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KunTech Solar Panels (hot water and electric)

- ❖ The first manufacturer of solar collectors in the Republic of Kazakhstan
- ❖ #1 on the installed solar systems (>1500m², ~1MW)
- ❖ 4 years of developments, 9 patents, 3 research grants
- ❖ Winner of EXPO 2017, CleanTech USA, and contents of the Ministry of Energy of the Republic of Kazakhstan

"TURN-KEY" ALTERNATIVE ENERGY FROM INDUSTRY LEADERS:

- domestic solar collectors for hot water and heat supply
- PV panels and wind-powered generators
- solar pumps and desalination systems
- heat pumps and ground thermal storages
- self-contained lanterns and solar light tubes
- solar cooling and ground thermal storages

Why is this necessary?



Lack of centralized grids hinders the development of tourism facilities and agriculture.



High level of solar insolation in the Republic of Kazakhstan: 2200-3000 solar hours per year, 1300-1700 W per 1m²



Stable growth of tariffs *:

Electricity cost per kWh -

215% growth from 6.04 tenge to 12.99 tenge

Heat cost – **366% growth** from 723 tenge to 2642 tenge per 1 Gcal from 2008 to 2017.



Commitments of the Republic of Kazakhstan on RES:

by 2030, to reach 10%, by 2050, to reach 50%. The order on the implementation of EXPO technologies. Energy cost reduction by 25%



Energy expenses comprises up to 60% of the **prime cost for services and goods**



The Law on Renewable Energy Sources, 50% refund for home equipment

| Tariffs for heat* | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-------------------|-------|------|-------|-------|-------|-------|-------|
| tenge/gcal | 2 458 | 2585 | 2 746 | 2 920 | 3 009 | 3 419 | 3 723 |



- Since August 2017, the night-time tariff for electricity has been canceled
- Since January 2018, the price for gas has increased by 10% and continues to grow
- The price for coal grows by 20% per year

* - tariffs are indicated for individuals, tariffs for corporate bodies are higher

World experience

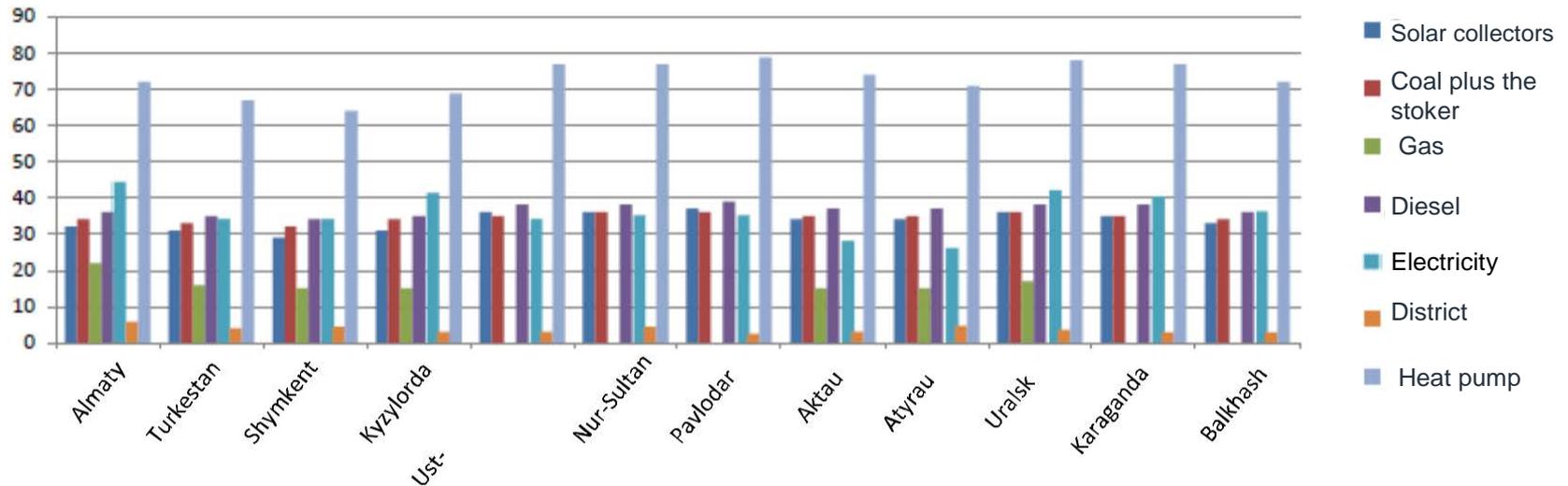
The solar potential of the country in comparison: horizontal insolation rates for well-known countries of the world and cities of the Republic of Kazakhstan <http://atlassolar.kz>

