



Reinvented Toilet: Early Adopter Compendium

As developed by the Boston Consulting Group for the Bill and Melinda Gates Foundation

February 2018

Agenda

Early adopters

- Introduction and exemplars
- Framework for prioritization
- EA launch strategy
- Segment deep dives

Background on this report

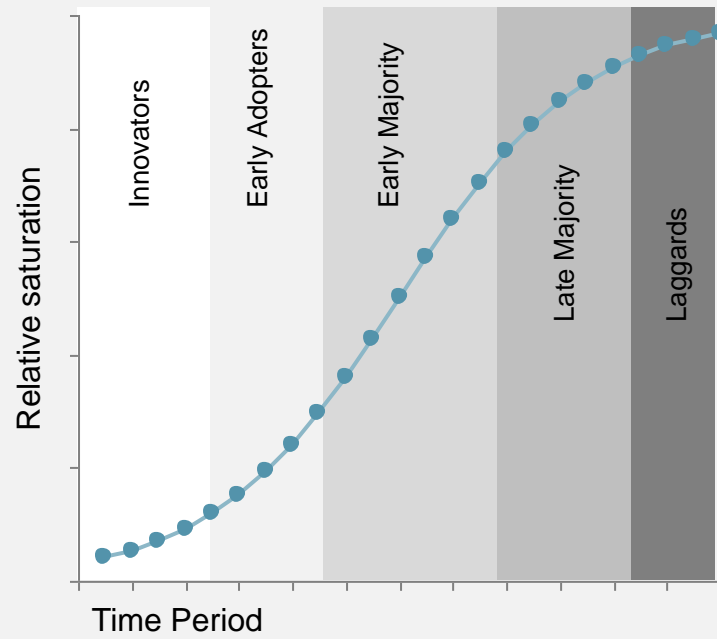
Between 2017-18, the Boston Consulting Group (BCG) undertook a series of studies to investigate the potential market size for the Reinvented Toilet and potential market entry strategies for this set of novel sanitation solutions. This work was commissioned by the [Sanitation Technology Platform \(STeP\)](#) and funded by the Bill and Melinda Gates Foundation, which launched the [Reinvent the Toilet Challenge \(RTTC\)](#) in 2011.

The following report profiles 8 potential early adopter segments for the Reinvented Toilet: U.S. Military, Refugees, Tourism Sites in China and India; Hospitals in India; Eager Municipalities in China; Green Buildings; Trains in India; U.S. National Parks. Admittedly, some of these early adopter segments (e.g., U.S. Military, U.S. National Parks) do not target the populations for which the RTTC was designed – those **4.5 billion people in the world living without access to safely managed sanitation**. However, many of these early adopter segments hold potential to ‘unlock’ these ‘global access’ markets, such as by demonstrating the transformative power of these technologies, by driving down costs, by generating insights to refine product design for mass market appeal, etc.

It is this ‘unlock’ potential that proves critical in early adopter segments, wherever they might happen to be in the world. This report explores where that highest unlock potential for the Reinvented Toilet might reside, and how those early adopter segments might be leveraged to expand into other ‘global access’ markets, specifically those serving populations with limited or no access to safely managed sanitation.

Consumer adoption of new products typically follows S-curve path

Early adopters represent the second phase of product adoption



Source: BCG framing based on "Diffusion of Innovations" by Everett Rogers

...and are crucial for developing understanding of product potential and building momentum

- Demonstrate proof of concept and design for manufacturing, supply-chain set-up
- Provide feedback on early model—"beta test"—and learnings on implementation
- Act as "product evangelicals" and opinion leaders
- Generate aspiration for product as visible trendsetters

Early adopters can be thought of both as distinct segments and subsets of core market, driving two dominant strategies

1 Launch with early adopter segment(s), then broaden scope to mass market

Core market need exists, but requires influence to motivate switch; begin with **niche segments** to generate momentum and proof points to **expand into the core**

- Provides additional opportunities for iterative, open feedback loop
 - Time to incorporate learnings before mass launch
- However, longer lead time to reach scale and serve core areas of need

2 Directly enter mass market, leveraging pockets of early adopters in the core

Time to enter the core is **now**: core is ready, excited for product and sanitation ecosystem supports the switch ; decision-making taking place requires **immediate action** to avoid missing out on opportunity

- Opportunity to achieve scale more quickly
 - Drives both higher cost efficiency from the beginning and facilitates reaching core areas of need faster
- However, will need a solid partner willing to invest at risk ahead of demand

When to use?

Key considerations

Strategic choice to target early adopter segments or pockets of early adopters in mass market

1 **Strategy 1:** Develop product for an early adopter segment, then broaden scope to mass

soylent

Meal replacement beverage to fill the void of cheap, healthy alternatives to costly food prep

First was created by and launched for "**techies**"

Product has expanded with different flavors and forms (powder to liquid) and is shelf stable, broadening mass market appeal to become the **most popular beverage on AMZN**; further investigating therapeutic use cases¹

watergen

Technology to create drinking water from humidity in the air, addressing Israel's severe droughts

Product first developed with the **Israeli Defense Force** in mind, to reduce burden of carrying water in the field

Have broadened to civilian products (smaller size, water ATM), including in developing markets e.g. signed MOU in Hyderabad, **India**²

2 **Strategy 2:** Directly enter mass market, leveraging pockets of early adopters in core mass market

chotukool

Freestanding mobile mini refrigerator

Mass adoption was ultimate goal; identified strategic in to rural market working with the **Indian postal service** to target rural communities

Hired local entrepreneurs as sales reps; facilitated loans & financing and sold **15,000 units** in first year (2011)³ and now have variety of chotukool types (*office, personal, party*)

PowerGen
RENEWABLE ENERGY

Microgrid solution for "off-the-grid"/"near-grid" areas

Deep market due diligence to identify high unmet need areas and targeted **local community leaders** to act as early adopters and install grid on their land, offering visibility and security

Have constructed **40 micro-grids** (highest of any firm in Africa) serving thousands of customers in 7 countries⁴

