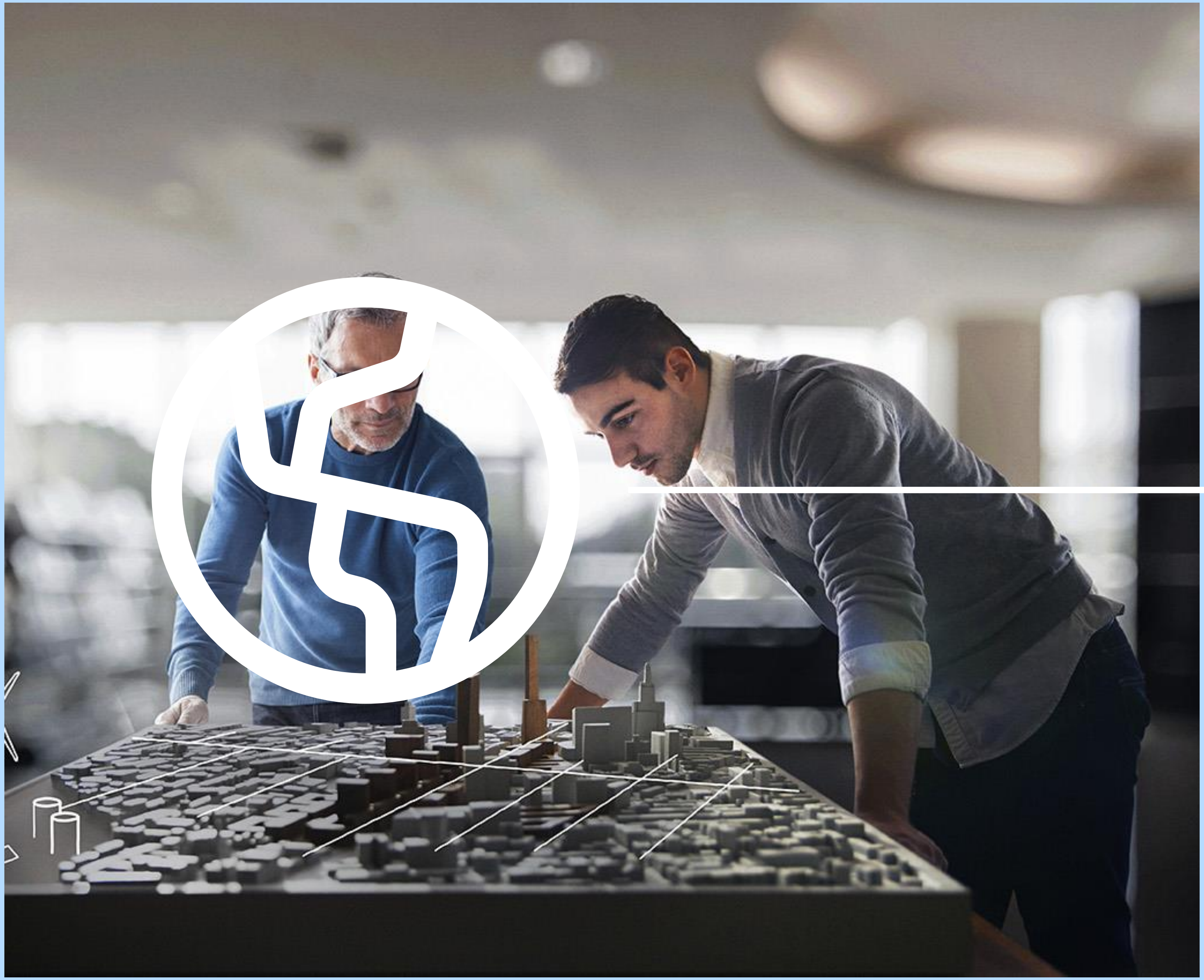
Let water flow smart

Factbook

A factbook of insights on the shifting dynamics shaping water demand in commercial buildings—driven by global urbanisation, a growing middle class, and the pressing need for sustainable water use. This factbook explores how existing building stock, rising urban water needs, and smarter water applications all point to a critical opportunity: enabling commercial buildings to become part of the water-smart solutions.



