Energetic Thermo-Modernisation with ISOMAX TERRASOL Technologies for the Buildings of the World

Roughly 46% of the energy - we use - is “wasted” on climate control in the buildings of the world.

The urgently necessary energetic thermo-modernisation, or “ETM”, using ISOMAX technologies tested internationally in all climate zones could save these vast quantities of energy over the next 10-12 years both economically and in an extremely environmentally friendly way through the dual energy system of EARTH and SUN.

Ground temperatures near to the surface in connection with *solar heat* are available to us at no cost and in an environmentally friendly way in unlimited quantities, both in winter and summer.

The practical technology for utilisation of these inexhaustible quantities of energy in building climate control (heating, cooling, ventilation and pre-heating of water) was tested and evaluated on buildings in all climate zones over the course of 30 years of research and development by the graduated engineer and physicist Edmond D. Krecké of Luxembourg, not only for new buildings but also for the energetic thermo-modernisation of the existing buildings of the world.

In many countries on our planet, these ®ISOMAX ®TERRA-SOL buildings have been built for years as passive houses (8-12 kWh/m2/y) or even “zero energy” buildings under licence from the developer.

The astounding technical ease with which the dual energy of “EARTH and SUN” can be used for energetic thermo-modernisation of buildings is described below:

1) As far as possible, a roughly 2.50 m wide working trench is dug around the building down to the depth of the foundation base for creation of the heat and cold reservoir.

2) At a distance of approx. 1.50 m from the basement walls, an additional 15 – 20 cm wide and approx. 1.50 m deep ditch is dug. In this ditch, 12 cm Styrodur insulation panels with 2 m length are professionally installed as perimeter insulation and the remaining open volume is filled and compressed.
As a result, 50 cm of the Styrodur insulation panels protrude into the working ditch.

3) At a distance of approx. 20 cm from the outer basement walls, 40–60% (depending on the climate zone) of the pipe-in-pipe counter-flow ventilation system is laid within this future heat reservoir and the remaining 40-60% of the length outside of the perimeter insulation.
Both pipe ends must be run into the building through the outer basement wall to where the manifold will later be installed.

4) After careful laying of these stainless steel coaxial pipes, this area is levelled with sand.

5) On this new level, a light steel reinforcement mesh (1.50 m wide) is laid above the heat reservoir and another 0.80 m wide steel reinforcement mesh is laid outside of the perimeter insulation.

6) Lines of PP-20/2 hose are fastened to these steel reinforcement meshes according to the energy calculation for the building (in this case, a single-family home is taken as an example).
At the same time, a 32 mm diameter PE hose is laid in the heat reservoir for the hot water pre-heating.
All ends of the hose lines are run through the outer basement wall to the ISOMAX distributors inside.
Then all hose lines are embedded in approx. 6 cm of concrete as protection against rodents.

7) Above the concrete layer of the heat reservoir, 12 cm of Styrodur insulation is laid to minimise upward energy losses.
These 12 cm insulation panels must be laid precisely with the vertically installed insulation panels – without large gaps.
Sealing of the joint against the outer basement wall must be performed properly.
This heat reservoir will fulfil its function completely if the described insulation is laid properly so that the energy introduced from the solar collectors takes the heat reservoir from an initial +9° C to 12° C (depending on the climate zone) to +17°C to +22°C.
This temperature also very quickly flows to the side under the building.

8) If desired by the building owners, measurement probes can be placed in both the heat and cold reservoir to allow visual evaluation of the performance of the dual energy system.

9) Against the outer basement walls, the ISOMAX temperature barriers in the form of PP 20/2 hose lines are laid according to the energetic calculations and segmented per room, levelled with levelling plaster, lined with 15 cm of Neopor insulation and protected by dimpled sheeting and a drain plate.

10) Against the outer ground level and upper level walls, the ISOMAX temperature barriers in the form of PP 20/2 hose lines are also laid according to the energetic calculations and segmented per room, levelled with levelling plaster, lined with 5-15 cm of Neopor insulation (depending on the climate zone), reinforced with textile sheet and textured plaster or scraped stucco.

11) For the required roof modernisation, an intermediate Neopor insulation layer of 5 - 25 cm (depending on the climate zone) is laid.
Between this insulation and the roof cladding, PP 20/2 hose lines are also laid according to the energetic calculation.
These then make up the ISOMAX solar absorber.
(The average solar radiation received in Europe is 1,000 kWh/m2/y.
We generally utilise approx. 20-25% of this with the PP-20/2 hose lines.)

12) A small circulating pump is then activated by a temperature difference switch to transport the solar energy of the SOLAR ABSORBER into the HEAT CIRCUITS.

13) In winter operation, we take the heat from the HEAT CIRCUITS (+17°C to +22°C) and transport this to the TEMPERATURE BARRIERS in the outer walls.
In summer operation, we take the cold from the COLD CIRCUITS (+9°C to +12°C) and transport this to the TEMPERATURE BARRIERS in the outer walls.
This results in an extremely favourable delta-T between the indoor and wall temperatures for all climate zones of the world in winter as in summer, while maintaining pleasantly uniform and very comfortable room temperatures.

14) A stainless steel pipe-in-pipe counter-flow ventilation system supplies the building with fresh warm/cold air.
At the construction site, the approx. 50 m long coaxial pipe is wound and laid with 40-60 % in the HEAT CIRCUIT and 40-60% in the COLD CIRCUIT.
The efficiency level is approx. 98%.

An enormous additional energy source arises from the fact that the supply air in the outer pipe absorbs the energy of the ground (heat/cold), providing the ISOMAX TERRASOL building with a massive amount of additional, free energy.

15) If a ground reservoir arrangement is not possible, it is also possible to use a cyclically stable salt hydrate, packed in flat magazine form with extremely reduced volume.
The melting point lies at +26°C.
When heat is transported over this phase-change material, the hydrate melts, storing the thermal energy (and cools as a side-effect)!
More information is available at www.rubitherm.com

16) The infinite, gigantic dual energy potential of EARTH and SUN is the most economical and environmentally friendly climate control energy available for buildings.

“The best energy is the energy we do not need.”
“It is not enough to say we want to protect the environment, we have to do it as well.”
Quote: E.K.