1. Website/employee information 2. Website 3. INSEAD case study 4. PowerGen website

Agenda

Early adopters

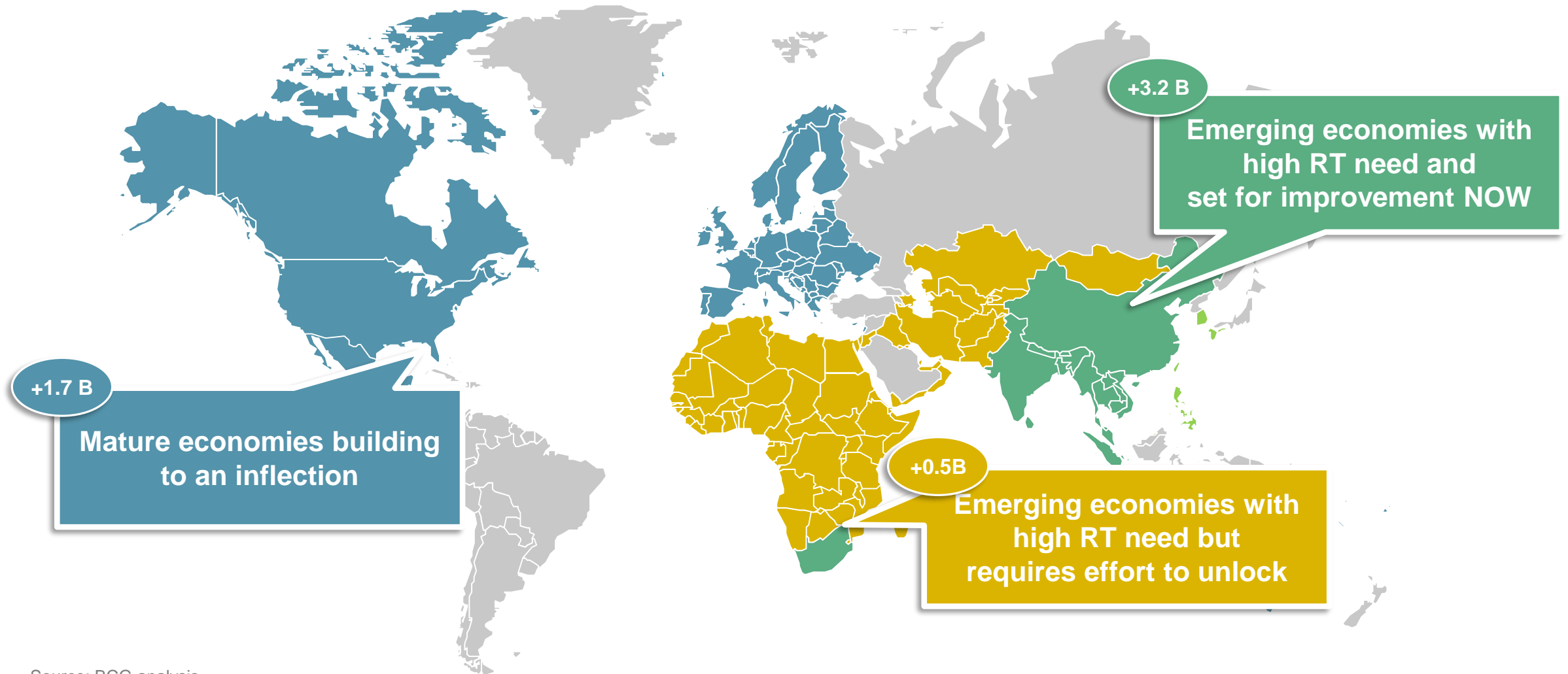
Introduction and exemplars

➤ Framework for prioritization

EA launch strategy

Segment deep dives

Mature and emerging economies present varied shape of Reinvented Toilet (RT) opportunity across the globe



Source: BCG analysis

Early Adopter Compendium vUploaded.pptx

Different early adopter paths can guide Corporate Partner (CP) vision across geographic segmentations

Mature economies building to an inflection

Market vision: Become an alternative to sewer in the developed world



Early adopter strategy: Leverage **strategy 1**, building momentum with early adopter segments such as pockets of remaining need (e.g. remote, current solutions failing) and eager innovators, to unlock mass opportunity

High RT need and set for improvement now

Market vision: Attain profitable mass market product distribution – in a compressed time frame



Early adopter strategy: Leverage **strategy 2**, directly entering mass market with one product, with focus on countries actively pursuing sanitation programs, seeking support from early champions

High RT need, but requires effort to unlock


Market vision: Attain profitable mass market product distribution – over a longer time horizon


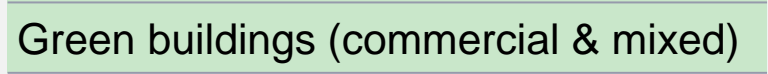

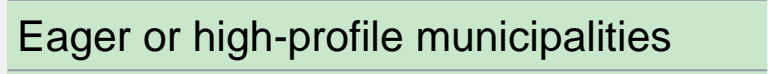




Early adopter strategy: Leverage **strategy 1**, either with blue/green markets serving as "early adopters" or directly entering yellow markets, targeting opportunities where government or aid organization support is likely

————— *Potential "quick win" for visibility:* Emergency situations —————

Short-list of early adopters considered in geographic framework and deep dive selections

 = indicates segment selected for deep dive

Geographic market	Segment	Overarching criteria
<p>Blue: Mature economies building to an inflection</p>	<p> Military remote sites</p>	<p>Segments with current burning platform and clear procurement path, high visibility/potential to drive aspiration and ability to be a trendsetter and unlock both mature/developing markets</p>
	<p> Green buildings (commercial & mixed)</p>	
	<p>National and state parks</p>	
	<p>Green consumers</p>	
	<p>RV parks</p>	
	<p>Roadside rest stops</p>	
<p>Green: High RT need and set for improvement now</p>	<p> Tourism/religious sites</p>	<p>Segments with high willingness to take the plunge, current burning platform and clear procurement path, high visibility/potential to drive aspiration and ability to influence broader mass market</p>
	<p> Eager or high-profile municipalities</p>	
	<p> Rural hospitals</p>	
	<p>Trains</p>	
	<p>Rural schools</p>	
<p>Yellow: High RT need, but requires effort to unlock</p>	<p> Refugees</p>	<p>Beta test segments with clear potential for government/aid organization support, to capture learnings for broad rollout</p>
	<p>Container-based sanitation</p>	

Summary: Unlock potential across short-listed segments include:

	Geo unlock	Segment unlock	Rationale
Military		<ul style="list-style-type: none"> Rural markets 	<ul style="list-style-type: none"> Potential to generate key learnings about getting product to remote sites
Green buildings		<ul style="list-style-type: none"> Green consumers New construction 	<ul style="list-style-type: none"> Likely to generate trickle down to green consumers Potential to more broadly influence other builders beyond currently green-focused ones
National Parks		<ul style="list-style-type: none"> Rural markets 	<ul style="list-style-type: none"> Potential to generate key learnings about getting product to remote sites
Green consumers		<ul style="list-style-type: none"> Green developers 	<ul style="list-style-type: none"> Will be challenging for individual consumers to exert same level of influence, except perhaps with those already in the green space
RV parks		<ul style="list-style-type: none"> Tiny homes/green consumers 	<ul style="list-style-type: none"> May generate upstream interest with those currently in green homes/RV situations
Roadside rest stops		<ul style="list-style-type: none"> Adjacent segments (e.g. RV park) 	<ul style="list-style-type: none"> Demonstration of proof of concept could lead to nearby sites' adoption, e.g. RV parks or perhaps other parks/public sites
Tourist/religious sites		<ul style="list-style-type: none"> Public sites 	<ul style="list-style-type: none"> Likely to generate key learnings for serving high-traffic, public areas (e.g. deal with challenges of overuse, potential vandalism, etc.)
Eager municipalities		<ul style="list-style-type: none"> High mass market potential 	<ul style="list-style-type: none"> Adoption by a municipality (for commercial areas, in high profile locations) will increase exposure and drive broader movement to adopt
Rural hospitals		<ul style="list-style-type: none"> High mass market potential 	<ul style="list-style-type: none"> Product placement in hospitals likely to inspire confidence in RT, allowing for broader adoption; further, could provide learnings of rural procurement/product delivery
Rural schools		<ul style="list-style-type: none"> Broader rural market adoption 	<ul style="list-style-type: none"> Learnings could be applied to schools in rural yellow areas, but also more broadly to rural areas (e.g. procurement relationships, tackling supply chain challenges)
Trains			<ul style="list-style-type: none"> Demonstration of value prop could allow for broadening to trains in "blue markets" too
Refugees		<ul style="list-style-type: none"> Public sites 	<ul style="list-style-type: none"> Likely to generate key learnings for serving high-traffic, public areas (e.g. deal with challenges of overuse, potential vandalism, etc.)
Container-based sanitation		<ul style="list-style-type: none"> Individual consumer core 	<ul style="list-style-type: none"> Could be an early in to core high-need segment; however, must recognize this is a current niche product/would be disrupting this still fringe space