GLOBAL FACTS

Facts and conditions

GLOBAL FACTS

Rising population and shifting demographics

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Global urban growth and rising middle class will drive water demand	**The global population is expected to grow to 9.7 billion people by 2050**	*From an estimated 7.7 billion people worldwide in 2019, the UN projections indicates that the global population could grow to around 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100.[1]*
	6.3 billion people are expected to live in cities by 2030	*The urban population of the world is forecast to grow to 6.3 billion people in 2050 from 3.4 billion in 2009, representing both population growth and net migration from countryside to town.[2]*
	55% of the global population lives in urban areas, expected to increase to 68% by 2050	*Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050, adding another 2.5 billion people to urban areas with close to 90% of the increase taking place in Asia and Africa.[3]*
	The global middle class potentially growing to 5.3 billion by 2030 will accelerate demand for water	*5.3 billion is the expected number of the global middle class by 2030, while this number was 3.3 billion in 2020. This will increase the purchasing power and will grow the demand for water globally.[4]*

1. United Nations: World Population Prospects: The 2019 Edition https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf
2. https://www.unwater.org/water-facts/water-and-urbanization
3. UN DESA, 2018, https://population.un.org/wup/
4. The European Commission: growing Consumerism, 2020 https://knowledge4policy.ec.europa.eu/growing-consumerism_en

GLOBAL FACTS

Global water supply & demand

KEY MESSAGE	CORE MESSAGE	INSIGHTS
	**Over the past 100 years, water use has increased 6x**	***Global water use has increased by a factor of six over the past 100 years and continues to grow steadily*** *at a rate of about 1% per year as a result of increasing population, economic development and shifting consumption patterns.*[1]
	A 40% shortfall of the available global water supply is expected by 2030	***A 40% shortfall of the available global water supply is expected by 2030.*** *In many regions, companies can no longer rely on a stable supply of good-quality water to grow their business.*[2]
	Countries continue to put their water resources at risk	***6/10 countries are at risk of having unsustainable water resource*** *usage by 2050.*[3]
	Worldwide, cities possess massive water footprints	***Cities occupy less than 3% of the land*** *on Earth, yet the* ***catchment areas that provide them with water cover roughly 41%.***[4]
	In the next 3 decades, demand for water in cities is projected to increase by 50%	*Current estimates show that the future of humanity looks ever more urban. The demand for water grows by the day:* ***a 50 percent increase in urban water demands is anticipated within the next 30 years.***[5]

1. UNESCO, 2020, The United Nations world water development report 2020: Water and climate change, executive summary: https://unesdoc.unesco.org/ark:/48223/pf0000372882
2. https://cdp.net/en/disclose/question-bank/water-security
3. https://cdp.net/en/disclose/question-bank/water-security
4. McDonald, Robert I., Katherine Weber, Julie Padowski, Martina Florke, Christof Schneider, Pamela Green, Thomas Gleeson, Stephanie Eckman, Bernhard Lehner, Deborah Balk, Timothy Boucher, Gunther Grill, and Mark R. Montgomery. 2014. "Water on an urban planet: Urbanization and the reach of urban water infrastructure," Global Environmental Change 27: 96–105.
5. https://www.worldbank.org/en/news/feature/2017/05/15/water-scarce-cities-initiative

GLOBAL FACTS

Climate change & water stress

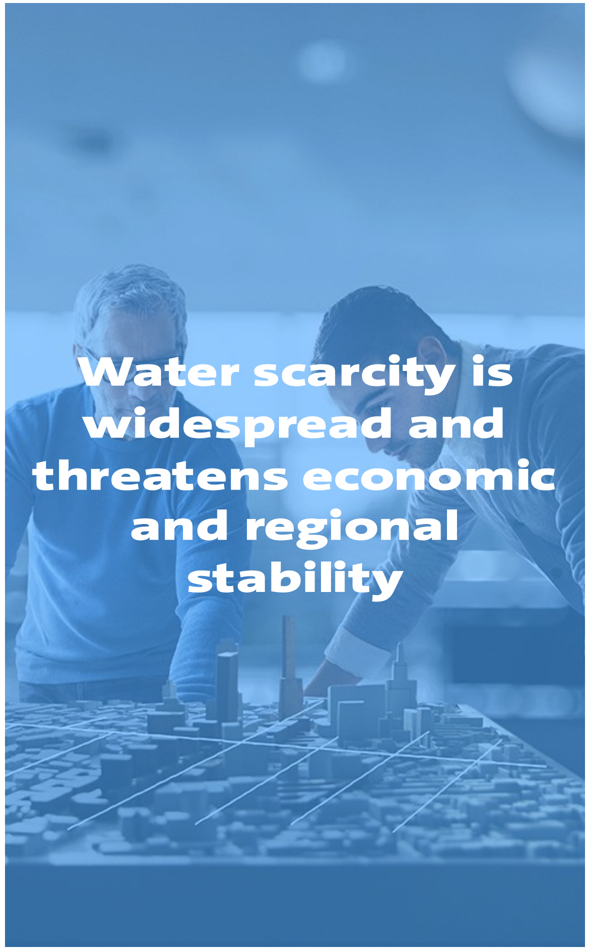
KEY MESSAGE	CORE MESSAGE	INSIGHTS
Climate change is driving water stress, unsafe supply, and disaster risk	**Current business practices are placing major cities in high water stress situation in the near future**	***45 cities with over 3 million people each will face extremely high-water stress by 2030*** *if the world continues with business as usual.*[1]
	Water-related events and disasters have risen more than 50% over the last 10 years	***Globally, floods and extreme rainfall events have increased by more than 50% over the past decade****, occurring at a rate four times greater than in 1980. Climate change is expected to further increase the frequency and severity of floods and droughts.*[2]
	29% of the planet drinks unsafe water	*Following a natural disaster, population displacement or a war, the lack of drinking water and inadequate sanitary conditions.* ***Currently, 29% of people on the planet is drinking water that is not safe for consumption.***[3]
	9 out of 10 natural disasters are water-related	***Nine out of ten disasters triggered by natural hazards during the last decade were related to water****. Water-related disaster deaths have more than doubled in the last 10 years.*[4]

