

Summary of the ventilative cooling track of the 38th AIVC conference in Nottingham, September 2017

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The joint 38th AIVC, 6th TightVent and 4th venticool Conference on 'Ventilating Healthy Low-energy Buildings' was held in Nottingham, UK, 13-14 September 2017. The programme consisted of plenary sessions and 3 parallel tracks, one devoted to Ventilative Cooling in four sessions (20 papers) and 17 papers in poster sessions. Two sessions were topical, proposed by IEA EBC Annex 62, plus one discussion session. One topical session focused on case-studies [6, 18, 23-25] including houses, offices, a large space and shopping malls. O'Sullivan [26] presented preliminary conclusions (~20 buildings), completed post 2010 studied by Annex 62 participants. The second topical session was devoted to Indicators and Strategies/Components. Flourentzou [37] presented energy performance indicators with following papers [15, 31-34] on experiences from offices to renovated dwellings to supermarkets and shopping malls where potential is high. Peter Holzer chaired the discussion session on the proposal for a new IEA EBC Annex on Resilient Cooling.

The paragraphs that follow attempt to group papers according to Technology Readiness Levels (TRL) - Figure 1, and compare with [TRLs of those presented two years before at the 36th AIVC conference in Madrid](#) (35 papers).

1. Low TRL: 16 papers were presented on simplified design tools and inter-model comparison of more complex tools for better prediction with emphasis on overheating dissipation. In many cases only boundary conditions are different – i.e. external conditions (weather data) and internal conditions (use of space) [1-16]. More papers were presented (11 in Madrid) and were similar in scope.
2. Mid TRL: 6 papers presented performance assessment of prototypes through laboratory experiments and/or simulation. A variety of components was presented such as phase change materials and radiant panels combined with ventilation [19, 20], adjustable jets [21], façade improvement [22] bulk air flow measurements [18] including hot climates [17]. Number of papers was less than in Madrid (10) with more emphasis on experimental results.
3. High TRL - 14 papers presented performance verification with data from operational buildings [23-36] for a variety of buildings types. In Madrid the number was similar (13) where in general measurements did not include ventilation/air flow but parameters related to environmental and thermal comfort performance. In Nottingham, more papers included ventilation/air flow measurements. Energy indicators are still investigated but work on health impact has increased.

The need for more explicit reference to Ventilative cooling within building energy performance regulations was discussed [37] with more work initiated by IEA EBC Annex 62.

In conclusion, based on papers presented, work towards more explicit reference to ventilative cooling in energy regulations has progressed, evidence from operational buildings has progressed including health impacts but less work on component development was reported.