| Cities of the Republic of Kazakhstan | - Insolation (kWh/m ² , year) - | Alternatives in the world |
|--------------------------------------|--|---------------------------|
| Petropavlovsk/ Kokshetau | - 1200/1250 - | Seoul/Tokyo/ Bulgaria |
| Astana/ Karaganda/ Semey/ Aktobe | - 1300/1350 - | Shanghai/Canada/ Romania |
| Atyrau/ Aktau | - 1350/1400 - | Italy/New Zealand |
| Almaty/ Taraz | - 1450/1500 - | Uruguay/Taiwan |
| Kyzylorda/ Turkestan | - 1500/1550 - | Greece/Portugal |
| Shymkent/ South Kazakhstan oblast | - 1650/1800 - | Australia/ Mexico/Turkey |

Source: Data from Solar Heat Worldwide international report for 2018, and UNDP solar atlas

- Israel:**
 -hot water supply for 80% of all residential units is provided by solar water heaters, the state standard
- USA:**
 -more than 60% of private and public swimming pools are heated by solar energy (5-7 mln.toe per year)
- Turkey:**
 -820000 m² solar collectors as of 2001
 -total production of 290000 TOE (tons of oil equivalent)
- China:**
 -2009: total area of solar water heaters of 140 mln.m²
 -by 2020: 300 mln.m² of premises in China will be equipped with solar collectors (SC)
 -Since 2017 evacuated (tube) collectors are inferior to flat-plate ones in demand

Comparative analysis of the leveled cost of 1 kWh for hot water supply



Comparison of the 1 kWh thermal energy cost from various sources for the purposes of hot water supply for individual housing constructions in the context of cities of the Republic of Kazakhstan

Source: UNDP Project on Calculation of capacity for using renewable energy resources for the needs of hot water supply and heating at various civil engineering facilities for domestic needs taking into account gender aspects - 2020

Benefits in Kazakhstan

Kazakhstan is one of the leading countries in the region in terms of the average annual insolation capacity: the annual duration of sunlight is 2200-5000 hours, and the estimated power is 1300-1700 kW per 1 m² per year, this exceeds the similar indicators of European countries.

IMPORTANT:

EFFICIENCY OF SOLAR COLLECTORS DEPENDS MORE ON THE NUMBER OF CLEAR DAYS OF THE YEAR, RATHER THAN THE AVERAGE AIR TEMPERATURE!



IMPORTANT:

THE USE OF SOLAR HEAT IN KAZAKHSTAN CAN PROVIDE UP TO 60% OF THE AVERAGE ANNUAL COST SAVINGS FOR HOT WATER AND HEATING!

Prospective consumers:

- Private houses and apartments
- Hotels, cafes, amusement parks, malls
- Manufacturers of food raw materials
- State institutions and authorities, schools, hospitals, kindergartens, nursing homes, prisons
- Military units, especially remote ones
- Farmers and peasant farms
- Industrial facilities, swimming pools

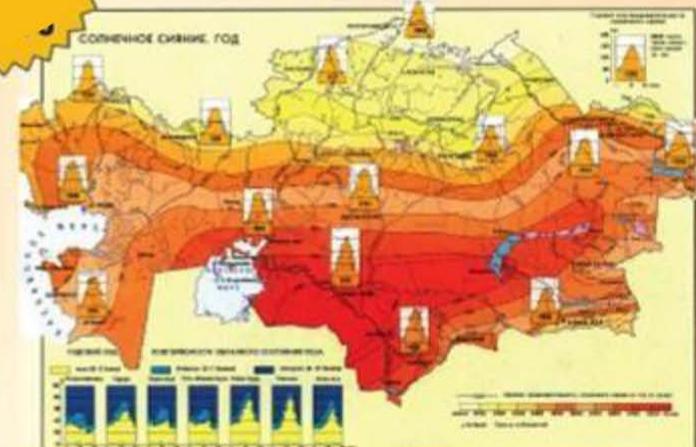
1 panel = 1400 W

- * heats 100 liters of water per day
- * or 12m² of underfloor heating
- * house of 6 people-three panels
- * payback - 3-4 years
- * Service life-up to 40 years