1. https://www3.weforum.org/docs/WEF_Imagine_IF_Water-Series_2021.pdf
2. UNESCO, 2021, The United Nations world water development report 2021: valuing water; facts and figures: https://unesdoc.unesco.org/ark:/48223/pf0000375751
3. https://sdgs.un.org/partnerships/better-data-water-related-disasters
4. https://www.solidarites.org/en/taking-aid-further/combatting-waterborne-diseases/?gclid=EAIaIQobChMIovncpsC0-gIVRJnVCh0JDQHgEAAYAiAAEgLwJ_D_BwE

GLOBAL FACTS

Climate change & water scarcity

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Water scarcity is widespread and threatens economic and regional stability	**2/3 of the world population experience water scarcity at least once annually**	*Recent research has demonstrated that **two thirds of the world's population currently lives in areas that experience water scarcity for at least one month a year.** Noteworthy is that about 50% of the people facing this level of water scarcity live in China and India.*
	Water scarecity issues are expected to rise with 30% by 2030	*If water demand stays at current usage levels and without significant water saving efforts, the warming climate and reduced precipitation in the Mediterranean will cause extreme increases in water scarcity.*
	Water scarcity is estimated to reduce regional growth rates by up to 6%	*The World Bank estimated that **regions affected by water scarcity could see their growth rates decline by as much as 6% of GDP by 2050** as a result of losses in agriculture, health, income and property – sending them into sustained negative growth.*



1. UNESCO, 2017, The United Nations world water development report 2017: wastewater: the untapped resource: https://unesdoc.unesco.org/ark:/48223/pf0000247553
2. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/water-statistics
3. UNESCO, 2021, The United Nations world water development report 2021: valuing water; facts and figures: https://unesdoc.unesco.org/ark:/48223/pf0000375751

Building facts

Facts and conditions

BUILDING FACTS

The role of commercial buildings in water-related challenges

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Commercial buildings significantly impact urban water use and must be part of the solution	**The vast majority of commercial buildings consuming water already exist today**	*80% of buildings that will exist in 2050 are already built. Hence, there is a huge need—and opportunity—to retrofit existing assets.*[1]
	Buildings in general are responsibe for a notable amount of global water consumption	*As water availability declines, and population and urbanisation keep growing, there is a need to reduce demand and replace groundwater supplies. Currently, buildings and constructions are responsible for around 15% of freshwater use globally.*[2]
	Commercial buildings are one of the main contributors to urban water demands	*Commercial and institutional buildings account for 17–25% of total water demand in urban areas, varying by city size and industrial composition.*[3]

1. https://www.mckinsey.com/industries/engineering-construction-and-building-materials/our-insights/call-for-action-seizing-the-decarbonization-opportunity-in-construction
2. https://www.wsp.com/en-ca/insights/the-world-is-facing-a-water-crisis-here-is-how-the-built-environment-can-help
3. EPA, 2009, Water efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.gov/sites/default/files/2017-03/documents/ws-commercial-ci-whitepaper.pdf

BUILDING FACTS

Current challenges for commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
 **Commercial buildings face major efficiency gaps but have clear opportunities for improvement**	**Most commercial buildings are wasting energy due to outdated and inefficient systems**	***Over 80% of existing pumping systems*** *in commercial buildings* ***are outdated or inefficient****, leading to increased energy costs and reliability issues*[1]*.*
	Most of today's commercial buildings are not up to par with current sustainability requirements	***90% of public buildings need upgrades*** *within the next 7 years to meet Net-Zero requirements.*[2]
	A lot of unnecessary water use can be circumvented with simple efficiency and conservation initiatives	*Implementing* ***water-efficient fixtures and conservation strategies can reduce*** *a commercial building's overall* ***water use by more than 40%***[3]

