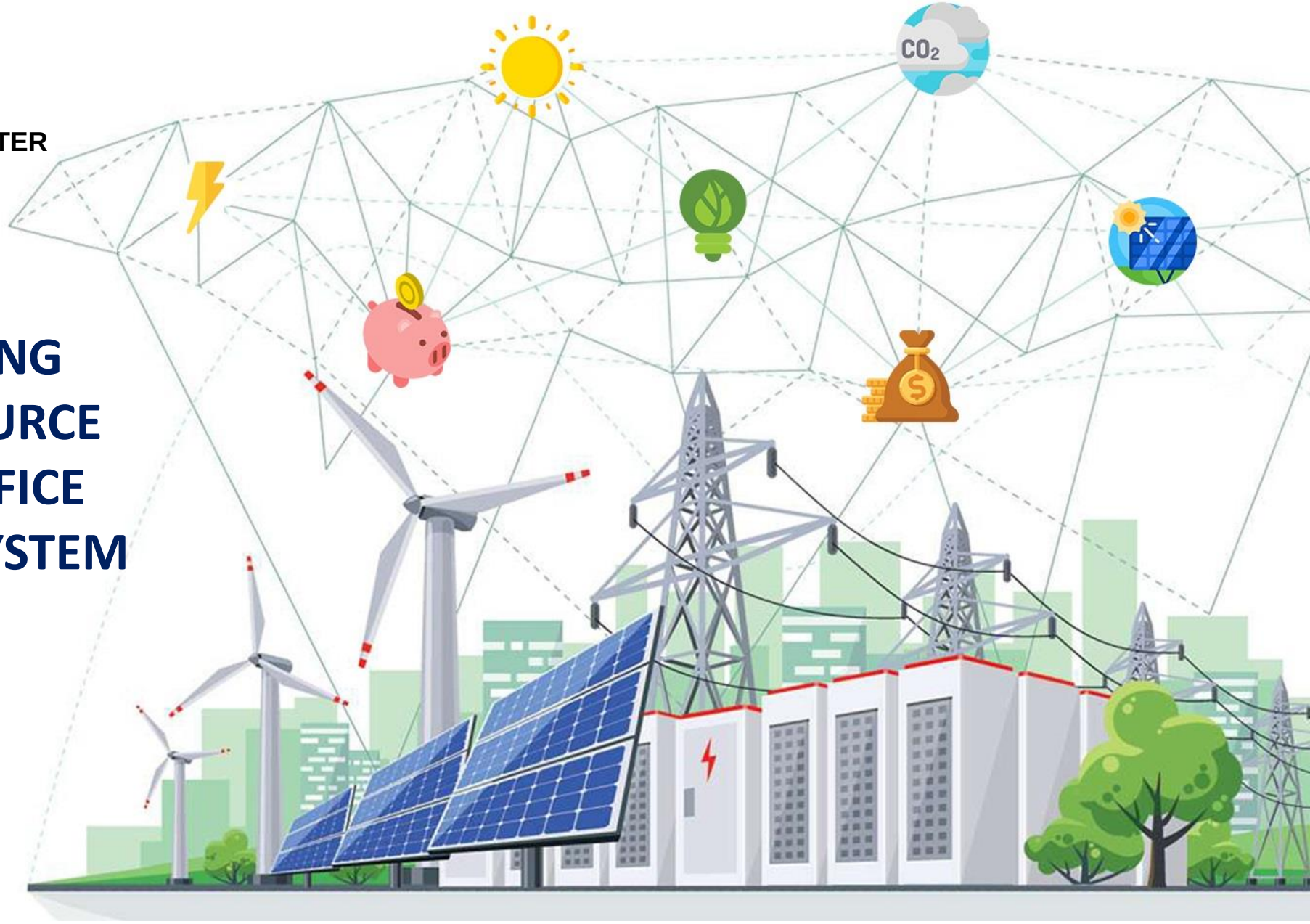
NATIONAL RENEWABLE ENERGY CENTER

EXPERIENCE IN USING GROUND WATER SOURCE HEAT PUMP FOR OFFICE BUILDING HEATING SYSTEM



Purevsuren
Chief Engineer of NREC,
Javkhlantug
Director, Bayasaltugs LLC

EXPERIENCE IN USING GROUND WATER SOURCE HEAT PUMP FOR OFFICE BUILDING HEATING SYSTEM

2010

“B” building of “Ireedui” complex kindergarten of Zuunmod soum

2013

Solar heating system and wind turbine on Research center . Khentii province, Tsenkher Mandal soum..

