

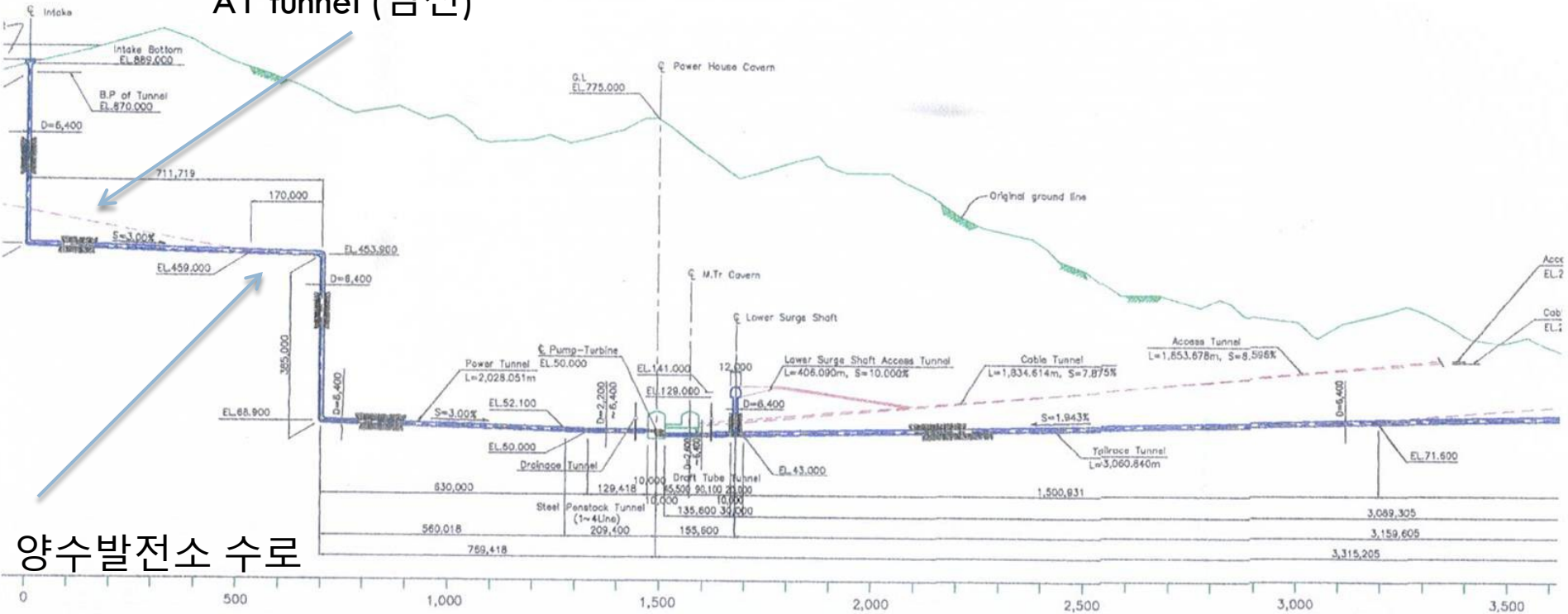
Y2L History – A thought

Yeongduk Kim

