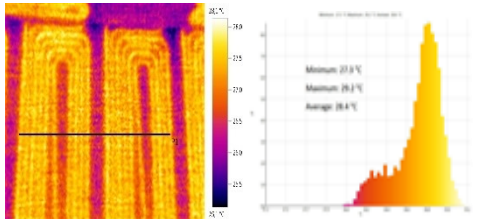




## WATER & ENERGY SYSTEMS

### Contact details

Name	<b>Water &amp; Energy Systems</b>																																												
Acronym	<b>WESYS</b>																																												
Logo																																													
Site	<a href="http://www.wesys.utcluj.ro">www.wesys.utcluj.ro</a>																																												
Address	128-130, 21 Decembrie 1989 Street, 3 <sup>rd</sup> Floor, Room 317, Cluj-Napoca, Romania																																												
Faculty Department	Faculty of Building Services Engineering																																												
Telephone	+40 264 202 558	<table border="1"> <thead> <tr> <th rowspan="2">Material; Material properties</th> <th colspan="3">Sustainability</th> <th rowspan="2">Utilities amount</th> </tr> <tr> <th>CO<sub>2</sub> emission equivalent</th> <th>Embodied Energy</th> <th>LCC*</th> </tr> <tr> <th>UM→</th> <th>[CO<sub>2</sub> eq.]</th> <th>MJ/kg</th> <th>[Euro/year]</th> <th></th> </tr> </thead> <tbody> <tr> <td>Concrete</td> <td>0.107</td> <td>0.75</td> <td>3.08</td> <td>0.92</td> </tr> <tr> <td>PVC-U</td> <td>3.23</td> <td>67.5</td> <td>4.72</td> <td>0.35</td> </tr> <tr> <td>HDPE</td> <td>2.52</td> <td>84.4</td> <td>5.15</td> <td>0.26</td> </tr> <tr> <td>GRP</td> <td>8.1</td> <td>100</td> <td>3.06</td> <td>0.32</td> </tr> <tr> <td>Vitrified clay</td> <td>0.55</td> <td>7.9</td> <td>2.54</td> <td>0.96</td> </tr> <tr> <td>Shares</td> <td>0.3</td> <td>0.3</td> <td>0.4</td> <td></td> </tr> </tbody> </table> <p>* Dn 600, road, 2 m deep.</p>	Material; Material properties	Sustainability			Utilities amount	CO <sub>2</sub> emission equivalent	Embodied Energy	LCC*	UM→	[CO <sub>2</sub> eq.]	MJ/kg	[Euro/year]		Concrete	0.107	0.75	3.08	0.92	PVC-U	3.23	67.5	4.72	0.35	HDPE	2.52	84.4	5.15	0.26	GRP	8.1	100	3.06	0.32	Vitrified clay	0.55	7.9	2.54	0.96	Shares	0.3	0.3	0.4	
Material; Material properties	Sustainability			Utilities amount																																									
	CO <sub>2</sub> emission equivalent		Embodied Energy		LCC*																																								
UM→	[CO <sub>2</sub> eq.]		MJ/kg	[Euro/year]																																									
Concrete	0.107		0.75	3.08	0.92																																								
PVC-U	3.23		67.5	4.72	0.35																																								
HDPE	2.52	84.4	5.15	0.26																																									
GRP	8.1	100	3.06	0.32																																									
Vitrified clay	0.55	7.9	2.54	0.96																																									
Shares	0.3	0.3	0.4																																										
Fax																																													
Director	Assoc.Prof. Dr. Eng. Eugen Vitan																																												
e-mail	<a href="mailto:eugen.vitan@insta.utcluj.ro">eugen.vitan@insta.utcluj.ro</a>																																												

### Areas of expertise

**Water systems:** Surveillance and measurements in water and sewer systems, Material selection methods, Water treatment, Water management  
**Energy in buildings:** Energy performance certificate, Energy management, Thermal imaging, HVAC performance monitoring, Indoor Air Quality (IAQ)

### Team

**Assoc.Prof. Dr. Eng. Eugen Vitan**, Assoc.Prof. Dr. Eng. Ciprian Bacoțiu, Assoc.Prof. Dr. Eng. Florin Domnița, Assist.Prof. Dr. Eng. Anca Hoțupan, Assist.Prof. Dr. Eng. Cristina Iacob, Assist.Prof. Dr. Eng. Anagabriela Deac, Assist.Prof. Dr. Eng. Gelu Chisăliță, Assist.Prof. Dr. Eng. Adriana Hădărean, Assist.Prof. Dr. Eng. Roxana Mare, Assist.Prof. Dr. Eng. Marius Fetea, Assist.Prof. Dr. Eng. Constantin Cilibiu, Assist. Prof. Dr. Eng. Raluca Moldovan, Drd. Eng. Angel Campianu.

