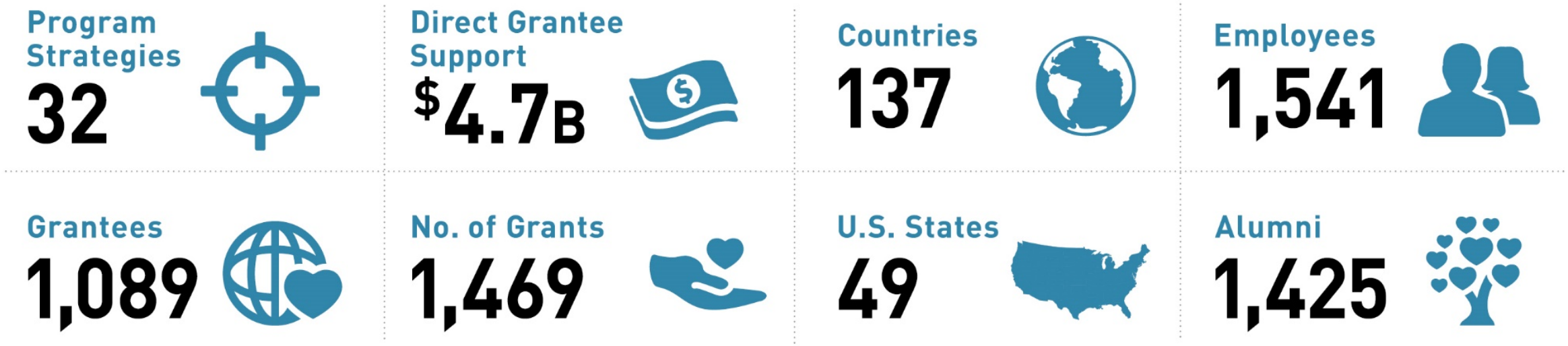
PARTNERSHIPS CHAIN TO LAUNCH THE TOILET INDUSTRY

World Toilet Summit, Expo
Sao Paolo, Brazil, Nov. 18-19, 2019

Doulaye Kone, PhD
Water Sanitation Hygiene
Global Growth Opportunity

THE SCOPE OF OUR WORK

We work with partner organizations around the world to reduce inequity



For the Year ended December 31, 2017. Amounts in thousands of U.S. dollars. Value of Grants total represents grants only.

MAKING MARKETS

WORK FOR THE POOR

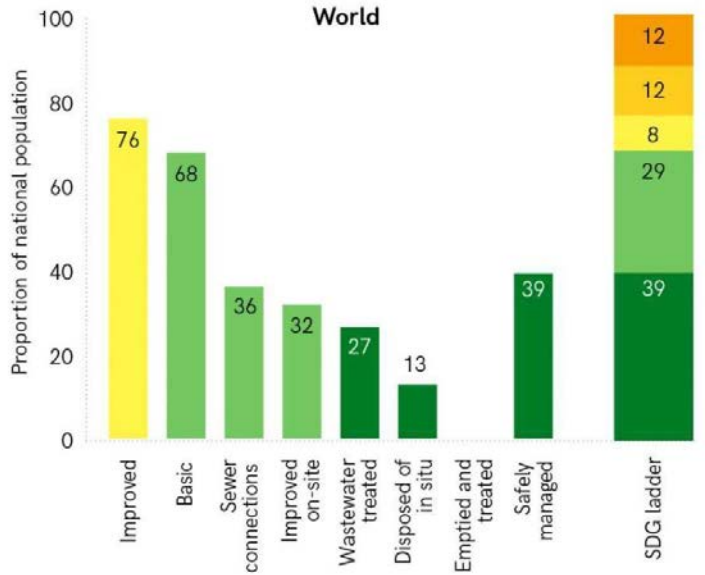
4.5B

people globally lack access to safely managed sanitation

2.3B

people globally still lack access to even basic sanitation services

Only 3% increase in access to safely managed solutions over the last 5 years



Safely Managed
Improved and not shared - excreta safely disposed in situ or off-site[1]

Basic
Improved and not shared - excreta not safely disposed

Limited
Improved (e.g. sewer, septic, VIP latrines) and shared facilities

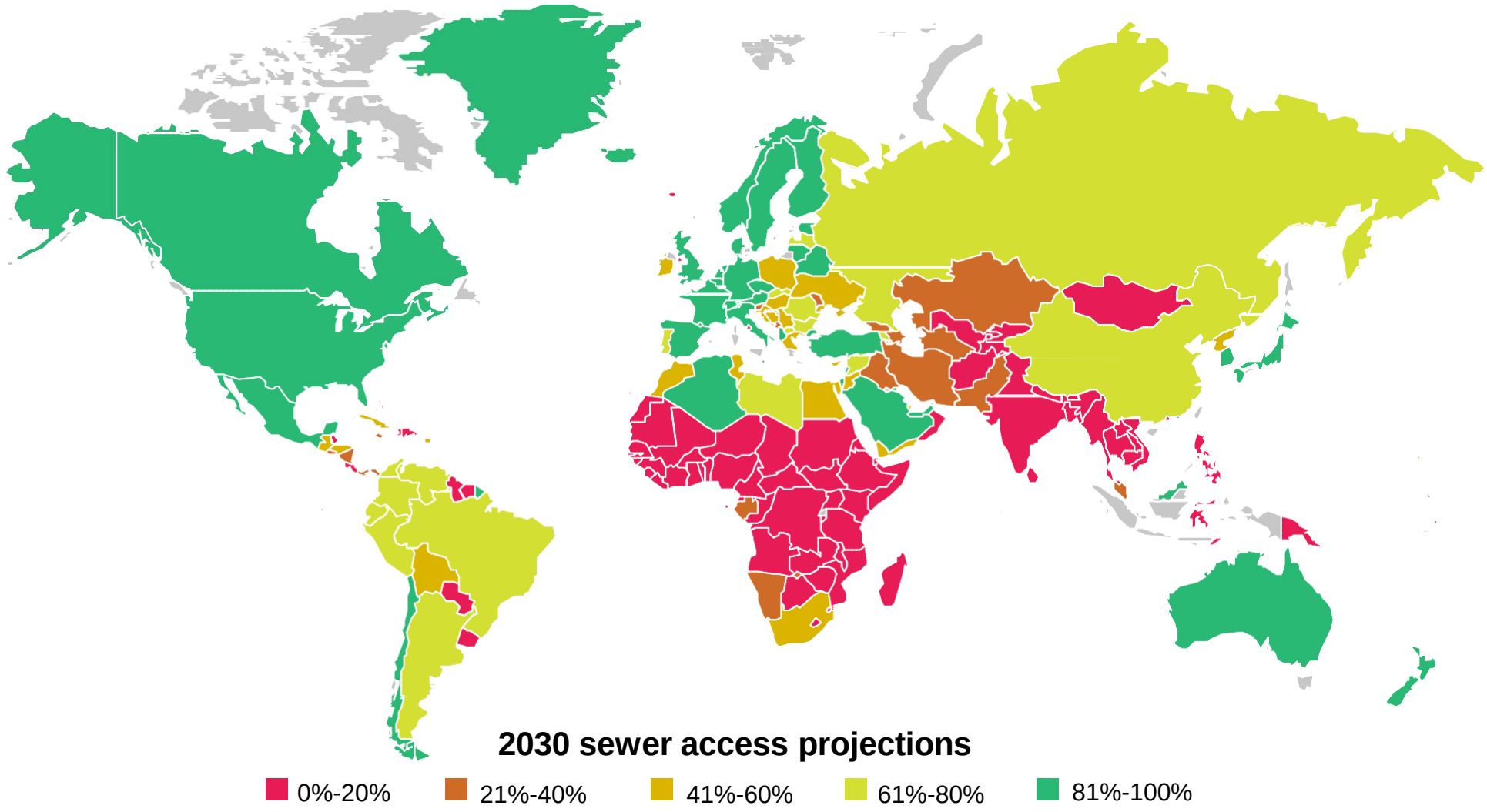
Unimproved
Use of pit latrines without a slab or platform, hanging and bucket latrines

