

REFERENCES

- 4 *Most Common HVAC Issues & How to Fix Them*. (2016, April 15). Brighthub Engineering. Retrieved October 14, 2025, from <https://www.brighthubengineering.com/hvac/129254-four-most-common-hvac-issues-and-how-to-fix-them/>
- Abdul-Rahman, H., Wang, C., Wood, L. C., & Khoo, Y. M. (2012). Defects in Affordable Housing Projects in Klang Valley, Malaysia. *Journal of Performance of Constructed Facilities*, 28(2), 272–285. [https://doi.org/10.1061/\(asce\)cf.1943-5509.0000413](https://doi.org/10.1061/(asce)cf.1943-5509.0000413)
- ABD-WAHAB, S. R. H., SAIRI, A., CHE-ANI, A. I., & TAWIL, N. M. (2015). Building Maintenance Issues: A Malaysian Scenario for High-Rise Residential Buildings. In Research India Publications, *International Journal of Applied Engineering Research* (Vol. 10, Issue 6, pp. 15759–15776). <http://www.ripublication.com>
- Aberdeen, T. (2013). Yin, R. K. (2009). Case study research: Design and methods (4th Ed.). Thousand Oaks, CA: Sage. *The Canadian Journal of Action Research*, 14(1), 69–71. <https://doi.org/10.33524/cjar.v14i1.73>
- Admin. (2022, September 19). *Noise Control: Part 4 – Reducing HVAC Noise Issues*. Heinen & Hopman. Retrieved October 14, 2025, from <https://www.heinenhopman.com/noise-control-part-4-reduce-hvac-noise-issues/>
- Ahrens, M. & National Fire Protection Association. (2016). *High-Rise Building Fires*. National Fire Protection Association. <https://static1.squarespace.com/static/6440a3452a48ef743ffce53c/t/644866cfab1dff42e8ef958e/1682466511796/NFPA+High-Rise+Building+Fires.pdf>
- Akguc, A., EKOMIM, Yilmaz, A. Z., & Istanbul Technical University. (2015). Improving Energy Efficiency Level of HVAC Systems for the Luxury High-rise Residential Building Case Study in Turkey. In *Conference Paper*. <https://www.researchgate.net/publication/339986982>
- Al-Adhami, M., Wu, S., Ma, L., University of Huddersfield, & University College London. (2019). Extended Reality Approach for Construction Quality Control. In *CIB World Building Congress 2019*.

- Ali, A., Lee, O. J., Lee, D., & Park, C. (2021). Remote Indoor Construction Progress Monitoring Using Extended Reality. In *Technology Innovation in Construction*.
- Ali, B., Kalvin, R., Nadeem, K., Nadeem, A., Arif, S., & Ali, M. (2018). Performance analysis of different configurations of heating and cooling for a multi-zone building. *International Journal of Renewable Energy Technology*, 9(3), 337. <https://doi.org/10.1504/ijret.2018.10013095>
- Alizadehsalehi, S., Hadavi, A., & Huang, J. C. (2020). From BIM to extended reality in AEC industry. *Automation in Construction*, 116, 103254. <https://doi.org/10.1016/j.autcon.2020.103254>
- Al-Nasser, A. D., & Al-Omari, A. I. (2014). Information theoretic weighted mean based on truncated ranked set sampling. *Journal of Statistical Theory and Practice*, 9(2), 313–329. <https://doi.org/10.1080/15598608.2014.897278>
- Analysis of the heat column formation in a 10-storey building. In K. Prasath, S. Thavanees, A. Prakashan, M. A. Wijewardane, & R. A. C. P. Ranasinghe (Eds.), *October 2016*. <https://www.researchgate.net/publication/311952321>
- Andrews, C., Southworth, M. K., Silva, J. N. A., & Silva, J. R. (2019). Extended Reality in Medical Practice. *Current Treatment Options in Cardiovascular Medicine*, 21(4). <https://doi.org/10.1007/s11936-019-0722-7>
- Asim, N., Badiei, M., Mohammad, M., Razali, H., Rajabi, A., Haw, L. C., & Ghazali, M. J. (2022). Sustainability of Heating, Ventilation and Air-Conditioning (HVAC) Systems in Buildings—An Overview. *International Journal of Environmental Research and Public Health*, 19(2), 1016. <https://doi.org/10.3390/ijerph19021016>
- Aynur, T. N., Hwang, Y., & Radermacher, R. (2009). Simulation comparison of VAV and VRF air conditioning systems in an existing building for the cooling season. *Energy and Buildings*, 41(11), 1143–1150. <https://doi.org/10.1016/j.enbuild.2009.05.011>
- Azian, F. U. M., Yusof, N., & Kamal, E. M. (2020). Problems in high rise residential building: From management perspective. *IOP Conference Series Earth and Environmental Science*, 452(1), 012087. <https://doi.org/10.1088/1755-1315/452/1/012087>
- Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & MacIntyre, B. (2001). Recent advances in augmented reality. *IEEE Computer Graphics and Applications*, 21(6), 34–47. <https://doi.org/10.1109/38.963459>