A1 터널 검토

2

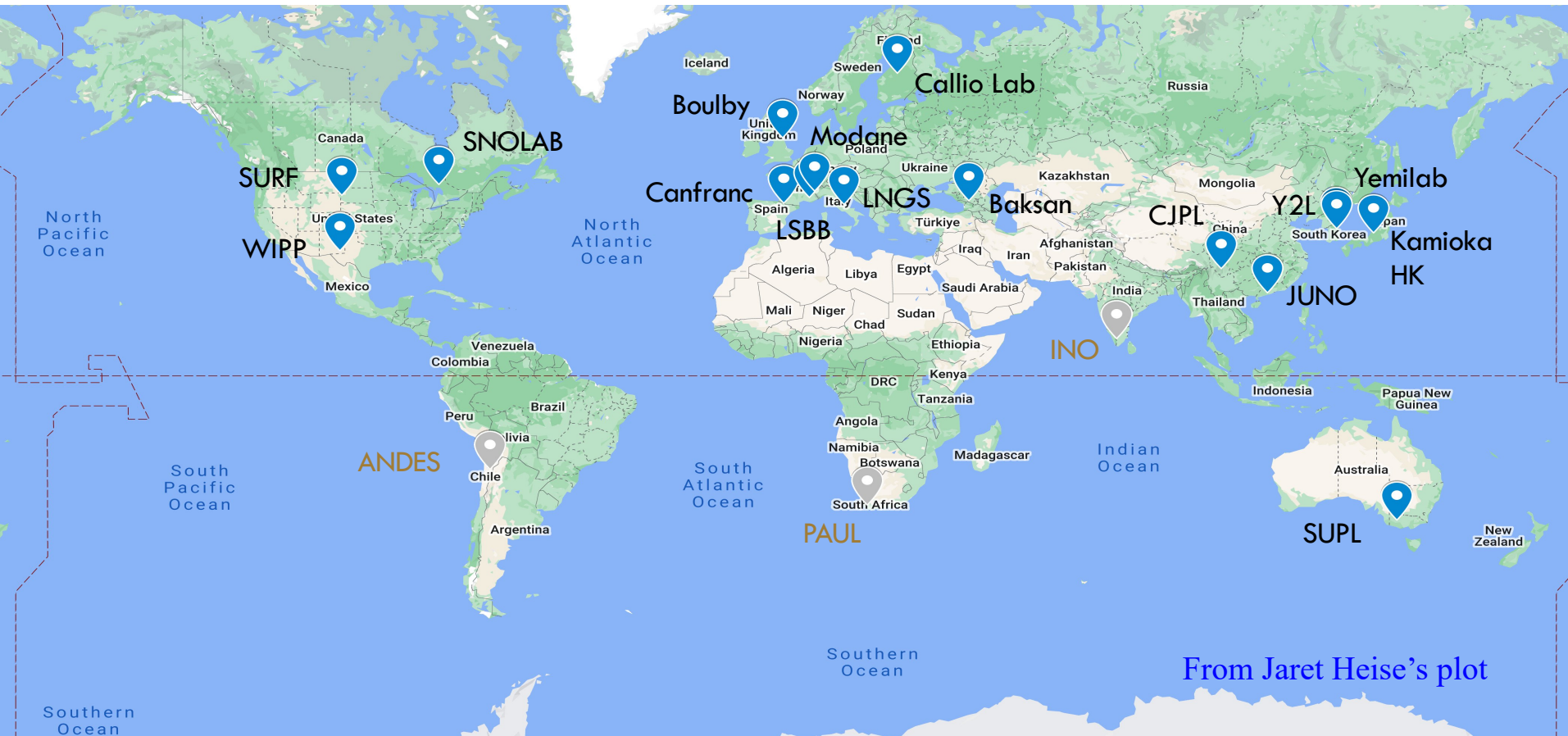
A1 tunnel (점선)