1. (Source: U.S. Department of Energy).
2. https://www.csemag.com/articles/water-management-in-commercial-buildings-thinking-differently/
3. https://www.csemag.com/articles/water-management-in-commercial-buildings-thinking-differently/

BUILDING FACTS

The water-energy nexus in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Water and energy are deeply linked in buildings—and HVAC is a major driver	**Global energy production is challenged by increased water scarcity**	*47% of the world's thermal power plant capacity and 11 % of hydroelectric capacity are in highly water-stressed areas. This is a problem because **both thermal and hydroelectric power are highly dependent on water to produce electricity**.[1]*
	Energy consumption account for approx. 2/3 of GHG emissions	*Energy is in the spotlight of climate change initiatives **as about two-thirds of the world's anthropogenic GHGs come from energy production and use.**[2]*
	Buildings' energy usage are closely interconnected with their water usage patterns	*Electricity usage can constitute **up to 40% of a building's total water utility expenses.**[3]*
	HVAC systems are one of the primary contributors to commercial buildings' energy consumption	*The energy required to ventilate, heat and cool new air already **makes up about 40% of a building's total energy usage.**[4]*
	Enhancing HVAC systems' energy efficiency is a key objective to achieve sustainability goals	***Energy efficient heating and cooling of buildings** will be the second greatest lever to leap to 1.5°C. If all urban areas and cities in Europe, China and the USA invested in energy efficient heating and cooling of buildings, they **would contribute to the 1.5°C target of the Paris agreement with 20%**[5]*

1. UNESCO, 2014 https://unesdoc.unesco.org/ark:/48223/pf0000226961
2. UNESCO, 2020, The United Nations world water development report 2020: Water and climate change, executive summary: https://unesdoc.unesco.org/ark:/48223/pf0000372882
3. https://www.epa.gov/sustainable-water-infrastructure/energy-efficiency-water-utilities
4. https://www.usgbc.org/articles/how-hvac-can-turn-buildings-healthy-spaces-all
5. Navigant, 2020, How to reach the 1.5°C target in urban areas, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://assets.danfoss.com/documents/latest/402822/AH492544884836en-000101.pdf

BUILDING FACTS | *The untapped potential of commercial buildings*

KEY MESSAGE	CORE MESSAGE	INSIGHTS
	**Retrofitting is a key enabler to reduce energy (and water) consumption**	***Retrofitting existing pumps systems*** *with monitor-enabled devices* ***can save energy by up to 20%***[1]
	Leveraging smart technologies for building retrofitting is an effective strategy for reducing building energy consumption	***Integrating smart technologies across building systems****, including water supply,* ***can lead to overall energy savings of 30-50%*** *in existing buildings that were previously inefficient*[2]
	Optimising commercial building HVAC systems showcase strong energy savings potential	***On average, implementing smart HVAC optimisation decreases energy use with 25%****, leading to lower water usage in heating and cooling systems.*[3]

1. Council of the Great Lakes Region, 2024, The role of pump technology in achieving net zero goals, https://councilgreatlakesregion.org/the-role-of-pump-technology-in-achieving-net-zero-goals
2. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.aceee.org/sites/default/files/publications/researchreports/a1701.pdf
3. https://www.mdpi.com/2079-9292/12/12/2590?