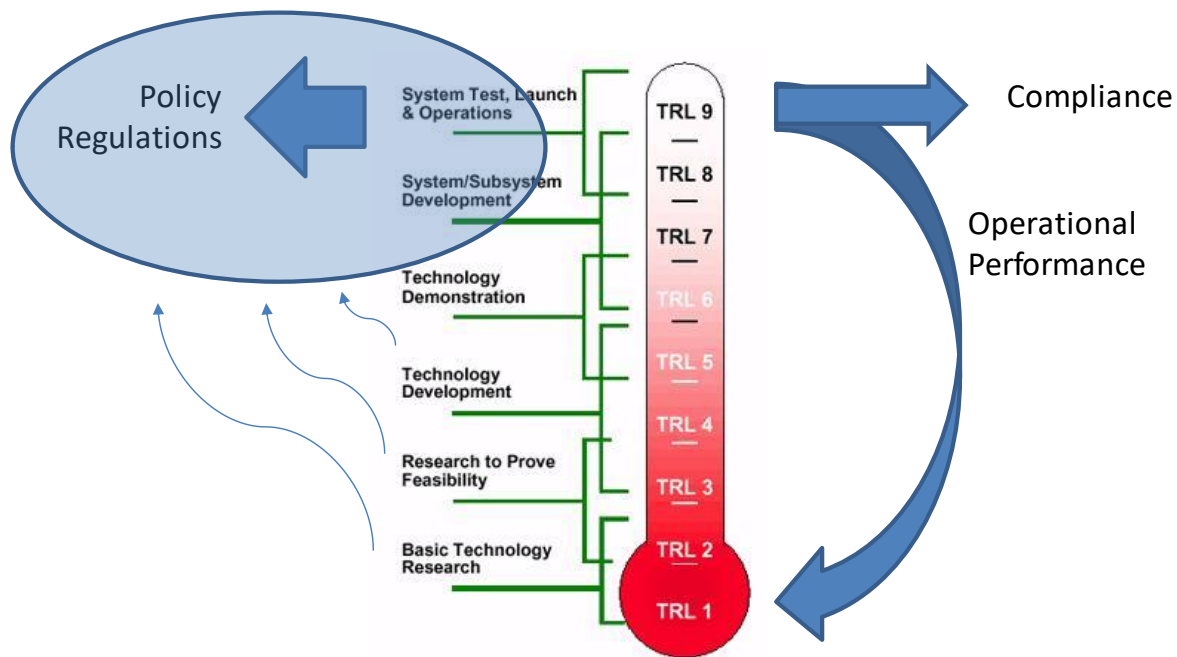


Figure 1: Technology Readiness Levels; adapted from: NASA Technology Readiness Levels - https://en.wikipedia.org/wiki/Technology_readiness_level

Low TRL papers

1. Alessandrini, J.-M., & Ribéron, J. (2017). [Will naturally ventilated dwellings still be safe under heatwaves?](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 26-37).
2. Rahman, H., & Han, H. (2017). [Ventilative cooling potential based on climatic condition and building thermal characteristics.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 61-69).
3. Cheng, J., Qi, D., Katal, A., & Wang, L. (2017). [Evaluating natural ventilation cooling potentials during early building designs.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 481-489).
4. Thompson, J., Donn, M., & Baird, G. (2017). [The Reintroduction of Natural Ventilation to a 19th Century Opera House, Utilising Calibrated Computer Simulation and User Operation.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 70-79).
5. Steiger, S., & Roth, J. (2017). [Hybrid ventilation in new and refurbished school buildings – the future of ventilation.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 49-60).
6. Steiger, S., & Roth, J. (2017). [The future of hybrid ventilation in office buildings – energy simulations and lifecycle cost.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 239-250).
7. Tsirintoulaki, E., Kolokotsa, D., Gompakis, K., & Kampelis, N. (2017). [Impact assessment of natural ventilation on thermal comfort levels in sustainable residential buildings.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 516-525).
8. Petrou, G., Mavrogianni, A., Mylona, A., Raslan, R., Virk, G., & Davies, M. (2017). [Inter-model comparison of indoor overheating risk prediction for English dwellings.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 526-535).
9. Youssef, A., Truyen, P., Bröde, P., Fiala, D., & Aerts, J.-M. (2017). [Towards Real-Time Model-Based Monitoring and Adoptive Controlling of Indoor Thermal Comfort.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 536-542).
10. Wang, C., Sadrizadeh, S., & Holmberg, S. (2017). [Application of open-source CFD software to the indoor airflow simulation.](#) 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 543-552).
11. Carbonare, N., Coydon, F., Dinkel, A., & Bongs, C. (2017). [The influence of occupancy behaviour on the performance of mechanical ventilation systems regarding energy consumption and IAQ.](#) 38th AIVC

- Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 593-602).
12. Cho, H.-J., Shin, J.-H., Park, J.-Y., Kim, W.-J., & Jeong, J.-W. (2017). [Evaluation of thermal comfort in an office building served by a liquid desiccant-assisted evaporative cooling air conditioning system](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 577-586).
 13. Lestinen, S., Kilpeläinen, S., Kosonen, R., Jokisalo, J., & Koskela, H. (2017). [The flow interaction of air distribution with thermal plumes and the effect on the air velocity fluctuation under increased heat load conditions](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 955-966).
 14. BurrIDGE, H., Sehmbi, G., Dosil, D. F., & Hughes, G. (2017). [Determining the venting efficiency of simple chimneys for buoyant plumes](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 967-973).
 15. da Graça, G., Mateus, N., & Rebelo, R. (2017). [Experimental evidence of effective single sided natural ventilation beyond 20ft or 2.5 floor to ceiling heights in open plan office spaces](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 791-792).
 16. Santos, T., Kolokotroni, M., Hopper, N., & Yearley, K. (2017). [A study of panel ridges effect on heat transfer and pressure drop in a ventilation duct](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 429-436).

