothermal waste heat
2	PO Sawargi	Choco Powder	Kawah Kamojang/Hujan	Surface manifestation
3	PO Karya Mulya	Jams	Kawah Kamojang/Hujan	Surface manifestation
4	CV Tepung Hoenkwe Cap Boenga	Flour	Gunung Salak	Geothermal waste heat
5	PO Wali Songo	Dried Mango	Gunung Salak	Geothermal waste heat
6	CV Glisindo	Soya Powder	Kawah Kamojang/Hujan	Surface manifestation
7	PT Tirta Fresindo	Minuman berkarbonasi	Gunung Salak	Geothermal waste heat
8	PT Satya Sumba Cemerlang	Textile	Kawah Kamojang/Hujan, Wayang Windu	Surface manifestation, Geothermal waste heat
9	PT Bintang Indospin Industri	Textile	Kawah Kamojang/Hujan	Surface manifestation

No	Demand		Source	
	Company/region	Type		Company/region
10	PT Sejahtera Bintang Abadi Textile	Textile	Kawah Kamojang/Hujan, Wayang Windu	Surface manifestation, Geothermal waste heat
11	PT Tribintang Lokawarna, Laswi, Bandung	Textile	Kawah Kamojang/Hujan	Surface manifestation
12	PT Pavettia Atsiri Indonesia	oil	Gunung Salak	Geothermal waste heat
13	PT ISAM Bandung	Milk	Wayang Windu	Geothermal waste heat
14	Amerta Indah Otsuka (Pocari Sweat)	Isotonic Drink	Gunung Salak	Geothermal waste heat
15	Indolakto	Milk	Gunung Salak	Geothermal waste heat
16	Asia Sejahtera Perdana Pharmaceutical (Kratingdaeng)	Energy Drink	Wayang Windu	Geothermal waste heat
17	PT Djojonegoro C- 1000	Vitamin Healthy Drink	Gunung Salak	Geothermal waste heat
18	Yakult Indonesia Persada	Fermented Milk	Gunung Salak	Geothermal waste heat
19	Patuahwatte tea PT Indorub Sumber Wadung	Black Tea	Patuha	Geothermal waste heat
20	PTPN VIII Sinumbra Unit	Black Tea	Patuha	Geothermal waste heat
21	PT. Indofood Asahi	Beverage	Gunung Salak	Geothermal waste heat

No	Demand	Source		
	Company/region	Type	Location	Type
22	PTPN VIII Kertamanah Unit	Black Tea	Wayang Windu	Geothermal waste heat
23	Samarang Vetiver Oil	Vetiver oil	Kamojang	Geothermal waste heat
24	PTPN VIII Malabar Unit	Black Tea	Wayang Windu	Geothermal waste heat
25	Parakan Salak	Black Tea	Gunung Salak	Geothermal waste heat
26	Dairy company Bogor	Heat demand	West Java Basin	Sedimentary basin
27	Jababeka Industrial Estate	Multiple heat demand	West Java Basin	Sedimentary basin
28	Karawang International Industry City	Multiple heat demand	West Java Basin	Sedimentary basin
29	Cisolok Cisukarame	Electricity	Cisolok	Surface manifestation

2.2 RANKING POTENTIAL TARGETS

In WP 3.02 - Market survey, the potential targets were determined, based on temperature match and distance. Also, the capacity was determined. The targets are ranked, based on the ratio of distance and power. Table 2 gives an overview. The number corresponds to the number in Table 1.

Table 2: Ranking potential targets

Ranking	No	Source	Distance	Capacity	Capacity/Distance
[-]	[-]	type	[km]	[kW]	[kW/km]
1	26	Sedimentary basin	0,5*	4,800*	9.600
2	27	Sedimentary basin	1,0**	3.000**	3.000
3	28	Sedimentary basin	1,0**	3.000**	3.000
4	15	Geothermal waste heat	13	2.941	226
5	18	Geothermal waste heat	13	1.783	137
6	13	Geothermal waste heat	9	948	105
7	19	Geothermal waste heat	3	170	57
8	29	Surface manifestation	2,0***	100***	50
9	21	Geothermal waste heat	13	642	49
10	22	Geothermal waste heat	4	175	47
11	23	Geothermal waste heat	6	281	47
12	25	Geothermal waste heat	6	213	35
13	20	Geothermal waste heat	5	170	34
14	16	Geothermal waste heat	20	412	21
15	17	Geothermal waste heat	13	192	15
16	14	Geothermal waste heat	13	189	15
17	24	Geothermal waste heat	14	114	8,1
18	10	Surface manifestation	13	88	6,9
19	7	Geothermal waste heat	15	59	4,0
20	9	Surface manifestation	16	38	2,3
21	8	Surface manifestation	10	12	1,1
22	2	Surface manifestation	7	4,2	0,6
23	11	Surface manifestation	12	6,5	0,6
24	4	Geothermal waste heat	13	1,9	0,1
25	3	Surface manifestation	12	1,6	0,1
26	6	Surface manifestation	13	0,2	0,0
27	12	Geothermal waste heat	20	0,2	0,0
28	5	Geothermal waste heat	18	0,0	0,0
29	1	Geothermal waste heat	20	0,0	0,0