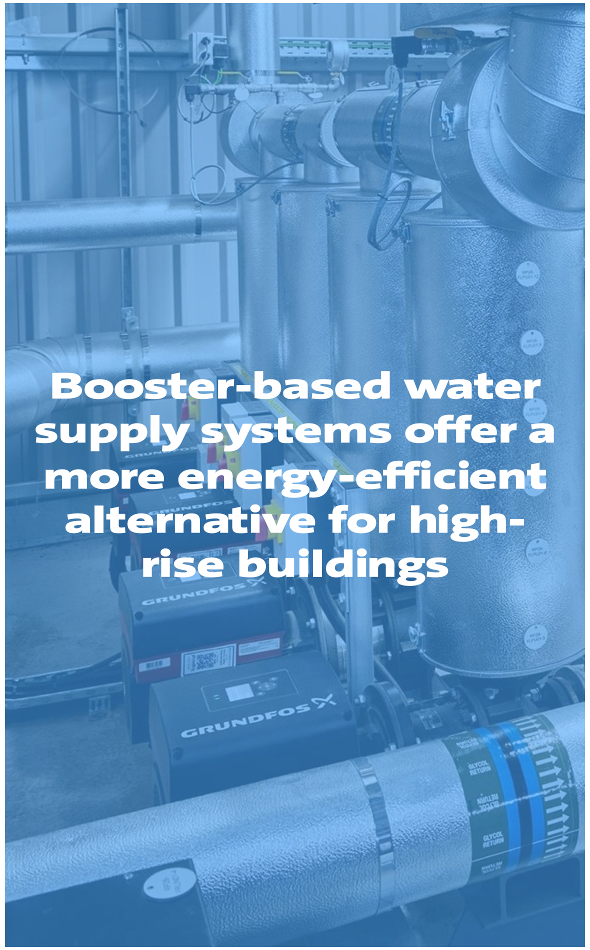
Application facts

Facts and conditions

APPLICATION FACTS

The role of water supply in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Booster-based water supply systems offer a more energy-efficient alternative for high-rise buildings	**Roof tank systems use 30% more energy than booster pumps**	*When comparing the energy consumption between roof tank and pump booster systems the overall energy consumption for roof tank system was about 30% higher than that of booster pump system[1]*
	Electricity for water pumps accounts for 20–40% of lifecycle costs in high-rise commercial buildings	*Based on a study of the 20 - year - life - cycle cost of water supply system in high-rise buildings, the total cost of electricity to operate the pumps for water supply systems in commercial buildings ranges from 20-40%[2]*
	Operating booster systems with pressure control can reduce annual energy use by up to 33%	*Operating water boosting systems in proportional pressure control mode can achieve annual energy savings of up to 33%[3]*
	High-rise water supply systems waste 75% of energy; half is lost through inefficient pumps alone	*The energy efficiency for high-rise water supply system is below 25% and more than 75% input energy is wasted. Half of the energy loss attributes to water pumps[4]*



1. Nguyen, Lan Huong & Nguyen, Viet-Anh & Dang, Huyen & Tran, Hoai Son & Cuong, Dinh. (2018). Optimization to water supply system design and operation scheme in high rise buildings. Journal of Science and Technology in Civil Engineering (STCE) - NUCE. 12. 123-131. 10.31814/stce.nuce2018-12(3)-12.
2. Nguyen, Lan Huong & Nguyen, Viet-Anh & Dang, Huyen & Tran, Hoai Son & Cuong, Dinh. (2018). Optimization to water supply system design and operation scheme in high rise buildings. Journal of Science and Technology in Civil Engineering (STCE) - NUCE. 12. 123-131. 10.31814/stce.nuce2018-12(3)-12.
3. https://www.grundfos.com/uk/learn/ecademy/all-courses/applying-proportional-pressure-in-water-boosting-systems/how-to-save-energy-by-using-proportional-pressure-in-water-boosting-systems?
4. Nguyen, Lan Huong & Nguyen, Viet-Anh & Dang, Huyen & Tran, Hoai Son & Cuong, Dinh. (2018). Optimization to water supply system design and operation scheme in high rise buildings. Journal of Science and Technology in Civil Engineering (STCE) - NUCE. 12. 123-131. 10.31814/stce.nuce2018-12(3)-12.

APPLICATION FACTS

The role of drainage in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Drainage systems in high-rise buildings face performance and energy efficiency challenges	**Increase in sustainable drainage system demand for commercial properties**	*Market of commercial roof drainage systems are set to increase by 52% from 2025 to 2033, as the market as seeing more green building initiatives and commercial properties are incorporating sustainable drainage systems.*[1]
	Hot wastewater and detergents reduce drainage performance by 40 percent.	*Use of detergents and hotter wastewater can reduce building drainage performance by up to 40%, yet design guides have not been updated to address this impact.*[2]
	Outdated sewage infrastructure is resulting in unnecessary water overflow	*Out of 200 American water industry stakeholders, 75% stated aging sewage infrastructure as the most challenging issue facing the water infrastructure sector.*

1. https://www.globalgrowthinsights.com/market-reports/roof-drainage-system-market-105822
2. Kelly, David & Campbell, David & Xue, Yunpeng & Stewart, Colin. (2021). Building Drainage System Design for Tall Buildings: Current Limitations and Public Health Implications. Buildings. 11. 70. 10.3390/buildings11020070.
3. https://www.theutilityexpo.com/news/water-wastewater-and-stormwater-industry-trends-fo

APPLICATION FACTS

The role of rainwater harvesting in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
 **Rainwater harvesting reduces water use in commercial buildings significantly**	**Rainwater harvesting plays a critical role in reducing water usage in types of commercial buildings**	*The substitution of potable water with rainwater or treated greywater, as proposed by has the potential to fulfil about 50% of the water demand in commercial buildings.*[1]
	Harnessing rainwater and water recycling can help cut water use by up to 30%	*Initiatives like using water-efficient appliances, recycling water, and harvesting rainwater can achieve a 30% reduction in water use through green building practices.*[2]
	Rainwater harvesting systems are economically beneficial	*Recent research has evaluated 267 RWH projects in Beijing and found that in 66.7% of the instances, RWH systems economically beneficial.*[3]