2014

Office building of “Bayasaltugs” LLC

2016

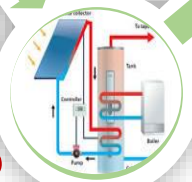
Ongrid and Offgrid solar power system at Khuree University Research Center

2017

Geothermal heating system of Achit-Ikht LLC factory building.

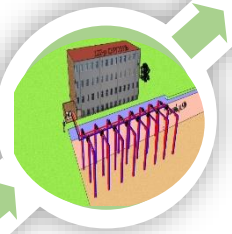
2018

Solar water heater system on "Taliin buudal" hotel. Khovd province, Khovd city



2019

Geothermal heating system of 122nd school.



2020

Implementing a comprehensive RE system in “Броун хилл”.

2021

“Kindergarten No. 1 of Jargalant soum of Khovd province.

EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM

In 2014, a 75 kW heat pump was installed in a 720 m2 office building and the heat supply was resolved, and it is currently operating without any problems.

Figure 1: 720 m2 office building / 3rd floor with garage /

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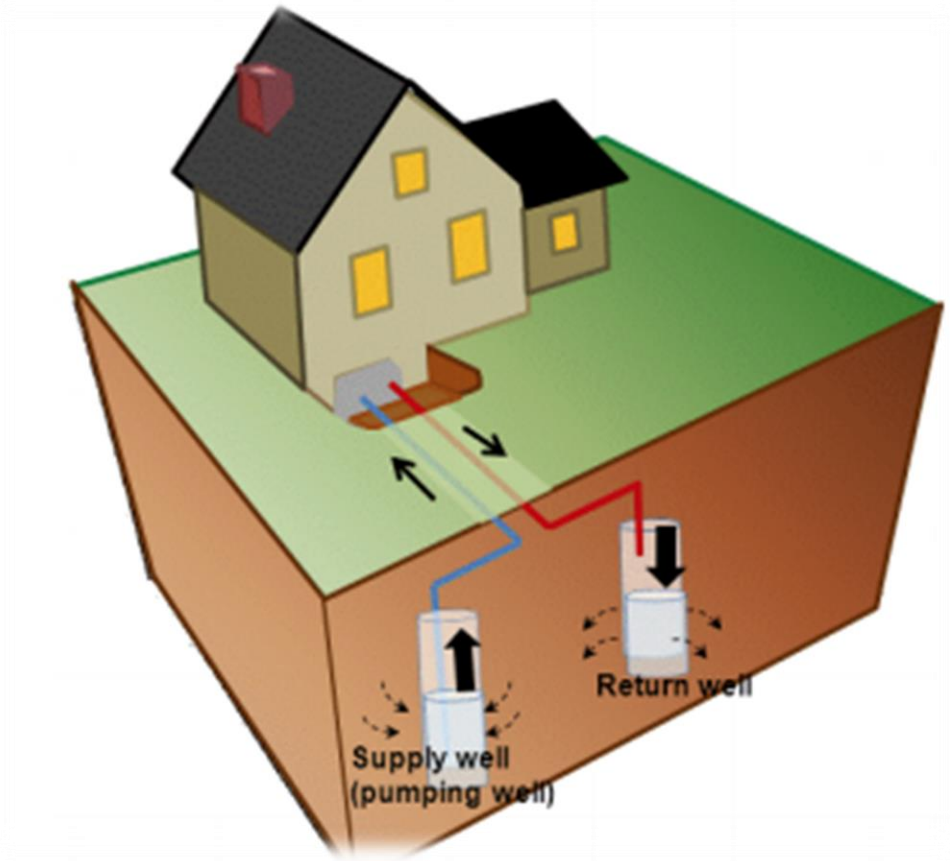