Initial consideration set to frame early adopter segmentation and strategy (I/II)

Criteria for market unlocks












Timing Aspiration Visibility Value chain

Category	Early adopter segments	Rationale	Timing	Aspiration	Visibility	Value chain
Mature economies building to inflection	Military remote sites	Clear procurement path, potential to grow	●	●	●	●
	Green buildings (commercial & mixed)	Highly visible; precedent for adoption; potential to generate broader product aspiration	●	●	●	●
	National and state parks	Remaining area of need; clear product application	●	●	●	●
	Green consumers	High risk tolerance/innovators in sanitation	●	●	●	●
	RV parks	Clear area of need; test-drive "rural" supply chain	●	●	●	●
	Roadside rest stops	Clear area of need; test-drive "rural" supply chain	●	●	●	●
High RT need and set for improvement <i>now</i>	Tourism/religious sites	Clear procurement path/area of focus for China's toilet revolution and Swachh Bharat campaign	●	●	●	●
	Eager rural municipalities	Governmentt procurement; area of focus for China's toilet revolution campaign	●	●	●	●
	Schools	Strong procurement opportunities with governments, NGOs; highly visible segment/marketing potential	●	●	●	●
	Rural hospitals	Strong potential aid funding/government procurement opportunity; likely to generate aspiration/belief in product	●	●	●	●
	Trains	Potential for compelling financial value prop	●	●	●	●
	Public housing	Clear govt procurement path; area of focus for India's Swachh Bharat mission	●	●	●	●
	Informal settlements	High area of need; clear product application	●	●	●	●
	Green buildings (esp. commercial)	Strong product fit; easier to enter into new construction	●	●	●	●

Initial consideration set to frame early adopter segmentation and strategy (II/II)

Category	Early adopter segments	Rationale	Criteria for market unlocks			
			Timing	Aspiration	Visibility	Value chain
High RT need but requires effort to unlock	Schools	Strong procurement opportunities w/govts, NGOs; highly visible segment/marketing potential	●	●	●	●
	Public toilets, markets & transport hubs	High area of need; clear product application	●	●	●	●
	Container-based sanitation	Tap into segment of people already open to innovating in sanitation	●	●	●	●
"Quick win" emergency use cases	Refugee camps	Current area of need, with substantial support	●	●	●	●
	Natural disasters	High area of need; clear product application	<i>Difficult to predict</i>	●	●	●

Initial criteria set and methodology

"Unlock" Criteria	Scoring	Explanation
Timing		"Burning platform" for product adoption, often due to government campaigns and/or buyer stated interest
		Need for product is current; however, no factor driving why adoption must happen <i>right now</i>
		<i>N/A; all potential early adopters ready for product now</i>
Aspiration		Early adopter segment's perceived innovativeness driving "cool" factor, or represents a "feel-good" product application
		Segment neither detracts from nor strongly bolsters product's perception
		Association of product with this segment not likely to positively impact perception; may slightly detract
Visibility		Segment in highly public/trafficked places and/or likely to generate substantial press coverage
		Segment located in medium to lower-trafficked areas; moderate press coverage expected
		Segment not highly publicized and/or located in remote areas where low traffic expected
Value Chain		Procurement path/potential buyer is clear and easily accessible at the current time
		Procurement path/potential buyer identified, but some roadblocks may be anticipated
		<i>N/A; any segments deemed too difficult to reach not a candidate for early adoption</i>
Commercial Partner Fit	N/A	Notes to indicate anywhere CPs have expressed interest/have promising leads
Technology Partner Fit	N/A	Notes to indicate anywhere technology has progressed farther/higher degree of readiness

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Three key learnings guide early adopter launch strategy



Unlock between geographic markets likely to take too long

Geographic "trickle down" more a question of years, or even decade(s)



Consequently, need to seed early adopters in all markets where you want to play



Willingness to try *now* and accept iteration varies by early adopter segments

In some segments, early challenges may preclude broader adoption later on



Stagger within early adopter segments, first starting with those most eager and tolerant of being "guinea pig"



Necessary to aggregate demand across markets to ensure attractiveness

RT unlikely to initially generate enough scale to be financially sustainable



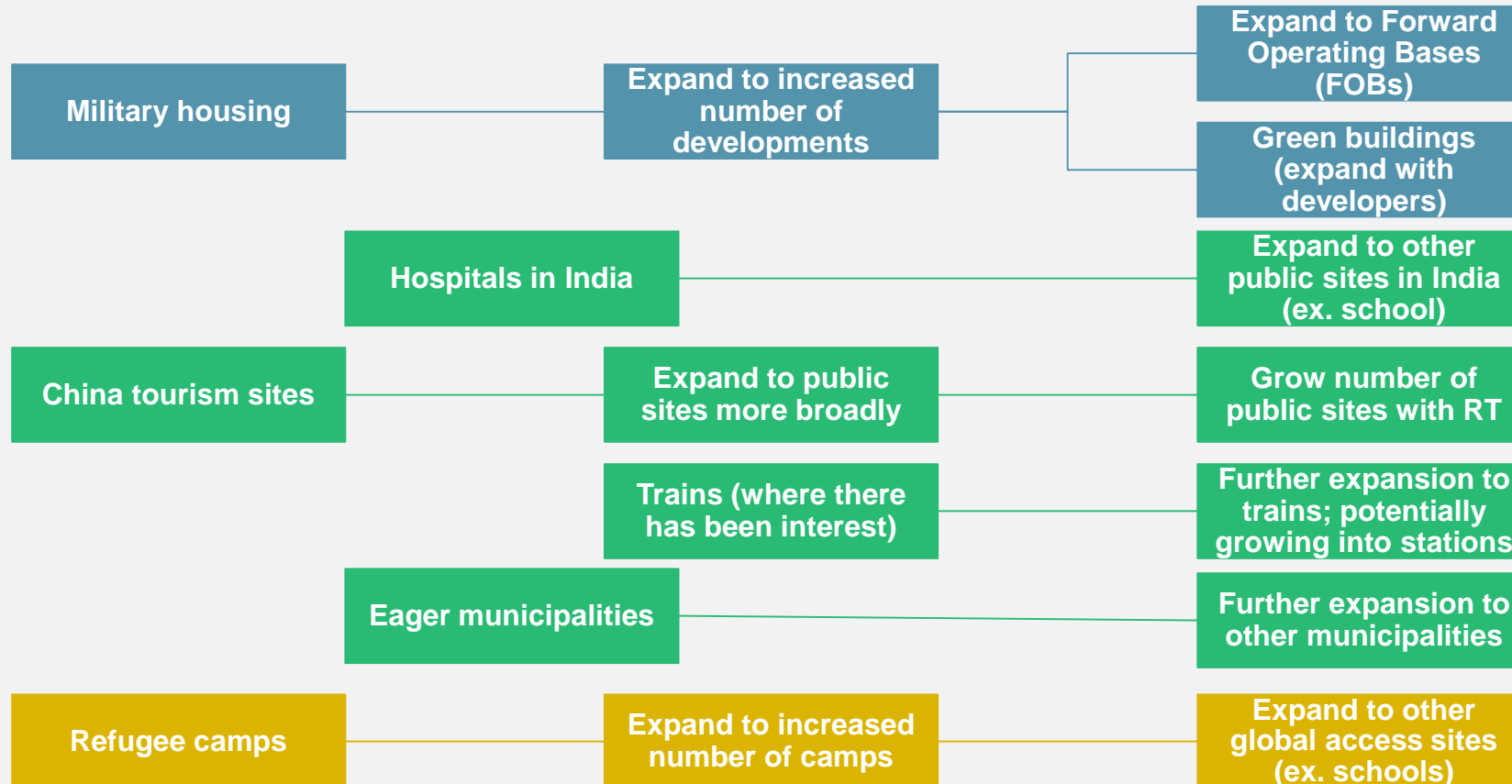
Need someone to play aggregator role across segments, to cross-subsidize product development