1. Thebuwena, A.C.H.J.; Samarakoon, S.M.S.M.K.; Ratnayake, R.M.C. On the Necessity for Improving Water Efficiency in Commercial Buildings: A Green Design Approach in Hot Humid Climates. Water 2024, 16, 2396. https://doi.org/10.3390/w16172396
2. Thebuwena, A.C.H.J.; Samarakoon, S.M.S.M.K.; Ratnayake, R.M.C. On the Necessity for Improving Water Efficiency in Commercial Buildings: A Green Design Approach in Hot Humid Climates. Water 2024, 16, 2396. https://doi.org/10.3390/w16172396
3. Karim, M. R., Sakib, B. M. S., Sakib, S. S., & Imteaz, M. A. (2021). Rainwater Harvesting Potentials in Commercial Buildings in Dhaka: Reliability and Economic Analysis. Hydrology, 8(1), 9. https://doi.org/10.3390/hydrology8010009

APPLICATION FACTS

The role of wastewater in commercial buildings

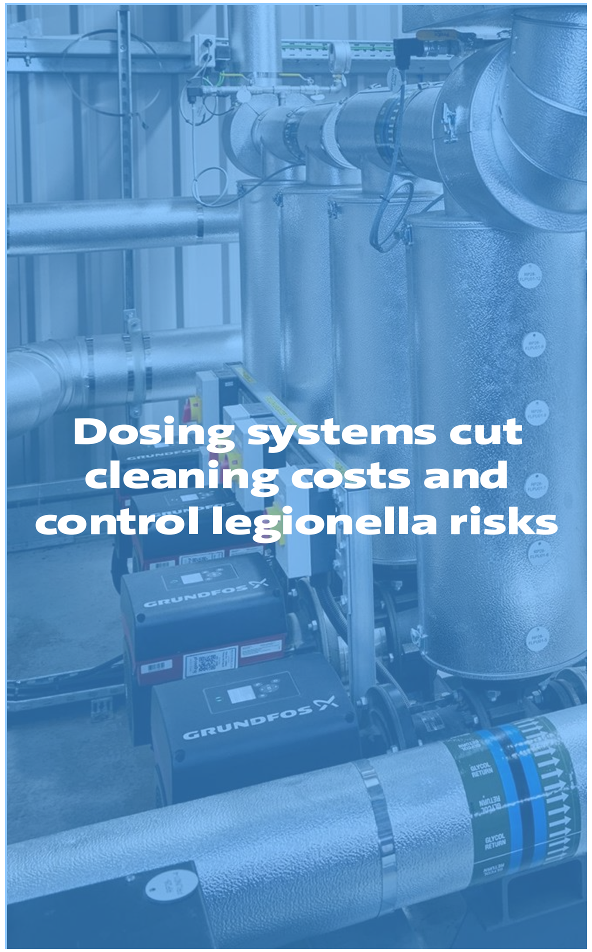
KEY MESSAGE	CORE MESSAGE	INSIGHTS
Most wastewater remains an untapped resource	**Approx. 380 billion m³ of water can be recovered from wastewater annually**	*About* ***380 billion m3 of water can be recovered from the annual volumes of wastewater produced****. This type of water recovery is expected to reach 470 billion m3 by 2030 and 574 billion m3 by 2050.*[1]
	80% of global wastewater is discharged untreated	***Treating and reusing wastewater offers significant potential to alleviate water scarcity and reduce environmental impact****. Capturing this resource can enable buildings to recover water, generate energy, and reclaim valuable nutrients — supporting both sustainability goals and operational efficiency.*[2]
	Less than 2.5% of treated wastewater in the EU is reused	*More than 40,000 million m^3 of wastewater is treated in EU every year.* ***Only 964 million m3 of this is treated wastewater is reused, equaling 2,5%****.*[3]

1. UNESCO, 2021, The United Nations world water development report 2021: valuing water; facts and figures: https://unesdoc.unesco.org/ark:/48223/pf0000375751
2. State of Green, 2022: https://stateofgreen.com/en/news/urban-wastewater-treatment-and-its-potential-for-the-city/
3. https://ec.europa.eu/environment/water/pdf/water_reuse_factsheet_en.pdf

APPLICATION FACTS

The role of dosing & disinfection in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Dosing systems cut cleaning costs and control legionella risks	**In certain markets, legionalla can be found in up to half of all large buildings**	***Legionella,*** *the bacteria that causes Legionnaires' disease,* ***is still the largest threat in America's water systems, as it is found in 50% of all large buildings.*** *However, it is now compounded with other hazards that have emerged as public safety challenges.[1]*
	Effective chemical dosing systems can reduce clearning costs by up 30%	*The European Cleaning Journal estimates that* ***a good dosing and dispensing system can reduce a company's cleaning costs by up to 30 per cent*** *by accurately diluting the proper amount of chemicals.[2]*