- Babu, T., Nair, R. R., S, K., & M, V. (2024). Enhancing Gas Leak Detection with IoT Technology: An Innovative Approach. *Procedia Computer Science*, 235, 961–969. <https://doi.org/10.1016/j.procs.2024.04.091>
- Bae, Y., Bhattacharya, S., Cui, B., Lee, S., Li, Y., Zhang, L., Piljae Im, Adetola, V., Vrabie, D., Leach, M., & Kuruganti, T. (2021). Sensor impacts on building and HVAC controls: A critical review for building energy performance. In *Advances in Applied Energy* (Vol. 4, p. 100068).
- Balaras, C. A., Dascalaki, E., & Gaglia, A. (2006). HVAC and indoor thermal conditions in hospital operating rooms. *Energy and Buildings*, 39(4), 454–470. <https://doi.org/10.1016/j.enbuild.2006.09.004>
- Basbagill, J., Flager, F., Lepech, M., & Fischer, M. (2012). Application of life-cycle assessment to early-stage building design for reduced embodied environmental impacts. *Building and Environment*, 60, 81–92. <https://doi.org/10.1016/j.buildenv.2012.11.009>
- Battaglia, M. P., Hoaglin, D. C., & Frankel, M. R. (2009). Practical considerations in raking survey data. *Survey Practice*, 2(5), 1–10. <https://doi.org/10.29115/sp-2009-0019>
- Beckmann, J., Knauf, K. M., Weber, P., & Fachhochschule Südwestfalen. (2018). AR and VR Meet Boiler Suits: Deriving Design Elements for AR / VR Trainings in the HVAC Industry. In *EdMedia + Innovate Learning 2018* (p. 1533). Fachhochschule Südwestfalen. <https://www.researchgate.net/publication/326176523>
- Berryman, D. R. (2012). Augmented Reality: A Review. *Medical Reference Services Quarterly*, 31(2), 212–218. <https://doi.org/10.1080/02763869.2012.670604>
- Bichiou, Y., & Krarti, M. (2011). Optimization of envelope and HVAC systems selection for residential buildings. *Energy and Buildings*, 43(12), 3373–3382. <https://doi.org/10.1016/j.enbuild.2011.08.031>
- Bier, E. A., Brito, A. E., Goyal, R., Mostafavi, S., Nelson, L., Sharma, R., Bhandari, M. S., Kunwar, N., & Li, S. (2023). Sensorium: commissioning abundant sensors with augmented reality and QR codes. *Building Simulation Conference Proceedings*, 18. <https://doi.org/10.26868/25222708.2023.1424>
- Brackney, L., Parker, A., Macumber, D., & Benne, K. (2018). Introduction to HVAC Systems. In *Springer eBooks* (pp. 103–126). https://doi.org/10.1007/978-3-319-77809-9_4

- Cai, S., Ma, Z., Skibniewski, M., Guo, J., & Yun, L. (2018). Application of Automation and Robotics Technology in High-Rise Building Construction: An Overview. *Proceedings of the . . . ISARC*.
<https://doi.org/10.22260/isarc2018/0044>
- Calibration, registration, and synchronization for high precision augmented reality Haptics*. (2009, February 1). IEEE Journals & Magazine | IEEE Xplore. Retrieved October 14, 2025, from
<https://ieeexplore.ieee.org/abstract/document/4492774/>
- Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing*, 25(8), 652–661.
<https://doi.org/10.1177/1744987120927206>
- Capehart, B. L., & Brambley, M. R. (2021). *Automated diagnostics and analytics for buildings*. CRC Press.
- Carrier Corporation. (2013). *Variable Refrigerant Flow (VRF) Systems*.
<https://www.shareddocs.com/hvac/docs/1001/Public/0B/04-581067-01.pdf>
- Casini, M. (2022). Extended Reality for Smart Building Operation and Maintenance: A Review. In F. Morgado-Dias (Ed.), *Energies* (Vol. 15, p. 3785).
<https://doi.org/10.3390/en15103785>
- Chen, Y., Wang, Q., Chen, H., Song, X., Tang, H., & Tian, M. (2019). An overview of augmented reality technology. *Journal of Physics Conference Series*, 1237(2), 022082. <https://doi.org/10.1088/1742-6596/1237/2/022082>
- Cho, H. P., Lim, H., Lee, D., Cho, H., & Kang, K. (2017). Patent analysis for forecasting promising technology in high-rise building construction. *Technological Forecasting and Social Change*, 128, 144–153.
<https://doi.org/10.1016/j.techfore.2017.11.012>
- Chu, M. W., Moore, J., Peters, T., Bainbridge, D., McCarty, D., Guiraudon, G. M., Wedlake, C., Lang, P., Rajchl, M., Currie, M. E., Daly, R. C., & Kiaii, B. (2012). Augmented reality image guidance improves navigation for beating heart mitral valve repair. *Innovations Technology and Techniques in Cardiothoracic and Vascular Surgery*, 7(4), 274–281.
<https://doi.org/10.1097/imi.0b013e31827439ea>
- Craig, A. B. (2013). *Understanding Augmented Reality: Concepts and Applications*. Morgan Kaufmann.

