CITADEL
ADVANCED ENGINEERING

Innovative
energy efficiency technologies

Our mission

Our mission - development and introduction of the new products improving economics, energy consumption, and environmental efficiency and safety of life

We want to help people to survive on Earth and assist with space efforts

NASA:
to 2075 global sea level will rise up to 2 m

Why is it promising

Global climate change:

- **increasing the cost of electricity and engineering equipment for cooling and heating**
- the increase in global sea level,
- the increasing frequency and destructiveness of natural disasters (**floods, hurricanes,** earthquakes**,** tornados,etc.),
- the displacement of climatic zones,
- the increase in the average global temperature,
- temperature anomalies, **cost of utilities**
- population growth

National Oceanic and Atmospheric Administration (NOAA) announced that the damage from natural disasters in 2017 amounted to 306 billion dollars, 90 billion dollars more than in 2005, when the record was previously set.

Sustainable development

Recyclable materials are used in the production of our building elements.

The production process itself and the operation of our buildings are optimized for minimal impact on the environment.

The production process leaves no debris.

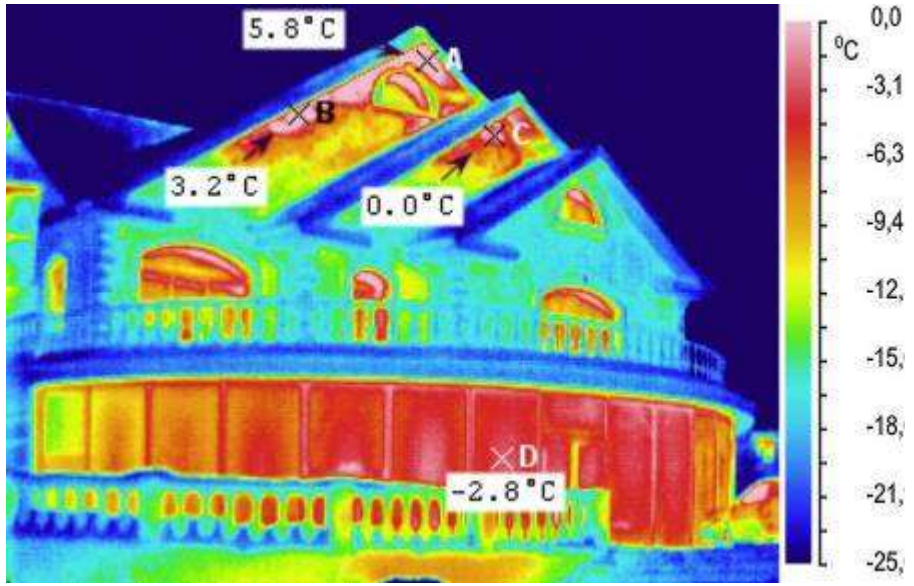
Glassing - why it is important?

Problem:

- ✓ Energy efficiency and Energy savings
- ✓ Big part of the energy is lost to environment across the windows
- ✓ **Windows are the key loss factor of energy**

Global trends:

- ✓ ECOlogy, green construction
- ✓ Energy saving
- ✓ Natural lighting
- ✓ Panoramic glazing
- ✓ Passive House



Windows - the key to energy savings in the building

Our Solution: glazing

The index of **glassing heat transfer resistance in the GCC region varies from 0.33 (m2 K)/W** and when using glasses with low-emission cotings with argon gas filling can reach **0.65 (m2 K)/W** but our solution **5 - 10 times** more efficient than conventional windows in GCC

Up to 10 times of energy saving VS standard glassing

- ✓High protection from outdoor heat and cold
- ✓High noise insulation
- ✓Reducing CO2 emissions
- ✓Maximizing natural lighting
- ✓No condensate
- ✓Complies with ‘green’ standards LEED, BREEAM
- ✓Profile of any material
- ✓Can be used for any buildings types
- ✓Affordable price