Figure 2: Water wells

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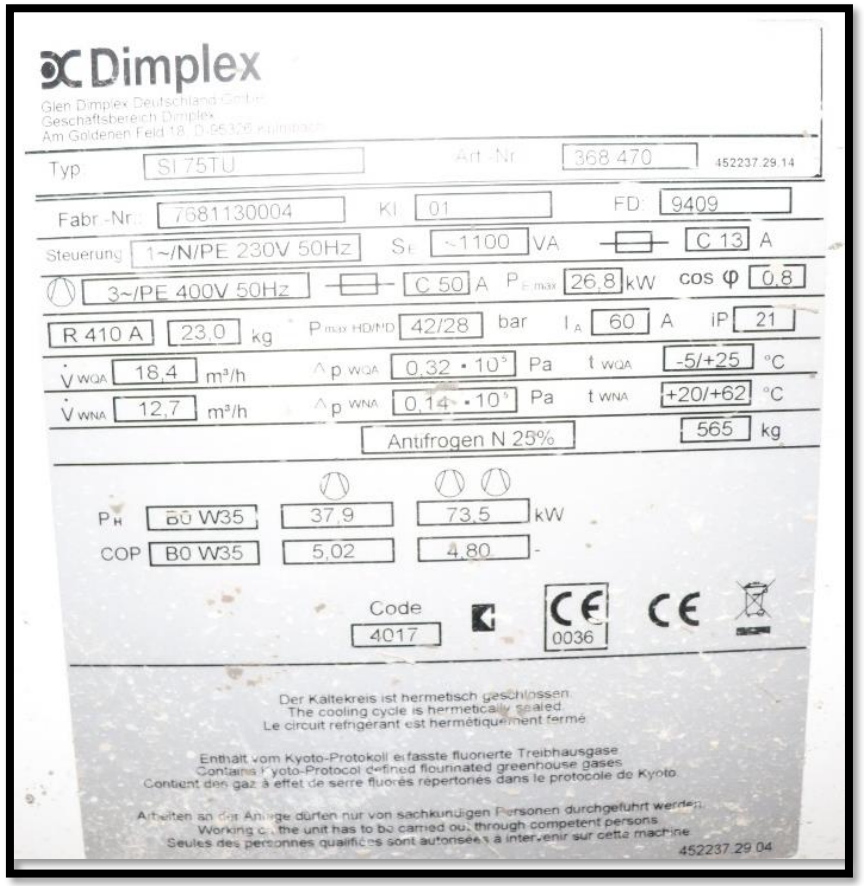
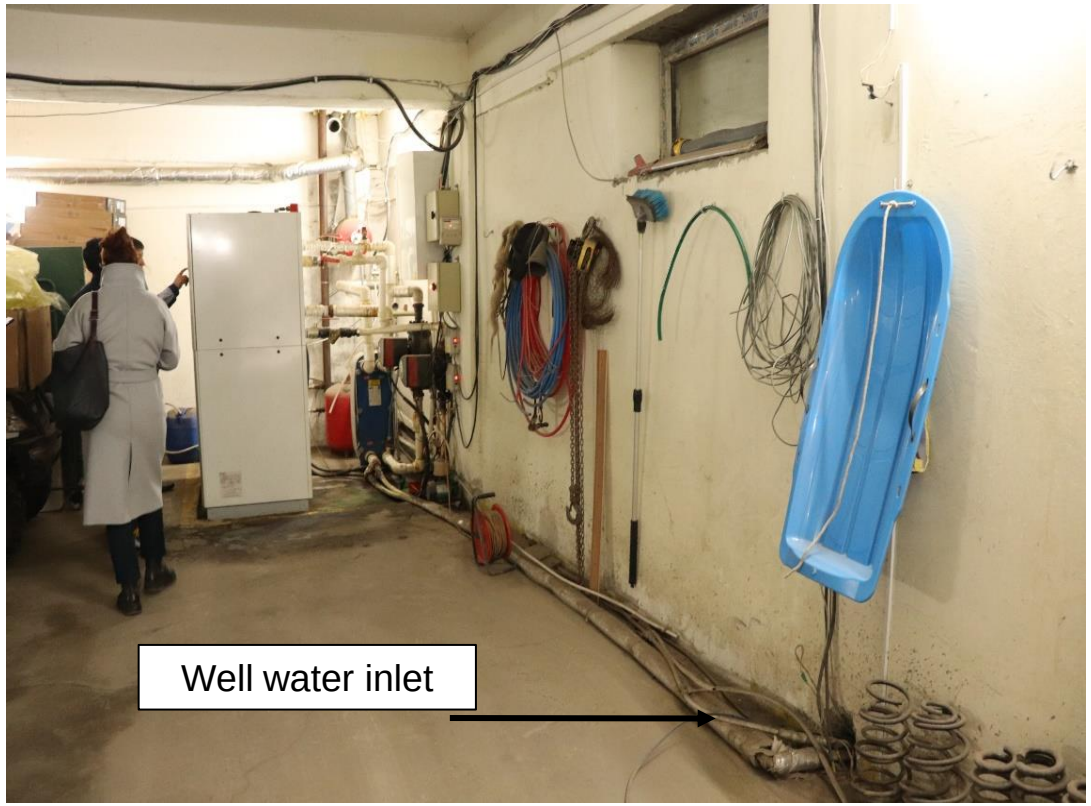