- Craighead, G. (2009). *High-Rise Security and Fire Life Safety*. Butterworth-Heinemann.
- Davis, L., Gertler, P., Jarvis, S., & Wolfram, C. (2021). Air conditioning and global inequality. *Global Environmental Change*, 69, 102299.
<https://doi.org/10.1016/j.gloenvcha.2021.102299>
- De Wilde, P. (2014). The gap between predicted and measured energy performance of buildings: A framework for investigation. *Automation in Construction*, 41, 40–49. <https://doi.org/10.1016/j.autcon.2014.02.009>
- Divyadarshi, A., Tiwari, P., Sharma, B., George Washington, & Samal, K. P. (2018). Energy Consumption and Efficiency in Green Buildings. *IJSRD - International Journal for Scientific Research & Development*, 021.
<https://www.researchgate.net/publication/322273339>
- Dong, L., Lin, B., Jiang, Y., Wang, W., Zhang, Y., Gu, J., & Xu, P. (2024). Automatic generation of pipe routing for variable refrigerant flow air conditioning system. *Journal of Building Engineering*, 111755.
<https://doi.org/10.1016/j.jobe.2024.111755>
- Döringer, S. (2020). ‘The problem-centred expert interview’. Combining qualitative interviewing approaches for investigating implicit expert knowledge. *International Journal of Social Research Methodology*, 24(3), 265–278.
<https://doi.org/10.1080/13645579.2020.1766777>
- Elsaid, A. M., Mohamed, H. A., Abdelaziz, G. B., & Ahmed, M. S. (2021). A critical review of heating, ventilation, and air conditioning (HVAC) systems within the context of a global SARS-CoV-2 epidemic. *Process Safety and Environmental Protection*, 155, 230–261.
<https://doi.org/10.1016/j.psep.2021.09.021>
- Energy Consumption Characteristics of Commercial Building HVAC Systems. (2001). In J. Ryan, *Office of Building Technology State and Community Programs* (DE-AC01-96CE23798). Office of Building Equipment.
https://www1.eere.energy.gov/buildings/publications/pdfs/commercial_initiative/hvac_volume1_final_report.pdf#:~:text=URL%3A%20https%3A%2F%2Fwww1.eere.energy.gov%2Fbuildings%2Fpublications%2Fpdfs%2Fcommercial_initiative%2Fhvac_volume1_final_report.pdf%0AVisible%3A%200%25%20

- Etikan, I. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Evan. (2015, April 29). *HVAC Systems & Indoor Air Quality – Debating Science*. Retrieved October 14, 2025, from <https://websites.umass.edu/natsci397across/hvac-systems-indoor-air-quality/>
- Feng, P., & Xingkuan, W. (2011). Sustainable development of high-rise building. *Procedia Engineering*, 21, 943–947. <https://doi.org/10.1016/j.proeng.2011.11.2098>
- Fritzson, P. (2011). *Introduction to Modeling and Simulation of Technical and Physical Systems with Modelica*. Wiley-IEEE Press.
- Furht, B. (2011). Handbook of Augmented Reality. In *Springer eBooks*. <https://doi.org/10.1007/978-1-4614-0064-6>
- Gamayunova, O., & Spitsov, D. (2020). Technical features of the construction of high-rise buildings. *E3S Web of Conferences*, 164, 08008. <https://doi.org/10.1051/e3sconf/202016408008>
- Geekiyanage, D., & Ramachandra, T. (2018). A model for estimating cooling energy demand at early design stage of condominiums. *Journal of Building Engineering*, 17, 43–51. <https://doi.org/10.1016/j.jobbe.2018.01.011>
- Gelan, E. (2022). Green Building Concepts and Technologies in Ethiopia: The Case of Wegagen Bank Headquarters Building. *Technologies*, 11(1), 2. <https://doi.org/10.3390/technologies11010002>
- Gemma, B. C. (2024, June 6). *Inici*. Retrieved October 14, 2025, from <https://dugi-doc.udg.edu/>
- Get familiar with common HVAC problems | Adams Air*. (2023, September 14). Retrieved October 14, 2025, from <https://www.adamsairsystems.ca/common-hvac-problems>
- Ghimire, R., Pattipati, K. R., & Luh, P. B. (2016). Fault diagnosis and augmented reality-based troubleshooting of HVAC systems. *IEEE*. <https://doi.org/10.1109/autest.2016.7589590>
- Ghimire, R., Pattipati, K. R., Luh, P. B., & Department of electrical and computer engineering, University of Connecticut. (2016). *Fault Diagnosis and Augmented Reality-based Troubleshooting of HVAC Systems*.