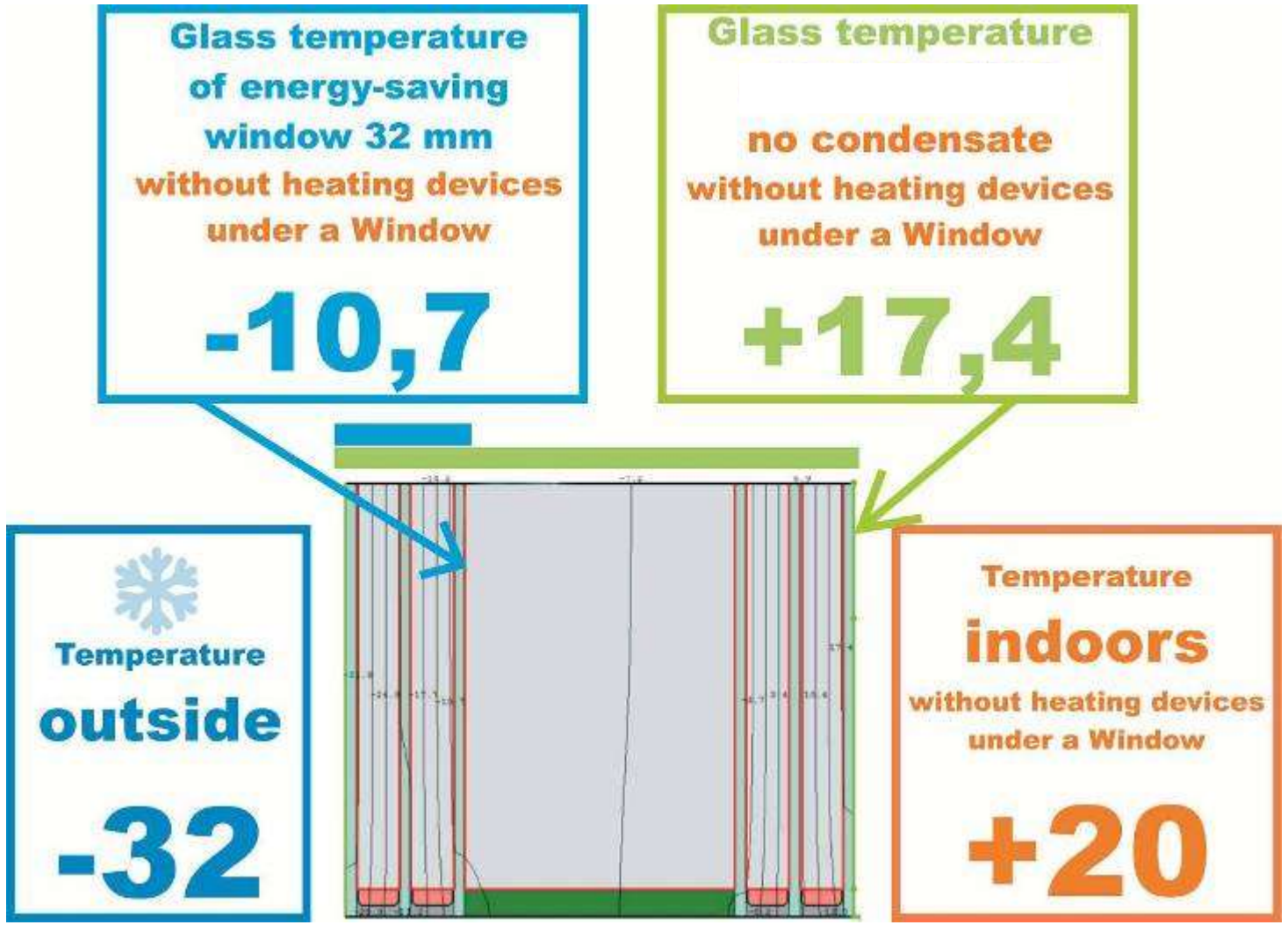
Uw= 0,29 W/m2K

Rw = 3,4 (m² K)/W

Patent №2620241RU (30.03.16),
EPO №201700601/26 (27.12.17),
PCT/RU2016/000190 (05.04.2016),
WO №2017/171578 (05.10.17)
EP patent
USA patent

Scheme of Glazing

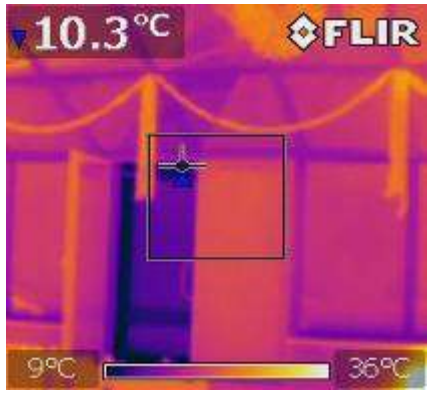
Our translucent structure comprising at least two independent IGU modules wherein IGU modules are joined together in such a way to create a chamber between them.



Example of energy efficiency

Room – 200 sq.m., glazing area of winter garden – 250 sq.m.
BEFORE: problem of the room – cold in winter, hot in summer; excess energy consumption.
AFTER: in the winter temperature indoors +23 degrees Celsius (+74 degrees Fahrenheit), reduced the usable period of the batteries, installed a thermostat for economical operation of the boiler.
In the summer: the absence of the greenhouse effect, reducing 4 times energy consumption for air conditioning.