AVERAGE ANNUAL

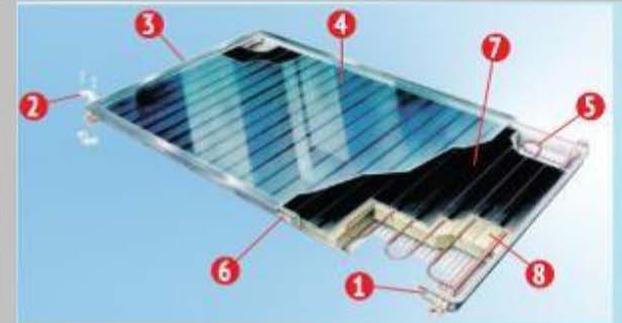
savings ~60 %

HEAT PUMP FOR MAINTAINING COLLECTORS IN WINTER



ON A CLEAR SUNNY DAY, THE TEMPERATURE AT THE OUTPUT OF THE COLLECTOR CAN REACH 110 °C!

Benefits of flat-plate SC

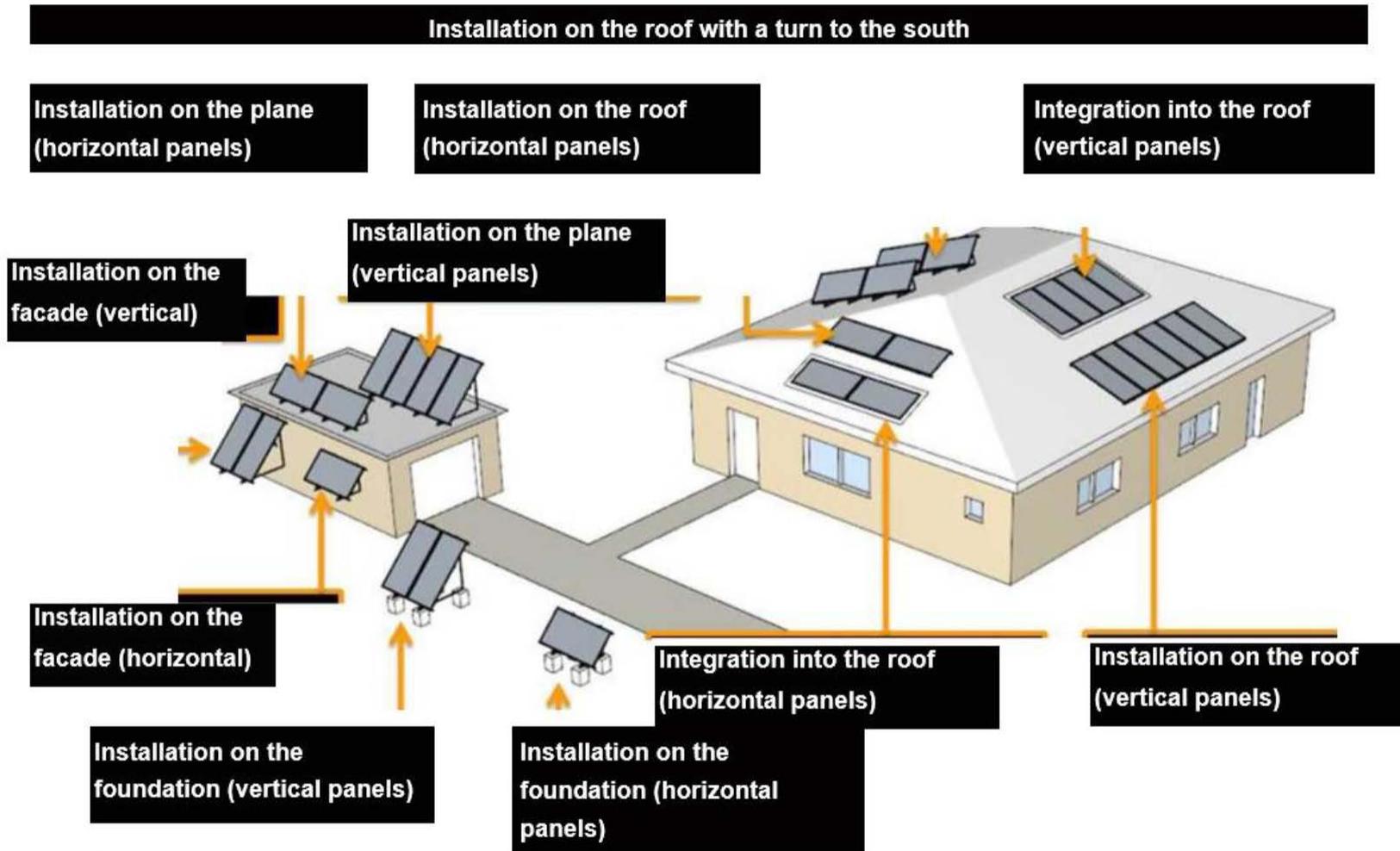


1. Forged or framed case (KZ)
2. Outlet coupling with a clamp (EU)
3. Wrapping anodized profile (KZ)
4. 4 mm ultra-strong solar glass (KZ)
5. Pressed Copper Coil (EU)
6. Enclosed rubber gasket (KZ)
7. Selective Heat Absorber (EU)
8. Mineral insulation (KZ)

Advantages of the flat-plate model:

- ✓ Cheaper by 60%, safer
- ✓ Less area by 35%
- ✓ Does not frost up in winter
- ✓ Does not boil away in summer
- ✓ Does not require service
- ✓ Eco-friendly antifreeze solution (propylene glycol)
- ✓ More aesthetically pleasing in appearance
- ✓ Can be integrated into the roof and even facade (SolarFacade™)

According to IEA data, 93% of the panels in Europe are flat-plate



European certificates for our products

DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

CERTIFICATE

Certificate holder LLP KunTech
Kabanbay batyr ave 53
VP-13
010000 Nur-Sultan city
KASACHSTAN

Product Solar collectors

Type, Model KT-2108

Testing basis DIN EN 12975-1:2011-01
DIN EN 12975-2:2006-06