Open Defecation
Disposal of human faeces in fields, or other open spaces or with solid waste

Faster progress required to achieve the SDG goal of safely managed sanitation by 2030

1. Transported and treated offsite Source: JMP 2017 Report

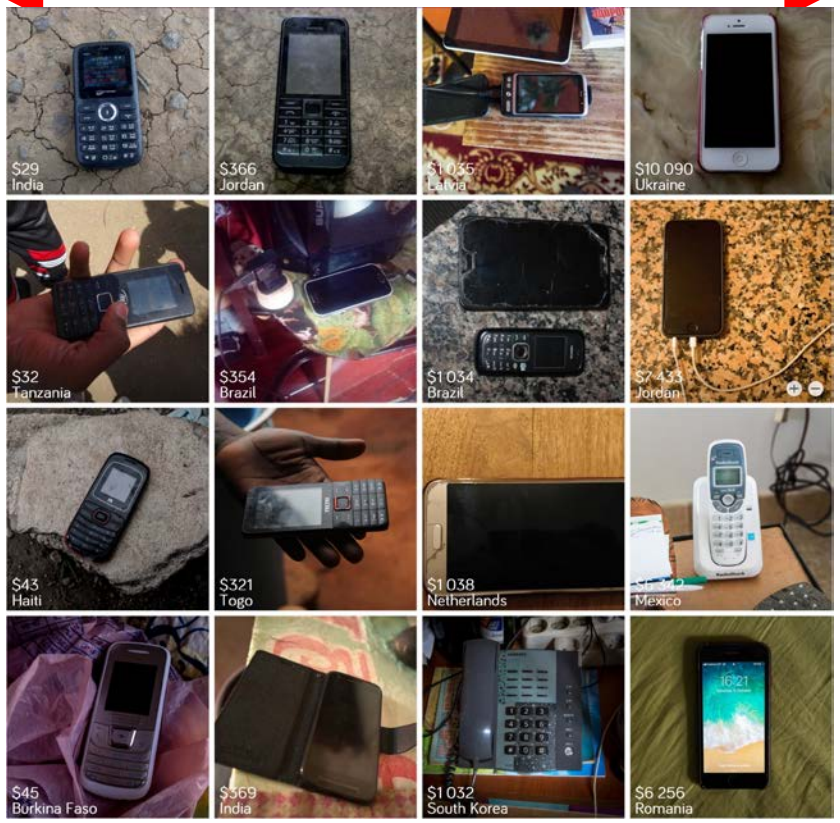
Many parts of the world will continue to lack access to sewers



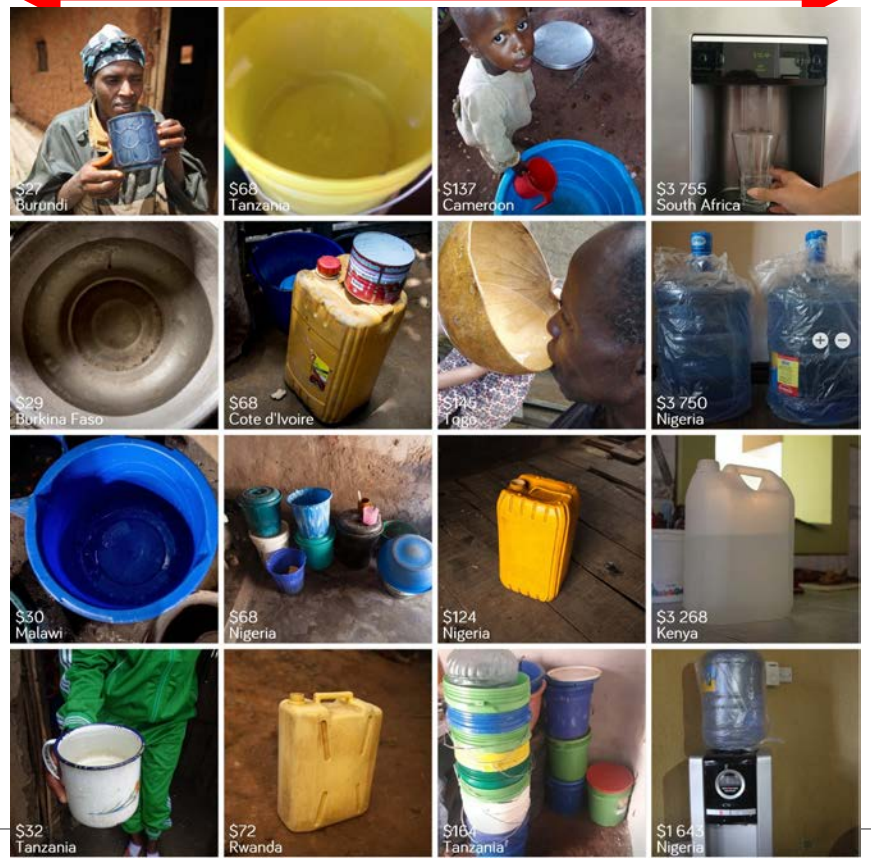
Note: countries in gray do not have data reported
Source: JMP 2017 Report; BCG analysis

Who is the customer, who are we designing the toilets and sanitation products for?

