


Research, Technological Development and Innovation Centre in Civil and Building Services Engineering

Contact details

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Areas of expertise

- 1. Energy management of buildings and associated technologies:** energy demands and consumption in existing and future buildings; energy balances in building complexes (residential, commercial, industrial, public and other buildings); energy conservation in built environment; energy sustainability, resilience and climate adaptability of buildings; external and internal design conditions for energy efficient buildings; life cycle energy efficiency of buildings and embodied energy; residential energy refurbishment; and renovation; building envelope materials; new building materials; engineered structures for buildings; sustainable building management strategies; clean technologies associated with energy efficient buildings; specific sustainable technologies for the building construction industry.
- 2. Sustainable development of localities infrastructure:** adaptive built environments for sustainable cities; public health interventions in the built world; water infrastructure; power and energy infrastructure; transport infrastructure; engineered structures: bridges, railways, roads and other transport infrastructures; emerging technologies in urban sustainability and construction; information technology infrastructure; resilient infrastructure; rural infrastructure; urban infrastructure; remanufacturing, reuse and recycling; waste management infrastructure; intelligent systems and technologies.
- 3. Renewable energy management and associated technologies:** biomass conversion; energy bioresources; geothermal technology; HydroPower; hydrogen production technology and fuel cells; nuclear energy; nutrient-energy-water nexus; photovoltaic technology applications; solar and low energy architecture; solar radiation management; solar thermal applications; thorium energy; wave, tide and ocean energies; wind energy technology; circular economy of urban development under the current climate changes; socio-economic and policy issues; clean technologies associated with renewable energy - optimization techniques, Life Cycle Assessment (LCA), Life Cycle Inventory (LCI), Life Cycle Impact Assessment (LCIA), Life Cycle Costing (LCC).

Team

Director: prof.univ.dr.eng. Ioan AȘCHILEAN

| 1. Energy management of buildings and associated technologies | 2. Sustainable development of localities infrastructure | 3. Renewable energy management and associated technologies |
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| Responsible: assist.prof.dr.eng. Horea DAN | Responsible: assoc.prof.dr.eng. Ovidiu GAVRIȘ | Responsible: assist.prof.dr.eng. Raluca FELSEGHI |
| Members: - assoc.prof.dr.ec. Sorina CIPLEA - assist.prof.dr.eng.Dorina SUCALĂ - assist.dr.eng. Raluca IȘTOAN - drd.eng. Paul Adrian BUDUȘAN - drd.eng. Marian BUTEAN - drd.eng. Alex O. MUNTEAN | Members: - assist.prof.dr.eng. Mihaela DUMITRAN - assist.prof.dr.eng. Adrian BOJAN - drd.eng. Vlad Răzvan AȘCHILEAN - drd.eng. Cristian CIULBEA - drd.eng. Georgiana GIURGIU - drd.eng. Teodora RAD | Members: - assist.prof.dr.eng. Andrei BOLBOACĂ - drd.eng. Mircea AMBRO - drd.arh. Radu Ioan BOIERU - drd.eng. Monica MATEESCU - drd.eng. Ovidiu MATEESCU - drd.eng. Alexandra STOICA |

Representative projects

"Optimized system for producing thermal energy from renewable sources using heat pump", Main Partner: National Research-Development Institute for Cryogenic and Isotopic Technologies - INC DTCl ICSI Rm. Valcea Project partner: Technical University of Cluj-Napoca. Partnerships in priority areas Domain: 2-Energy Project acronym: OPTHP Contract no: 22-128 / 2008 Contract period: 2008-2011.

"Design and realization of the combustion pile assembly. Experimental determinations in order to establish functional performance. Elaboration of technical documentation to achieve a combination of hydrogen and airpowered combustion cells with a useful electrical power of up to 1kW", collaboration with - INC DTCl ICSI Rm. Valcea, 2008-2010.

"Unfavorable impact of street traffic on water, sewerage and gas pipelines solutions and ways to solve", Technical University of Cluj-Napoca & AIB CONSULTING SRL.

"Research and development of a membrane Reactor for the production of pure hydrogen usable in supplying fuel cells", collaboration with - INC DTCl ICSI Rm. Valcea, 2010.

Significant results

The most representative publications of the past 5 years:

