PEOPLE & PLANET
BATHROOM OF THE FUTURE

STYLUS
People & Planet

Bathroom of the Future

Traditional bathrooms guzzle copious amounts of water and energy, and are stocked with myriad plastic goods. Innovators are rethinking standard fixtures, materials and personal products with ‘people and planet’ in mind – designing for a resource-scarce world, for consumers seeking more socially responsible solutions, and for the sizeable opportunity in serving off-grid populations.

Summary

Washing In A Water-Scarce World
Domestic water usage will skyrocket in the next few decades, as developing markets urbanise and climate change makes water availability less predictable. Several clever concepts propose new ways to ensure showers waste less water, with solutions ranging from new atomising techniques to water recirculation.

Personal Care Gets Planet-Friendly
Consumers are more alert to avoidable waste, and as bathrooms become a key wellbeing arena (see Crafting Wellness), they’re keen to populate these spaces with ethical, feel-good purchases. In response, brands are creating personal care products that are reusable, packaging-light or -free, water-saving and otherwise sustainably focused.

The Off-Grid Opportunity
Bringing toilets to more people around the globe will be both life-changing (impacting health, education and safety) and a lucrative opportunity: it’s estimated that new sanitation technologies will be worth $6bn annually by 2030 across both developing and developed markets (BCG, 2018). The key lies in innovative new off-grid systems.

Mindful Materials & Design
How can we build bathrooms in more sustainable ways? Recycled materials and composites that resemble natural stone and terrazzo hold potential, along with bioplastic-based 3D printing, and self-healing materials.
At A Glance
The Regional Focus of this Report – Global

Relevant Industries
- Architecture/Design
- Beauty
- Construction/Property
- Education/Non-Profit Organisations
- Utilities

Trend Duration
- Now
- 2 yrs
- 5 yrs
- 10 yrs
- 20 yrs

Innovation Platforms
- Power
- 24h
- Green
- Flowers
### Key Stats

#### Washing in a Water-Scarce World

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<th>Stat</th>
<th>Description</th>
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<tr>
<td>3.6bn</td>
<td>Almost half the global population (around 3.6 billion people) live in areas that are potentially water-scarce at least one month per year</td>
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<tr>
<td>75%</td>
<td>In the US, India, Brazil and France, 75% of consumers are interested in smart appliance features that manage water usage</td>
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<td>1.2tn</td>
<td>In the US, nearly 1.2 trillion gallons of water are used just for showering each year</td>
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#### Personal Care Gets Planet-Friendly

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<tr>
<td>72%</td>
<td>Across 16 megacities, 72% of consumers said they would pay more for products packaged in ways that provide “substantial sustainability benefits”</td>
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#### The Off-Grid Opportunity

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<th>Stat</th>
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<tr>
<td>2.3bn</td>
<td>Globally, 2.3 billion people lack access to basic sanitation facilities such as toilets or latrines</td>
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<td>80%</td>
<td>Eighty per cent of infectious diseases around the world stem from poor sanitation</td>
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<tr>
<td>20%</td>
<td>Worldwide, at least 20% of girls lacking adequate bathroom facilities eventually drop out of school</td>
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<td>$6bn</td>
<td>The global market for new sanitation technologies is forecast to reach $6bn annually by 2030</td>
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Washing in a Water-Scarce World

Between 2010 and 2050, water demand is likely to more than triple in parts of Africa and Asia, and double in Central and South America. However, almost half of the global population lives in areas that are already potentially water-scarce for at least one month a year (UN-Water, 2018).

Crises like the water shortage in Cape Town last year (which at one point limited residents to just 13 gallons per day) are raising consumers’ consciousness. In a survey of American, Indian, Brazilian and French consumers, 75% expressed interested in smart appliance features that manage water usage (Whirlpool, 2018).

The shower is a key culprit in the home. The average American shower uses 18 gallons (about 70 litres) of water per use, amounting to over one trillion gallons (3.8 trillion litres) annually (US EPA, 2018).

- **Misty System**: San Francisco start-up Nebia has created a shower that atomises water into micro-drops, increasing its surface area and coverage while reducing usage by up to 65%. The design uses a combination of nozzles, some patented, for a unique effect. Nebia’s 2.0 version, a Kickstarter hit, is set to launch mid-year.