Poor — **Cellphones** — rich



Poor — **Water** — rich



Poor — **Toilets** — rich

Source: Dollar Street, September 11, 2019 2019

IMPACT OF STANDARDS: THE SEWER REGULATIONS IN 1832 UNLOCKED THE POTENTIAL OF SEWER TECHNOLOGY

Edwin Chadwick 1800 – 1890, The pioneer of the plumbing regulations

Sir Edwin Chadwick KCB was an English social reformer who is noted for his work to reform the Poor Laws and to improve sanitary conditions and public health.

Timeline

In 1823, he enrolled in law school at The Temple in London.
1830: On 26 November 1830 he was called to the bar, becoming a barrister, also known as a court lawyer.

- **In 1832, Chadwick began on his path to make improvements with sanitary and health conditions.**
- **In 1834, he was appointed secretary to the Poor Law commissioners.**
- **In 1852, Chadwick conversed with Swansea MP, Lewis Llewelyn Dillwyn, in relation to the construction of a sewerage system in Swansea.**

Source: Wikipedia, Sept. 2016

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SANS 30500:2019
Edition 1
ISO 30500:2018
Edition 1

SOUTH AFRICAN NATIONAL STANDARD

Non-sewered sanitation systems — Prefabricated integrated treatment units — General safety and performance requirements for design and testing

This national standard is the identical implementation of ISO 30500:2018, and is adopted with the permission of International Organisation Standardization.

WARNING
This document references other documents normatively.

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www.sabs.co.za

SABS

ISO 30500 **adopted in South Africa**, Senegal, Nigeria, Cameroon and Benin. In process in China, USA, Canada, …

PERFORMANCE SPECS FOR SAFE OFF-GRID TOILETS ISO30500

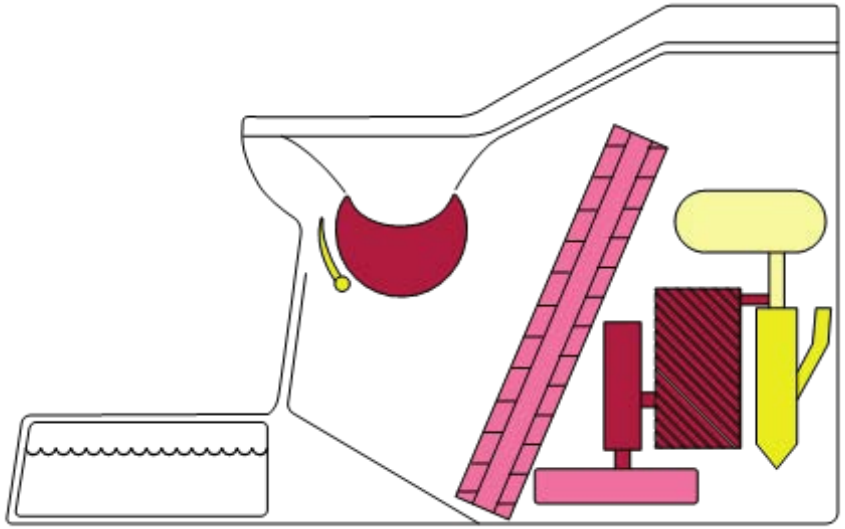
The aim of the Reinvented Toilet is to: destroy all pathogens onsite and recover valuable resources, operate without sewer, water or electricity connections and cost less than $0.05/user/day in a sustainable business model.

ELIMINATE PATHOGENS

- Eliminate safety concerns via handling
- Reduce disease burden
- Improve environmental safety

OPERATE OFF GRID

- Eliminate need for external inputs such as water and energy
- Make portable and easy to install



CONVEY LOW LIFE-CYCLE COSTS

- Reduce need for pit emptying
- Ensure a sustainable business model, including maintenance via service providers

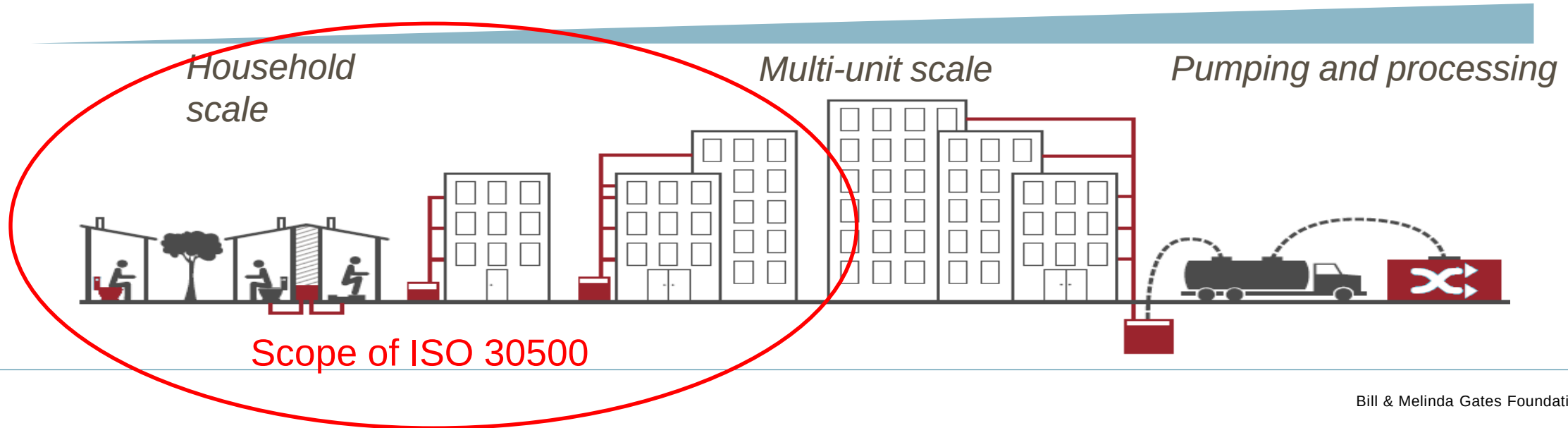
PRESENT MODULAR, ATTRACTIVE INTERFACE

- Reduce / eliminate construction costs
- Provide clean and dignified product
- Eliminate odors and waste