Focusing efforts on high potential deals and phasing within early adopters has potential to quickly drive broader unlock

Phase 1 early adopters

Phase 2 early adopters

Phase 3 early adopters



Unlock additional segments and geographies to reach individual consumer core

Three key opportunities to explore with potential partners



Military housing

- Work with large-scale developer (e.g. Corvias) to install in homes on bases



China/India govt sponsored procurement

- Work with government to introduce RT in tourism site revamp in China
- Work on Swachh Bharat related procurement, e.g. hospitals, schools (*TBD*)



Refugee camps

- Work with UNHCR team to introduce RT in established Zaatari camp
- Work with UNHCR to launch in high unmet-need camp for Rohingya refugees in Bangladesh

Several key criteria evaluated to arrive at prioritized list

Degree of importance

- | | | |
|---|---|---|
| 1 | Identified party of interest | There is already a RT champion, with decision making power , who has expressed interest in piloting RT |
| 2 | No additional proof point needed to be willing to pilot RT | Willing to be a first-mover and try RT now, with the information currently known /minor clarification questions |
| 3 | Willingness to accept failure | Initial product failure will not preclude later usage; willing to accept risks with initial implementation and iterate on product <ul style="list-style-type: none"> As compared to a user segment where this could sour taste of the product for distribution later on |
| 4 | Quick turnaround for RT to get in the field | Segment has an urgent need driving RT to be deployed now , and/or there is a clear path for RT's introduction avoiding a lengthy procurement cycle |
| 5 | Activities needing to support overlap with other key segments | Segment is a "two birds, one stone" strategy <ul style="list-style-type: none"> E.g. establish distribution model in key market, create point of contact in important market where potential Commercial Partners need data before engaging, technology modifications support other usages |

Several key success factors across segments for "new" product launch, particularly in "green" and "yellow" markets

Example



Product usage depends on educating users on both the "why" and "how" of the product

Not just how to use it, but why should someone switch from Open Defecation to this?



Kiosks showed bacteria in untreated water under a microscope to help women realize this was harming them and their families



Successful uptake requires product is suited to local cultural preferences

Lack of cultural fit most common reason products will go unused and fail



Communal toilets introduced in Jordan went unused while refugees made individual makeshift ones because of preference for private facilities



Generating aspiration for product is necessary

It is not enough that there is an unmet need—will not guarantee uptake



Dry toilets were turned down in Bolivia, a water-scarce area lacking sanitation—as people wanted the "real" flush toilets



... but aspiration is very segment/geography specific

Western products can benefit from "halo" effect, but it's not necessarily impactful or sufficient; scale/prestige do not always transfer



Currently advertising on Indian billboards

- *"I'm not sure that you can get to a scale with RT that is so loud and successful in the Western market that it's flashy enough to make an impact in the developing world"*

—BCG Consumer Durables expert



For a product to be credible, pilots alone may not suffice—will benefit from credible endorsements

Don't be afraid to leverage partners' brand and/or seek out NGO partnerships to bolster the product's credibility



Partnership with US Agency for International Development credited with helping the product gain initial recognition

- *"Proof of concept isn't just a pilot; it's also having credible people believe in it"*

—CEO WaterHealth

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Military

Military sustainability initiatives and base locations necessitate **water, waste** as focus—many RT use cases, including for homes

RT could help address army's desire to innovate to **tackle water scarcity**, particularly in **hard-to-reach areas**, in parallel developing credibility with a segment that has proven its early adopter potential and has potential to influence broader policy shifts

Source: Expert interviews, Army Net Zero initiative report



Current administration is seeking to **privatize** service provision where possible—therefore, depending on specific opportunity may be able to avoid **an otherwise potentially lengthy competitive bid/request for proposal (RFP) process**. Further, the military is traditionally **willing to pay a price premium** for the best possible product—functionality and user experience is key—but important to demonstrate the cost efficiency of conservation aspects of toilet

Key considerations:

- Must be able to withstand **extreme weather conditions**
- Must develop supply chain to potentially **service remote areas**
- Military procurement apt to **change between administrations**
- Must provide **pleasant user experience**—key decision criteria for military homes procurement



Segment deep dive: US Military



Segment overview

Several potential RT military applications:

- **Housing (120k+ homes on base)**
- **Forward Operating Bases (FOBs); budget includes \$14.7B for Base Operation Support¹ and \$10.8B to offset deferred maintenance)**

Segment **less price sensitive** and more focused on **performance**



Value Proposition

RT offers both environmental and cost benefits:

- Addresses **water scarcity** issues in hard-to-reach areas—an area of innovation for army
- Water **cost savings** and deferred Capital Expenditure (CAPEX) for military developers



Procurement path

Military housing offers "in" to segment with efficient procurement:

- Maintains **private to private** sale
- Otherwise, direct to the Department of Defense (DoD) will require **competitive bid**



Unlock Potential

- **Other US military segments:** FOBs, ranges, proving grounds, naval ships
- **Other commercial developer segments closer to core:** same developer may have other holdings such as **student housing, apartments,**
- **Individual consumers:** RT exposure to **first-time homeowners** may encourage them to adopt RT after military
- **FEMA/disaster relief:** Initial in with DoD could allow to expand to **other government departments**

1. Includes training support, installation services, and infrastructure sustainment, restoration, and modernization.

Source: DoD Budget Request

http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2018/fy2018_Budget_Request_Overview_Book.pdf

Military has proven its early adopter potential, originating many now ubiquitous technologies



Photos source: google images

Products originating with the military have become synonymous with **quality**, making it a powerful early adopter

Several potential applications of RT technology within military



Military housing

Sell to **private developers** responsible for military housing, who view RT as a way to **reduce utility costs** and **avoid reliance on DoD infrastructure**



Forward Operating Base

Sell directly to DoD for use on FOBs, reducing reliance on **external contractors** for servicing latrine who further may present security risks



Ranges/ Training areas

Sell directly to DoD for training areas to help bridge the gap of **avoiding installing plumbing**—and eliminating need for **expensive servicing of a latrine**



Naval ships

Sell to **naval shipbuilders** to improve waste elimination on ships, which currently may **eject waste directly into water**

Current sanitation solutions vary widely across military applications



Different types of latrines are common on FOBs and training areas...

