

Seasonal thermal energy storage (SSTES) technology for space heating and sanitary hot water applications

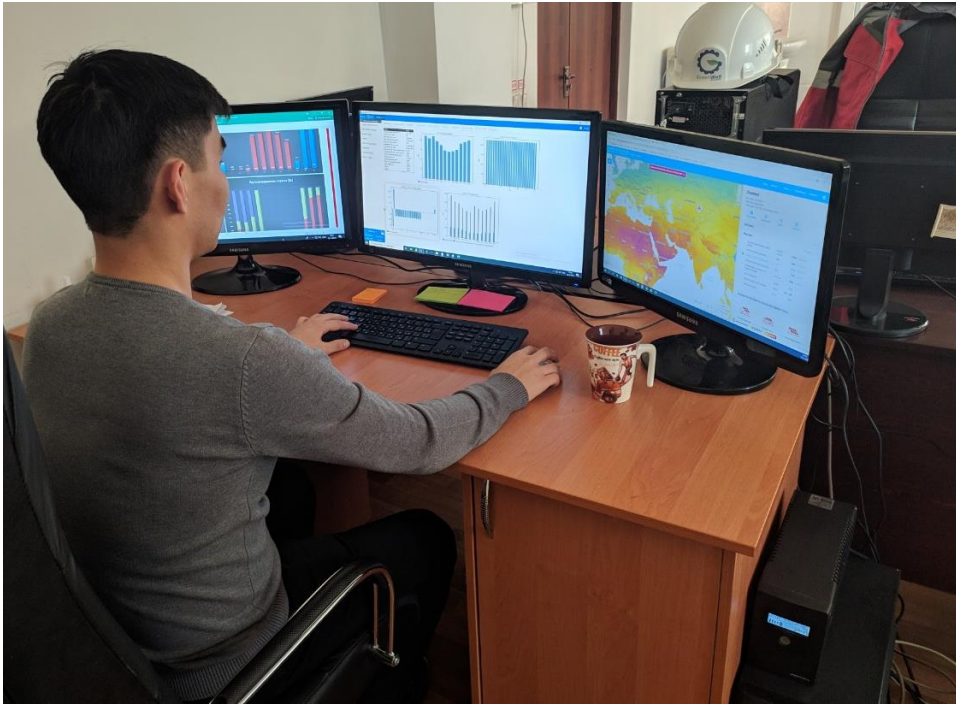
July-December 2019

Subproject supervisor: Madina Tungatarova

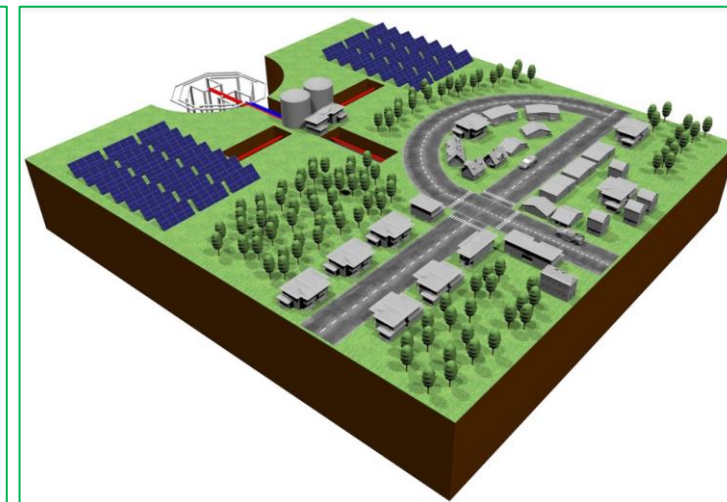
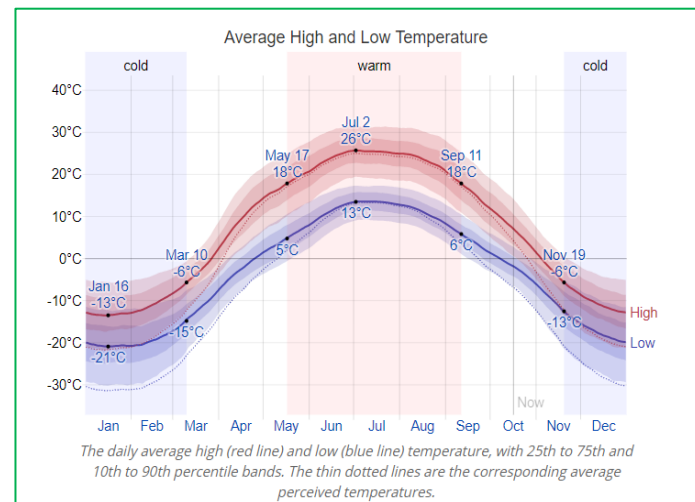
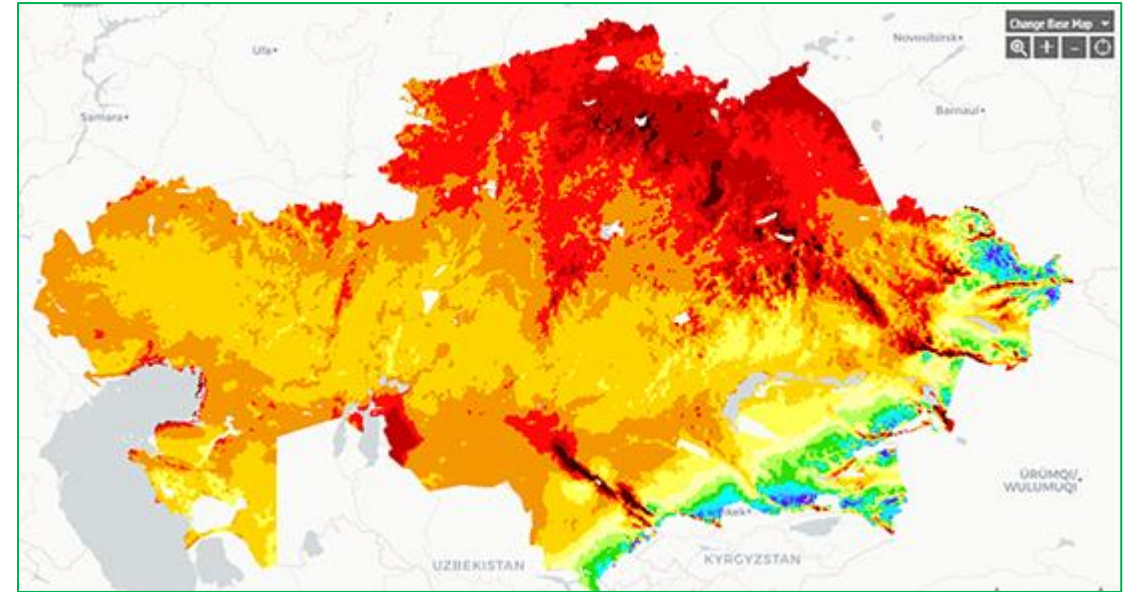
Tasks for 2019

	Task	3rd year			
		1 quarter	2 quarter	3 quarter	4 quarter
1	Integration of the system parts				
2	Integration of the whole system with the heating system of the building				
3	Optimization of charging/discharging and power management of the SSTES				
4	Development of recommendations for end users on utilization of the SSTES technology as a central district heating system				
5	Patenting the technology				
6	Standardization/certification of SSTES technology				
7	Proposing the technology to the energy market of Kazakhstan				
8	Workshop/exhibition about the SSTES technology				
9	Development of Website with data releases in real time				
10	Acquisition of additional things in case any necessity				
11	Commercialization of SSTES technology				

Optimization of the regimes of the SSTES technology



- In-house optimization tool have been developed
- Highly accurate weather data is used to evaluate the energy efficiency of the SSTES technology for every customer
- Since heating system is customer-dependent, combination of the SSTES technology with other energy sources are also considered (gas, wind energy, PV, etc).