- Gündüz, M., Nielsen, Y., & Özdemir, M. (2012). Quantification of Delay Factors Using the Relative Importance Index Method for Construction Projects in Turkey. *Journal of Management in Engineering*, 29(2), 133–139. [https://doi.org/10.1061/\(asce\)me.1943-5479.0000129](https://doi.org/10.1061/(asce)me.1943-5479.0000129)
- Haines, R., & Wilson, L. (2003). *HVAC Systems Design Handbook*. McGraw Hill Professional.
- Hallebrand, E., & Jakobsson, W. (2016). *Structural Design Of High-Rise Buildings* (By Lund University, Sweco AB, & Lund University; P. Persson & J. Ahlquist, Eds.; K. Persson, Trans.) [Division of Structural Mechanics, Faculty of Engineering LTH, Lund University]. <https://www.byggmek.lth.se>
- Hanssen, S. O. (2004). HVAC-the importance of clean intake section and dry air filter in cold climate. *Indoor Air*, 14(s7), 195–201. <https://doi.org/10.1111/j.1600-0668.2004.00288.x>
- Harwood, T. G., & Garry, T. (2003). An overview of content analysis. *The Marketing Review*, 3(4), 479–498. <https://doi.org/10.1362/146934703771910080>
- Hashim, A. E., Samikon, S. A., Nasir, N. M., & Ismail, N. (2012). Assessing Factors Influencing Performance of Malaysian Low-Cost Public Housing in Sustainable Environment. *Procedia - Social and Behavioral Sciences*, 50, 920–927. <https://doi.org/10.1016/j.sbspro.2012.08.093>
- Heating, Ventilation, and Cooling System Market Growth [2030]*. Retrieved October 14, 2025, from <https://www.fortunebusinessinsights.com/heating-ventilation-and-cooling-hvac-system-market-102664>
- Heinemeier, K., Hoeschele, M., Weitzel, E., Close, B., Hunt, M., Western Cooling Efficiency Center, Pacific Gas & Electric, Davis Energy Group, & Southern California Edison. (2012). Uncertainties in Achieving Energy Savings from HVAC Maintenance Measures in the Field. In *ASHRAE Conference Paper*.
- Homod, R. Z. (2013). Review on the HVAC System Modeling Types and the Shortcomings of Their Application. *Journal of Energy*, 2013, 1–10. <https://doi.org/10.1155/2013/768632>
- How augmented reality can help the HVAC&R industry to evolve*. Retrieved October 14, 2025, from <https://cleanroomtechnology.com/how-augmented-reality-can-help-the-hvac-r-industry-to-evolve-207903>

- Hui, S. C. M. & Technological and Higher Education Institute of Hong Kong. (2001). HVAC Design and Operation for Green Buildings. In *Proc. of the Shaanxi-Hong Kong Refrigeration and HVAC Seminar 2001* (pp. A44-51).
- Ilesanmi, A. O. (2010). Post-occupancy evaluation and residents' satisfaction with public housing in Lagos, Nigeria. *Journal of Building Appraisal*, 6(2), 153–169. <https://doi.org/10.1057/jba.2010.20>
- Imal, M. (2015). Design and Implementation of Energy Efficiency in HVAC Systems Based on Robust PID Control for Industrial Applications. *Journal of Sensors*, 2015, 1–15. <https://doi.org/10.1155/2015/954159>
- Indoor Air Quality Considerations for HVAC Systems Design in India. (2016). In *International Journal of Scientific & Engineering Research* (Vol. 7, Issue 6, pp. 229–230). <http://www.ijser.org>
- J, N. V., Van Ham G, N., D, N. S., & L, N. H. (2017). Model selection for continuous commissioning of HVAC-systems in office buildings: A review. *Renewable and Sustainable Energy Reviews*, 76, 673–686. <https://doi.org/10.1016/j.rser.2017.01.119>
- Jacob, J. & Sinohydro Group Limited. (2016). A Study on Designing of a HVAC system in Green Building Environment. In *International Journal of Emerging Technologies in Engineering Research (IJETER)* (Vol. 4, Issue 8) [Journal-article]. <https://www.ijeter.everscience.org>
- Jamil, M., Mittal, S., Department of Electrical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia, & Department of Electrical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia. (2017). Building Energy Management System: A Review [Journal-article]. *Building Energy Management System: A Review*, 1–7. <https://doi.org/10.1109/XXXXXX>
- Johnston, A. (2014). Rigour in research: theory in the research approach. *European Business Review*, 26(3), 206–217. <https://doi.org/10.1108/ebr-09-2013-0115>
- Joppolo, C. M., & Romano, F. (2017). HVAC System Design in Healthcare Facilities and Control of Aerosol Contaminants: Issues, Tools, and Experiments. In *SpringerBriefs in public health* (pp. 83–94). https://doi.org/10.1007/978-3-319-49160-8_8
- Kalra, S., Pathak, V., & Jena, B. (2013). Qualitative research. *Perspectives in Clinical Research*, 4(3), 192. <https://doi.org/10.4103/2229-3485.115389>