...while housing on base currently innovating from regular to low-flush toilets in some instances



Within military segment, suggest focusing on base housing as entry point

RT has strong value prop for military homes

Military typically contracts 50-75 year ground lease partnerships to private companies

These companies pay all utilities, so are motivated to reduce utility costs

Further, RT enables them to avoid having to repair piping to connect to base sewer systems

...and clear procurement path with developers

Sales of RT to private developers would be private-private

- Avoids bureaucratic govt procurement process (competitive RFP) during initial phase

However, developers engage DoD to "bring them along" on new technology

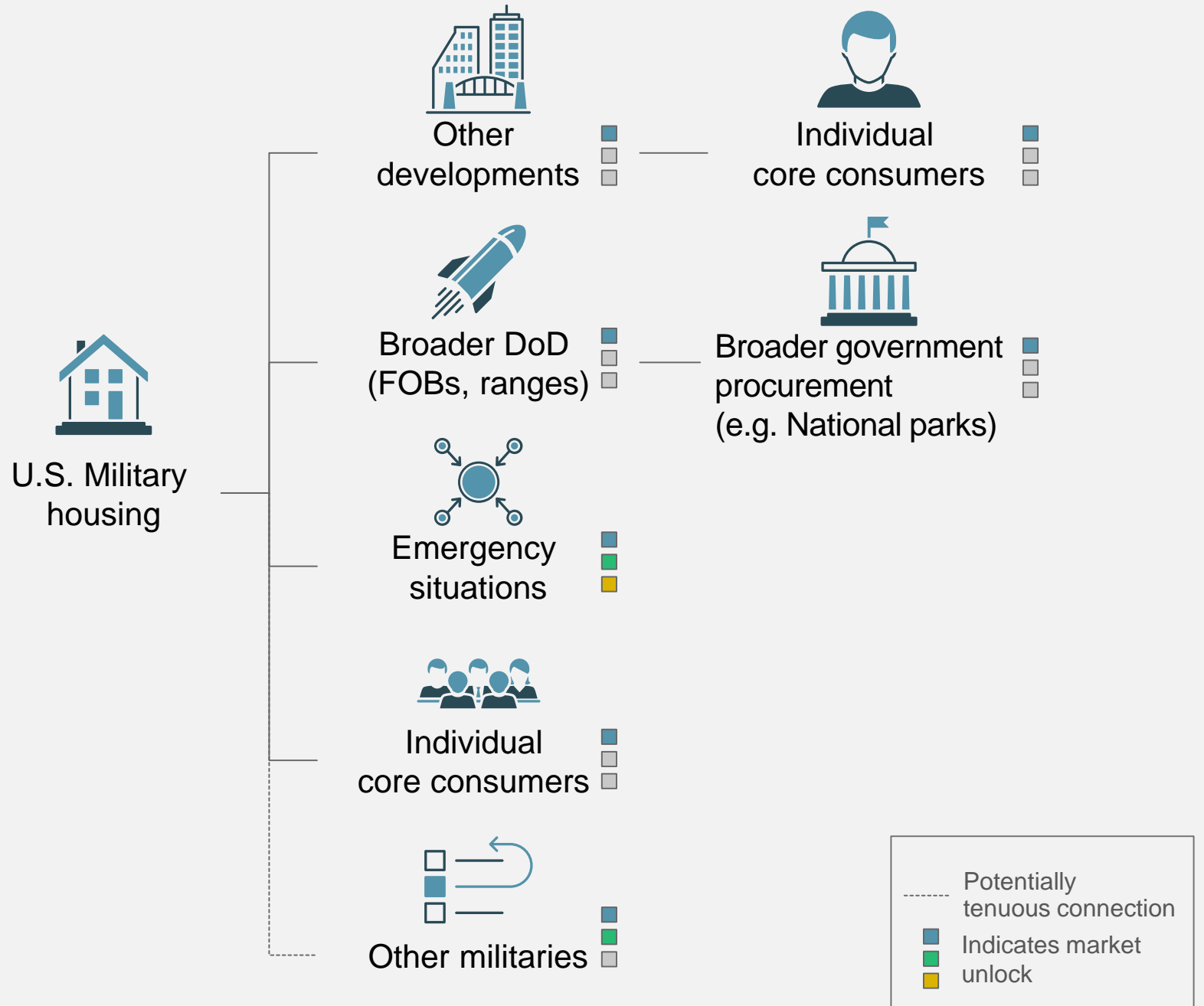
- Provides great visibility for RT

Military developers seeking DoD buy-in for new technology offer a **warm introduction** for downstream sales directly to DoD for FOBs, ranges/training areas—and these developers further unlock **other housing segments** that they play in (e.g. private apartments, student housing)

■ "There is a lot of old clay pipe, deferred maintenance, large construction projects on base, and with houses, may be on a combined sewer... if [RT] is seamless to user, we would be highly motivated to unplug on the wastewater side as the DoD runs it; it further allows us to not have to worry about dealing with digging up pipe"

Partnership Innovator/P3 lead, Corvias (military developer)

Beginning with military housing maximizes unlock potential for four expansion paths—with potential to **engage other militaries globally**



Example: Private developers such as Corvias have deep military housing portfolios and are excited about RT's potential application

US military housing locations



Corvias manages over 35,000 beds across both military and academic buildings

- Partnered with the Army/Air Force through Military Housing Privatization Initiative (MHPI)
 - Military portfolio includes 9 Army communities and 6 Air Force communities, totaling ~24,000 homes
- Military housing communities are located at both bases and proving grounds

Source: Corvias's website, expert interview

Example: Many military housing complexes' infrastructure in poor condition, as seen in the conversion of the Presidio trust

Presidio Trust has converted almost **2M** of residential square feet, **2M** non-residential, and **1M** remaining for conversion

Homes were built anywhere ranging from the **Civil War to the mid-1970s**—but in 1981, military knew they would be leaving; neglected improvements until the trust took over in 1999

Had to completely gut the houses, including **laying new piping** for water and waste lines, and gutting electrical connections

Repairs in some cases were almost **cost-prohibitive**



Compelling opportunity for subsequent expansion into FOBs

“

When I was deployed in Afghanistan, we had third party contractors who would **pump out the portable toilets everyday**...I'm sure we payed a lot of money to contract this service, and we had to **coordinate their arrival every day, inspect their vehicles and their persons** for security reasons, and then send sentries with them to **escort them to each toilet**

Former Marine Officer

”

Potential to reduce cost, operational complexity, and security risks

Beyond hassle of arranging for constant servicing, inherent risk in letting people into base, as enemies could bribe employees

Strongest opportunity for RT lies with long-term engagements, such as Iraq, Afghanistan

Direct procurement with armed forces has strict procedural elements—and also requires policy and behavioral influence



In order to sell to military, must register RT with General Services Administration (GSA)

Product must go through GSA registration to appear in catalogue

Can then receive a National Stock Number (NSN), permitting its purchase

- Much harder to orchestrate a commercial procurement



...however product's inclusion will not ensure uptake

Presidential executive orders will be most influential in encouraging adoption

- Ex. mandating certain water conservation
- Currently, guidance is U.S. Environmental Protection Agency (EPA) regulation or local requirement (whatever is stricter)

Further, each branch of the military has an installation procurement function

- Will need to get these decision-makers aware and excited about product
- Further, local commanders have substantial purview to accommodate local site needs

For RT to be a viable option for military houses, maintaining a seamless user experience is key

Several open questions to understand product viability



How is the RT maintained?