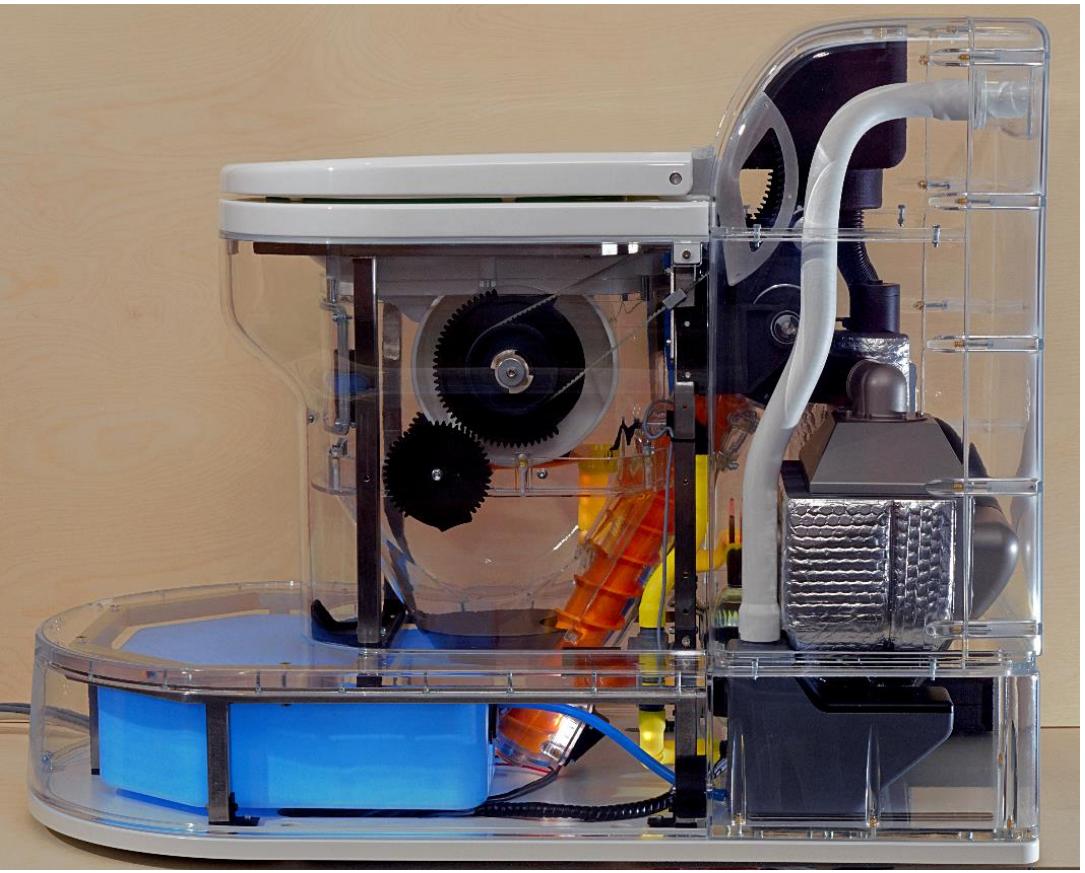
OFF-GRID SANITATION STANDARDS (ISO 30500)

Performance Standards

Parameters	Justification	Threshold
Human Enteric Pathogens	Bacteria (E. coli as surrogate) Virus (MS2 Coliphage) Protozoa (Clostridium perfringens spores)	≤100 per liter ≤10 per liter ≤1 per liter
Helminth eggs	Helminth eggs are considered a major health burden in many developing countries (Ascaris suum ova - surrogate)	≤ 1 eggs per litre

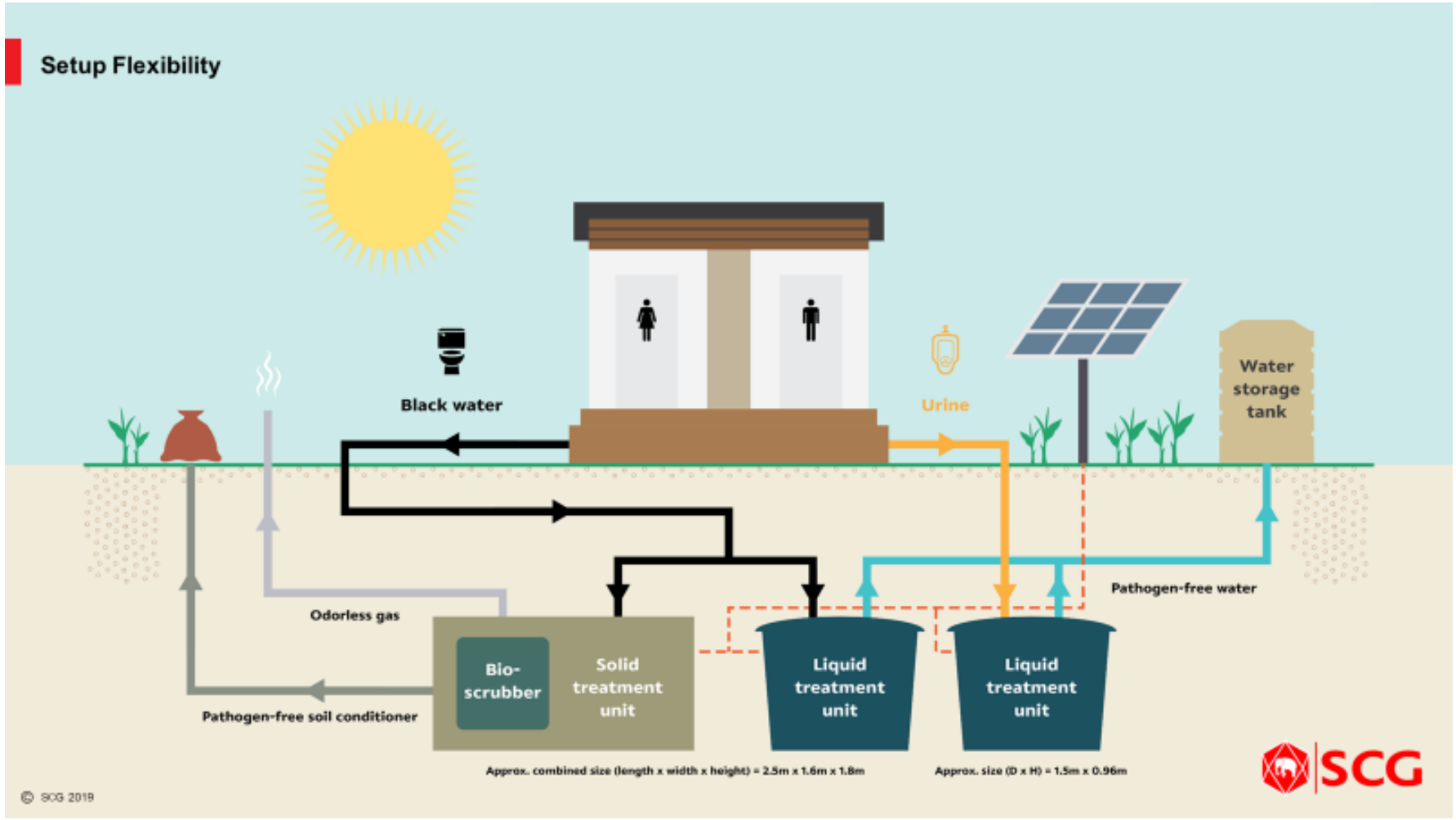


Prototypes of off-grid “reinvented toilets” that kill pathogens and operate off-grid