  With few consumers aware of which showerhead they use, Nebia sees opportunity in bringing brand awareness to this space, marketing its product as an environmentally guilt-free, indulgent experience. A new partnership with American kitchen and bath brand Moen will help Nebia scale the concept and make the shower (currently $500) more affordable.

  Similarly, Swedish start-up Altered has developed a nozzle attachment that fits onto existing taps and releases water as a mist, resulting in full functionality but using as much as 98% less water. The company also created an easily rinsed-off foaming hand wash that works well with the faucet. In a partnership with Altered, Ikea plans to launch a Misteln nozzle in August.
This nozzle uses only 2% of your tap water.
• **Recirculating Solutions:** Swedish company Orbital Systems has invented a shower that purifies and recirculates a small amount of water (typically 5-10 litres), using up to 90% less water and 80% less energy than a conventional shower. The smart device also tracks water savings and consumption data. The system is currently expensive ($2,500), but Orbital hopes to bring the cost to under $1,000. It’s also aiming to apply the technology to taps, toilets and washing machines, for a complete eco-bathroom solution.

Danish eco-hotel Axel Guldsmeden tested Orbital in 2018, reporting that each shower session saved 42-65 litres and used 55-57% less energy. Guldsmeden is installing the showers in its Islands Brygge hotel in Copenhagen, which is opening this year. Danish start-up Poshtel incorporates Orbital’s shower in its 5th Element prototype, an off-grid pop-up accommodation and accompanying service unit that can travel anywhere from festivals to disaster zones.

Fellow Scandinavian start-up Flow Loop’s retrofit shower system also recirculates water, relying largely on a UV-light filter for purification. The Danish company says it saves up to 85% water and 75% energy.

The e-Shower from Dutch company Hamwells uses 14 litres of water per eight-minute shower, as every drop is used several times. It also uses less energy than a typical shower.

© Hamwells HomeSpa

© Flow Loop
• **Nudge Tech for Shorter Showers**: Akin to Fitbit for bathers, several tech solutions nudge behaviour changes and challenge users by heightening their awareness of water usage.

LED-equipped shower head Aloé from French start-up Hydrao signals consumption levels via changing colours, turning red at eight gallons and flashing red above 11 gallons. The companion app lets users personalise levels for colour changes and track water savings over time.

Californian start-up Livin’s smart shower lets users set a time or water consumption limit, with the water flow briefly pausing when the limit is reached. Users can also press a button to pause water at the preferred temperature while they use soap or shampoo. See *Bathroom of the Future: Social Spaces* for more on Livin.

• **Shower Meets Shampoo**: L’Oréal has teamed up with Swiss start-up Gjosa for a salon showerhead that dispenses shampoo and rinses hair using much less energy and water – 1.5 litres per shampoo versus an average of eight litres. A specially formulated L’Oréal shampoo that’s easier to rinse is delivered through the showerhead itself, designed to use less water but with equivalent efficacy. Salons in South Africa and the US are piloting the system. See the *Personal Care Gets Planet-Friendly* section for more on sustainably minded bathroom products.
Personal Care Gets Planet-Friendly

As consumers become more passionate about limiting plastic and increasingly willing to pay a premium for sustainability benefits, personal care brands are finding it’s good business to readdress the status quo. Unilever reports its ‘sustainable living’ brands delivered 70% of its 2017 sales growth. See The Great Beauty Green-Up for a deeper dive into this topic.

- **Can Refillables Replace Single-Use Items?:** Loop is a potentially game-changing new circular initiative involving a partnership between dozens of consumer brands and New Jersey recycling company TerraCycle. Brands are creating reusable, refillable products that consumers order through Loop’s or participating retailers’ websites. Goods are shipped in reusable totes, which customers keep and can eventually repack with depleted products. Loop then picks these up, cleans the containers, recovers components like brush parts, replenishes products and redelivers them.

  Participating brands include Procter & Gamble’s Pantene, which introduced a durable aluminium bottle for its shampoo/conditioner, and Crest, which has created a glass bottle for its mouthwash.