양수발전소 수로

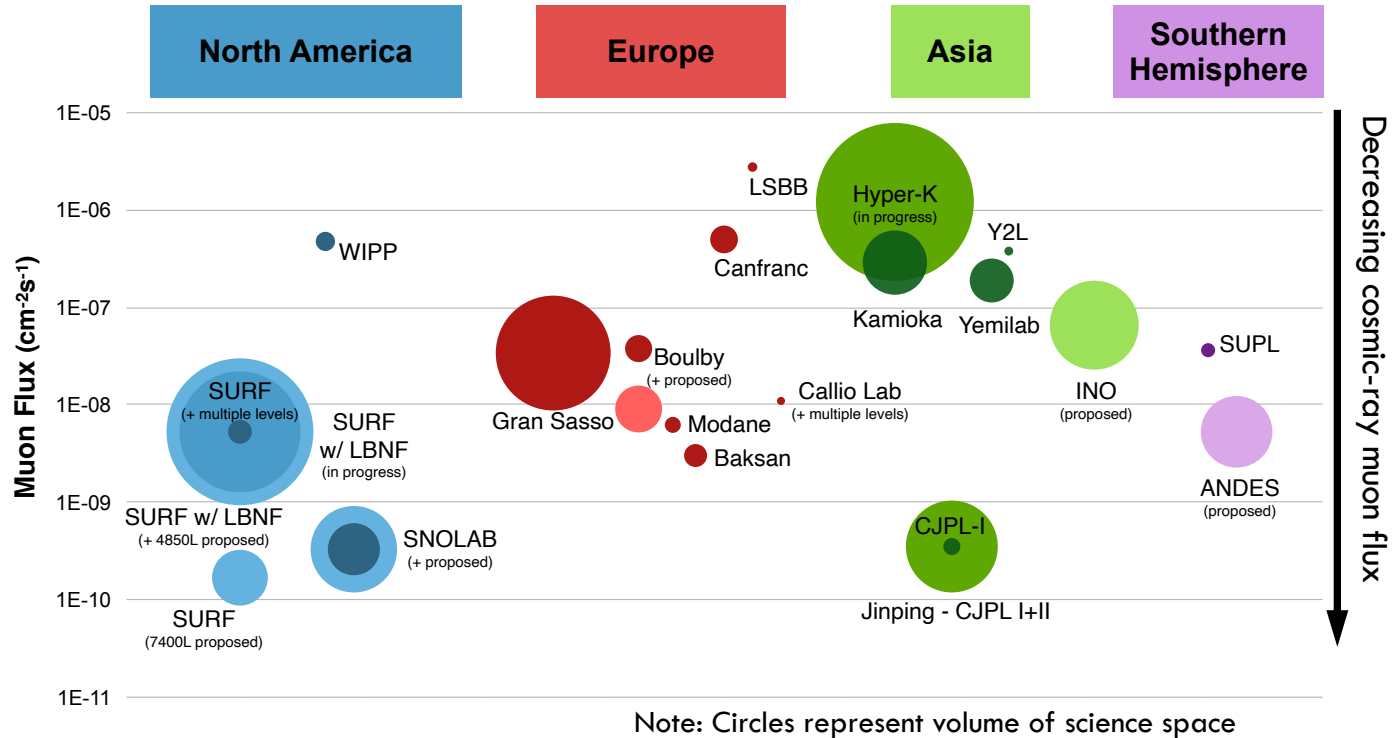
Underground Research Facility

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Worldwide Underground Facilities

From Jaret Heise's plot



- For last years, 5 new underground laboratories are completed or under construction in Asia.
- CJPL-II, HK, JUNO, Yemilab, SUPL

Why is Y2L so unique ?

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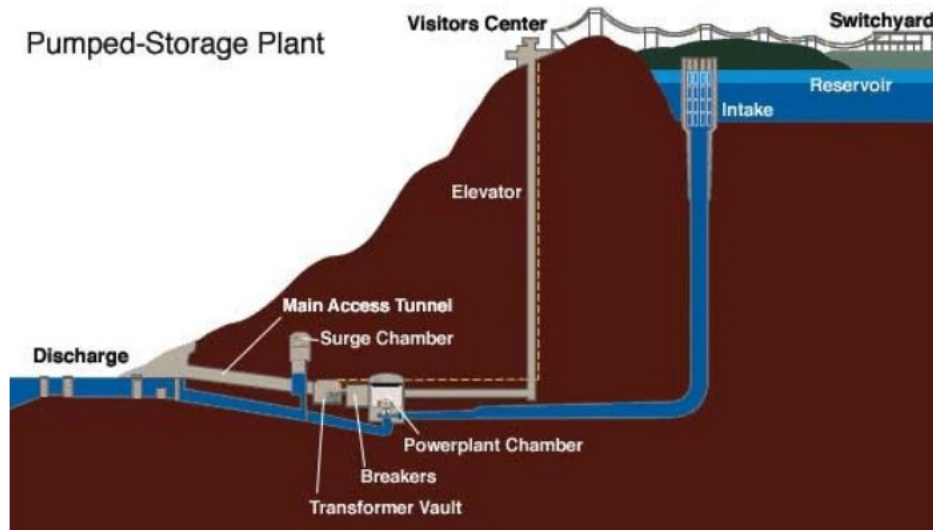
Y2L is unique because it is based on pumped storage power plant (PSPP). No other underground laboratory is based on PSPP.