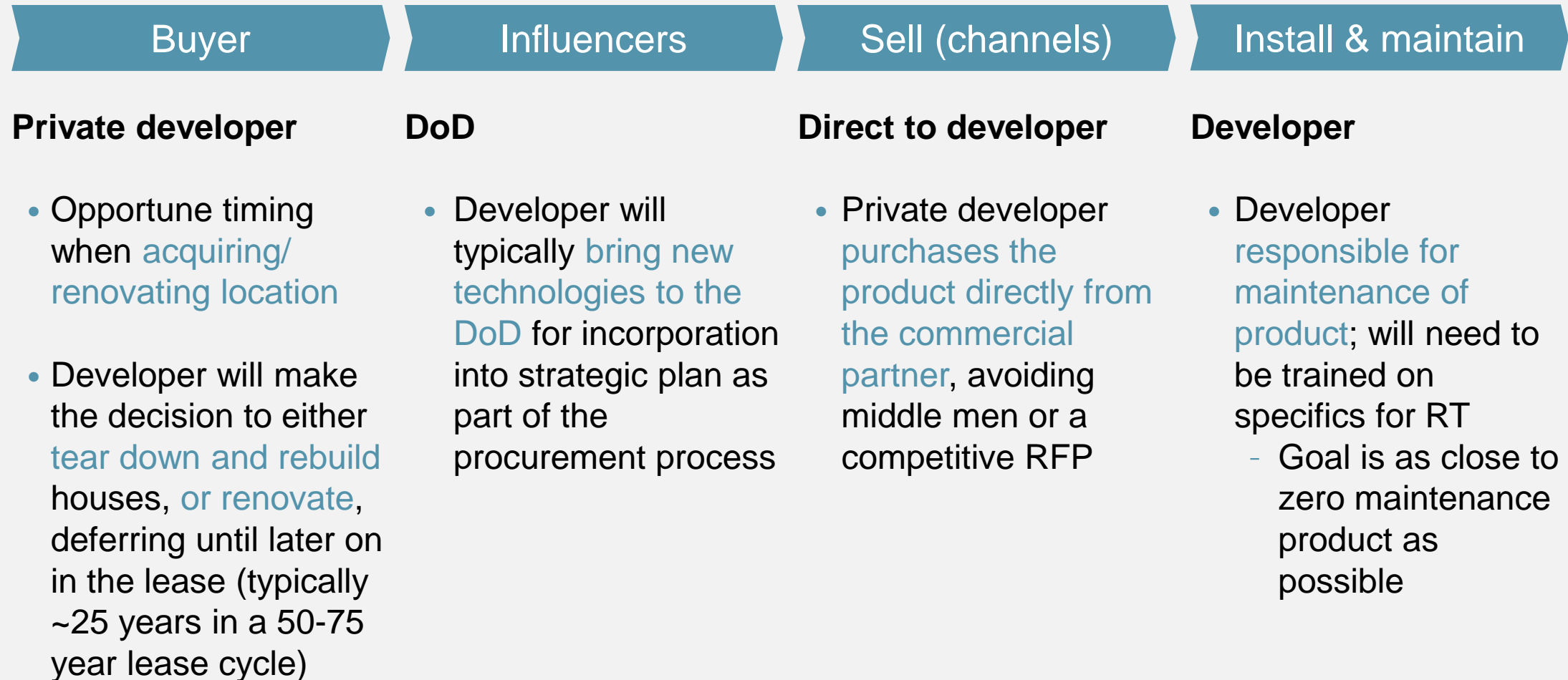
- What level/frequency of maintenance is required?
- Could maintenance be done without entering homes?
- What would happen if a repair was needed?



How similar is the user experience to current toilets?

- Does it just flush once?
- Does it “feel” the same?
 - Past challenges implementing low-flush toilets where features were not in line with expectations

For military housing, procurement path would be with private developers—who would loop DoD into process



Recap: Suggested next steps to pursue military housing opportunity

Develop stronger point of view on RT user experience and maintenance needs

- In order to get final "buy-in" will need to be able to speak to these points with more specificity

Develop more concrete view on potential cost savings from utilities, based on RT specs

- Private developers "view the RT more from a utility perspective" rather than a consumer good—this is what will convince them (assuming solid user experience)

While product is still in development, efforts are needed to **maintain relationships with interested buyers** and ensure technology partners are **achieving the necessary user experience**

To ensure well-positioned for DoD expansion, it is important for partners to **lay the groundwork for future FOB partnerships**

Consider reaching out to **current military suppliers** to create a future Corporate Partner relationship

- Military has a strong preference for incumbent suppliers

Further, can work on **establishing DoD relationships** through initial connection made through private housing developers

- Important to remain mindful of administration turnover
- Currently focused on base self-reliance, particularly avoiding any dependence on oil



Refugees

Refugees

Currently ~**22.5M** refugees and **65M** displaced people worldwide—with nearly **4M** living in planned/self-settled camps

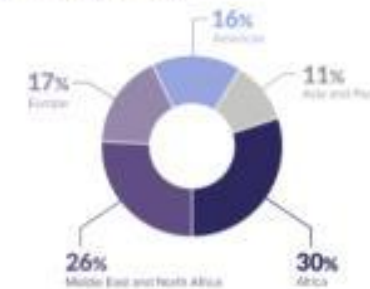
Dire current refugee situation offers a "quick win" to get RTs in the field, with substantial potential for impact—bringing dignity and improved health to often poor settlement conditions—and providing key learnings for "yellow" markets

1. UNHCR Statistical Yearbooks; UNHCR storymaps



8/10 of the largest refugee camps are located in Africa, which further hosts 30% of the world's displaced people, followed by 26% in MENA¹

Where the world's displaced people are being hosted



Procurement process would likely involve working with key humanitarian organizations such as **UN Refugee Agency (UNHCR)**, **International Committee of the Red Cross (ICRC)**, **Norwegian Refugee Council (NRC)**, which could present possibility for expansion across camps. However, must remain mindful of potential for **bureaucratic processes** (e.g. need to fill out tenders; competitive bid requirements)

Key considerations:

- Product must be able to handle **high volume**
- Product would need to be **cost competitive** to win procurement opportunities
- Time is **now**: deep refugee crises; some major camps piloting new toilets
- Likely possible to secure **aid funding** for WASH improvement initiatives at refugee camps



Segment deep dive: Refugees



Segment overview

RT has strong potential to improve sanitation for growing displaced population:

- 65.6 M forcibly displaced people as of end of 2016
- 22.5 M refugees

Many crises escalating currently, including almost 700k Rohingya refugees fleeing Myanmar since August 2017



Value Proposition

Improved sanitation decreases disease:

- In Kenyan refugee camp, sharing latrine with 3 households was significant cholera risk factor

Improves women's safety

- Searching for place to relieve themselves puts them at greater physical risk and/or of shaming their families