SOLAR KEYMARK Scheme Rules (2019-03)

Mark of conformity



Registration No. 011-752944 F

Valid until 2024-08-31

Right of use This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number.
See annex for further information.

2019-08-20
Dipl.-Phys. Carlo Seiser
Deputy Head of Certification Body



DAKKS
Deutsche
Akademischer
O 20 11125-01 00

DIN CERTCO Gesellschaft für Konformitätsbewertung mbH · Albrechtstraße 56 · D-12105 Berlin · www.din-certco.de

We are the only manufacturer of solar collectors in the Republic of Kazakhstan with European Quality Certificate. The presence of patents allows to purchase our products from a single place, and the status of EXPO winner allows to be included into the government order on RES.

| | | |
|--|---|----------|
| 1. Odovoditeľ / Conformity: | F 003212 | PRVOPIS |
| | Číslo / Number 00564 | ORIGINAL |
| THERMOSOLAR Žiar s.r.o. Na vartičke 14 965 01 Žiar nad Hronom Slovenská republika | | |
| 2. Prijímateľ / Consignee: | EURÓPSKA ÚNIA EUROPEAN UNION OSVEDČENIE O PÔVODE CERTIFICATE OF ORIGIN | |
| TOO KunTech Kabanbay batyr ave, 53, VP 13, 010000 Astana Kazachstan | 3. Krajina pôvodu / Country of origin: | |
| | SLOVAK REPUBLIC (EUROPEAN UNION) | |
| 4. Druh depozity inšpektorát / Means of Transport (optional): | 5. Poznámky / Remarks: | |

