OPPORTUNITY #15
WHAT IF WE NEVER HAD TO LEAVE OUR HOMES?

LIFE-IN-A-BOX

Self-sufficient homes, inspired by space research, that provide life's essentials and unburden the planet

759 million

people worldwide do not have access to electricity

WHY IT MATTERS TODAY

Civilisation today is not delivering basic necessities for billions.

Despite progress on the United Nations' Sustainable Development Goals (SDGs) related to food, water and energy, over 2 billion people still do not have access to adequate food,[141] one in three still do not have access to drinking water[142] and 759 million do not have access to electricity.[143] More generally, and despite decreasing fertility levels, the global population is expected to continue to increase by more than 80 million people per year to 9.8 billion by 2050.[144]

These trends in the human population place further stress on resources. Global energy consumption, assuming the global economy returns to pre-Covid pandemic levels, is projected to grow by 12% by 2030[145] and water demand, assuming no efficiency gains are realised, will rise by 40% above the level of reliable supplies.[146]

Water scarcity in the Middle East and North Africa (MENA) is expected to as much as quadruple in some countries by 2050.[147] As a result, agricultural production is projected to decrease by as much as 60% in some economies, with consequences for food security.[148]

SECTORS

ADVANCED MATERIALS & BIOTECHNOLOGY · EDUCATION · HEALTH & HEALTHCARE · INFORMATION & COMMUNICATION TECHNOLOGY · LOGISTICS, SHIPPING & FREIGHT · MEDIA & ENTERTAINMENT · REAL ESTATE · TRAVEL & TOURISM · UTILITIES

Power generation, particularly in hot climates, relies on large supplies of water for cooling and the cost of the necessary transformation toward less water-intensive electricity generation is estimated at USD50 billion by 2050[149] in the Middle East and North Africa (MENA).

These challenges are compounded by the rise in climate-related weather events, from wildfires to ice storms, from flooding to drought.

The response to these pressures has been to build 'smart', eco-friendly homes that are 'off-grid' in terms of conventional networks and are self-sufficient in power, water and other resources.[150, 151, 152, 153]

The global smart home market size is projected to reach more than $620 billion by 2026, a growth rate of nearly 30% per year.[154] The global green building materials market is expected to grow from around $217 billion in 2020 to nearly $400 billion in 2025 at an annual growth rate of nearly 13%.[155]

THE OPPORTUNITY TOMORROW

The ability for humans to live in complete autonomy, even on Earth, is still in its infancy. However, space research may provide scope for progress.

Projects such as the European Space Agency's MELiSSA (Micro-Ecological Life Support System Alternative) are researching regenerative systems for life in space with the highest degree of autonomy possible to produce food, water and oxygen from waste. Similarly, the Amsterdam-based 'Space for Food' study looked at how the closed-loop technology used to recycle water in space could be applied on Earth with potential irrigation-quality water recovery of up to 80% and nutrient recovery sufficient to produce roughly 2 kilograms of vegetables per person per day from the municipal waste stream.[156]

Over
2 billion
people still do not have access to adequate food

1 in 3
still do not have access to drinking water

Future autonomous homes can include personalised on-demand water, electricity and food services, as well as Internet connectivity for immersive experiences for work or recreation.

There are many efforts in place focused on innovative solutions for an all-encompassing solution for homes that can be installed permanently or as needed, providing food, water and energy through novel solutions and closed-loop systems. A consortium to create an open self-sufficient living ecosystems that promotes collaboration between construction, technology and utility companies can be established to build the next generation of homes and sustainable communities.

Water demand, assuming no efficiency gains are realised, will rise by

40%

above the level of reliable supplies by 2030

BENEFITS

Such completely autonomous homes can serve as survival capsules in the face of catastrophes or existential threats. Fewer demands on natural resources or physical transport networks bring greater environmental benefits and new growth opportunities.

RISKS

Social isolation and the fracturing of physical communities could harm people. Risks of malicious harm arise because of potentially higher vulnerability to physical attacks and cyberattacks on closed-loop resource systems.