1. https://facilityexecutive.com/legionnaires-disease-preventing-an-outbreak
2. https://www.europeancleaningjournal.com/magazine/june-july-2018/latest-news/cleaning-chemical-dosing-still-necessary

APPLICATION FACTS

The role of water reuse in commercial buildings

KEY MESSAGE

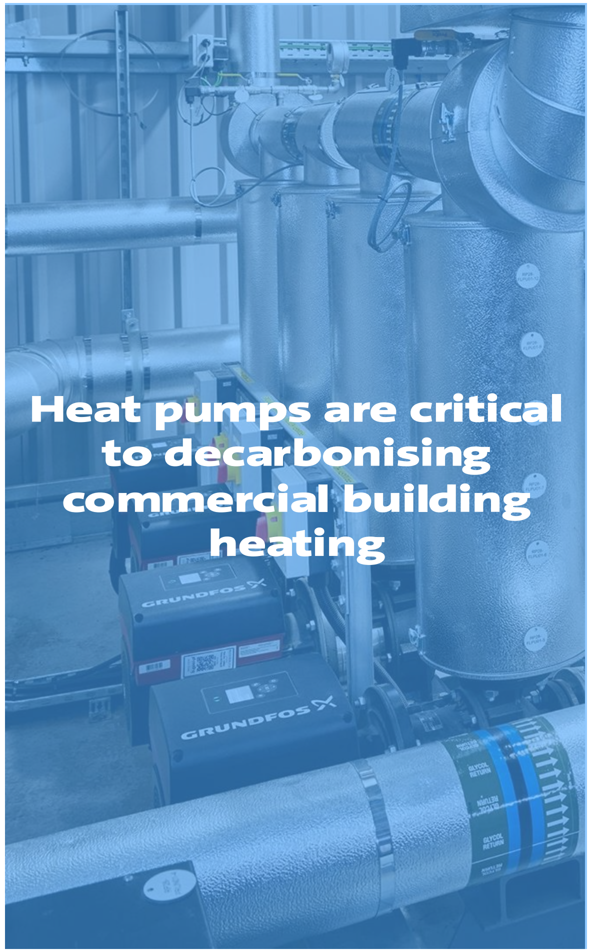
Water reuse boosts sustainability and cuts costs in buildings

CORE MESSAGE	INSIGHTS
Water reuse is one of the most reliable strategies to combat decreasing water supply	*It is increasingly necessary to consider 'unconventional' water resources in future planning. Water reuse (or reclaimed water) is a reliable alternative to conventional water resources for a number of uses, provided that it is treated and/or used safely.*[1]
Water recycling cuts potable use by up to 75% in commercial buildings	*Recycling water can greatly reduce reliance on potable water, helping conserve resources. In residential buildings, using recycled water can lower potable water demand by up to 50%. Commercial and industrial buildings, which typically use more water, can see reductions of up to 75% with well-designed recycling systems. This makes water reuse a powerful tool for improving sustainability across building types.*[2]
Water recycling reduces building water bills by up to 30%	*The use of recycled water can offer more than just environmental benefits — it can also result in meaningful cost savings. By reducing the reliance on potable water, buildings can significantly cut their water bills. In many cases, facilities that implement water recycling systems have reported reductions in water expenses of up to 30%.*[3]

1. UNESCO, 2020, The United Nations world water development report 2020: Water and climate change, executive summary: https://unesdoc.unesco.org/ark:/48223/pf0000372882
2. Chen, L., Chen, Z., Liu, Y. et al. Benefits and limitations of recycled water systems in the building sector: a review. Environ Chem Lett 22, 785–814 (2024). https://doi.org/10.1007/s10311-023-01683-2
3. Chen, L., Chen, Z., Liu, Y. et al. Benefits and limitations of recycled water systems in the building sector: a review. Environ Chem Lett 22, 785–814 (2024). https://doi.org/10.1007/s10311-023-01683-2