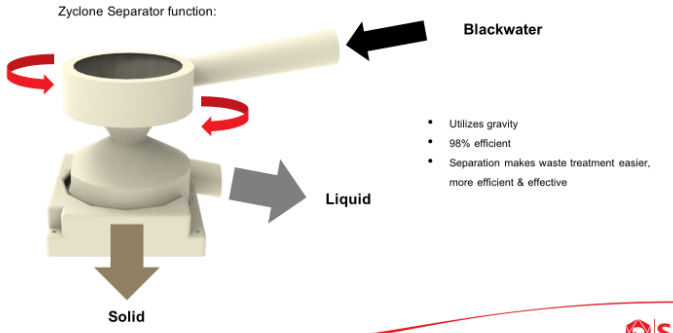


Cranfield Univ. reinvented toilet concept, UK

HTClean, a reinvented toilet concept by Helbling, Swiss



The Zyclone Cube – Key component



SCG

- **SCG Business profile**
- Leading business conglomerate in ASEAN
- Revenue 15 Billion USD / Profit 1.5 Billion USD
- 54,000 employees
- 3 core business interests: Cement-Building Materials Business, Chemicals Business & Packaging Business

Product Introduction

Eco-san

WATER RECYCLING ECOLOGICAL SANITATION SYSTEM

NON-SEWER **OFF-GRID**

Solar-powered On-site water treatment &Recycling

Eco-san

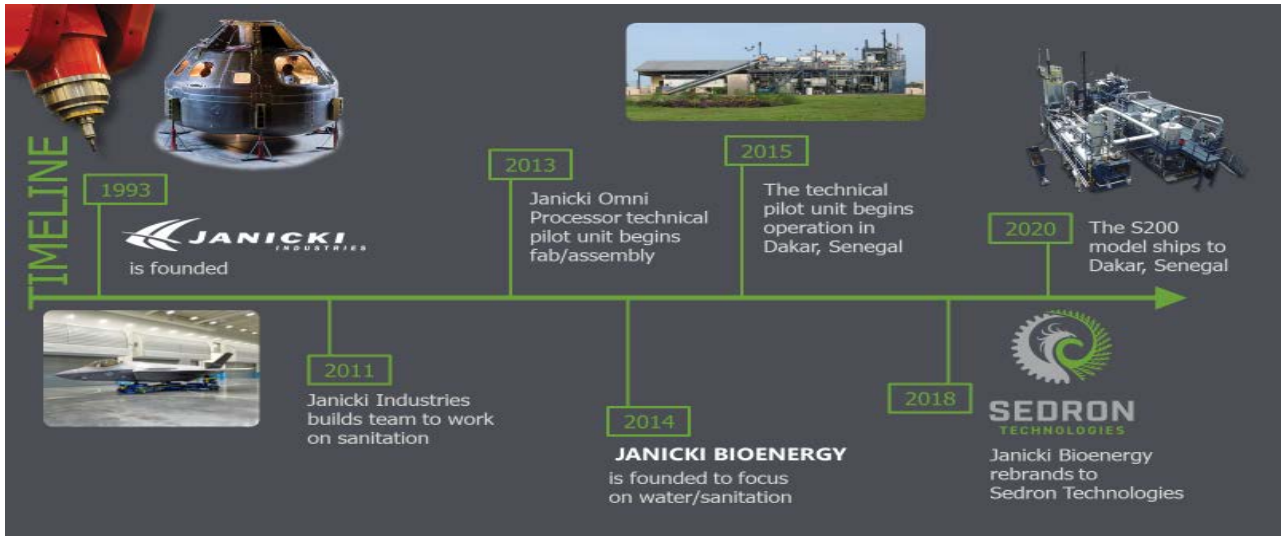
Biomass Controls Refinery Solution

- Decentralized small-scale pyrolysis system
- Experience treating human organic wastes (fecal sludge / food wastes / ag waste (manures))
- Integrated air emissions control technology
- Remote monitoring capabilities

Sedron Omni Processor S200

S200 FEATURES

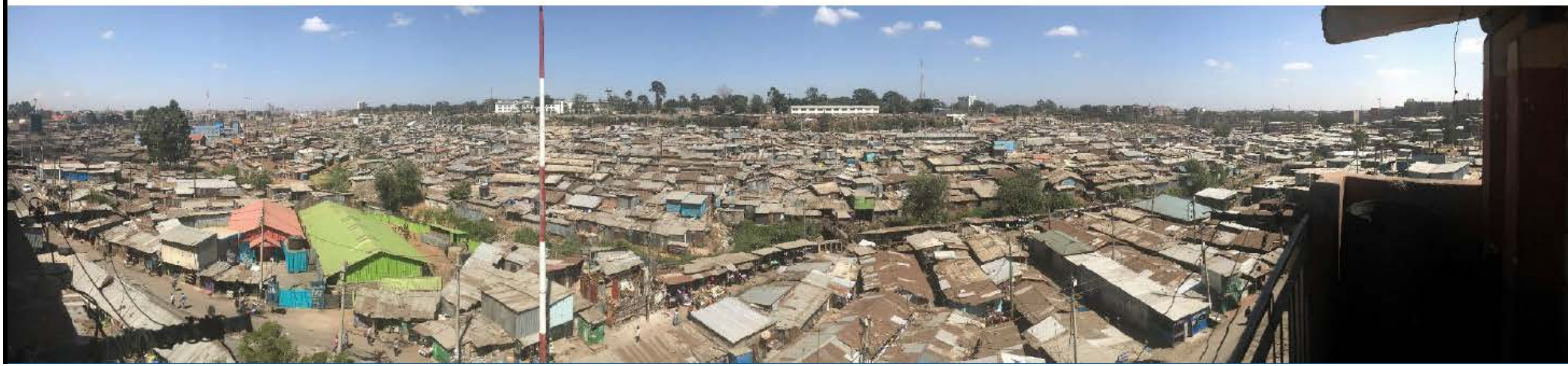
- ✓ Larger capacity than S100 (30 wet metric tons per day)
- ✓ More water produced (7250 l/day)
- ✓ Increased power (200-300 kW gross)
- ✓ Improved automation and more robust
- ✓ Improved corrosion resistance
- ✓ More flexible operation
- ✓ Incorporates lessons learned from pilot unit



The Janicki Omni-Processor is also commercialized by Sedron (USA), CRRC (China) and Ankur Scientific (India)