- Kandelousi, M. S. (2018). *HVAC System*.
- Kapoor, N. R., Kumar, A., Alam, T., Kumar, A., Kulkarni, K. S., & Blecich, P. (2021). A Review on Indoor Environment Quality of Indian School Classrooms. *Sustainability*, 13(21), 11855.
<https://doi.org/10.3390/su132111855>
- Kashkooli, A. M. S., & Altan, H. (2010). Re-Usability Of High-Rise Buildings: A Case Study Of The Arts Tower In Sheffield, United Kingdom. *International Journal of Architectural Research: Archnet-IJAR*, 4(1), 179–193.
<https://doi.org/10.26687/archnet-ijar.v4i1.70>
- Keim, D., Qu, H., & Ma, K. (2013). Big-Data Visualization. *IEEE Computer Graphics and Applications*, 33(4), 20–21.
<https://doi.org/10.1109/mcg.2013.54>
- Khan, J. A., Raman, A. M., Sambamoorthy, N., & Prashanth, K. (2023). *Research Methodology (Methods, Approaches and Techniques)*.
<https://doi.org/10.59646/rmmethods/040>
- Kothari, C. R., OTHARI. (1990). *Research Methodology: An Introduction*.
<http://ndl.ethernet.edu.et/bitstream/123456789/79439/5/Research%20Methodology%20-%20Methods%20and%20Techniques%202004.pdf>
- Kumar, R. (2011) *Research Methodology A Step-by-Step Guide for Beginners*. 3rd Edition. Sage, New Delhi. - References - Scientific Research Publishing. Retrieved October 14, 2025, from
<https://www.scirp.org/reference/referencespapers?referenceid=1971596>
- Leavy, P. (2022). *Research Design: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. Guilford Publications.
- Lee, S., Akin, Ö., & Elsevier B.V. (2010). Augmented reality-based computational fieldwork support for equipment operations and maintenance. In *Automation in Construction* [Journal-article].
<https://doi.org/10.1016/j.autcon.2010.11.004>
- LeggettInc. (2023, November 22). *What to Consider When Designing Your HVAC System* | Leggett. Leggett Inc. Retrieved October 14, 2025, from
<https://leggettinc.com/designing-hvac-systems/>
- Li, H., Wang, Z., Hong, T., & Piette, M. A. (2021). Energy flexibility of residential buildings: A systematic review of characterization and quantification methods

- and applications. *Advances in Applied Energy*, 3, 100054. <https://doi.org/10.1016/j.adapen.2021.100054>
- Li, Y., Ning, Y., & Chen, W. T. (2018). Critical success Factors for safety Management of High-Rise Building Construction projects in China. *Advances in Civil Engineering*, 2018(1). <https://doi.org/10.1155/2018/1516354>
- Lopez, H., Navarro, A., & Relano, J. (2010). An Analysis of Augmented Reality Systems. *2010 Fifth International Multi-conference on Computing in the Global Information Technology*. <https://doi.org/10.1109/iccgi.2010.24>
- Ltd, Z. T. C. (2022, June 9). *HVAC Industry Trends to Watch Out for in 2022*. Retrieved October 14, 2025, from <https://www.linkedin.com/pulse/hvac-industry-trends-watch-out-2022-zerohvact/>
- Luger, C., Kallinovsky, J., & Rieberer, R. (2016). Identification of representative operating conditions of HVAC systems in passenger rail vehicles based on sampling virtual train trips. *Advanced Engineering Informatics*, 30(2), 157–167. <https://doi.org/10.1016/j.aei.2016.02.006>
- Ma, J., & Cheng, J. C. (2016). Estimation of the building energy use intensity in the urban scale by integrating GIS and big data technology. *Applied Energy*, 183, 182–192. <https://doi.org/10.1016/j.apenergy.2016.08.079>
- Mansor, A. A., Abdullah, S., Ahmad, A. N., Ahmed, A. N., Zulkifli, M. F. R., Jusoh, S. M., & Ismail, M. (2024). Indoor air quality and sick building syndrome symptoms in administrative office at public university. *Dialogues in Health*, 4, 100178. <https://doi.org/10.1016/j.dialog.2024.100178>
- Marjanovic, O., Patmore, G., & Balhave, N. (2022). Visual Analytics: Transferring, Translating and Transforming Knowledge from Analytics Experts to Non-technical Domain Experts in Multidisciplinary Teams. *Information Systems Frontiers*, 25(4), 1571–1588. <https://doi.org/10.1007/s10796-022-10310-4>
- Massachusetts Institute of Technology. (2012, July 30). *How 'Big Data' Is Different | MIT Sloan Management Review*. MIT Sloan Management Review. Retrieved October 14, 2025, from <https://sloanreview.mit.edu/article/how-big-data-is-different/>
- Matetić, I., Štajduhar, I., Wolf, I., Palaić, D., & Ljubic, S. (2022). Data Visualization Tool for Smart Buildings HVAC Systems. In *Advances in intelligent systems and computing* (pp. 444–453). https://doi.org/10.1007/978-3-031-14054-9_41