Figure 3: Heat pump 75 kW / used for 8 years /

EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM



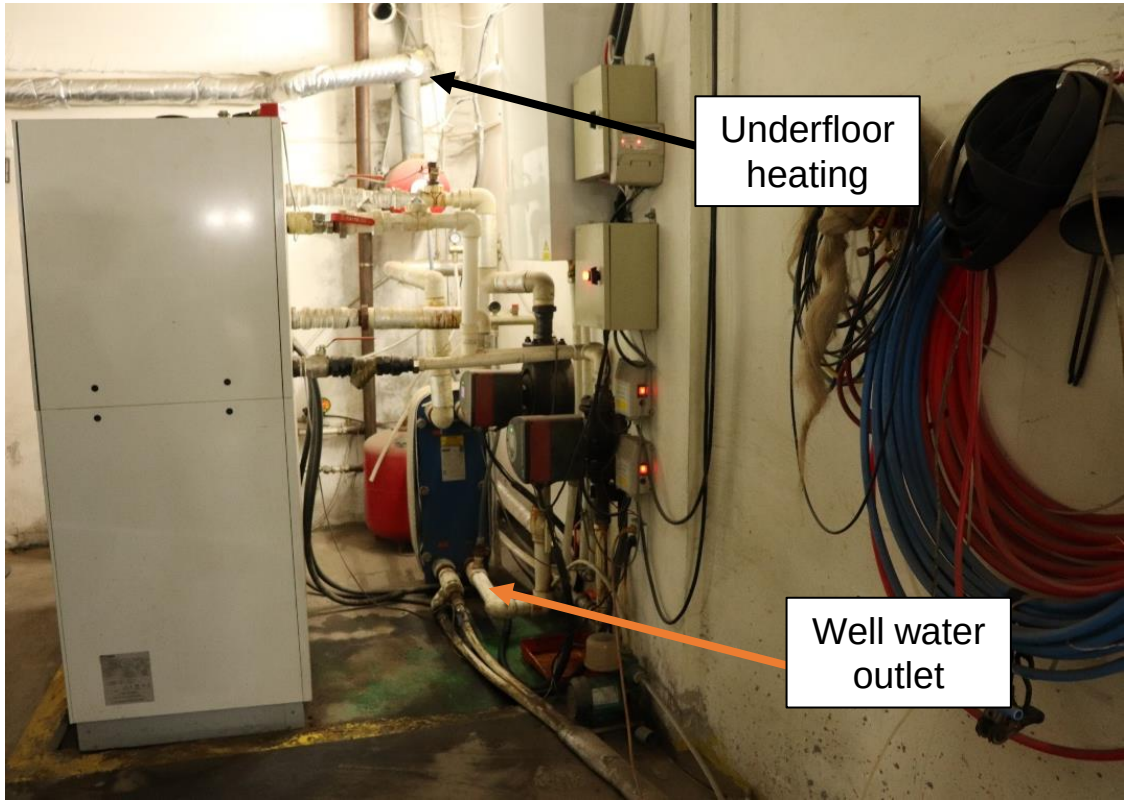
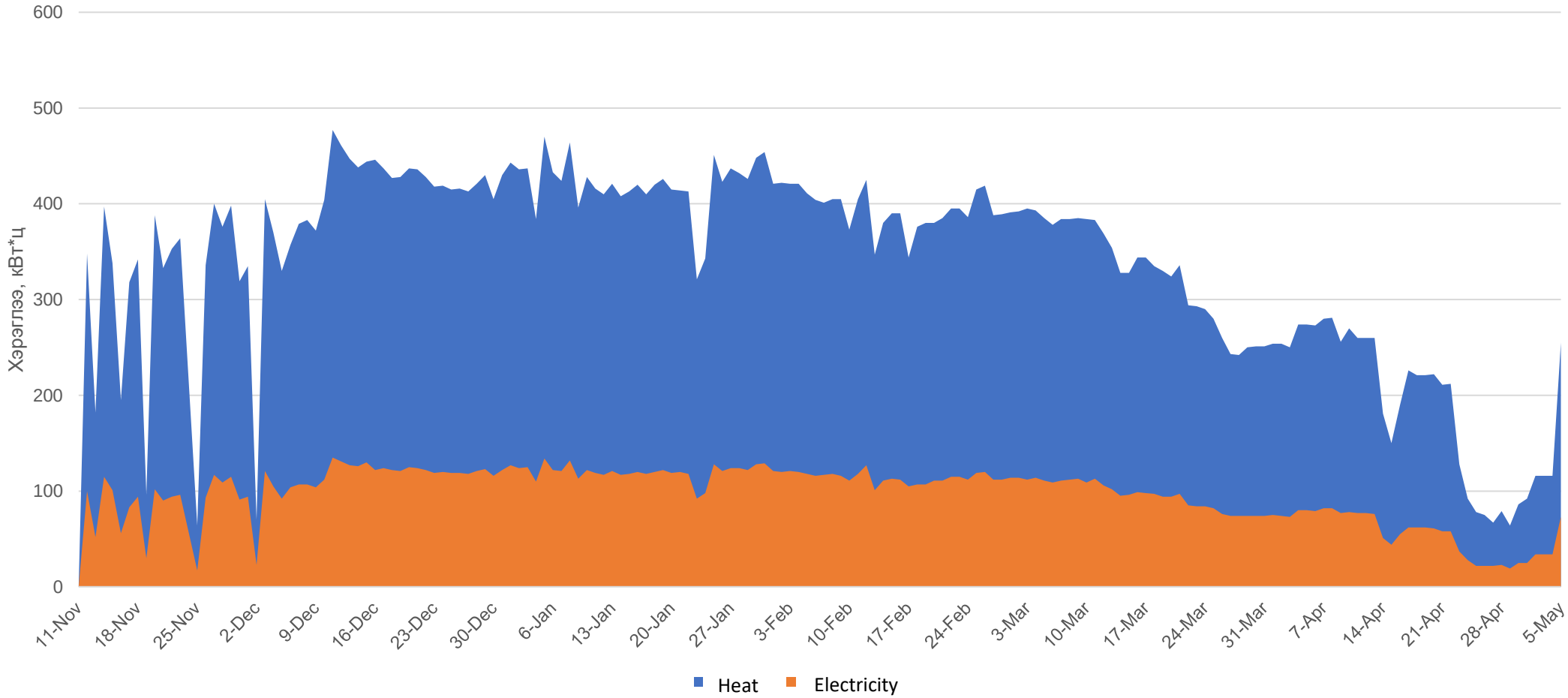