  Loop will be tested in New York and Paris as of mid-2019, expanding to London later in the year via a collaboration with British retailer Tesco.
• **Aesthetic Opportunity:** Refillable packaging not meant to be quickly discarded represents an exciting opportunity for brands to target design-conscious, eco-aware audiences by creating display-worthy goods. Under the Loop initiative, Unilever deodorant brands including Dove and Axe/Lynx will test a refillable deodorant packaged in stainless steel with a sleek, minimalist design.

Similarly, New York deodorant brand **Myro** launched in September 2018 with a contemporary tube design that users fill with replaceable pods. The system reportedly uses 50% less plastic than a typical deodorant. See [Luxurifying Personal Hygiene](https://www.stylus.com/) for more on the hygiene market’s makeover.
• **Back to the Bar:** Reflecting the growing rejection of plastic, UK shoppers are buying bar soap again after years of declining sales. Bars enjoyed 3% sales growth in the year to September 2018 (outpacing growth for liquid soaps/shower gels), with sales at supermarket chain Waitrose up as much as 20%. Among bar soap users, 49% said they ‘avoid products harmful to the environment’, up from 43% in 2017 (Kantar Worldpanel, 2019).

Brands are betting on bars for other personal care products, inspired by eco-pioneer Lush’s success with solid shampoos. Plastic-free personal care line Ethique, based in New Zealand, produces only bar products, as well as compostable in-shower containers made with bamboo and sugarcane. Lush is similarly working on “cork-tainers” for its shower bars. See Instagangs: Single-Product Beauty Brands for more on Ethique.

• **Solid Solutions:** Turning liquid products into solids can limit or eliminate packaging. As discussed in Reinventing Beauty Packaging, Lush has focused its research and development on no-packaging concepts. The UK brand has now opened three of its Naked stores (Milan, Berlin and Manchester) dedicated to unpackaged products, including a bottle-shaped solid shower gel and a shower oil.

One billion toothpaste tubes are tossed each year according to LA start-up Bite, which makes toothpaste tablets that foam up when bitten into. Users then simply brush as normal. Bite’s tablets come in glass jars designed to be refilled. As part of the Loop initiative, Unilever’s oral care brand Signal is launching a similar product called Integral 8 Tooth Tabs. Lush also sells toothpaste tablets.
• **Water-Saving Wonders:** As outlined in *Beauty: New Ways with Water*, brands are focusing on limiting their water usage. Unilever-owned *Love Beauty and Planet*, one of our *3 New Green Beauty Brands to Watch in 2018*, makes conditioners with “fast-rinse technology”. The product breaks down into smaller molecules when rinsing starts, enabling shorter showers. Meanwhile, its *Showerless Cleansing Mist* claims to let hurried users skip the shower – a concept with at least as much traction in the convenience stakes as in its sustainability angle. The brand will also partner with Loop.

• **The Trouble with Toilet Paper:** Americans use on average a roll and a half of toilet paper per week, the manufacturing of which requires 55.5 gallons of water, according to US start-up Tushy. Helping consumers use less paper, Tushy has created a bidet-like water-spraying device that attaches to the toilet, purportedly using on average just 1.3 gallons per week. Tushy targets millennials with its environmental message, coupled with cheeky humour. It also sells toilet paper made from bamboo.
The Off-Grid Opportunity

Shockingly, 2.3 billion people globally still lack access to basic sanitation facilities such as toilets or latrines (WHO, 2018), while many others are limited to inadequate facilities. This impacts health (80% of infectious diseases stem from poor sanitation), safety and education, with at least 20% of girls lacking adequate bathroom facilities eventually dropping out of school (Change:Water).

Since installing sewage systems is costly and complex, humanitarian organisations and businesses are looking to leapfrog traditional facilities and find off-grid solutions, which also have a lower environmental footprint.

The business potential here includes developed economies: the US in particular is grappling with ageing infrastructure, while enhanced off-grid options could be embraced by festivals, builders of tiny houses, and more.