We found pumped storage power plant an attractive place to do underground experiment.
In 1998, Sanchong PSPP was recognized by Prof. Wonyong Lee.
In 1999, we visited Cheongpyeong PSPP. (청평 양수발전소)

Q : Does only Korea have this kind of PSPP ?

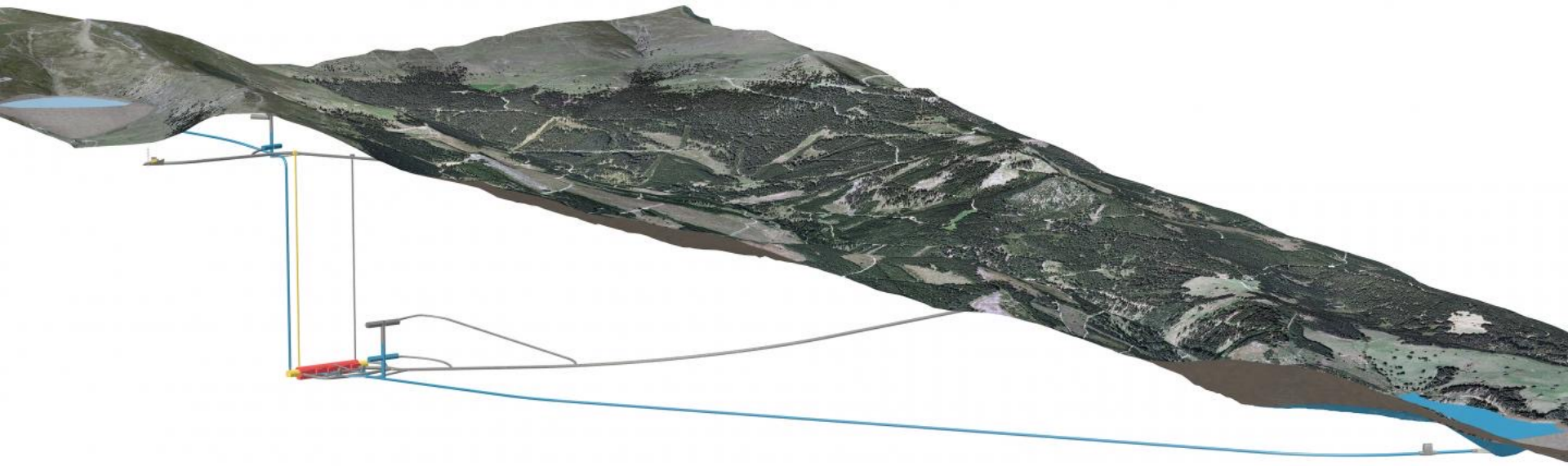
Raccoon Mountain, TN, USA

6



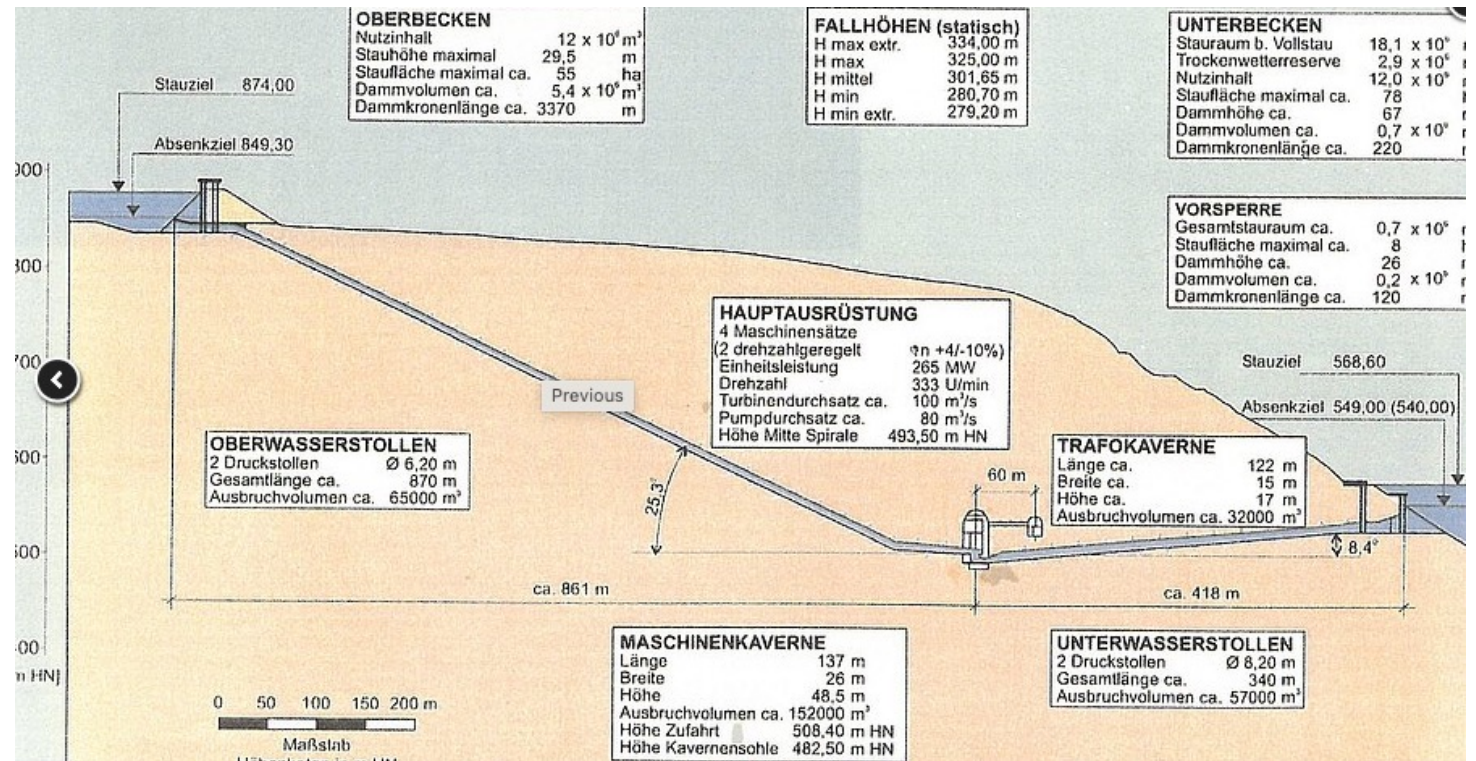
PSPP in the world

7



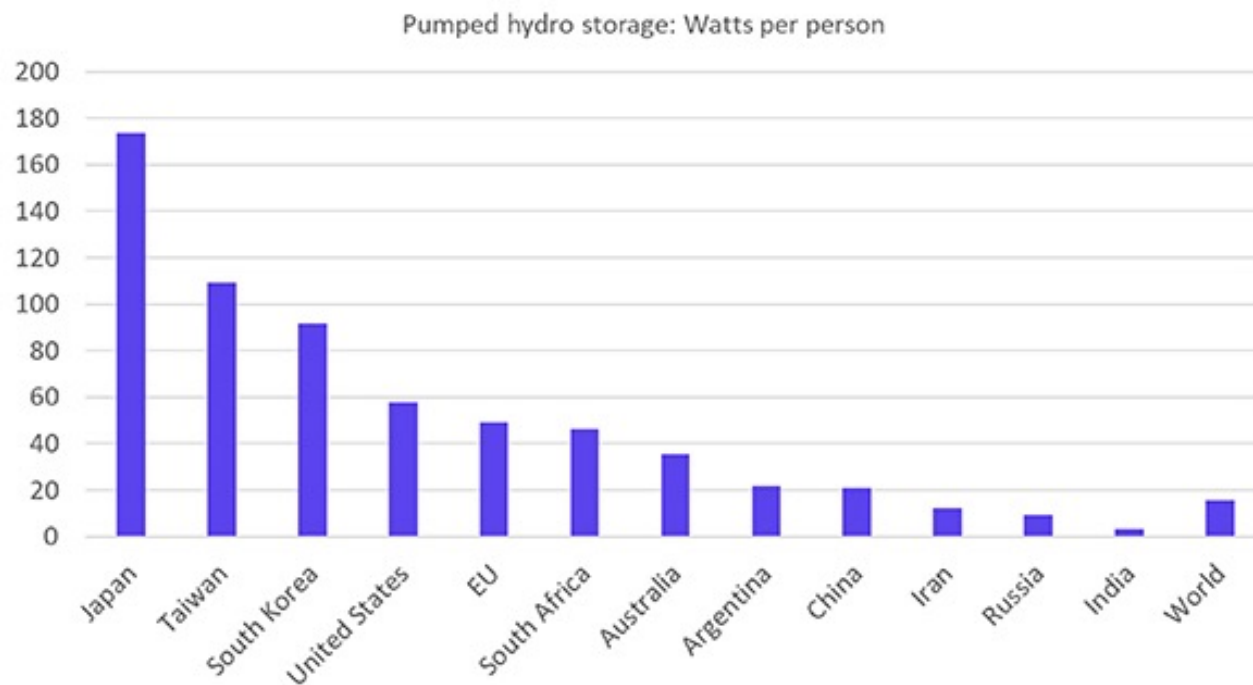
AFRY company

Goldisthal, Germany