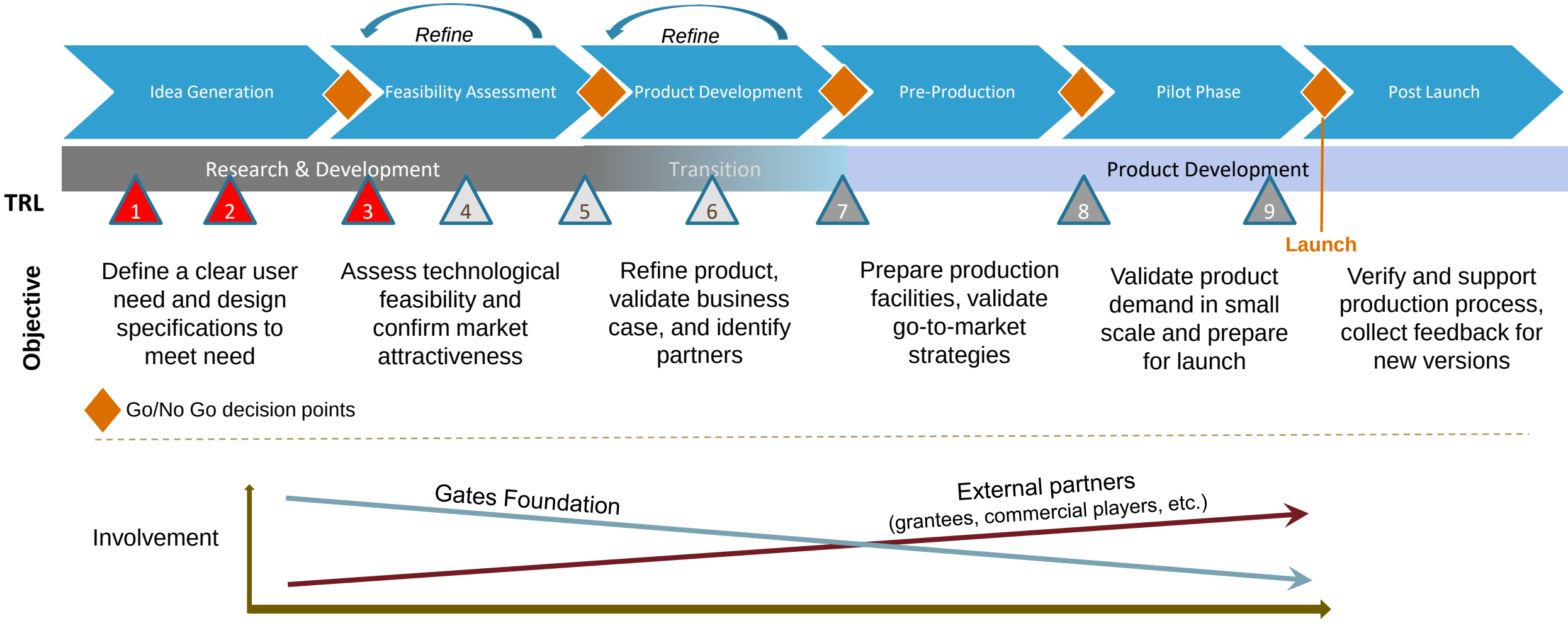
Malodor and Sanitation Behaviors in Low-Income Settlements

Study #6 - Nairobi (Mathare)

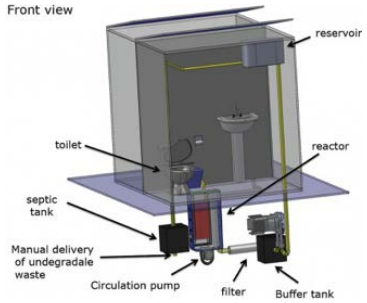


THE PRODUCT DEVELOPMENT PATHWAY

BMGF has funded partners to accelerate R&D for transformative technologies. Now that they are entering the transition to commercial products, many new skills, partners and preparations will be required.