Mid TRL papers

17. Vyas, D., & Apte, M. (2017). [Effectiveness of Ventilative Cooling Strategies in Hot and Dry and Temperate Climates of India](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 38-48).
18. Avantaggiato, M., Mateus, N., Belleri, A., Pasut, W., & da Graça, G. (2017). [Bulk airflow measurements in a large naturally ventilated atrium in a mild climate](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 211-219).
19. Hu, Y., & Kvols Heiselberg, P. (2017). [Thermal performance of ventilated solar collector with energy storage containing phase change material](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 603-612).
20. Lim, H., Shin, J., Li, S., Cho, H.-J., & Jeong, J.-W. (2017). [Energy performance prediction of thermoelectric ceiling radiant panels with a dedicated outdoor air system](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 613-621).
21. Maula, H., Koskela, H., Haapakangas, A., & Hongisto, V. (2017). [The effect of adjustable cooling jet on thermal comfort and perception in warm office environment – a laboratory study](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 936-942).
22. Gruner, M., Justo-Alonso, M., & Dokka, T. (2017). [Façade Improvements to Avoid Draught in Cold Climates – Laboratory Measurements](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 868-877).

High TRL papers

23. Holzer, P., Moherndl, P., & Psomas, T. (2017). [Ventilative Cooling on the test bench - Learnings and conclusions from practical design and performance evaluation](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 202-210).
24. Belleri, A., Haase, M., Papantoniou, S., & Lollini, R. (2017). [Delivery and performance of a ventilative cooling strategy: the demonstration case of a shopping centre in Trondheim, Norway](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 220-229).
25. Plesner, C., & Dupin, N. (2017). [Ventilative cooling in a single-family active house from design stage to user experience](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 230-238).
26. O'Sullivan, P., O'Donovan, A., Zhang, G., & da Graça, G. (2017). [Design and performance of ventilative cooling: a review of principals, strategies and components from International case studies](#).

- 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 251-262).
27. Conlan, N., & Harvie-Clark, J. (2017). [Challenges of using passive ventilation to control the overheating of dwellings in noisy environments](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 490-502).
 28. Merema, B., Delwati, M., Sourbron, M., & Breesch, H. (2017). [Demand controlled ventilation in school and office buildings: lessons learnt from case studies](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 391-399).
 29. Broderick, Á., Byrne, M., McGrath, J., & Coggins, M. (2017). [Indoor Air Quality and Thermal Comfort, in Irish Retrofitted Energy Efficient Homes](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 571-576).
 30. Barbadilla-Martín, E., Guadix Martín, J., Salmerón Lissén, J., & Aparicio-Ruiz, P. (2017). [Energy Efficiency in a Thermal Comfort Field Work in Spain](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 587-592).
 31. Psomas, T., Heiselberg, P., & Lyme, T. (2017). [Automated window opening control system to address thermal discomfort risk in energy renovated dwellings](#). Summertime assessment. 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 793-794).
 32. Justo-Alonso, M., Blandkjenn, S., & Mathisen, H. (2017). [Experiences regarding draught effects for ventilative cooling in cold climate](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 795-805).
 33. Mylona, Z., Kolokotroni, M., & Tassou, S. (2017). [Coupling night ventilative and active cooling to reduce energy use in supermarkets with high refrigeration loads](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 806-815).
 34. Avantaggiato, M., Belleri, A., De Carli, M., & Lollini, R. (2017). [Mixed-mode ventilative cooling opportunity for an existing shopping mall retrofit](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 816-826).
 35. Schrade, J., & Erhorn, H. (2017). [Influence of night ventilation on the cooling demand of typical residential buildings in Germany](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 851-860).
 36. De Grussa, Z., Andrews, D., Lowry, G., Newton, E., Yiakoumetti, K., Chalk, A., & Bush, D. (2017). [A Case Study assessing the impact of Shading Systems combined with Night-Time Ventilation strategies on Overheating within a Residential Property](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 943-954).

Policy related papers

37. Flourentzou, F., & Bonvin, J. (2017). [Energy Performance Indicators for Ventilative Cooling](#). 38th AIVC Conference "Ventilating healthy low-energy buildings", Nottingham, UK, 13-14 September 2017, (pp. 780-790).