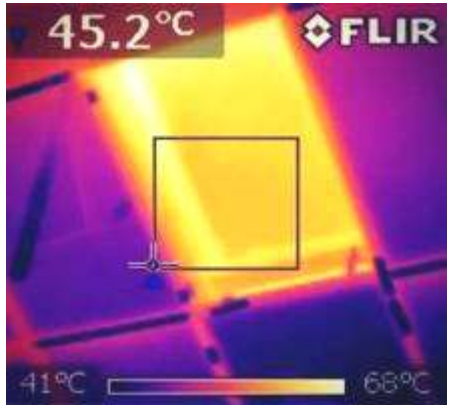
WINTER t outside -17 degrees Celsius or 1,4 degrees Fahrenheit



The temperature difference:
26 degrees Celsius
(78, 8 degrees Fahrenheit)

Temperature of inner glass surface of energy-saving window 32 mm, tinting +10 degrees Celsius +50 degrees Fahrenheit
Temperature of inner glass surface of TEPLORIUM + 36 degrees Celsius +97 degrees Fahrenheit

SUMMER t outside +36 degrees Celsius or 96,8 degrees Fahrenheit



The temperature difference:
27 degrees Celsius
(80,6 degrees Fahrenheit)

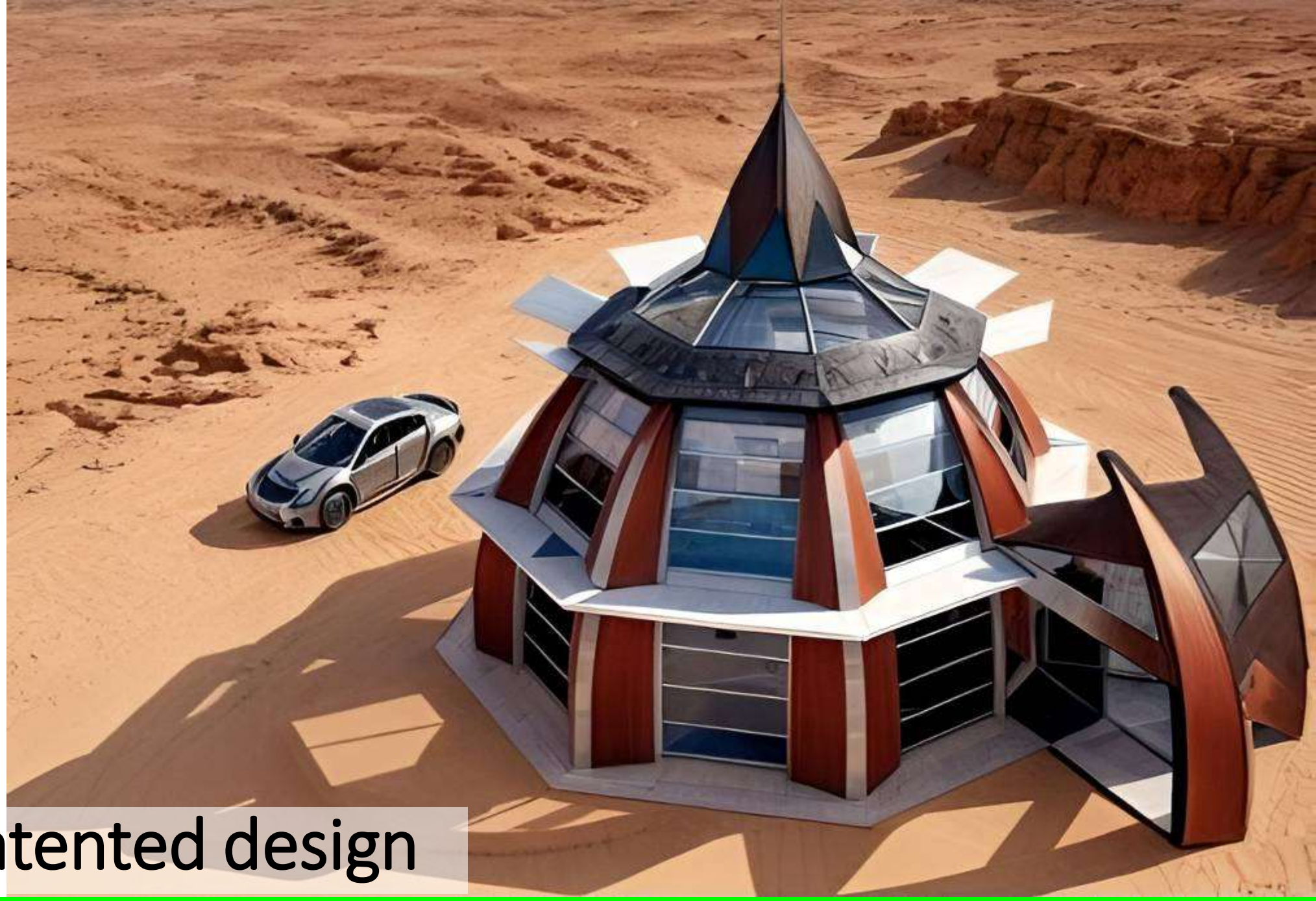
Temperature of inner glass surface of energy-saving window 32 mm, tinting +68 degrees Celsius +154 degrees Fahrenheit
Temperature of inner glass surface of TEPLORIUM +41 degrees Celsius +106 degrees Fahrenheit