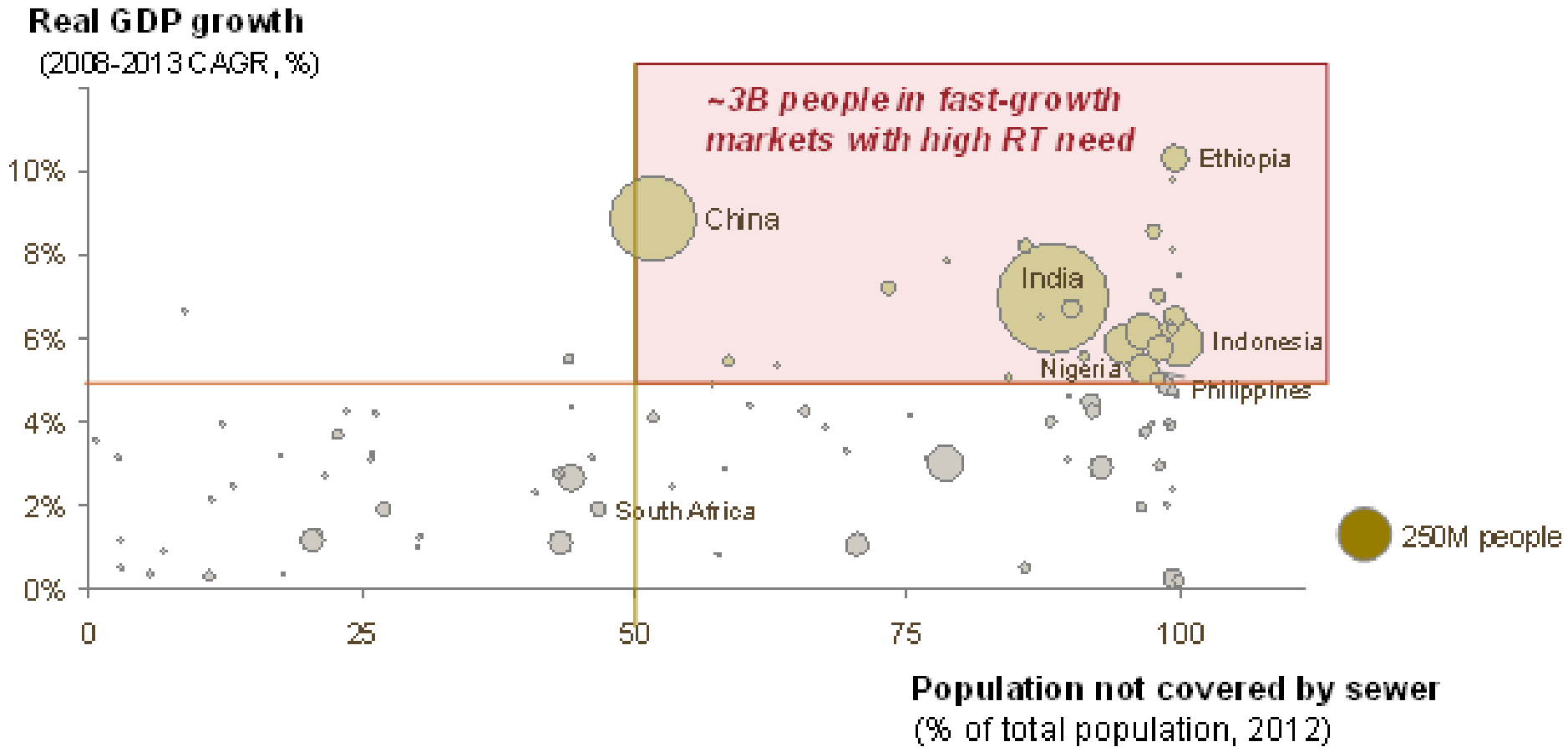


WE ARE SEEKING PARTNERS ALONG THE VALUE CHAIN TO PRODUCTIZE AND BRING TECHNOLOGIES TO MARKET

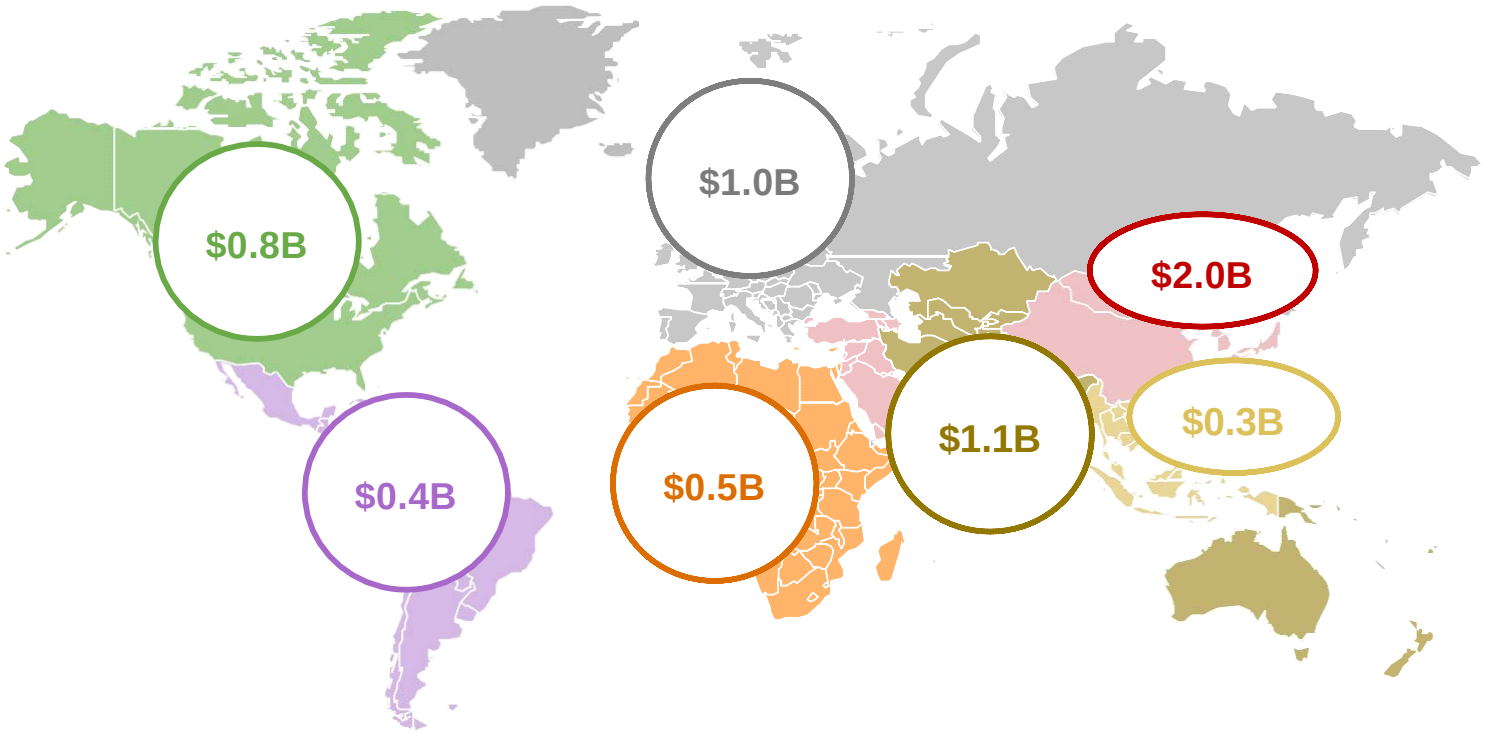
Sub-System Manufacturer	System Integrator	Distributor
		
Capabilities		
Research and Development	Research and Development	Product Distribution
Sub-system Design	System Design	Installation
Product Sourcing	Product Sourcing	Post-Sales Service and Support
Sub-system Integration	System Integration / Assembly	Operator Training
Sub-system Manufacturing	Manufacturing	Maintenance

THE EMERGING SANITATION MARKETS IS OFF-GRID, NO FLUSH TOILETS.

The utility service and business models need to be rethought



Reinvented Toilet represents a potential $6B+ global annual revenue opportunity,



2030 projections

- Technology currently in pilots and ready for commercialization
- Ecosystem of partners and enablers exist to plug into
- Extensive market intelligence conducted to inform business model
- BMGF continues to develop market and enabling environment to maximize opportunity

Source: BCG analysis

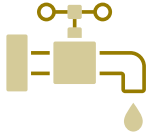
Market size for the sanitation circular economy in India only is estimated at 62 Billion/year (Toilet Board Coalition, 2018)

MACRO TRENDS MAKE TRANSFORMATIVE TECHNOLOGY VALUE PROPOSITION EVEN MORE COMPELLING

Growing population with urbanization

Population growth led by developing countries frequently outpacing sanitation infrastructure growth

66% of global population projected to be urban in 2050 creating need for low cost, high access sanitation solution



Aging infrastructure

Even in developed markets, current sewer and centralized wastewater treatment systems can be capacity strained

Infrastructure repairs costly and disruptive

Water scarcity and stress

Half of the global population could be facing water shortages by 2030

Demand could outstrip supply by 40%

Policy changes

Government programs and initiatives focused on sanitation, esp. in developing markets

"Eco-friendly" policies to support sustainable development

Source: World Urbanization Prospects, 2014 Revision; United Nations World Water Development Report 2015; expert interviews