Workshop/exhibition about the SSTES technology

- GreenWell Mechanics participated in Solar fest Qazaqstan (SFQ) - 2019
- SFQ – 2019 was organized by Solar Power Association of Qazaqstan
- During the session, mechanisms for allocating subsidies and auctions for renewable energy were discussed
- Moreover, possibility of the SSTES technology as a centralized district heating system was actively discussed



Discussion of SSTES technology during SFQ-2019
(Oleg Kim – commercialization specialist)



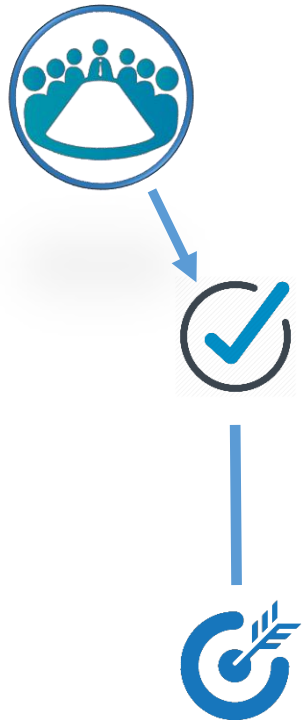
Madina Tungatarova and Oleg Kim attended
SFQ – 2019

Solar energy association of Kazakhstan

GreenWell
MECHANICS



**Solar energy association
of Kazakhstan**



United platform for Kazakhstan and international players in the field of solar energy.

Aim – consolidation of the sector: To unite the subjects in the field of solar energy in order to create favorable conditions for the development of the industry.

Mission: Formation of a coherent position of the association members to obtain attractive conditions for investment in solar energy projects.



Association and its collaborators



The successful experience of the Association will allow the the Association members to receive methodological assistance and interaction channels with:



Ministry of Energy of the RoK



Ministry of Investments and Development of the RoK



Ministry of National Economy of the RoK



Ministry of labor and social protection of population of the RoK



Local executive authorities upon obtaining land plots



National grid operator «KEGOC»



«Financial-Settlement Centre for support of renewable energy sources» LLP



National Chamber of Entrepreneurs of the RoK «Atameken»



AoLE «Kazakhstan Electricity Association»



KAZENERGY Association

Regional electricity grid companies

Commercialization

Commercialization of SSTES technology

Greenhouse for basil growing (near Almaty)

The overall heating area: 300 m²

Heating system: the floor is equipped with heating pipes.

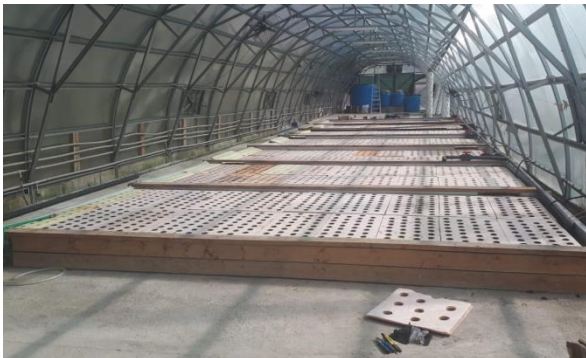
The annual heating demand of the greenhouse: 908.82 GJ.

Thermal energy delivered by the SSTES technology: 55% (28% by solar collectors + 27% from seasonal BTES).

Additional heating support: 45% (from gas boiler).

Total cost of the SSTES technology: 10 120 000 tg with 10% margin of the GreenWell Mechanics.

Currently, they are looking for funds for the implementation of the project.



Commercialization of SSTES technology

Greenhouse “Atakent” (in Almaty)

The overall heating area: 32 m²

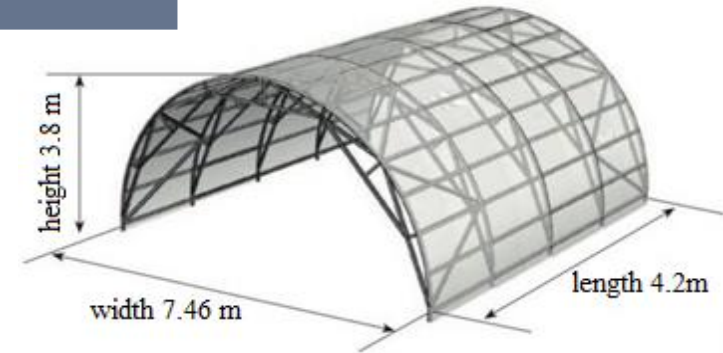
Heating system: floor based heating.

The annual heating demand of the greenhouse: 170.87 GJ.