APPLICATION FACTS

The role of heating systems in commercial buildings

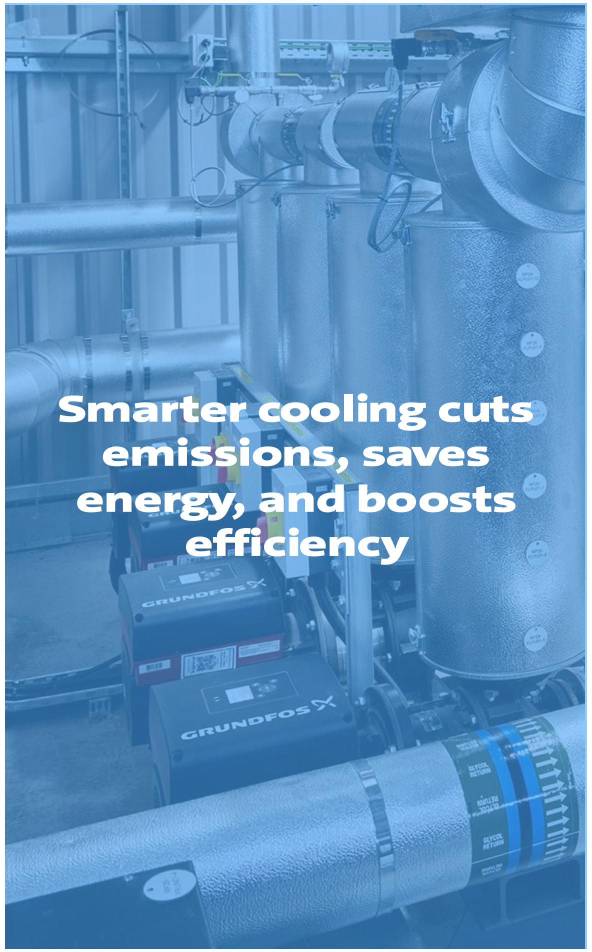
KEY MESSAGE	CORE MESSAGE	INSIGHTS
 **Heat pumps are critical to decarbonising commercial building heating**	**Retrofitting modern heating into historic buildings has a major efficiency potential**	*Nearly 60% of historic commercial buildings experience inefficiencies with their HVAC systems, leading to increased energy consumption. These inefficiencies are often due to outdated infrastructure and challenges in retrofitting modern systems into older structures.*[1]
	Heat pumps could cut 500Mt CO_2 by 2030 — matching emissions from all European cars	*The IEA estimates heat pumps globally have the potential to reduce global carbon dioxide (CO2) emissions by at least 500 million tonnes in 2030 – equal to the annual CO2 emissions of all cars in Europe today.*[2]
	Heat pump adoption must rise to meet Net Zero heating targets by 2050	*Heat pumps today still meet only around 10% of the global heating need in buildings. To get on track with the Net Zero Emissions by 2050.*[3]

1. Challenges and Solutions for HVAC Systems in Historic Commercial Buildings, Evolution Mechanical
2. https://www.iea.org/energy-system/buildings/heat-pumps
3. https://www.iea.org/energy-system/buildings/heat-pumps

APPLICATION FACTS

The role of cooling systems in commercial buildings

KEY MESSAGE	CORE MESSAGE	INSIGHTS
Smarter cooling cuts emissions, saves energy, and boosts efficiency	**District cooling can reduce greenhouse gas emissions by 30–35%**	*District cooling has the potential to reduce greenhouse gas emissions by 30–35%, making it a powerful solution for enabling cleaner, greener, and more energy-efficient urban environments.[1]*
	District cooling cuts peak power demand by up to 80%	*District cooling reduces peak power demand in new development by 40 - 80% depending on the type of district cooling technology used and provide local power close to demand.[2]*
	Green roofs cut cooling load by 70% and boost comfort	*Green roofs can reduce the cooling load by up to 70%, decrease the indoor temperature achieving an indoor air temperature reduction up to 15 ∘C, and provide a significant improvement of thermal comfort conditions.[3]*
	Efficient cooling towers boost water efficiency by 38%	*Efficient cooling towers and the redirection of condensed water into the cooling tower make-up water tank improved the overall water efficiency to 38%.[4]*



1. The GHG savings figures are for new developments (EESL and UNEP, 2019).
2. Chen, Z., Kolsepatil, N., Jha, K., Shinde, T., Chaturvedula, S., Kumar, E., Hickman, B., Mohanty, P., & Riahi, L. (2021). *District energy in cities initiative: Rapid assessments of five indian cities - Pune*.
3. Mihalakakou, Giouli & Souliotis, Manolis & Papadaki, Maria & Menounou, Penelope & Dimopoulos, Panayotis & Kolokotsa, Dionysia & Paravantis, John A. & Tsangrassoulis, Aris & Panaras, Giorgos & Giannako, 2023. "Green roofs as a nature-based solution for improving urban sustainability: Progress and perspectives," Renewable and Sustainable Energy Reviews, Elsevier, vol. 180(C).
4. Mohd Zaini, Farhana & Kwong, Qi Jie & Jack, Lynne. (2020). Water efficiency in Malaysian commercial buildings: a green initiative and cost–benefit approach. International Journal of Building Pathology and Adaptation. ahead-of-print. 10.1108/IJBPA-09-2020-0080.

Let water flow smart

Thank You