| Characteristics | KunTech (KT 101/300 models) | German alternatives | Sunrain (China), FPC1200D model |
|---|--------------------------------|--|---|
| Technical (according to www.solarkeymark.dk) | | | |
| Size (L x W x H), mm | 2009 x 1009 x 100 (heated) | 2380 x 1056 x 72 | 2000 x 1000 x 80 |
| Weight, kg | 40 | 35-52 | 32 |
| The area of absorber (aperture, m ²) | 2.03 | 2.33 | 1.85 |
| The material of absorber | Aluminum oxide (st. steel) | Copper | Copper / Aluminum film |
| Efficient heat capacity, KJ/m ² | 7.2 | 4.5 | no data |
| Power output per m ² at 1000W/m ² , W | 525-700 | 406-700 | 298-400 |
| Coefficient rate of radiation to heat (efficiency) | 0.815 | 0,754 – 0,8 | 0.71 |
| Changeover point, C | 195 | 196 | 142 |
| High-quality | | | |
| Quality | European | European | chinese |
| Warranty period | 5 years | no data (on the Republic of Kazakhstan) | no |
| Operational life | up to 40 years | up to 30 years | up to 5 years, according to experience |
| Price | | | |
| The cost of one collector in Kazakhstan is | 375 euros | 950-1300 euros+ delivery to Kazakhstan | 420 euros |
| The cost in terms of 1W of energy | 0,27 euros | 0,79 euros | 0,52 euros |



Examples of our installations



pilot system, NU Technopark



BI Group Green Quarter showroom



500L HWS system in centralized fuelling system , Arnasay district



Affordable Housing showroom, Urker district



HWS + swimming pool, NU sport facility



300L HWS system, the school in the East Kazakhstan region



Greenhouses heating in Arnasay district



HWS, Kamkor medical center, Akkol



Light shelf in Arnasay district



HWS system, Hospice, East Kazakhstan region

Turn-key price: 1 150 000 tenge
Capacity: 10000L of HWS per month
Savings for one year: 907 200 tenge
Payback: 1.2 years
Contact: didardali_uk@mail.ru



HWS, Green Academy, Arnasay district

Turn-key price: 1 750 000 tenge
Capacity: 500L of HWS per day
Savings for one year: 607 200 tenge
Payback: 3.9 years
Contact: greenkaz.kz@gmail.com



HWS, Kamkor medical center, Akkol

Number of panels: 30 pieces
Capacity: 3000 litres of hot water per day
Savings (plan): 60%
Payback (plan): 3-5 years
Contact: natdruz@mail.ru



Nazarbayev University, campus

Number of cottages: 67
Number of panels: 201 pieces
Capacity: 20 000L of HWS per day
Savings (plan): 60%
Payback (plan): 3-5 year

Annual savings: 50-70%
Average payback : 2-5 years



Remote mine of the national mining company, solar system for 100kW and 50kW

Objectives: household hot water supply and technological processes

Number of panels: 108 pieces

Savings (plan): 80%

Capacity: 10 000L and 5 000L of HWS per day

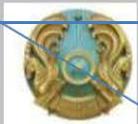


Subsidies of RES and energy efficiency projects (EXPO support/PPP)

Implementers: UNDP+Damu+Banks

Subsidizing 10% of the rate /25% of the debt+guarantee for the bank for 50% of the amount loans for projects in the field of RES and energy efficiency.

<http://eep.kz>



50% refund (targeted aid) for domestic RES

Implementers: Regional akimats (within the allocated budgets)

According to the Order of the Ministry of Energy of the Republic of Kazakhstan dated November 28, 2014 No. 161 on approval of the Rules for providing targeted aid, 50% of the cost of RES produced in the Republic of Kazakhstan is refunded to consumers



Order of the Government of the Republic of Kazakhstan on the implementation of EXPO technologies

Implementers: Akimats (local authority bodies) and national companies (within the allocated budgets)

Our products are one of the domestic developments of the EXPO 2017 exhibition and are included in the list of technologies required for implementation in regions