Comparison with the best world alternatives

	OUR SOLUTION fasades windows doors	Best in the world			Standard	
		SCHUCO Germany fasades FW 60+.HI, Schüco FW 50+HI	WICONA, SCHUCO Germany windows Schuco AWS 120 CC.SI WICONA WICLINE 125	Interhorm Austria Wooden-aluminium windows Interhorm HV 350	IGU	Best IGU
Rw, (m^2 K)/W	3,4	1,25	1,53-0,83	1,25- 1,55	0,6	1
Uw, W/(m^2 K)	0,29	0,8	1,2 – 0,65	0,64 – 0,8	1,67	1

- ✓ Increasing the area of glazing up to 3000 mm x 6000 mm, doors up to 3000 mm
- ✓ Big size window leafs opening up to 1000 mm wide and up to 2500 mm high

Sales



Unique patented design

Our Net Zero strategy - real-life project

Our Net Zero strategy - real-life project

A real-life NetZero project. Many assembling options and engineering modules used allow the ability to harvest and use available natural resources to make the building more autonomous and efficient. That includes (but not limited to) solar and wind power plants with energy storage, heating and air conditioning units, desalination and water condensation plants (to produce own drinking water), etc.

All materials used for the production are produced on the territory of GCC

Efficiency in any climatic zone

Efficiency in Residential buildings

Others option models MAJELIS

Floating building

The building can be equipped with a floating pontoon

Floating building

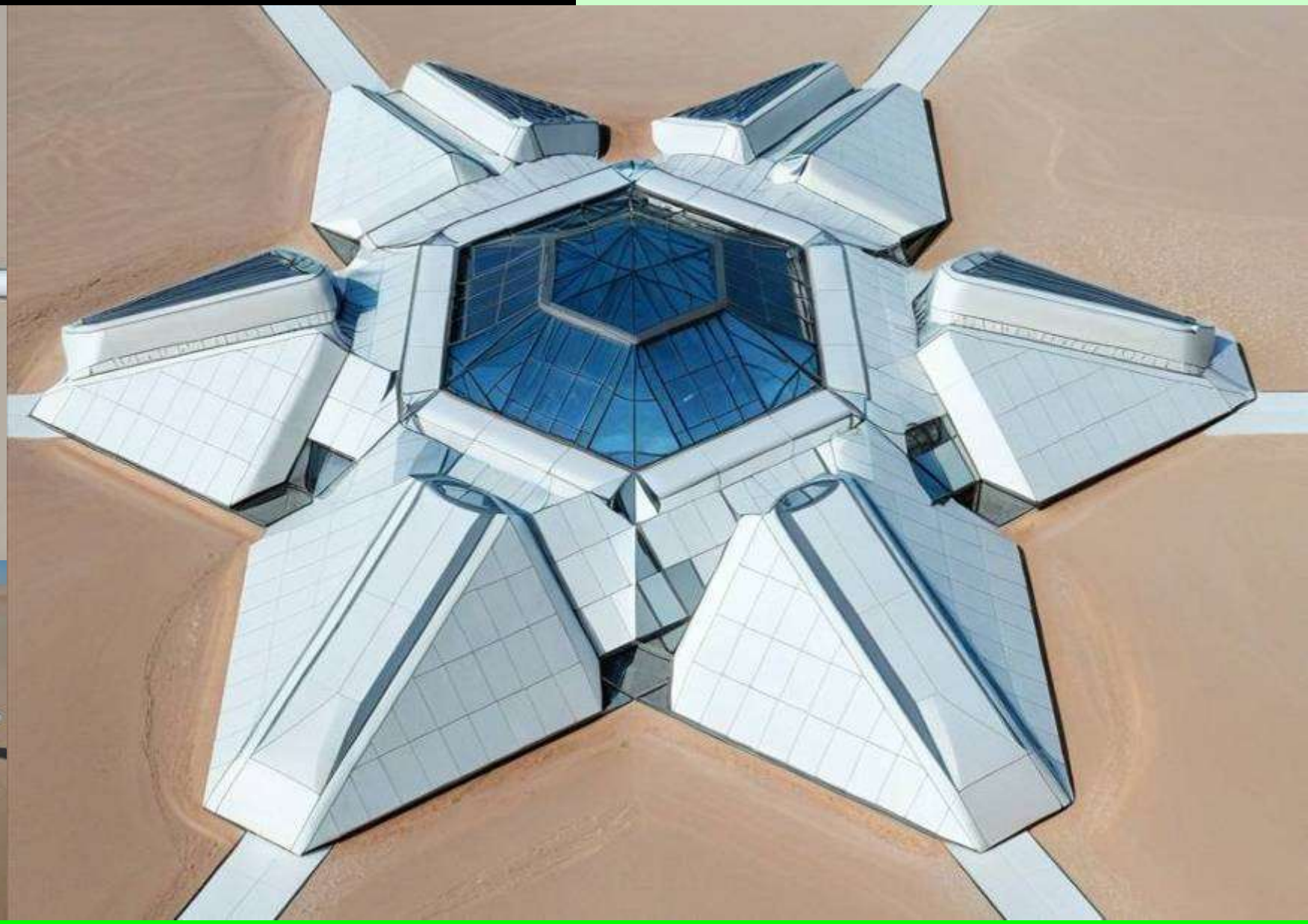
Unique design, energy autonomy

The possibility of using luxury finishing materials

Others option models

Others option models

Flexible modular design



Possibility of expanding the area

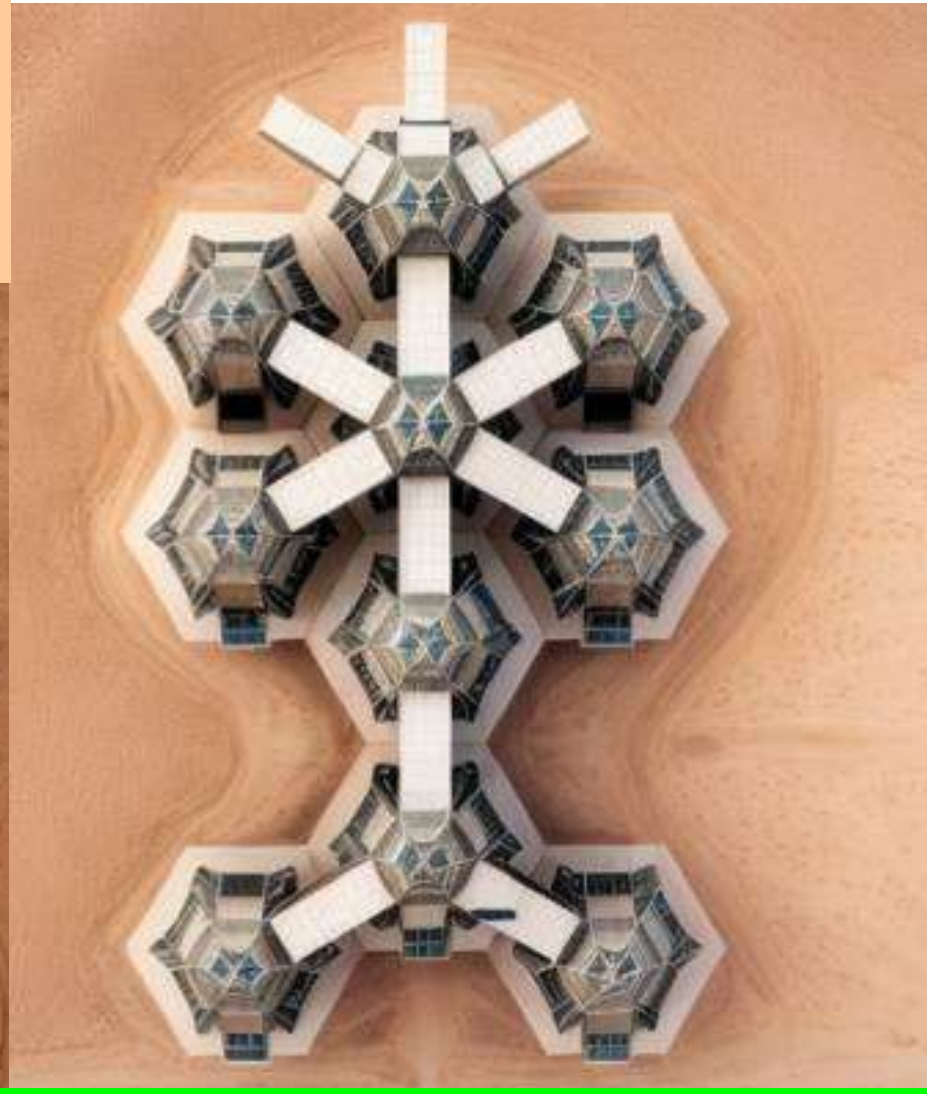
Possibility of expanding topics (new buildings:

- **MARS-1, Star Wars,Travel around the World, Sights of the World etc**

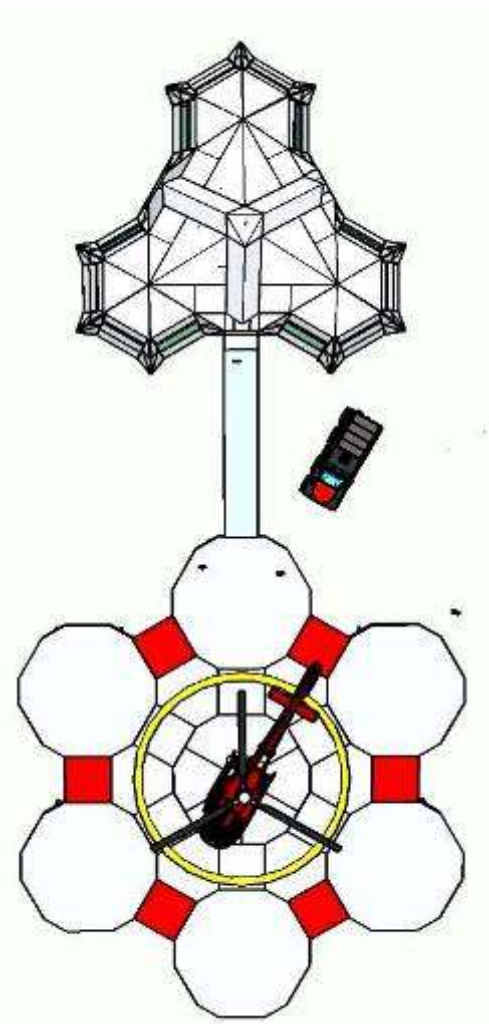
Expansion (new buildings):