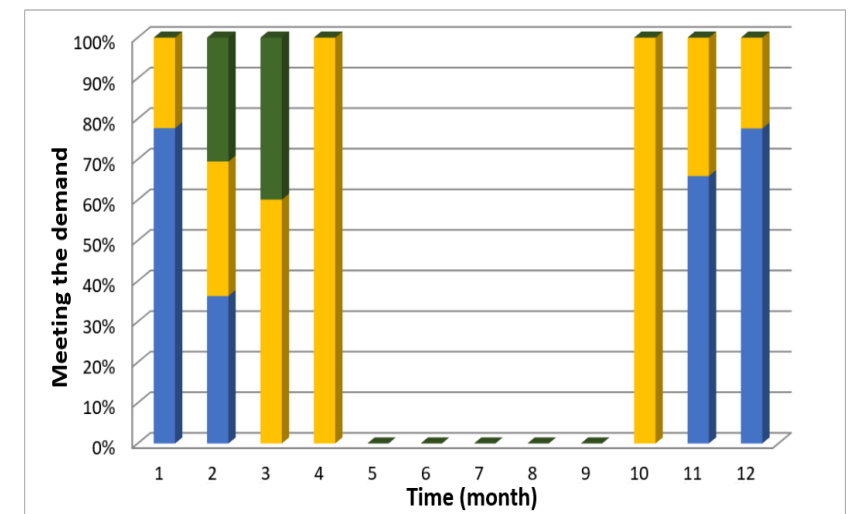
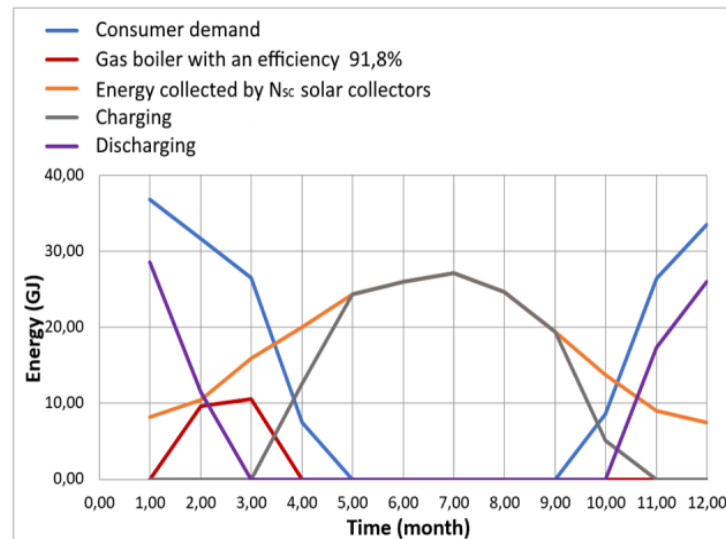
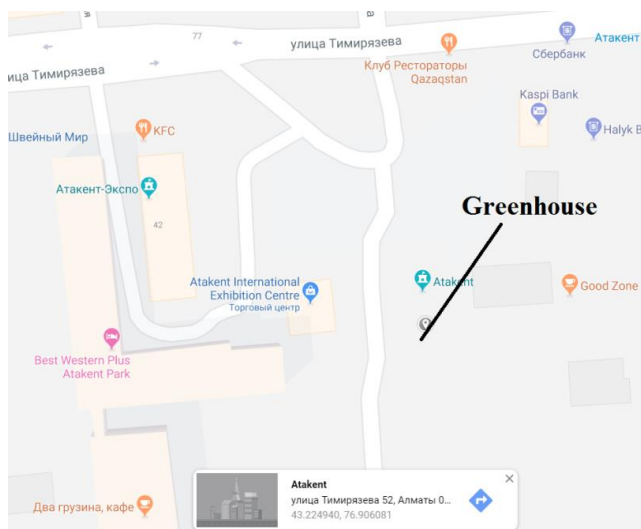
Thermal energy delivered by the SSTES technology: 90% (40% by solar collectors + 50% from BTES).

Additional heating support: 10% (gas boiler).

Total cost of the SSTES technology: 4 350 000 tg with 10% margin of GreenWell Mechanics.



The construction of the greenhouse is planned in 2020, currently the cost of the SSTES technology for consideration in the budget of the object has been transferred to the Customer.



Commercialization of SSTES technology

Mosque “Kyzyltu” (near Almaty)

The overall heating area: 280 m²

Heating system: floor based heating.