RT's modularity makes it an appealing solution for camp assembly/disassembly



Procurement path

Procurement through organization responsible for camp management

- Likely to require cost competitiveness through an RFP

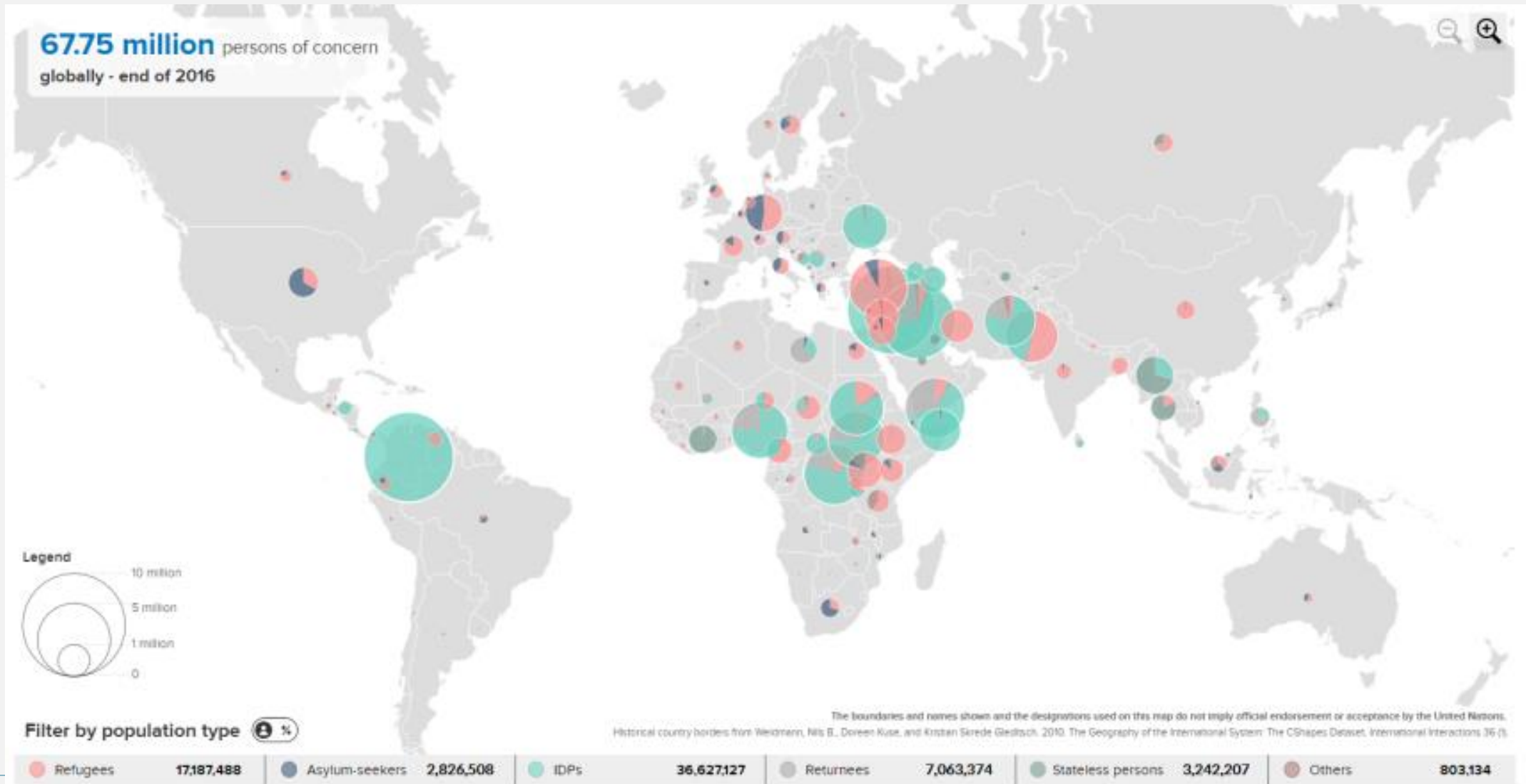
Given current refugee landscape, further likely to be a timely opportunity for procurement



Unlock Potential

- **Refugee camps in other locations:** potential to expand through relationships with camp managers to others they manage in Africa and the Middle East and North Africa (MENA)
- **High need "yellow markets":** NGOs involved in camp management may also work in high-need areas, offering "in" to places such as schools, hospitals, public sites, etc.
- **Disaster relief:** NGOs involved in camp management may also work in emergency situations; could potentially introduce RT

Meaningful opportunity to contribute to tackling refugee crisis: highest number on record, concentrated around crises in Myanmar, Syria, Central America



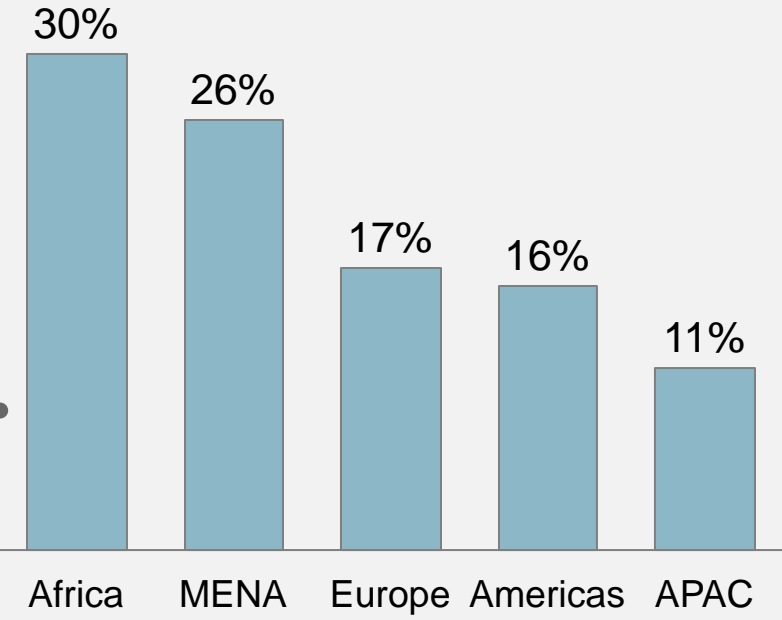
The burden of refugee camps disproportionately resides with developing – and primarily "yellow" countries – offering entry opportunity while having impact



8/10 of the largest refugee camps are located in Africa

Africa further hosts 30% of the world's displaced people, followed by 26% in MENA¹

Distribution of displaced peoples



Source: UNHCR statistical yearbooks and storymaps

Refugee camps are in dire need of sanitation innovation—RT can potentially address



Challenges prevail in planned refugee camps...

- Variety of solutions, ranging from pit latrines, installation of new latrines—but open defecation persists
- Prevalence of many diseases linked to open defecation/subsequent contamination of water sources, including cholera, dysentery, diarrhea—which can further contribute to malnutrition



...and situation often worse in spontaneous sites

- Same challenges with diseases due to open defecation
- Further, often highly dense and grow in a way that is not conducive to retrofitting piping; lack of areas for de-sludging

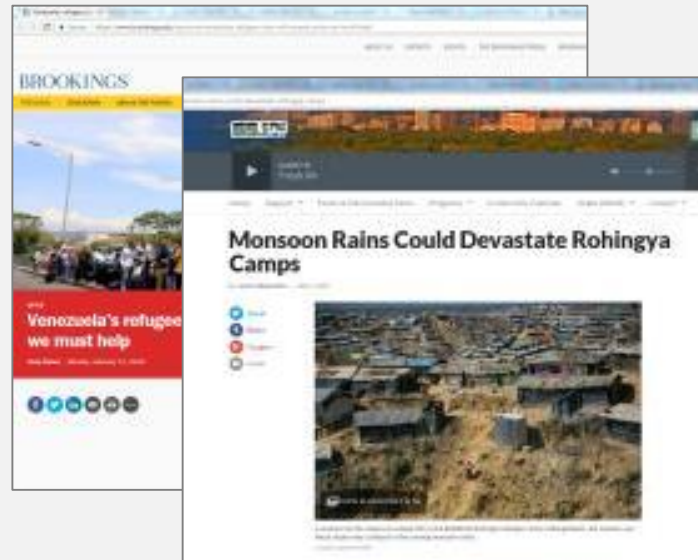
Source: Press releases, expert interviews

“In the morning when it is still dark, I take water in a small pot and go to the jungle, which is **20 minutes-walk**, from my tent just to defecate in an open space. It’s uncomfortable but **I have no other choice**. For children, we take them to some place closer to our tent and let them defecate in an open place”

Source: Rayhana, resident of Jamtoli camp
(*World Vision reporting*)

Placing RT in refugee camps both serves this pressing need and also has potential to be **strong proof point** for product to enable growth