- **The Push to Expand Access**: The UN is prioritising access to clean water and sanitation as one of its Sustainable Development Goals. The **Bill & Melinda Gates Foundation** is a key influencer – since 2011, it has invested $200m in research into redesigning the toilet. The Seattle-based non-profit is challenging companies to devise economical off-grid devices that eliminate odours and pathogens, and that require minimal maintenance. At the foundation’s 2018 Reinvented Toilet Expo, the World Bank and others announced up to $2.5bn in funding for inclusive sanitation projects.
**New Takes on Toilet Tech:** Twenty toilet and waste-treatment technologies are now available for licensing and production through the Gates Foundation. Key approaches to safely eliminating pathogens include dry combustion, which converts waste to a fuel source akin to charcoal briquettes; wet oxidation, with oxygen breaking down waste suspended in water; and electrochemical processing, which relies on metal oxides. The following are among the key projects.

North Carolina’s Duke University, which is home to a sanitation technology cluster, is working with US ‘smart sanitation’ start-up Biomass Controls on a toilet that separates and processes liquid and solid waste on-site. Liquid is filtered and disinfected for reuse, while solids are turned into fuel or fertiliser. Since meeting the needs of women and girls is a priority, a thermal treatment unit safely incinerates sanitary towels. The toilets will be installed in two Indian cities in 2019.

Japanese water and sanitary product maker Lixil is partnering with Unicef and the Gates Foundation to expand access to its cheap and non-sewer-dependent Sato products. Already used by six million people in Africa and Asia, the toilet requires only half a cup of water per flush, with a trapdoor component sealing off odours. Starting in Kenya, Ethiopia and Tanzania, Unicef is educating communities to ensure they embrace improved sanitation and bringing along Lixil employees to assess which products are the best match.

The vaporising, waterless toilet from Change:Water Labs – a Boston-based social start-up focused on women and girls without access to toilets – reduces a community’s sewage volume by at least 85%. It catches waste in a moisture-absorbing polymer bag (replaced roughly twice a month) that can separate liquids and solids, then evaporate most waste. A filtration system absorbs some odours.
We are proud to announce that we have been awarded the prestigious Red Dot Design Award for our V-Trap technology.

This Children’s Day say goodbye to open defecation and give the children a clean gift of soft sanitation.

The SATO V-Trap system prevents clogging and bad odour.

Chivas Venture - Change: Water Labs © Chivas Regal
• **Energy-Generating Toilets:** Solar biodigesters use bacteria to break down waste and transform it into biogas for households. Israeli company HomeBiogas makes a completely sealed porcelain toilet that connects to a biodigester, which turns waste into gas for powering the household stove.

Similarly, Singapore-based architecture studio Spark has proposed a concept called the Big Arse Toilet – a 3D-printed module based around a biogas dome that’s buried underground. Designed to provide sanitation while producing energy for remote communities, the easily transportable toilet would be made with bamboo fibres and bio-polymer resin.
• **Refining Crisis Facilities**: Japanese studio Nendo has designed Minimlet, an ultra-simple kit for disaster zones. It includes seven items: the carrying bag, aluminium pipes, a toilet seat, tissues, a tent, garbage bags and a coagulant to neutralise waste. See The Brief for more.

eSOS is a smart toilet developed by Dutch studio Flex, Bosnian software maker Systech and The Unesco-IHE Delft Institute for Water Education. Designed for crisis situations as well as urban slums, the lightweight latrine monitors tank levels to optimise cleaning routines, minimising bacteria growth. It also collects data from human waste for insight into emerging health issues (see also Outsense in Crafting Wellness). The design of the toilet makes the most of each component, with the shipping pallet becoming the toilet’s foundation, for instance.

A Canadian student group has devised an intriguing concept – a compostable, mushroom-based toilet. The mycelium tank’s receptacle divides liquids (which are neutralised) and solids (which are covered with organic material like sawdust to prevent odour). Winner of the 2018 Biodesign Challenge, the toilet would be usable by one household for a month. Local seeds included with it can be planted over the top once it’s ready for composting. See Biohm in Sustainable Colour & Materials Influencers for more on mycelium as a construction material.