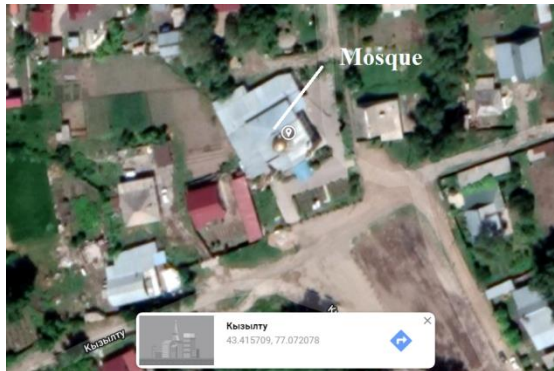
The annual heating demand of the greenhouse: 284.34 GJ.

Thermal energy delivered by the SSTES technology: 60% (32% by solar collectors + 28% from BTES).

Additional heating support: 40% (gas or coal based boiler).

Total cost of the SSTES technology: 5 610 000 tg with 10% margin of GreenWell Mechanics.

Cancelled due to technical problems on the installation of floor heating system from Customer side



Commercialization of SSTES technology

Mosque “Akshi” (near Almaty)

The overall heating area: 250 m²

Heating system: floor based heating.

The annual heating demand of the greenhouse: 284.34 GJ.

Thermal energy delivered by the SSTES technology: 60% (32% by solar collectors + 28% from BTES).

Additional heating support: 40% (gas or coal based boiler).

Total cost of the SSTES technology: 5 320 000 tg with 10% margin of GreenWell Mechanics.

Cancelled due to groundwater level (not suitable site for borehole thermal energy storage)



Commercialization of SSTES technology

Mosque “Koksai” (near Almaty)

The overall heating area: 200 m²

Heating system: floor based heating.

The annual heating demand of the greenhouse: 202.5 GJ.

Thermal energy delivered by the SSTES technology: 65% (34% by solar collectors + 31% from BTES).

Additional heating support: 35% (gas or coal based boiler).

Total cost of the SSTES technology: 4 675 000 tg with 10% margin of GreenWell Mechanics.

Agreement has been signed and transfer of money is under process (will be in tranche with several transfers)

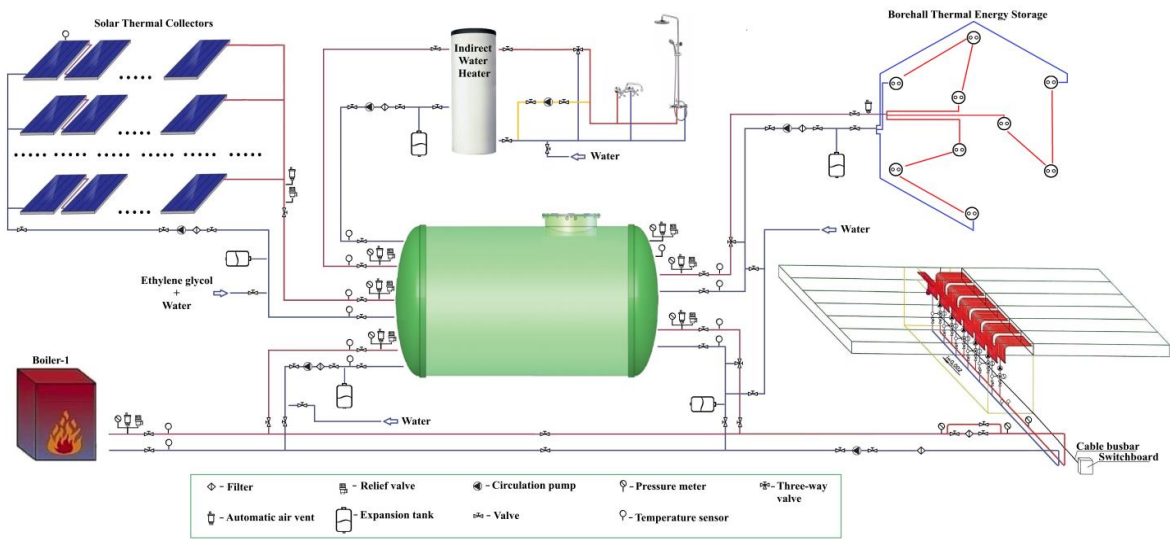


Commercialization of SSTES technology

Locations have been selected to install the components/parts of the SSTES technology



Design of the SSTES technology is represented for the current application



Thank you for your attention