Source: Press releases, NGO websites

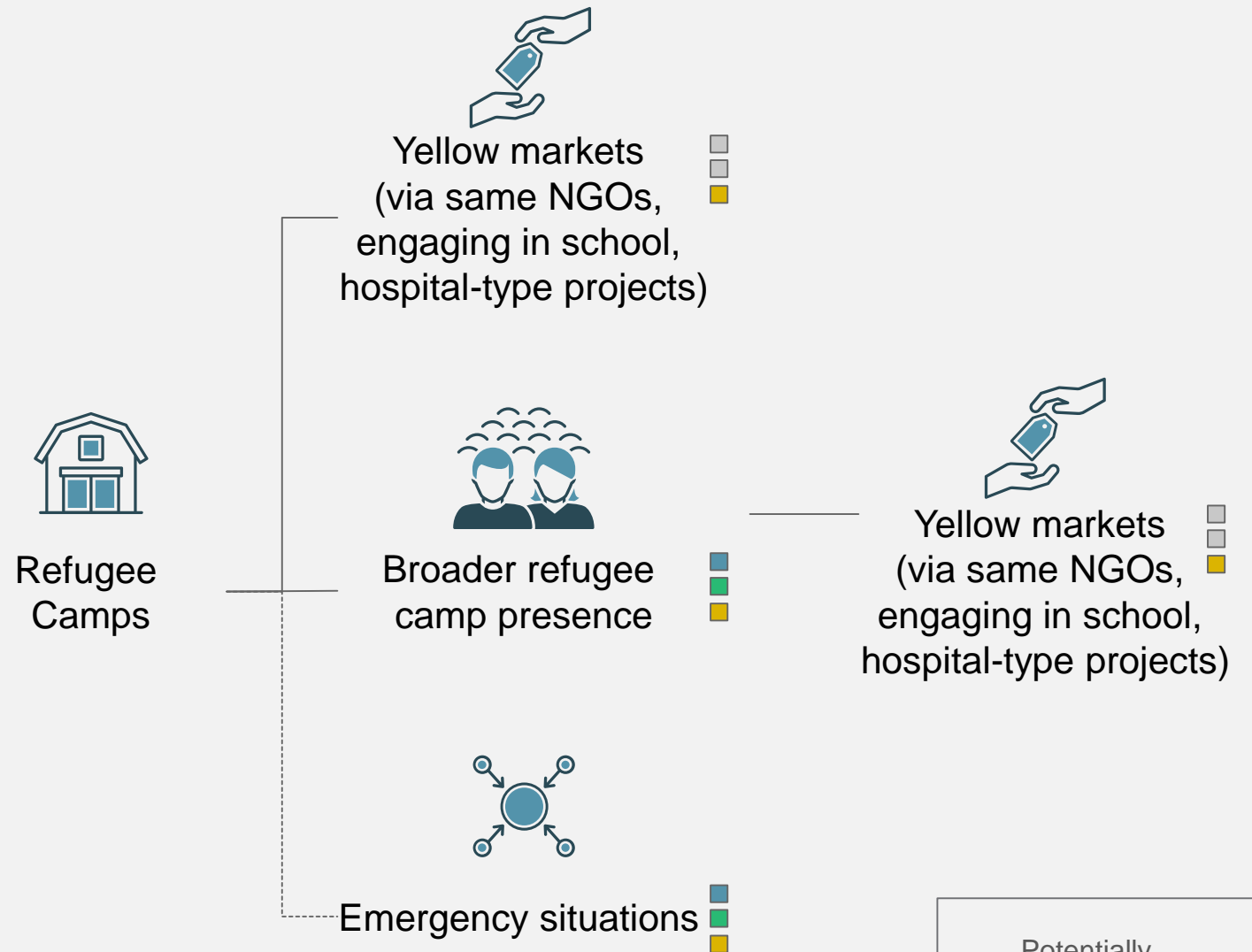


Current crises such as Syria, Myanmar both trying to solve critical sanitation challenges *now* and receiving **substantial press coverage...**

...and introducing RT as solution involves **partnering** with organizations and government buyers whose work extends beyond refugees— **unlocking deeper yellow market penetration**, and potentially **disaster relief** in other markets



Refugee camps and associated partnerships offer potential expansion both **within segment** and to other high-need markets



----- Potentially tenuous connection

■ Indicates market

■ unlock

Suggest pursuing opportunities to pilot RT *now* and expand deeper in planning phase for new camp—consider bringing RT to Rohingya camps (I/II)

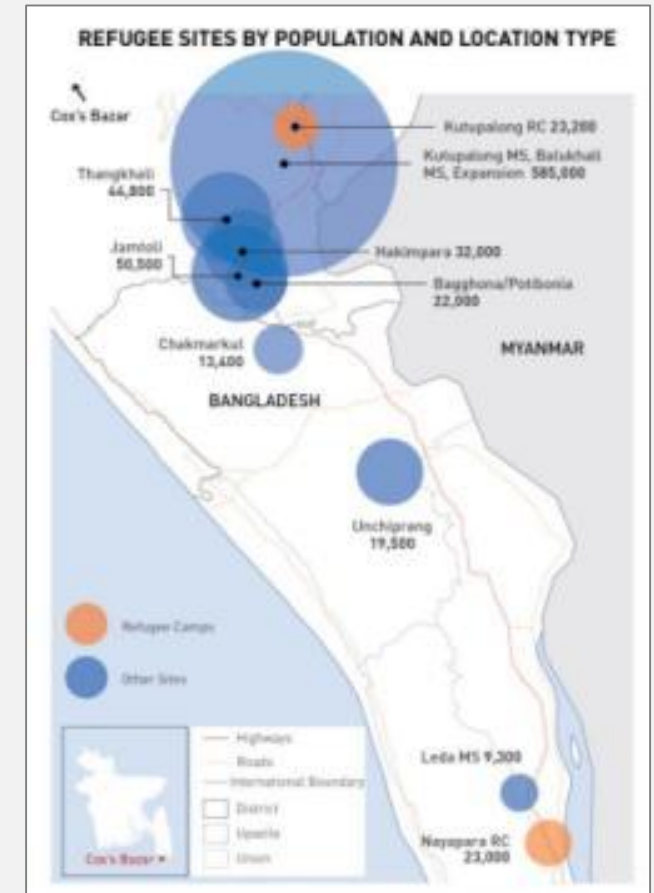
Between August 2017 and January 2018, ~700k refugees fled Myanmar to Cox's Bazar (Bangladesh)—which previously had ~200k registered Rohingya inhabitants

- Fastest-growing refugee crisis currently

The Bangladeshi government allotted ~3000 acres for a new camp, but refugees arrived before humanitarian partners could develop appropriate facilities

- Now rushing to install adequate shelter and sanitation facilities in particular

Furthermore, impending monsoon season in Bangladesh has increased the urgency of getting facilities in place



Suggest pursuing opportunities to pilot RT *now* and expand deeper in planning phase for new camp—consider bringing RT to innovative Zaatari camp (II/II)

Zaatari camp currently has ~80k refugees fleeing the crisis in Syria, an 8-year ongoing conflict

UNICEF responsible for WASH; UNHCR responsible for shelter, but involved in WASH efforts

- Piloting a FSM micro-organic product to treat waste in latrines

Camp management at Zaatari are eager and experienced innovators

- Have already piloted solutions such as cash-based assistance for food, solar energy

UNHCR WASH lead open to RT pilot



“Zaatari is one of the most sophisticated camps. We try to implement new technologies and concepts, like cash-based assistance. We are out of the box thinkers.”—UNHCR technical lead for Zaatari camp/WASH overseer on willingness to pilot RT

Source: Expert interview, UNHCR Syria Refugee Response Inter-agency sharing portal

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