See also Creativity for Crisis: Humanitarian Innovation.
Mindful Materials & Design

Bathrooms require materials that can withstand heat, humidity and temperature fluctuations, imposing restrictions on designers’ work. Promising developments, especially in repurposed waste products, show there’s potential for more sustainable and durable alternatives to conventional construction materials. Bathrooms could one day make waste a feature.

- **Recirculating Bathroom Materials**: Creating a directly circular system (old bathroom materials repurposed for new use), US kitchen and bathroom manufacturer Kohler is looking to transform its industrial waste – including pottery dry cull and enamel powder – into high-end tile collections via its WasteLab sustainability initiative. Meanwhile, Silicastone by UK brand Alusid is a slab material made from post-industrial vitrified porcelain sinks and toilets combined with ground-down TV screens. Read more about it here.

A new composite surface material by Berlin-based studio Llot Llov and German cosmetics group Cosnova uses rejected nail-polish bottles and loose polish colours mixed with concrete.
• **Second-Life Sanitaryware:** Stylus’ senior editor of Colour & Materials Lauren Chiu believes there’s great untapped potential in upcycling and restoring vintage sanitaryware: “Brands should seize the opportunity to create compelling visual narratives in products through the use of salvaged materials, which can lend bathrooms a unique character and history while satisfying consumers’ increasing appetite for sustainable options.” See The Brief for more on this theme.

• **Refining Plastic Waste:** Finnish company Durat is at the forefront, producing a recyclable surface material containing about 30% post-industrial plastics, which are granulated into speckles. The line includes wash basins and baths. Following a circular model, Durat also takes back its used products for recycling or renewal.

Other new concepts that reuse discarded plastics hint at the potential of use in bathrooms. These include the terrazzo-like sheet-plastic material produced by Dutch start-up Plasticiet, and Germany-based designer Enis Akiev’s tiles, which incorporate geological components and mimic natural stone. British designer Toni Packham is exploring plastiglomerate, a stone-like material formed when sand, wood and shells are melded with ocean plastic.

For more on upcycling plastics, see Evolving Plastics and the plastics section of Materials Evolution: A/W 20/21.
• **Self-Healing Materials:** Fenix NTM is an intelligent material for interior design developed by Italian manufacturer Arpa Industriale. It creates hyper-durable surfaces that are anti-scratch, anti-smudge, and self-healing. It’s also hydro-repellent and mould-proof, making it ideal for bathroom applications. For more, see The Brief. Another material, Fenix NTA, features a brushed metal surface and is abrasion- and heat-resistant. See also Adaptive Surfaces in Materialising Modern Work.

• **Lighter Footprints:** Furniture-inspired pieces that can be moved around and easily replaced offer a solution to the waste involved in constructing and eventually removing solid, wall-covering units and hefty hardware. Plural by Milan-based designer Terri Pecora for Italian bathroom brand Vitra includes a siphon system enabling washbasins to be mounted in an open space.
Future Insights

**Enlist Partners**
L’Oréal hit on an intriguing new concept with its salon shower by teaming up with Gjosa – joining a wave of ‘uncommon partners’ advancing themselves through collaboration. Public-private partnerships will also be key (see the Lixil/Unicef/Gates Foundation project), with philanthropies helping businesses better understand the needs and nuances of unfamiliar communities.

**Discover Trickle-Up Innovations**
Off-grid inventions designed to improve lives in developing regions also have massive commercial potential in the developed world, from travelling eco-hotels like Poshtel and Accor’s Flying Nest (see The Brief), to festivals and the growing cohort of consumers seeking self-sufficiency.

**Help Consumers Do Good & Feel Good**
While they’re seeking to do better, consumers are more likely to make relatively small adjustments (buying bar instead of liquid soap, for instance) than bigger changes (such as short showers). Design innovations like Nebia and Orbital’s water-saving but comfortable showers will be essential to enabling consumers to do and feel good.

**Create A Product Suite**
Ethique sells sustainably produced containers for its bath bars, while Altered is creating a hand wash that’s suited to its nozzle’s mist system. Think beyond your product niche to create harmonious bathroom products that fit and function well together.

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<tr>
<td><strong>Past</strong></td>
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<td><strong>Future</strong></td>
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