

# CAMaRSEC – Climate-adapted material research for the socio-economic context in Vietnam

## Client II – International partnerships for sustainable innovations

As a result of the rapid economic development in Vietnam, the lifestyles and needs of its population are changing as they live in new types of buildings with new materials, designs and supply systems. This development is leading to far-reaching structural and building physics-related problems, especially considering the country's demanding climatic conditions, which stand in the way of energy-efficient and sustainable construction. Consequently, the German-Vietnamese project "CAMaRSEC" supports the implementation and further development of energy-efficient, resource-saving, sustainable construction practices. Effective infrastructures for research, definitions of material characteristics, training and education resources and methods for transferring scientific results into Vietnamese construction and planning practices are being developed based on interdisciplinary problem analysis and fundamental research.

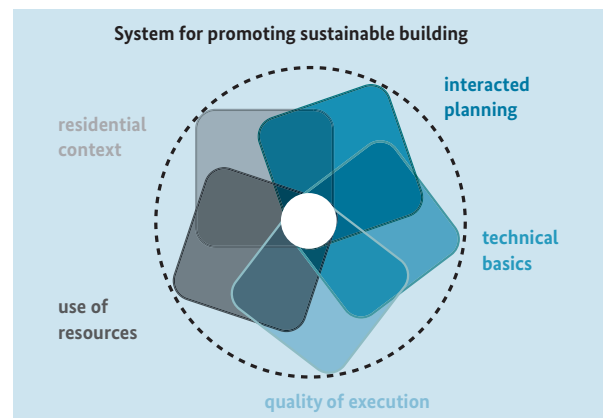
### State of science and technology

New types of buildings are being developed to meet the changing demands for comfort and convenience of Vietnam's residents. These developments also entail changes to a building's indoor climate. Construction materials are now exposed to these new climatic conditions and the materials and building systems currently used in the Vietnamese construction industry are also changing. For example, unfired bricks such as concrete and cellular concrete blocks are being promoted as alternative materials for the construction of modern high-rise residential towers in order to reduce the energy requirements and environmental impacts caused by brick production and the consumption of farmland for clay extraction. However, such new materials require both adapted technologies and new processing techniques as well as integration into the structural and plant engineering of the building's design in order to succeed as a permanent and sustainable replacement for established construction methods. The performance of new materials in humid conditions is particularly important in this context. Failure of these new building techniques, such as cracks in the plaster or moisture ingress, will bring the new construction practice into disrepute. There is currently insufficient knowledge within the Vietnamese construction industry of the relevant physical building properties and a lack of competence in using these materials.

"CAMaRSEC" therefore addresses the issues that are impeding the effective application of the necessary tools for energy-efficient and resource-saving construction in Vietnam and, in particular, the successful application of the new national energy code for residential tower construction.

### Inspections and project goals

The project examines the problems from five perspectives, which – when combined – illustrate the life cycle context of new residential buildings. These comprise the living context, integrated design, technical principles, quality of execution and use of resources.



Inspection aspects of the "CAMaRSEC" project.

All of these topics are designed to establish an effective governance framework to promote sustainable construction in Vietnam. For this purpose, extensive scientific sociological user surveys will be carried out in parallel with engineering audits of the building engineering physics in order to identify the current status quo. The climate conditions in relation to current construction practices will also be analysed.

Based on this interdisciplinary problem analysis and fundamental research, a central result of the project will be the development of a building physics research infrastructure

for scientific materials research and the identification of building material characteristics. A plan will also be drawn up for establishing a building physics laboratory and an outdoor testing area for material weathering. This will support the introduction of a regulatory framework on advanced engineering and energy-efficient and sustainable construction practices. In addition to this, skill-building measures will be implemented in different phases of the building life cycle.



Outdoor testing facility, Fraunhofer Institute for Building Physics, Holzkirchen.

### Contribution to sustainable construction

“CAMaRSEC” promotes the effective implementation and further development of construction standards and will thus make an effective contribution to energy-efficient, resource-saving and generally sustainable construction practices in Vietnam. The project activities are closely linked with plans sponsored by the local Ministry of Construction for building physics test facilities to be set up by project partner, the Vietnamese Institute for Materials. The project is also linked to plans of the National University of Civil Engineering and Ton Duc Thang University to develop study programmes on energy-efficient and sustainable construction as well as being involved in the training of construction workers in partnership with the College of Urban Works Construction. “CAMaRSEC” also supplements complementary projects run by other actors (for example UNDP, IFC, GIZ) which support the introduction of resource-efficient construction methods and the implementation of the new national energy standards. “CAMaRSEC” thus taps into huge potential for far-reaching effects.

The project takes a practice-oriented approach towards achieving the global energy and resource revolution in the construction industry, reaching far beyond Vietnam into the tropical regions of the world with its continuous and rapid socio-economic development.

#### Funding initiative

Client II – International partnerships for sustainable innovations

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CAMaRSEC – Climate-adapted material research for the socio-economic context in Vietnam

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#### Project partner

University of Hamburg; Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V.; TAURUS Instruments AG; BFW Berufsförderwerk BAU Sachsen e. V.; Vietnamese Institut for Building Materials; National University of Civil Engineering; Ton Duc Thang Universität; College of Urban Works Construction; Vietnam National Construction Consultants Corporation

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