



FOR 2017 ENERGY TRANSITION STARTUP AWARD COMPETITION

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Awarded a Top 100 Energy Transition Startup

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**SELECTIVE ANSWERS AS PART OF APPLICATION (most answers limited to 1500 words)**

*Limit: 1500 words*

**2. Define your vision towards the global energy transition and how your solution fits into it. How do you imagine a 100% renewable world? What actions need to be taken? How does your solution contribute to that vision?**

### **DEALING WITH THE PROBLEM OF WASTE WITHIN THE GLOBAL ENERGY TRANSITION**

Waste, unfortunately, has been the stepchild of our ongoing energy transition with far greater focus on recycling and far less focus on the deleterious health effects caused by open burning and unsanitary garbage on local residents and the environment.

For the developing world, waste IS an increasingly huge problem as populations and economies grow and local governments don't have the waste infrastructure to handle it. Even if the developing world were 100% powered by renewable energy, developing countries and their citizens would still have the problem of creating too much waste. In fact, a startling 62% of the world lives in areas without formal waste management systems. Instead, they rely on unsanitary garbage dumps or resort to open burning, even if deemed officially illegal in many countries.

When you look at how the developing world has recently dealt with similar big investment infrastructure needs for telecommunications and energy, countries fortunately were able to leverage state-of-art technology to leapfrog the developed world: Mobile networks sprouted up, led by the cell tower that obviated the need for expensive fixed wired legacy networks. Now, these same countries can and will deploy decentralized huge wind and solar installations, over the next decade, to similarly bypass the need for more centralized coal-based or even nuclear-based power plants. Bringing electricity and communication to the masses will fuel first-time consumer-based consumption – and more consumption leads to even more waste.

Unfortunately for the developing world (and the planet), waste processing, recycling and disposal has no magic wand - no technical frog that can leap - especially in major cities throughout India, Africa, China, Latin America and Asia.

For these cities, the solution is to build out, over time, developed world waste management infrastructure and operations in order to best handle the sheer volume of waste from collection to its best and highest use (recycle, reuse, incinerate, gasify or landfill). This will require expensive and extensive capital equipment investment to build both large modern landfills, as hubs, and material recovery facilities (MRFs), as spokes, where valuable collected waste is first sorted out and processed. The remaining waste will be sent to the nearest landfill (hub).

However, these infrastructures are almost always too expensive to extend throughout an entire country, especially for small cities (defined here as populations under 200,000), and isolated island nations that have minimal, or do not yet have formal, waste management systems.

As described in Question #1, we have a vision for these small cities and island nations – and it is a leapfrog long-term solution: Thousands of distributed and decentralized small-scale waste processing, recycling and disposal systems called Starter MRFs (“SMRFs”), with our combustor as its anchor. In some ways, an analogy can be made between how a wide area network of cell towers creates 100% mobile coverage in a country for a telecommunication company and to how, if properly situated, SMRFs could effectively cover all small cities and surrounding areas (a minimum of 30,000 people per SMRF based on historical waste per capita estimates), within a country.

Another advantage of these small systems is how they allow local communities to “get started” in waste management and recycling, and it allows local residents to get used to the technologies involved and collections process, and workflow before any scaling up can and should happen, i.e. the Starter aspect of a SMRF. Plus this occurs with a similar small investment to test the waste management waters to “get started” too.

## **HOW WE MAKE THIS VISION HAPPEN:**

### **[1] Aligning Key Stakeholders within Each Local, Decentralized Target Area**

To implement a successful SMRF, let alone thousands of them throughout the world, it won't be as simple as giving the operating blueprint and technology to each local government and going away. This has been tried and has repeatedly failed with other technologies. We are taking a different strategic approach as we've identified the need to get buy-in from 5 key stakeholders that must work together, especially as our strategy involves creating one local SMRF (as beachhead) that exceeds expectations, and then expanding, with stakeholders buy-in, into adjacent areas one SMRF at a time.