- **Wind Tunnel attraction, children's carousels in the style of Space** and others

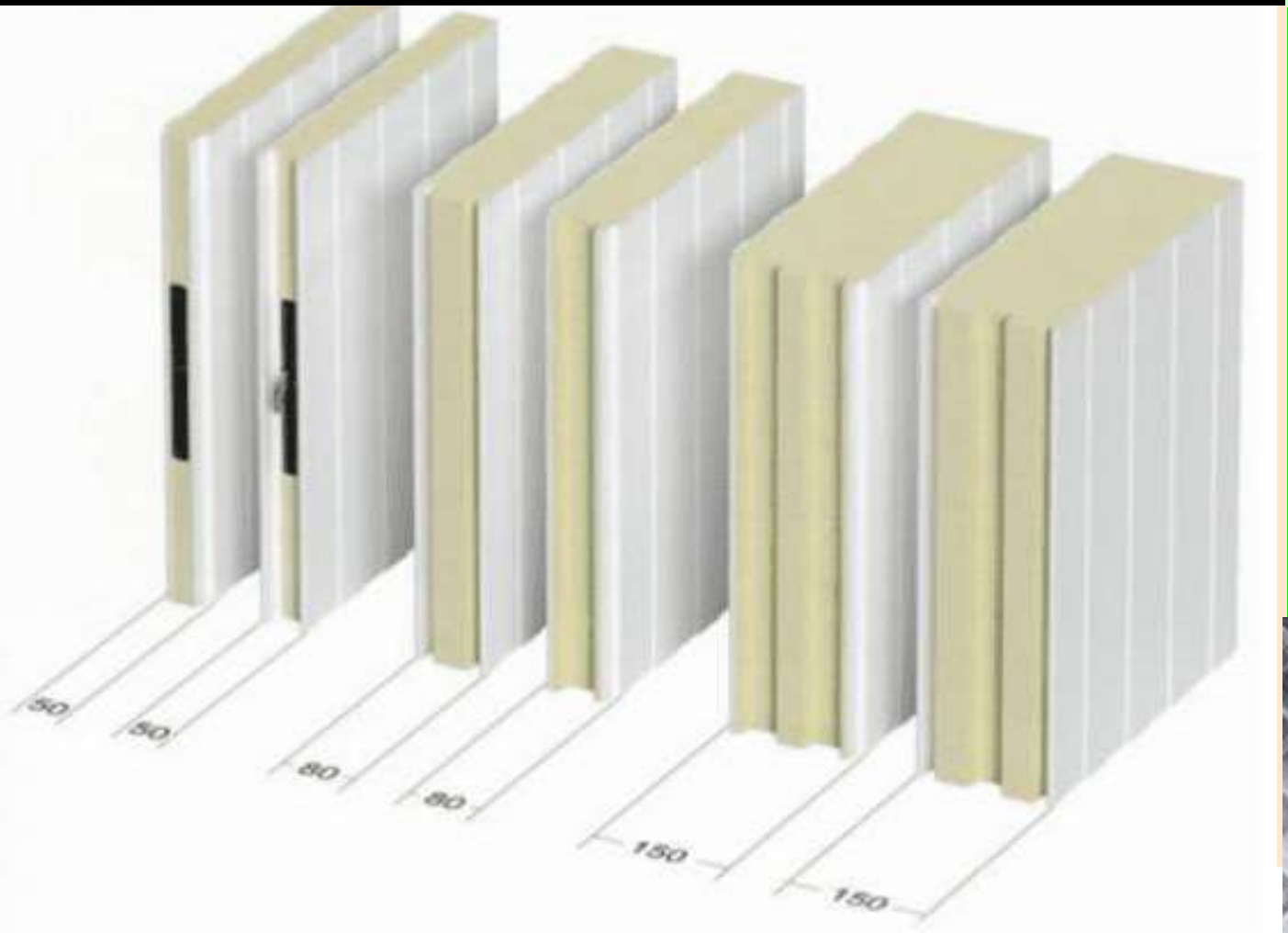
Autonomous villas ‘Crystal



Compositions from several modules



Walls and insulations PIR



Walls and insulation PIR

Insulation based on polyisocyanurate (PIR) thermosetting of the polymer - when exposed to fire, a porous carbon matrix is formed (charring and coking of the outer surface of the insulation), which prevents internal gorenje and the spread of fire.
Lightweight, durable

Variability of building area and height

2 generations of design

Building diameter and height are variable:

- diameter 6-50m height 4-12m square 36-1500

CYBER DOME STYLE

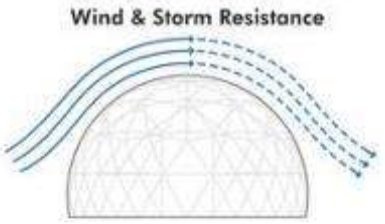
DESERT DOME STYLE

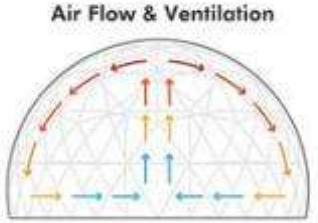
Advantages

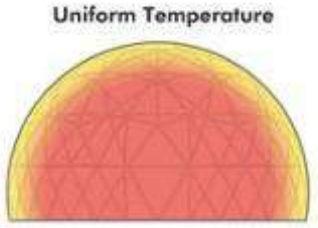
PROTECTION FROM FLOODS, HURRICANES, TORNADOS, AND EARTHQUAKES:

Wind, storm and seismic resistance
High fire safety
FLOATING and Armored version

Mobility
Quick and easy to build
Easy to transport to any location
Flexible to use
For homes and commercial
Ease of clustering upto buildings-settlement



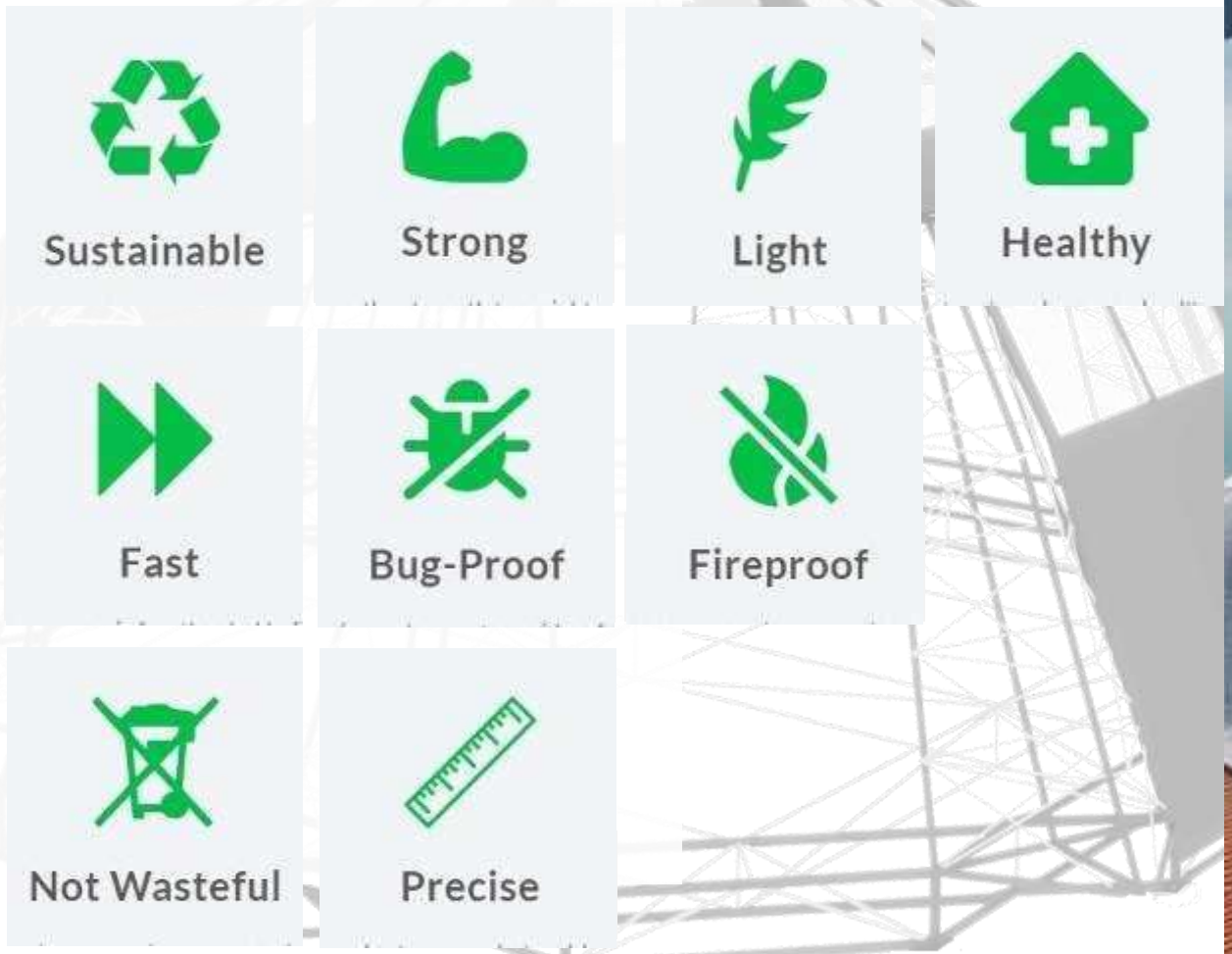




ENERGY EFFICIENCY:
Up to 70 % of energy saving.
Integrated solar panels Panoramic glazing or all-glass building