1. Felseghi, R. A., Plesa, A., & Popa, A. S. (2024). Electrification of the Thermal Load in an Industrial Hall by Replacing Conventional Energy with Solar Energy. *International Journal of Energy Research*, 2024(1), 6459432.
2. Felseghi, R.A., Bolboacă, A., Răboacă, M.S., Aschilean, I. (2022). Hybrid Energy Systems for Power of Sustainable Buildings. Case Study: A Renewable Energy Based on-Site Green Electricity Production. *Comprehensive Renewable Energy*, 420-436.
3. Senila, M., Nead, E., Cadar, O., Kovacs, E.D., Aschilean, I., Kovacs, M. H. (2022). Simultaneous removal of heavy metals (Cu, Cd, Cr, Ni, Zn and Pb) from aqueous solutions using thermally treated Romanian zeolitic volcanic tuff. *Molecules*, 27(12), 3938.
4. Bhatia, A., Kumar, A., ... Verma, C., Illes, Z., Aschilean, I., & Raboaca, M. S. (2022). Networked control system with MANET communication and AODV routing. *Heliyon*, 8(11).
5. Aschilean, I., Cobîrzan, N., Bolboacă, A., Boieru, R., & Felseghi, R. A. (2021). Pairing solar power to sustainable energy storage solutions within a residential building: A case study. *Int. Journal of Energy Research*, 45(10), 15495-15511.
6. Felseghi, R. A., Aschilean, I., Cobîrzan, N., Bolboacă, A. M., & Raboaca, M. S. (2021). Optimal Synergy between Photovoltaic Panels and Hydrogen Fuel Cells for Green Power Supply of a Green Building—A Case Study. *Sustainability*, 13(11), 6304.
7. Ancas, A. D., Aschilean, I., Profire, M., & Felseghi, R. A. (2021). Experimental Study on the Behaviour of Seismic Actions on a Flexible Glass-Reinforced Plastic Structure Used in Water Transport Pipes. *Materials*, 14(11), 2878.
8. Filote, C., Felseghi, R. A., Raboaca, M. S., & Aschilean, I. (2020). Environmental impact assessment of green energy systems for power supply of electric vehicle charging station. *Int. Journal of Energy Research*, 44(13), 10471-10494.
9. Maier, D., Maier, A., Aschilean, I., Anastasiu, L., & Gavrîș, O. (2020). The relationship between innovation and sustainability: A bibliometric review of the literature. *Sustainability*, 12(10), 4083.
10. Ancas, A. D., Aschilean, I., Profire, M., & Toma, I. (2019). System for Increasing the Seismic Safety of Pipelines in the Water Supply and Distribution Networks. *Water*, 11(5), 1049.
11. Aschilean, I., & Giurca, I. (2018). Choosing a water distribution pipe rehabilitation solution using the analytical network process method. *Water*, 10(4), 484.
12. Aschilean, I., Iliescu, M., Ciont, N., & Giurca, I. (2018). The unfavourable impact of street traffic on water distribution pipelines. *Water*, 10(8), 1086.
13. Aschilean, I., et al. (2018). Design and concept of an energy system based on renewable sources for greenhouse sustainable agriculture. *Energies*, 11.5: 1201.

Significant solutions:

Calculation relations for the flows and pressure drops related to the rehabilitated and modernized pipes; technical and economic strategies for choosing the optimal method for rehabilitating or modernizing water supply systems; method for determining when to rehabilitate or upgrade of a water network (Aschilean method).

Simultaneous and interdisciplinary approach of the two concepts with a special role in streamlining and decarbonizing energy generation systems for residential consumers: hydrogen technology and passive house. Evaluation of the local potential for RES harnessing through on-site electrolytic production of hydrogen in order to power a residential building.

Patents:

Badea G., Moldovan E.M. Three-stage natural gas filtration assembly, no. RO 126840/28.03.2014.

Badea G., Aschilean I. Active system for functional isolation of fluid storage tanks, no. 126490 / 30.08.2013.

Badea G., Aschilean I. Active system for protection of pipes related to fluid storage tanks, no. 12666 / 30.12.2013.

The offer addressed to the economic environment

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| Research & development | <p>Pragmatic anchoring of research, technological development and innovation activities within the research center to the process of generating knowledge through the contribution of applied research to the innovative solution of practical problems. Supporting local enterprises in the Civil Engineering and Installations sector to be more competitive on the market by using applied research. Achieving the transfer of knowledge and technologies developed in the field of Civil Engineering and Installations for their implementation in Romanian enterprises.</p> <p>Development strategy. The research and development activities of the research centre are focused on:</p> <ul style="list-style-type: none"> - identification and valorization of the research infrastructure by expanding the collaborations between the research teams at UTCN level, expanding the collaborations between the research team and other institutions, national research centers (INCDTIM Cluj-Napoca; ICSI Rm. Vâlcea; ICIA Cluj-Napoca, etc.); - assuming an active role of the research center in relation to the economic sector by extending and applying the RDI results within projects developed by economic organizations; - concentration of teaching and research skills in order to increase synergy and achieve the critical mass of researchers in order to improve the success rate of research project proposals in national/international competitions; - assisting and providing institutional support for participation in research projects, with addressability for young teachers (assistants), PhD students and / or master students; - assisting, supporting and providing institutional support for participation in projects financed by structural funds; - increasing the national and international visibility of the Faculty of Civil Engineering; - increasing the number of scientific publications in prestigious international journals -ISI Web of Science; - increasing the number of publications (articles / books) in collaboration with foreign authors; - increasing participation in scientific events, conferences in the country and / or abroad; - involvement in organizing events and scientific initiatives with international participation. |
| Consulting | - design activities; technical expertise activities; specific project verification activities; management activities of investments; technical assistance of investments. |
| Training | - continuous training activities for specialists (project verifiers and technical experts); continuous professional training courses; short courses for profile engineers with topics of current interest. |