### Representative projects

„**Report of the technical expertise of the sewerage works in the localities of Șpring and Cuța**,” contract with industry, 2023.  
 „**Algorithm for determining water losses in water distribution systems**” contract with industry, 2022.  
 “**Design of drinking water and sewage systems, expansions, rehabilitation**”, contracts SAMTID, POS, POIM, 2004-2019.  
 “**Study on the assessment of rainfall products by hydrological and hydrotechnical methods for 450 ha, elaboration of the 3D model and definition of their collection solutions**”, contract with industry, 2018.  
 “**Water balance in county water supply systems, algorithms and applications for a county system**”, contract with industry, 2018.  
 “**Good Practice Guide for achieving the optimum cost levels of the minimum energy performance requirements of the various categories of buildings**”, collaboration with UTCB, 2018.  
 “**Methodology for calculating the energy performance of buildings, indicative norm Mc001/2006: Revision methodology; Review/elaboration of comments and examples of application**”, collaboration with UTCB, 2017.  
 “**Shaping the degradation effects of water quality in distribution systems, associated with the situations of large discontinuities of consumption**”, contract with industry, 2016.  
 “**Method of choice of materials for urban infrastructure**”, Life Cycle Analysis (LCC), SSM Engineering tool (based on Global utility method), contract with industry, 2014.  
 “**Measurements for determining the performance of thermal rehabilitation works of buildings and related installations**”, contract with industry, 2011.  
 “**Research and development of a membrane Reactor for the production of pure hydrogen usable in supplying fuel cells**”, collaboration with ICSI Râmnicu Vâlcea, 2010.

**“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 air-powered combustion cells with a useful electrical power of up to 1kW”**, collaboration with ICSI Râmnicu Vâlcea, 2006.

## Significant results

### The most representative publications of the past 5 years:

1. Roxana Mare, Codruța Mare, Adriana Hadarean, Anca Maria Hotupan and Tania Rus “COVID-19 and Water Variables: Review and Scientometric Analysis”, *Environmental Research and Public Health*, 20, 957, 2023
2. E. Vitan, Anca Hotupan, Adriana Hadarean, C. Cilibiu “Overview and recommendations for analysis of water distribution systems based on performance indicators”, *JOURNAL OF APPLIED ENGINEERING SCIENCES* VOL. 12(25), ISSUE 2/2022, ART.NO. 350 pp. 237-244, 2022
3. Hădărean, Adriana; Hoțupan, Anca; Mare, Roxana - ANALYSIS OF WATER CONSUMPTION AND STORAGE VOLUMES FOR RESIDENTIAL AREAS SITUATED IN BIG CITIES OF ROMANIA. *Environmental Engineering & Management Journal (EEMJ)*. Jun 2022, Vol. 21 Issue 7, p1135-1146. 12p.
4. E. Vitan, Anca Hotupan, C. Cilibiu, V. Ștef “Methods for estimating water flows from storms and melting snow – case study”, *JOURNAL OF APPLIED ENGINEERING SCIENCES*, VOL. 12(25), ISSUE 1/2022, ART.NO. 335 pp.107-112, 2022
5. E. Vitan, Anca Hotupan, Adriana Hadarean - Average operating pressure effect on water supply systems performances. a case study for 12 romanian small water distribution networks, *JOURNAL OF APPLIED ENGINEERING SCIENCES*, VOL. 11(24), ISSUE 2/2021, pp.143-150, 2021,
6. A Hotupan , A Hădărean- Experimental study of water losses through a circular leakage hole in PVC pipes, *The 7th Conference of the Sustainable Solutions for Energy and Environment, IOP Conf. Series: Earth and Environmental Science 664 (2021) 012051*, doi:10.1088/1755-1315/664/1/012051, 2021
7. E. Vitan, T. Rus, A. Hotupan and C. Cilibiu “The impact of the decreasing number of users on the evolution of a centralized heating system”, *IOP Conference Series: Materials Science and Engineering*, Volume 1138 012043 Published: 2021
8. Hoțupan Anca, Hădărean Adriana - Experimental Determination of the Discharge Coefficient Through Circular Orifice in PVC Pipes, *JOURNAL OF APPLIED ENGINEERING SCIENCES*, Dec 2020, Vol. 10 Issue 2, p133-138
9. M. Muste, C.Bacoțiu, D. Thomas, “Evaluation of the slope-area method for continuous streamflow monitoring”, *Proceedings of the 38th IAHR World Congress*, September 1-6, 2019, Panama City, Panama, pp. 121-130, DOI:10.3850/38WC092019-1860.
10. Anca HOȚUPAN - INFLUENCE OF MANNING’ ROUGHNESS COEFFICIENT AND ABSOLUTE ROUGHNESS IN VELOCITY CALCULATION, *Bulletin of the Transilvania University of Brașov • Vol. 12 (61) No. 1 - 2019 Series I: Engineering Sciences*, pg 63-68

### Products and technologies:

1. SSM (Safety and Sustainability Method) - Engineering tool for the selection of pipe material.
2. Algorithms for determining water losses in water distribution systems.
3. Equipment for the measurement of the HVAC performance and energy of buildings.
4. Algorithms for analysing the performance of public water utilities systems.
5. Qualitative test rig for water magnetization devices.
6. Regulation norm Mc001, methodology for calculating the energy performance of buildings.
7. Good Practice Guide for achieving the optimum cost levels of the minimum energy performance requirements of the various categories of buildings

## The offer addressed to the economic environment

Research & development	Problems associated with public water utilities systems, diagnostics, performance, quality. Energy performance measurements associated with buildings and the related installations. Decision support algorithms for the choice of materials and technologies.
Consulting	Performance measurements in the field of Building Services Engineering. Analysis of public water utilities systems, diagnostics, performance, quality. Decision support algorithms for the choice of materials and technologies.
Training	Problems associated with building services engineering and public water utilities systems, diagnostics, performance, quality, selection of materials and technologies

Last updated: February 2023