Very sturdy Aluminum-framed or Steel-framed structures

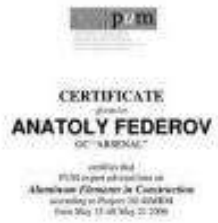
Aluminum is a Better Building Material



International Awards

Professional team with:

- ✓ **Experience in construction from 2003**
- ✓ **International awards**
- ✓ **StartUpGermany2018 finalist**

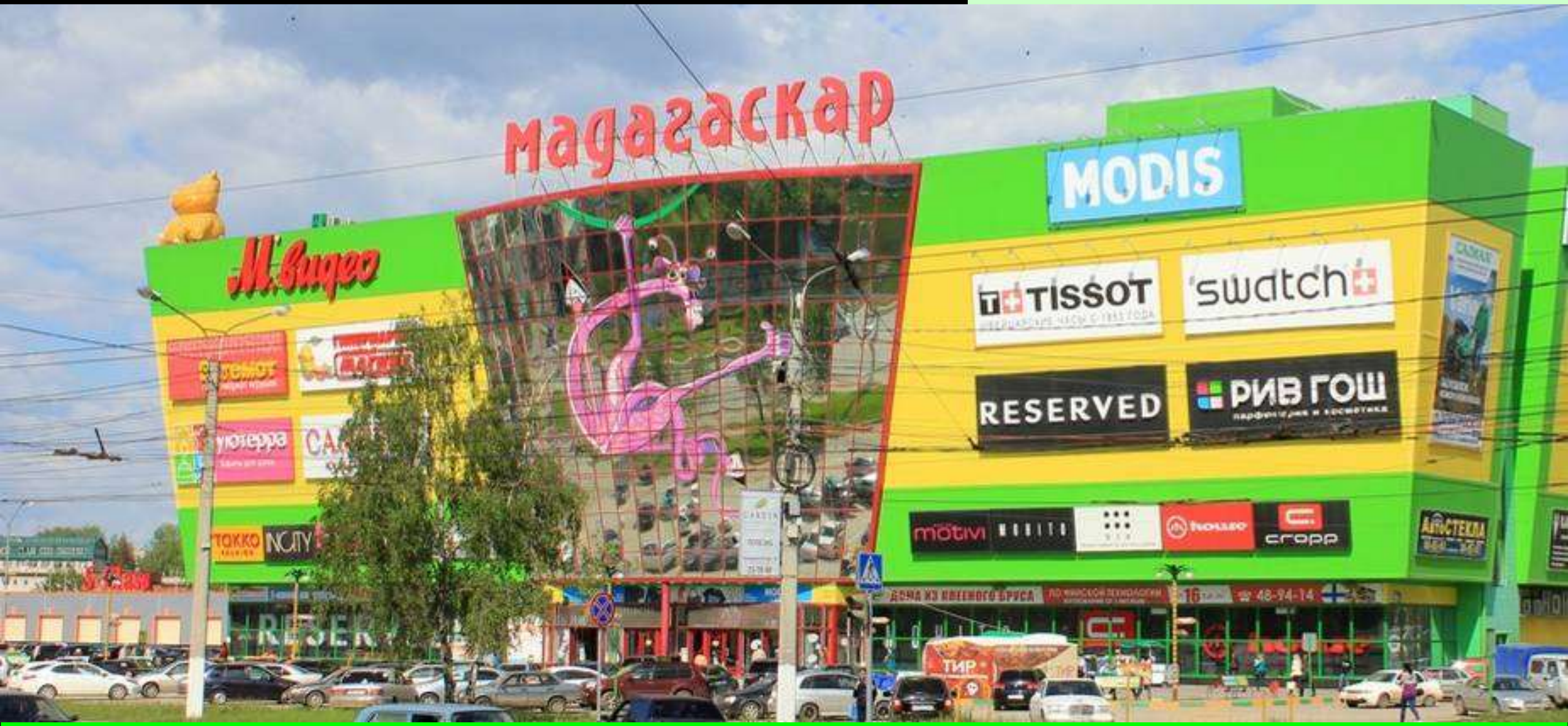


Our experience

Our innovative glazing

Our innovative glazing

Our innovative glazing



Our innovative glazing

Our innovative glazing

The most energy efficient glazing in the world

Our experience

The most compact building for transportation

On-site assembly is a simple process of connecting the ready-made modules according to a simple instruction and can be performed by anybody, including small team of a very few people or just a family without special training and without lifting equipment.

Construction is designed for easy mobility – 300-600 square meters of building can be placed into a standard 40-foot container or a track.

The kit includes a frame, foundation, windows, door and exterior cladding.

That allows the customers to use our building in any, even a most remote location.

Transportation options by any method

CONTACTS

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