- McGowan, M. K. (2021, May 1). *How Augmented Reality Could Help the HVAC& R Industry to Evolve*. Retrieved October 14, 2025, from <https://go.gale.com/ps/i.do?id=GALE%7CA689479644&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=00012491&p=AONE&sw=w&userGroup=anon%7E7a6385aa&aty=open-web-entry>
- Miller, R. (2009). *HVAC Troubleshooting Guide*. McGraw Hill Professional.
- Mohammadi, M., Assaf, G., & Assaad, R. H. (2024). Real-time spatial-temporal mapping and visualization of thermal comfort and HVAC control by integrating immersive augmented reality technologies and IoT-enabled wireless sensor networks: Towards immersive human-building interactions. *Journal of Building Engineering*, 94, 109887. <https://doi.org/10.1016/j.jobbe.2024.109887>
- Mohit, M. A., Ibrahim, M., & Rashid, Y. R. (2009). Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat International*, 34(1), 18–27. <https://doi.org/10.1016/j.habitatint.2009.04.002>
- Mohit, M. A., & Nazyddah, N. (2011). Social housing programme of Selangor Zakat Board of Malaysia and housing satisfaction. *Journal of Housing and the Built Environment*, 26(2), 143–164. <https://doi.org/10.1007/s10901-011-9216-y>
- Neymark, J., J. Neymark & Associates, Kennedy, M., Mike D. Kennedy, Inc., Judkoff, R., National Renewable Energy Laboratory, Gall, J., AAON, Inc., Knebel, D., AAON, Inc., Henninger, R., GARD Analytics, Inc., Witte, M., GARD Analytics, Inc., Hong, T., Lawrence Berkeley National Laboratory, McDowell, T., Thermal Energy System Specialists, Yan, D., . . . Tsinghua University. (2016). Airside HVAC BESTEST: Adaptation of ASHRAE RP 865 Airside HVAC Equipment Modeling Test Cases for ASHRAE Standard 140 Volume 1: Cases AE101 – AE445. In *National Renewable Energy Laboratory* (NREL/TP-5500-66000).
- Novakovic, V., & Teknologi, N. T. U. F. F. I. O. (2008). *Real-time supervision of building HVAC system performance*. Retrieved October 14, 2025, from <http://hdl.handle.net/11250/231184>
- Obaida, A. (2021, April 3). *Countries where Air Conditioning is in the Highest Demand - NaijaTechGuide*. NaijaTechGuide. Retrieved October 14, 2025, from <https://www.naijatechguide.com/2021/04/air-conditioning-highest-demand-countries.html>

- Oladokun, S. O., & Ajayi, C. A. (2018). Assessing users' perception of Facilities Management services in a Public University: A case study approach. *Journal of Facility Management Education and Research*, 2(2), 62–73.
<https://doi.org/10.22361/jfmer/00071>
- Olatunde, N. T. M., Okwandu, N. a. C., Akande, N. D. O., & Sikhakhane, N. Z. Q. (2024). Review of energy-efficient HVAC technologies for sustainable buildings. *International Journal of Science and Technology Research Archive*, 6(2), 012–020. <https://doi.org/10.53771/ijstra.2024.6.2.0039>
- Olubunmi, O. A., Xia, P. B., & Skitmore, M. (2016). Green building incentives: A review. *Renewable and Sustainable Energy Reviews*, 59, 1611–1621.
<https://doi.org/10.1016/j.rser.2016.01.028>
- Ortiz, M., Barsun, H., He, H., Vorobieff, P., & Mammoli, A. (2010). Modeling of a solar-assisted HVAC system with thermal storage. *Energy and Buildings*, 42(4), 500–509. <https://doi.org/10.1016/j.enbuild.2009.10.019>
- Ph.D., T. L. T. & School of Social Sciences, Universiti Sains Malaysia. (2003). Managing High-Rise Residential Building In Malaysia: Where Are We? In *Naprec Conference, Inspen*.
- Porter, M. E. (2023, October 26). *Why Every Organization Needs an Augmented Reality Strategy*. Harvard Business Review. Retrieved October 14, 2025, from <https://hbr.org/2017/11/why-every-organization-needs-an-augmented-reality-strategy>
- Putra, K., Djunaedy, E., Bimaridi, A., & Kirom. (2017). Assessment of Outside Air Supply for Split AC System Part B: Experiment. *Procedia Engineering*, 170, 255–260. <https://doi.org/10.1016/j.proeng.2017.03.012>
- Quispe-Astorga, A., Coaquira-Castillo, R. J., Mego, L. W. U., Herrera-Levano, J. C., Concha-Ramos, Y., Sacoto-Cabrera, E. J., & Moreno-Cardenas, E. (2025). Data-Driven fault detection and diagnosis in cooling units using Sensor-Based Machine Learning Classification. *Sensors*, 25(12), 3647.
<https://doi.org/10.3390/s25123647>
- Research, B. (2018, June 20). 3 Key Factors Driving Momentum in the Global HVAC Industry. *Market Reserach.com*. <https://blog.marketresearch.com/3-key-factors-driving-momentum-in-the-global-hvac-industry>
- Research, P. (2021, November 26). HVAC equipment market size to hit US\$ 206.89 billion by 2030. *GlobeNewswire News Room*.
<https://www.globenewswire.com/news->

[release/2021/11/26/2341293/0/en/HVAC-Equipment-Market-Size-to-Hit-US-206-89-Billion-by-2030.html](https://www.precedenceresearch.com/hvac-equipment-market-size-to-hit-us-206-89-billion-by-2030.html)