* Real data is confidential, therefore data on capacity is changed

** This is an industrial area. No information is available on capacity. Assumptions are made for distance and capacity.

*** This is Electrical capacity, transforming heat into electricity using ORC-technology. Assumption is made for distance to connect to the grid.

2.3 TARGET SELECTION

The ranking table (Table 2) gives a first indication about which targets look interesting. Distance and capacity however are not the only reasons to consider. There are a lot of other factors, of which many will be case specific, like involved stakeholders, local regulations, protected areas etc. To maximize the learning effect, it is good to select a mixture of applications, varying type of heat source, type of demand and capacity. The selected targets are shown in Table 3. An explanation on each selected target is given after the table.

Table 3: Selected targets

No	Demand	Demand	Source	Capacity
[-]	Company/region	Type	type	[kW]
26	Dairy company Bogor	Heat	Sedimentary Basin	4,800
27	Jababeka	Heat	Sedimentary Basin	3,0000+
23	Samarang Vetiver oil	Heat	Geothermal waste heat	280
22	PTPN VIII Kertamanah	Heat	Geothermal waste heat	175
29	Cisolok/Cisukarame	Electricity	Surface manifestation	100

2.3.1 Dairy company Bogor

There has been direct contact with a dairy company in Bogor. In the milk industry, a lot of heat is required for all kinds of processes. In this case, heat was generated using gas, and the company was willing to share data. The West Java Basin could be used as a heat source. Because the availability of the data and heat source, this is a good case to work out in more detail in a quick scan (WP 3.06).

2.3.2 Jababeka Industrial Estate

Jababeka Industrial Estate has a high density of large scale industry. A lot of industry will require heat. Also, there is good potential for the West Java Basin, making this area very interesting for direct use of low/med enthalpy geothermal heat. No detailed data is available yet, making it difficult to perform a quick scan. Because of the potential of the location, companies on Jababeka will be contacted to participate in the second workshop (WP 3.05). In the second workshop, the possibilities for direct use will be studied.

2.3.3 Samarang Vetiver oil

The Vetiver Oil production of Samarang has a limited heat demand. The impact of such a project would be limited, but if this project can be successful, the repeatability will be high. It

is expected that in Indonesia there will be many small scale production locations like the one in Samarang. A quick scan will be made.

2.3.4 PTPN VIII Kertamanah

PTPN is a state owned tea company. They use a lot of heat for drying tea leaves. They have many locations, of which some are situated near geothermal power plants. This makes it an interesting case to study, with a good repeatability for the rest of Indonesia. A quick scan will be made. Also, stakeholders of this potential project will be invited for the second workshop.

2.3.5 Cisolok – Cisukarame

Cisolok has very high temperature hot springs. The heat demand in the region is yet unknown. However, using new ORC technology, hot spring heat could be converted into electricity. Electricity from the grid will very muck likely be cheaper, but this is still an interesting case to study for several reasons. One reason is that, to encourage geothermal electricity production, also small scale can make a contribution. What it lacks in size, it can make up by the large numbers. Also, this technique can be extrapolated to more remote areas which are currently powered by diesel generators. A quick scan will be made. Also, stakeholders of this potential project will be invited for the second workshop.

3 NEXT STEPS

In the previous steps, promising targets in West Java are identified. The selected targets are a mixture of projects, varying in heat source, type of demand and size. Studying these targets in more detail will give insight in the applicability for all of Indonesia. The next steps will be carried out:

1. Have a second workshop (WP 3.05) with stakeholders of several targets to further quantify the opportunities for low/medium enthalpy geothermal energy. Stakeholders of the following targets will be invited:
 - Jababeka Industrial Estate
 - Wayang Windu
 - Cisolok/Cisukarame
2. Perform quick scans (WP 3.06) to further analyse the opportunities for low/medium enthalpy geothermal energy. The following targets will be worked out in more detail in a quick scan:
 - Dairy company Bogor
 - Samarang vetiver oil
 - Wayang Windu
 - Cisolok/Cisukarame