Figure 4: Heat pump connection

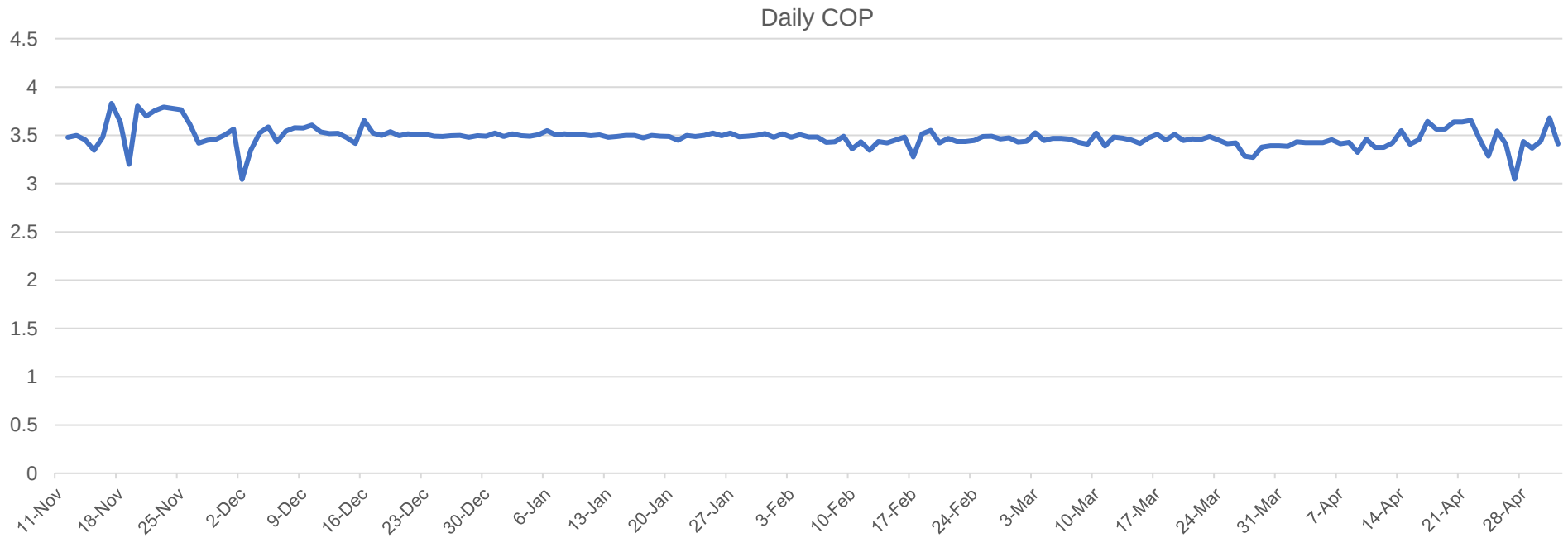
EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM

Results of 2014-2015 measurements of heat pumps installed in office buildings



In the first year, a total of 16,953 kWh of electricity was used and 59,078 kWh of heat was generated.

EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM



Results of 2014-2015 measurements of heat pumps installed in office buildings

EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM

As of April 14, 2022, 168,170 kWh of electricity was used and 571,018 kWh of heat was generated.

EXPERIENCE IN USING HEAT PUMP IN HEATING SYSTEM

Tariff	124.2	132.5	132.45	140.38	140.38	164.38	164.38	164.38	164.38	**Total**
Year	2014-11	2015-5	2016	2017	2018	2019	2020	2021	2022-4	
Generated heat kWh	59078		73134.29	73134.29	73134.29	73134.29	73134.29	73134.29	73134.29	**571018.03**
Price ₮	2096425.03	9898108	9686637	10266598	10266598	12021815	12021815	12021815	40007271.5	**118287080.6**
Used electricity kWh	16953		21602.43	21602.43	21602.43	21602.43	21602.43	21602.43	21602.43	**168170.01**
Payment ₮	601589.3	2876623	2861242	3032549	3032549	3551007	3551007	3551007	1183669	**24241242.3**

By installing this heat pump, the building have saved a total of MNT 118,287,081 from MNT 142,528,323 and MNT 24,241,242 was paid for electricity bills from November 2014 to April 2022. And recouped its initial investment in 5.5 years and is still profitable.

CONCLUSION

Since its installation in 2014, the heating system has been operating without any damage, which means that the ground water source heat pump heating system is suitable for our country.

Heat pump technology is environmentally friendly, does not emit carbon dioxide, is energy efficient, small in size, easy to install and use, has low operating costs, low noise, does not emit dust and does not emit odors.

Due to energy savings, a total of 306.9 tons of CO2 has been prevented from being emitted into the air so far.

However, the initial investment is high depending on the type and capacity of the heat pump. For water-to-water heat pump systems, the initial investment cost is lower than for other types of systems.

THANK YOU FOR YOUR KIND ATTENTION.