- Research, P. (2024, May 27). *HVAC Equipment Market Size to Reach USD 254.37 Billion by 2033*. Retrieved October 14, 2025, from <https://www.precedenceresearch.com/hvac-equipment-market>
- Roopa, S., & Rani. (2012). Questionnaire Designing for a Survey. *The Journal of Indian Orthodontic Society*, 46, 273–277. <https://doi.org/10.5005/jp-journals-10021-1104>
- Rosone, M. (2019, March 20). *Top 10 Causes of HVAC Airflow Problems*. Arista. Retrieved October 14, 2025, from <https://aristair.com/top-10-causes-of-hvac-airflow-problems/>
- Rosone, M. C. (2021, December 8). *High Rise HVAC: New Technology Saves Both Space and Energy*. Arista. Retrieved October 14, 2025, from <https://aristair.com/high-rise-hvac-new-technology-saves-space-energy/>
- Runji, J. M., Lee, Y., & Chu, C. (2022). User requirements analysis on Augmented Reality-Based maintenance in manufacturing. *Journal of Computing and Information Science in Engineering*, 22(5). <https://doi.org/10.1115/1.4053410>
- Saini, L., Meena, C. S., Raj, B. P., Agarwal, N., & Kumar, A. (2021). Net Zero Energy Consumption building in India: An overview and initiative toward sustainable future. *International Journal of Green Energy*, 19(5), 544–561. <https://doi.org/10.1080/15435075.2021.1948417>
- Sanzana, M. R., Abdulrazic, M. O. M., Wong, J. Y., & Yip, C. (2023). Efficient Thermal-Energy-Storage Chiller Plant Facility Management with Digital Twin-assisted Augmented Reality Application. *Research Square (Research Square)*. <https://doi.org/10.21203/rs.3.rs-2275758/v2>
- Schito, E. (2018). Dynamic simulation of an air handling unit and validation through monitoring data. *Energy Procedia*, 148, 1206–1213. <https://doi.org/10.1016/j.egypro.2018.08.010>
- Sedgwick, P. (2013). Snowball sampling. *BMJ*, 347(dec20 2), f7511. <https://doi.org/10.1136/bmj.f7511>
- Selamat, H., Mohamad Fadzli Haniff, Zainon Mat Sharif, Seyed Mohammad Attaran, Fadhilah Mohd Sakri, & Muhammad Al'Hapis Bin Abdul Razak. (2020). Review on HVAC System Optimization Towards Energy Saving Building

- Operation. In *International Energy Journal* (Vol. 20, pp. 345–358).
<https://www.thaiscience.info/Journals/Article/IENJ/10992379.pdf>
- Siriwardhana, M., & Namal, D. D. A. (2017). Comparison of Energy Consumption between a Standard Air Conditioner and an Inverter-type Air Conditioner Operating in an Office Building. *SLEMA Journal*, 20(1–2), 1.
<https://doi.org/10.4038/slemaj.v20i1-2.5>
- Sotiriadou, P., Brouwers, J., & Le, T. (2014). Choosing a qualitative data analysis tool: a comparison of NVivo and Leximancer. *Annals of Leisure Research*, 17(2), 218–234. <https://doi.org/10.1080/11745398.2014.902292>
- Stanney, K. M., Nye, H., Haddad, S., Hale, K. S., Padron, C. K., & Cohn, J. V. (2021). Extended Reality (XR) Environments. *Wiley*, 782–815.
<https://doi.org/10.1002/9781119636113.ch30>
- StaplesVR: AR/VR Creation, Training and Entertainment Solutions*. Retrieved October 14, 2025, from
https://www.staplesvr.com/?utm_source=google&utm_medium=cpc&gad_source=1&gclid=CjwKCAjwx4O4BhAnEiwA42SbVBrMLKEokDX-1y-1cUeuW9qyUJgSwJYUu1aH9cCLA5UvpmRG7fLIDhoCwxsQAvD_BwE
- Sulonteh, E. J., & Mahajan, A. (2024). Seismic performance of high-rise buildings with advanced lateral load resisting systems subjected to wind and earthquake loads. *Asian Journal of Civil Engineering*, 25(7), 5377–5391.
<https://doi.org/10.1007/s42107-024-01118-5>
- Taft, R. C., Lage, C. S., Hayden, J. D., Kirsch, H. C., Lin, J.-H., Denning, D. J., Shapiro, F. B., Bockelman, D. E., & N. Camilleri. (1995). The SCC BJT: A High-Performance Bipolar Transistor Compatible with High-Density Deep-Submicrometer BiCMOS SRAM Technologies. In *IEEE Transactions On Electron Devices* (Vol. 42, Issue 7, pp. 1217–1278).
- Thapa, C., Dhakal, D. R., Dhakal, A., Neupane, K., K L University, & Utech college of engineering. (2013). Construction Techniques And Demand Of High-Rise Building In India. *International Journal of Emerging Trends in Engineering and Development*, 46. <https://www.researchgate.net/publication/235989436>
- The Use of Augmented Reality, GPS and INS for Subsurface Data Visualisation. (2002). [Conference Paper]. In *FIG XXII International Congress*. International Federation of Surveyors (FIG).
https://www.fig.net/resources/proceedings/fig_proceedings/fig_2002/fig_index.htm