Business Roadmap-2020 Development Program on the infrastructure development

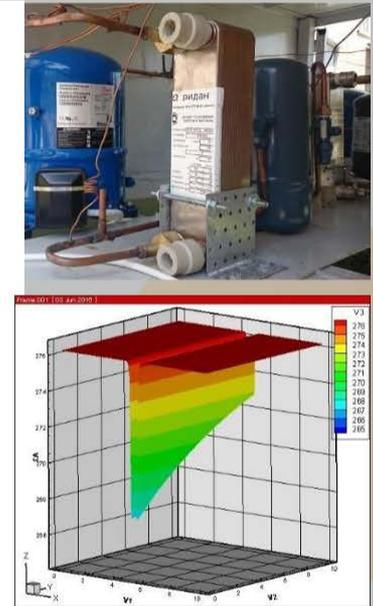
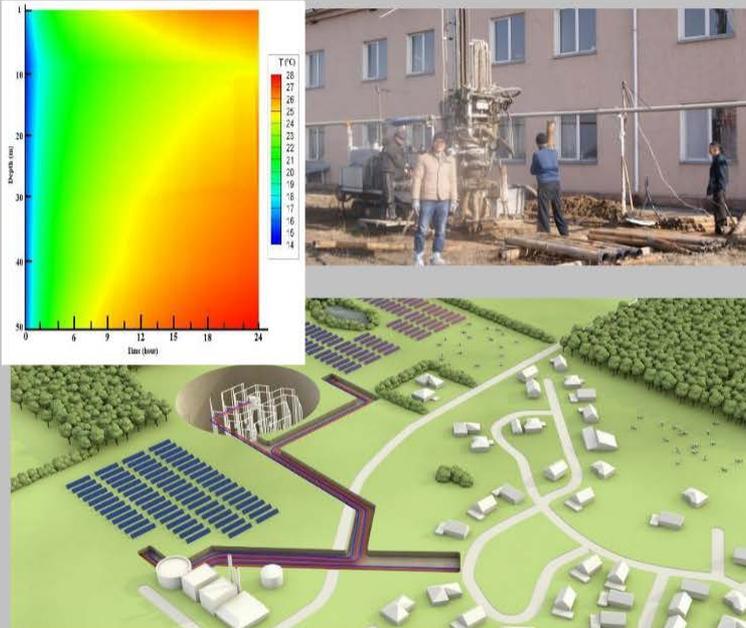
Implementers: Damu+Akimats+Banks

Infrastructure (energy, water, roads) for projects SMEs in single-industry cities with low and medium capabilities.

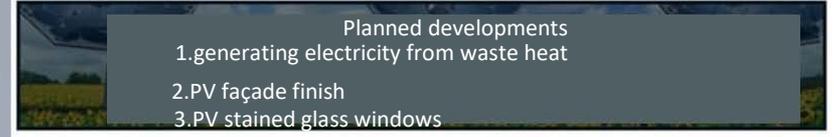
<https://business.gov.kz/ru/business-support-programs/detail.php?ID=50952>

1) **Interseasonal heat storage in the soil**, 2 patents, up to 90% of savings: the grant of the Ministry of Education for €0.5 mln jointly with KazGU (GreenWell Mechanics project)

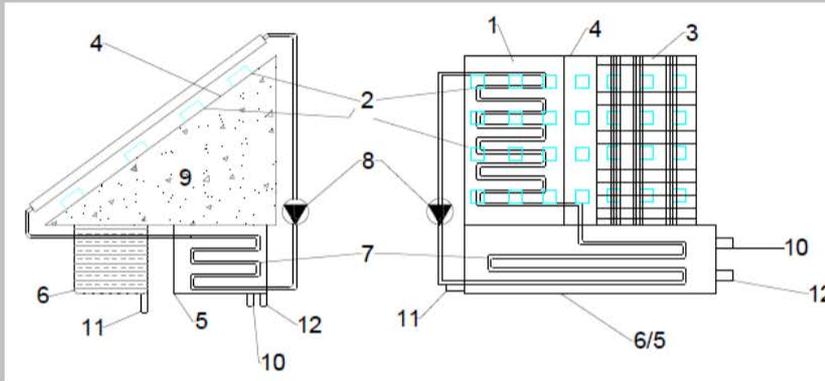
2) **Solar heat pump** for heating in cold climate, does not require drilling wells: the grant of the Ministry of Education for €0.3 mln jointly with KazGU (Q-Alt project)



3) Other developments: **Solar water desalination, Solar cooling, Light shelves, and etc.**



3) Solar water desalination.