BMGF AIMS TO REMOVE BARRIERS FOR MARKET ENTRY AND SCALE

R&D to overcome technical challenges and derisk product and component innovation

Enabling environment

Awareness and Perception

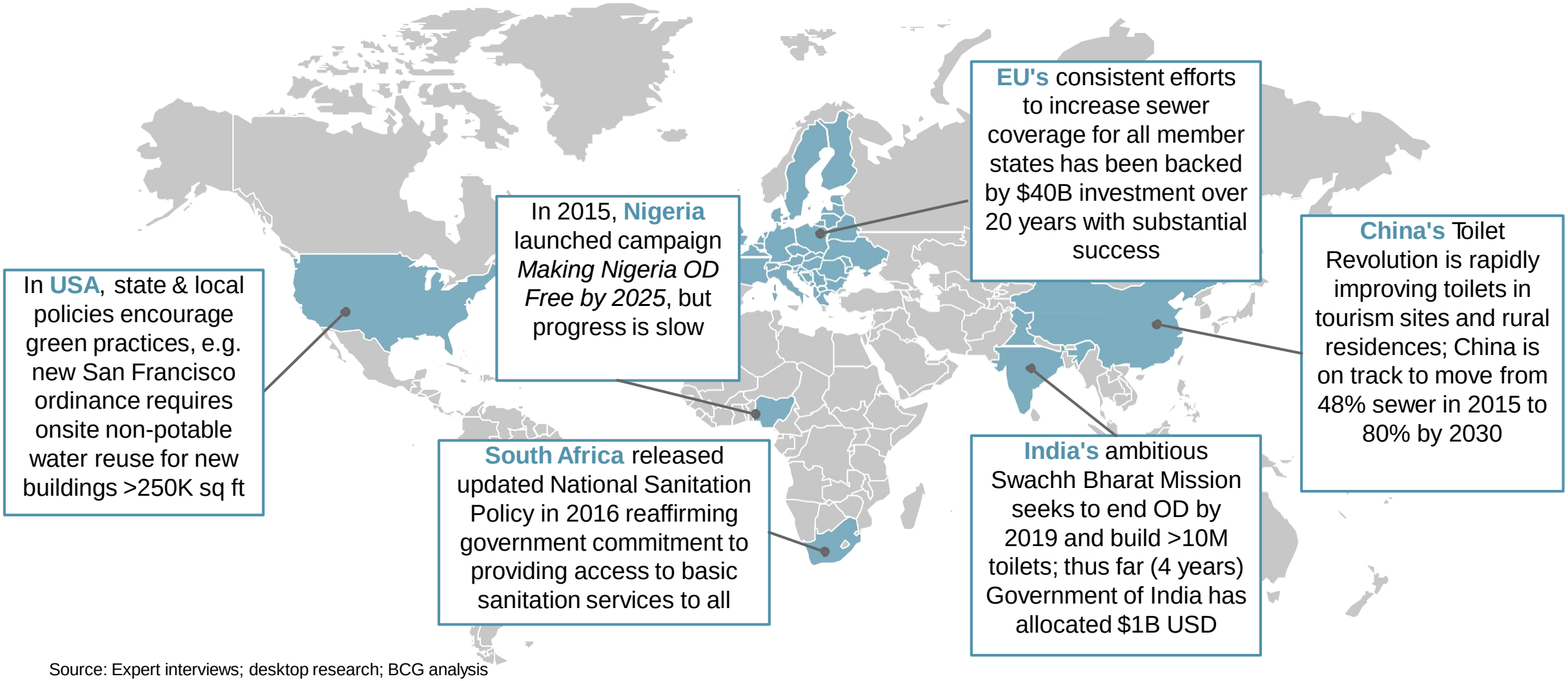
Marketplace readiness

Public Goods Research

www.consultcibc.com

www.stepsforsanitation.org

Policy changes: Governments across the globe have initiated campaigns to improve sanitation; some promote green infrastructure as well



Source: Expert interviews; desktop research; BCG analysis

INDUSTRIAL POLICY ACTION PLAN
2017/18 - 2019/20

Economic sectors, employment and infrastructure development cluster

PART 1: A BRIEF OVERVIEW

IPAP Achievement Highlights 2016-17
Leading challenges, focus areas and actio
Driving innovation and technology / prep

Radical economic transformation:

* Structural change: inclusive growth, en
* Investment in value-adding manufactu

the dti
Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA

IPAP 2017/18 – 2019/20: SECTORAL FOCUS AREAS 2

IPAP 2017-18 SECTORAL FOCUS AREAS 2

Primary minerals beneficiation
- Maximising the industrial potential of Southern African gas resources
- Energy storage development
- Fuel cell industry development
- Expansion of PGM beneficiation industries
- Steel sector supply-side interventions
- Monitor and evaluate reciprocal commitments by steel industry stakeholders
- Establish mining R&D Hub at CSIR

Green industries
- Policy roadmap for climate-compatible industrial development
- Strategic National Smart Grid Vision for the South African Electricity Industry

Business Process Services
- Implement the new BPS incentive
- Talent development for the BPS sector

Water and sanitation
- Water Industrialisation Development Plan
- Desalination in manufacturing
- Next generation sanitation cluster development
- Advanced wastewater technologies in manufacturing

Marine manufacturing & associated services
- Designation and localisation programme
- Components supplier development programme
- Skills development programme for increased competitivenesss
- Tariff measures to encourage domestic component manufacturing

Aerospace and defence
- Technology enhancement for high value manufacturing in aerospace industry

Electro-technical and white goods industries
- Local procurement of vaccine refrigerators
- Supplier development programme for white goods industry
- Localisation of products largely procured by National Department of Public Works

South Africa Sanitation Enterprise Development Program

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

WATER RESEARCH COMMISSION

Technology Demonstration (via CP)

Platform : Standards

Platform: Technical Advisory Group

Processes and Business Models of function: Scan the local and RTT (global) technologies available and report on their characterization; Due diligence; Short list those at TRL 7/8/9; Test against the ISO standard; Approve for field testing; Field testing; Report on user surveys; social acceptance, and engineering robustness

Market Development and Commercialization

Platform: Business Advisory Group

Processes and Business Models of Function: Operational models developed; Market penetration plans; Beneficiation models developed; Resultant shift required; Financial models and projections

Processes and Business Models of Function: Commercialization models; Multiple alternatives; Business case per technology; National generic model; Policies in place

Localisation and Industrialisation

Platform: IGR (inter-governmental) platforms , businesses and investors

Processes and Business Models of Function: Localization processes and models to localize and manufacture locally at least 4 global technologies; and ramped up manufacturing from prototypes to large scale production and participation on the manufacturing sector; Local manufacturing sector mobilization strategy and engagement process to be in place.

Be part of it!


REINVENTED TOILET PRODUCTS
新世代厕所产品
CLEAR
Eco-san
SCG
Eram Scientific
OMNI-PROCESSORS
万能处理器
CRRC
SEORON
https://stepsforsanitation.org/rte/