We absolutely need to align the roles and interests of all stakeholders and gain their cooperation for not just the first SMRF to succeed, but to create the atmosphere where expansion is wanted by all involved:

- **Local Waste Operator(s)** who have the ability to collect waste and/or operate the SMRF as for-profit ventures or NGOs.
  - They need to make a profit from either waste collect and/or SMRF activities
- **Local Household Residents and Businesses** need to actively participate and show strong buy-in (i.e. Bottom Up”) not by words, but by their actions, i.e. such as source-separating organics from their inorganic waste, if asked.
  - They need to actively provide the waste to be collected.
  - They need to see that their government is involved, contributing and making a long-term commitment.
  - They need to see the waste operators doing their job and creating “waste-free” areas.
- **Local Government**, with support from a country’s top leadership (i.e. “Top-Down”).
  - They must be actively involved, over time, with waste operators to set and help them achieve waste collection, processing and recycling milestones; yet also hold them accountable.
  - They must show local residents their financial commitment too. This commitment can take the shape of donating land for a SMRF; and to use tax money to pay for or partially subsidize collection tipping fees.
- **Outside Funding Organizations** (the U.N, World Bank, IFC, GIZ, USAID, etc.) need to step up to give long-term financial support, especially for the first SMRF. While implementation a few SMRFs could be funded locally, a decentralized distributed network of a large number of SMRFs in a regional area will require long-term financial support via project-based financing, especially to waste operators who prove responsible and meet all operating milestones.
  - These funders need to tie their initial funding (grant, loan, lease) to waste collection, processing, and recycling milestones that waste operators and local governments need to meet (and suffer the consequence when not met), and offer expansion capital funding, too, as appropriate.
- **Local Academic Institution to monitor total “waste-free” area savings.** By engaging a local institution to provide independent validation and metrics on the benefits (or not) of a working SMRF in a local area (economic productivity gains, healthier residents, etc.), it’ll be much easier to secure expansion funding.

## **[2] A Strategy to Grow a Decentralized, Distributed Network of SMRFs in a Country**

### **[a] Must Establish a Successful 1<sup>st</sup> SMRF as “waste free” beachhead**

- A business plan should be prepared, with Frontline’s consulting arm that aligns all stakeholders and defines the collection geographic boundaries, and time-based collection, recycling and disposal milestones.
- The first SMRF should be situated, if possible, in an area where waste is being collected already by a waste operator, or existing infrastructure could be easily added.
- The waste operator and SMRF operators sign contracts (could be the same group or not)
- Capital equipment funding needs to be secured.
- SMRF should be deemed an operating success within 12 months to create momentum!
- Local academic institution agrees to produce metric reports every 3 months in order for stakeholders to adapt as needed to meet operator and financial milestones.

An example: An area 15 by 10 kilometers is defined, and serves 39,000 people. Within an agreed upon 8 month SMRF ramp up, the local waste operator, as waste collector and SMRF operator, meets its milestones and Frontline deems the area as “waste-free.” This “waste free” area should be noticeably cleaner and everyone living within its boundaries healthier, too.

### **[b] Get Long-Term buy-in from funders, waste operators and regional government**

The stakeholders should also have an expansion plan – also created with Frontline’s consulting arm, for the next SMRFs in adjacent areas. Getting buy-in from people and businesses in an adjacent area should be easier when SMRF #1 is successful!

### **[c] Expand into adjacent areas – 1 SMRF at a time**

Getting lease funding commitments for SMRF #2 and beyond should then occur. Over time, more SMRFs are added into a regional area based on the successes of the first number of SMRFs. Key to success is that each SMRF operates for its own local residents and operators are held accountable to meet milestones and make profits.

## **[3] Example of Our Vision: A Decentralized, Distributed Network of SMRFs in Kitui County Kenya**

Kitui County, Kenya has a population of 1.1M people (2009 Census) over 11,500 sq. miles of land. Its largest city is Kitui City with a 160,000 population. Based on expected per capita waste, by reviewing the demographic population areas, one can divide Kitui County into 4 regions and, in total, 15 SMRFs could be placed and supported (opening one at a time), including 4 within Kitui City. For each SMRF and collection area, waste operators could hire between 50-80 people.