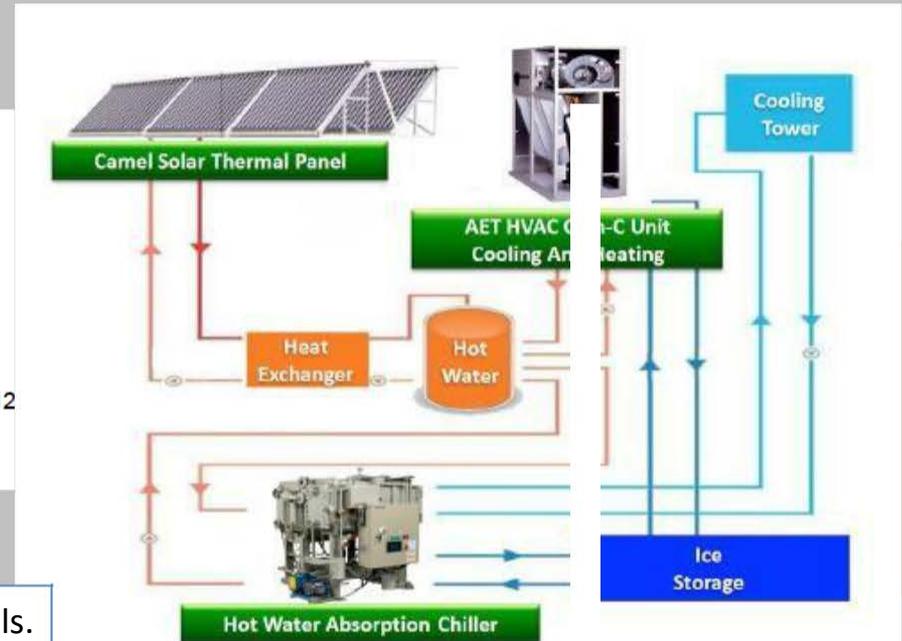


It is a combination of PV and thermal solar panels. Scalable, autonomous and mobile. SC evaporate dirty water. PV modules condensate clean water using TEM. The prototype is built. The patent is protected. Relevant for the regions without fresh water.

Facility: a farm, a greenhouse

Price: from 300 to 500 thousand tenge per equipment

4) Solar refrigerator (hybrid with gas)

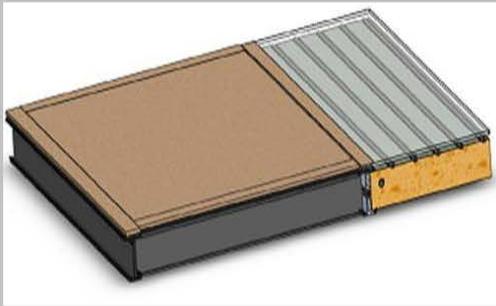


Winter combined gas (80%) / solar (20%) heating system can be used in summer for cooling. An agreement with the No. 1 manufacturer in China to promote this new technology.

Facility: any with a capacity above 100kW

Price: from to 20 mln tenge

New product: HelioFasad™



Joint development with VIMA LLP (grant of the Ministry of Education/WB)

Proposed solution is the combination of two innovative technologies: **module facade** and **solar collector**. It is able to replace the interior and exterior finish, stained glass windows.

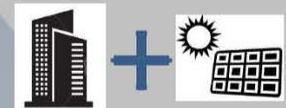


VIMA LLP:

- No. 2287 utility model patent; "Fixing block for facade elements"; Viktor Mamin; 28.10.2016

KunTech LLP :

- No.1583 utility model patent, No.1584 utility model patent, "Sheet heat panel of the solar collector" Diyaz Bayseitov; 24.07.2015, 30.07.2015



“KunTech” LLP



ph.:

KUNTECH
энергия в подарок

EXPO 2017 winner

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