Countries with the largest power pumped-storage hydro capacity in 2017^[51]

Country ⇄	Pumped storage generating capacity ⇄ (GW)	Total installed generating capacity ⇄ (GW)^[52]	Pumped storage/ total generating ⇄ capacity
China	32.0	1646.0	1.9%
Japan	28.3	322.2	8.8%
United States	22.6	1074.0	2.1%
Spain	8.0	106.7	7.5%
Italy	7.1	117.0	6.1%
India	6.8	308.8	2.2%
Germany	6.5	204.1	3.2%
Switzerland	6.4	19.6	32.6%
France	5.8	129.3	4.5%
Austria	4.7	25.2	18.7%
South Korea	4.7	103.0	4.6%
Portugal	3.5	19.6	17.8%
Ukraine	3.1	56.9	5.4%
South Africa	2.9	56.6	5.1%
United Kingdom	2.8	94.6	3.0%
Australia	2.6	67.0	3.9%
Russia	2.2	263.5	0.8%
Poland	1.7	37.3	4.6%
Thailand	1.4	41.0	3.4%
Bulgaria	1.4	12.5	9.6%
Belgium	1.2	21.2	5.7%



HPGe Array will remain at Y2L for a while.
Y2L can be used further for underground physics.

Summary

- ❑ **Y2L is unique underground physics laboratory.**
- ❑ **It has high head height among PSPPs.**
- ❑ **It is better to use Y2L further.**