

Editorial

The world energy crisis—Part 2: Some more vacuum-based solutions

The paradigm of energy starting from resources, continuing along the environmental impact and sustainability of its usage and ending with the reduction of its consumption has once more made an overwhelming reappearance in our economical, ecological, political, social and, last but not least, scientific consciousness.

The finite fossil resources and their environmental impact [1], the still unresolved issue of nuclear waste [2], the long reluctance in fostering solar and wind energy [3], and the rising energy demand due to the worldwide urban population growth [4] are the major challenges we are confronted with.

Within the context of energy consumption buildings are of major and increasing importance and they can be envisioned by recalling the following facts:

- the urban population is spending more than 90% of its lifetime in buildings;
- 30% of the total energy consumption is spent for heating and cooling in the industrialized countries, soon this will be a reality also in newly industrializing countries;
- the urban population is growing and in a few years will pass the mark of 50% worldwide;
- the comfort requirements for buildings worldwide are also rising;
- material production, product assembly and maintenance require a large amount of energy.

The notion of “vacuum” expresses the absence of matter in general, implying the suppression of conductive and convective heat transfer, as well as the prevention of unwanted chemical reactions. The first three contributions of this special issue deal with the vacuum insulation panel, the history of its development; its in situ performance applied to a flat roof and the quality control procedures for its production. The next contribution reports on long-term chemical heat storage placed in an integral vacuum

container. The subject of the fifth and the sixth contributions are evacuated glazings with low-emittance coating and aerogel filling, respectively. The last contribution focuses on switchable windows with vacuum-coated tungsten-oxide layers. I have to admit to being unsuccessful in persuading any of the three largest manufacturers of glass-coating assemblies in Europe to contribute to this issue. They all declined due to unprecedented investments mainly in China absorbing all the manpower available. I can assure them my full understanding.

All the above topics address the latest “vacuum-related” issues on energy saving and storage in the building industry and will have an enhanced relevance when tackling the unavoidable task of CO₂ reduction.

I am greatly indebted to all the contributors for their effort and interest, to the reviewers for their assistance with suggestions for improvement of the manuscripts as well as to John Colligon for his obliging reception of having another special issue of “VACUUM” on the topic of the world energy crisis, this time dedicated to vacuum-based energy-saving possibilities.

My gratitude goes also to the sources, to Fritz Heinrich my late “Doktorvater” at the Swiss Federal Institute of Technology for introducing me to the world of scientific publication.

References

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Karim Ghazi Wakili
Empa, Materials Science and Technology,
8600 Dübendorf, Switzerland
E-mail address: karim.ghaziwakili@empa.ch