- Thörn, Å. (1998). The sick building syndrome: a diagnostic dilemma. *Social Science & Medicine*, 47(9), 1307–1312. [https://doi.org/10.1016/s0277-9536\(98\)00206-8](https://doi.org/10.1016/s0277-9536(98)00206-8)
- Thurairajah, N., Haigh, R. P., Amaratunga, P. D., & Research institute for Built and Human Environment, University of Salford, M5 4WT, UK. (2007). Leadership in construction partnering projects. In *Conference Paper*.
- Tu, Q., Dong, K., Zou, D., & Lin, Y. (2011). Experimental study on multi-split air conditioner with digital scroll compressor. *Applied Thermal Engineering*, 31(14–15), 2449–2457. <https://doi.org/10.1016/j.applthermaleng.2011.04.010>
- Tubis, A. A., Jodejko-Pietruczuk, A., & Nowakowski, T. (2024). Use of augmented reality as a tool to support cargo handling operations at the CARGO Air Terminal. *Sensors*, 24(4), 1099. <https://doi.org/10.3390/s24041099>
- Tyagi, I. V., & Anand, S. (2025). Augmented Reality Virtual Reality in Manufacturing Market | MRFR. In *Market Research Future*. <https://www.marketresearchfuture.com/reports/augmented-reality-virtual-reality-in-manufacturing-market-40532>
- Van Audenhove, L., & Donders, K. (2019). Talking to People III: Expert Interviews and Elite Interviews. In *Springer eBooks* (pp. 179–197). https://doi.org/10.1007/978-3-030-16065-4_10
- Van Dronkelaar, C., Dowson, M., Spataru, C., & Mumovic, D. (2016). A Review of the Regulatory Energy Performance Gap and Its Underlying Causes in Non-domestic Buildings. *Frontiers in Mechanical Engineering*, 1. <https://doi.org/10.3389/fmech.2015.00017>
- Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How ‘big data’ can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, 165, 234–246. <https://doi.org/10.1016/j.ijpe.2014.12.031>
- Wang, J., Wang, X., Shou, W., & Xu, B. (2014). Integrating BIM and augmented reality for interactive architectural Visualisation. *Construction Innovation*, 14(4), 453–476. <https://doi.org/10.1108/ci-03-2014-0019>
- What the industry really thinks about green buildings. (2020, December 16). *Modus | RICS*. <https://ww3.rics.org/uk/en/modus/natural-environment/climate-change/what-the-industry-really-thinks-about-green-buildings.html>

- Wright, J., Farmani, R., Loughborough University, & University of Exeter. (2001). The simultaneous optimization of building fabric construction, HVAC system size, and the plant control strategy. *Buidling Simulation*.
- Wu, P.-Y., a, El-Assady, M., De Wolf, C., & ETH Zürich. (2025). A Unified Intelligence-Augmented framework for building audits via physical and virtual inspection. In *Expert Systems With Applications*.
<https://ssrn.com/abstract=5382849>
- Xianliang, G., Jingchao, X., Zhiwen, L., & Jiaping, L. (2021). Analysis to energy consumption characteristics and influencing factors of terminal building based on airport operating data. *Sustainable Energy Technologies and Assessments*, 44, 101034. <https://doi.org/10.1016/j.seta.2021.101034>
- Xiaolong, R. (2019). Problems and Improvement Methods of HVAC Design of Building. *IOP Conference Series Earth and Environmental Science*, 332(4), 042049. <https://doi.org/10.1088/1755-1315/332/4/042049>
- Yang, X., & Ergan, S. (2017). BIM for FM: Information Requirements to Support HVAC-Related Corrective Maintenance. *Journal of Architectural Engineering*, 23(4). [https://doi.org/10.1061/\(asce\)ae.1943-5568.0000272](https://doi.org/10.1061/(asce)ae.1943-5568.0000272)
- Yang, Y., Wang, Z., Li, X., Zhao, D., Zuo, J., Ren, Y., Lyu, W., & Xu, Z. (2023). Investigating the impact of stack effect on ventilation performance of residential kitchen exhaust shaft system. *Energy and Buildings*, 296, 113364. <https://doi.org/10.1016/j.enbuild.2023.113364>
- Yin, T. S., Othman, A. R., Sulaiman, S., Mohamed-Ibrahim, M. I., & Razha-Rashid, M. (2016). Application Of Mean And Standard Deviation In Questionnaire Surveys: Construct Validation. *Jurnal Teknologi*, 78(6–4).
<https://doi.org/10.11113/jt.v78.8983>
- Yu, J., Song, K., & Cho, D. (2017). Resolving Stack Effect Problems in a High-Rise Office Building by Mechanical Pressurization. *Sustainability*, 9(10), 1731. <https://doi.org/10.3390/su9101731>
- Yuan, J., Xiao, Z., Chen, X., Lu, Z., Li, J., & Gang, W. (2021). A Temperature & Humidity Setback Demand Response Strategy for HVAC Systems. *Sustainable Cities and Society*, 75, 103393. <https://doi.org/10.1016/j.scs.2021.103393>
- Yudelson, J. (2008). *The Green Building Revolution*.

Zhang, Z., Zhang, Y., & Khan, A. (2019). Thermal comfort of people in a super high-rise building with central air-conditioning system in the hot-humid area of China. *Energy and Buildings*, 209, 109727.
<https://doi.org/10.1016/j.enbuild.2019.109727>

Zhen, Y. C. (2024, March 26). *Air Conditioner Condensate Drain Pipe Installation Basics*. Aircondlounge. Retrieved October 14, 2025, from
<https://aircondlounge.com/air-conditioner-condensate-drain-pipe-installation-basics/>