

Sustainable Fluoride-Removal Solutions in Ethiopia and Kenya

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Overview

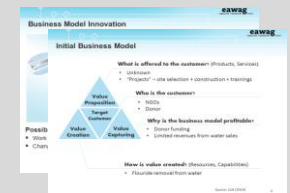
1

INTRODUCTION



2

BUSINESS INNOVATION



3

CONCLUSIONS

- Conclusions**
- Focus on the service delivery and not only on the technology
 - Introduction of HAP production and regeneration
 - Conduct market assessment
 - Improve collection of key data
 - Policy makers should rethink the need for subsidies for the mid-term and the poor

Prevalence of High Fluoride in Groundwater



Dental & Skeletal Fluorosis



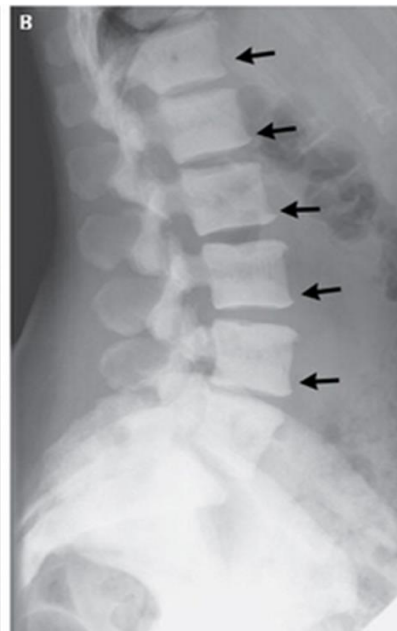
Mild



Moderate



Severe



Low-Cost Defluoridation

Community Filters



Low-Cost Defluoridation

Filter Materials

Bone Char



Hydroxyapatite (HAP)



Bone Char Production



(1) Raw Bone Purchase



(2) Charring



(3) Crushing & Sieving



(4) Washing



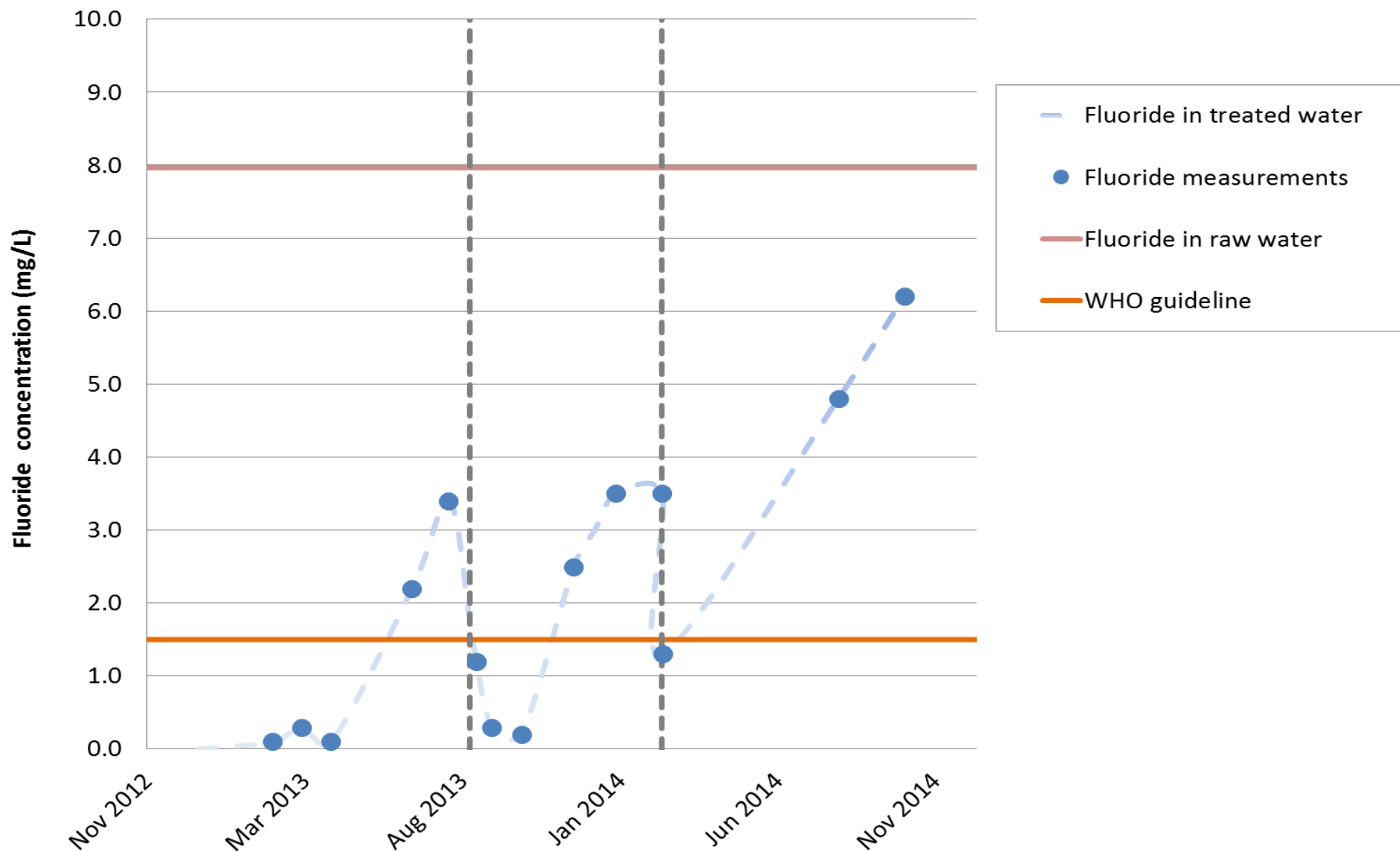
(5) Drying



(6) Packing & Storing

Low-Cost Defluoridation

Technical Performance Bone Char Community Filter



HAP Production



(1) Mixing



(2) Filter press



(3) Mixing with dry HAP powder



(4) Mincing



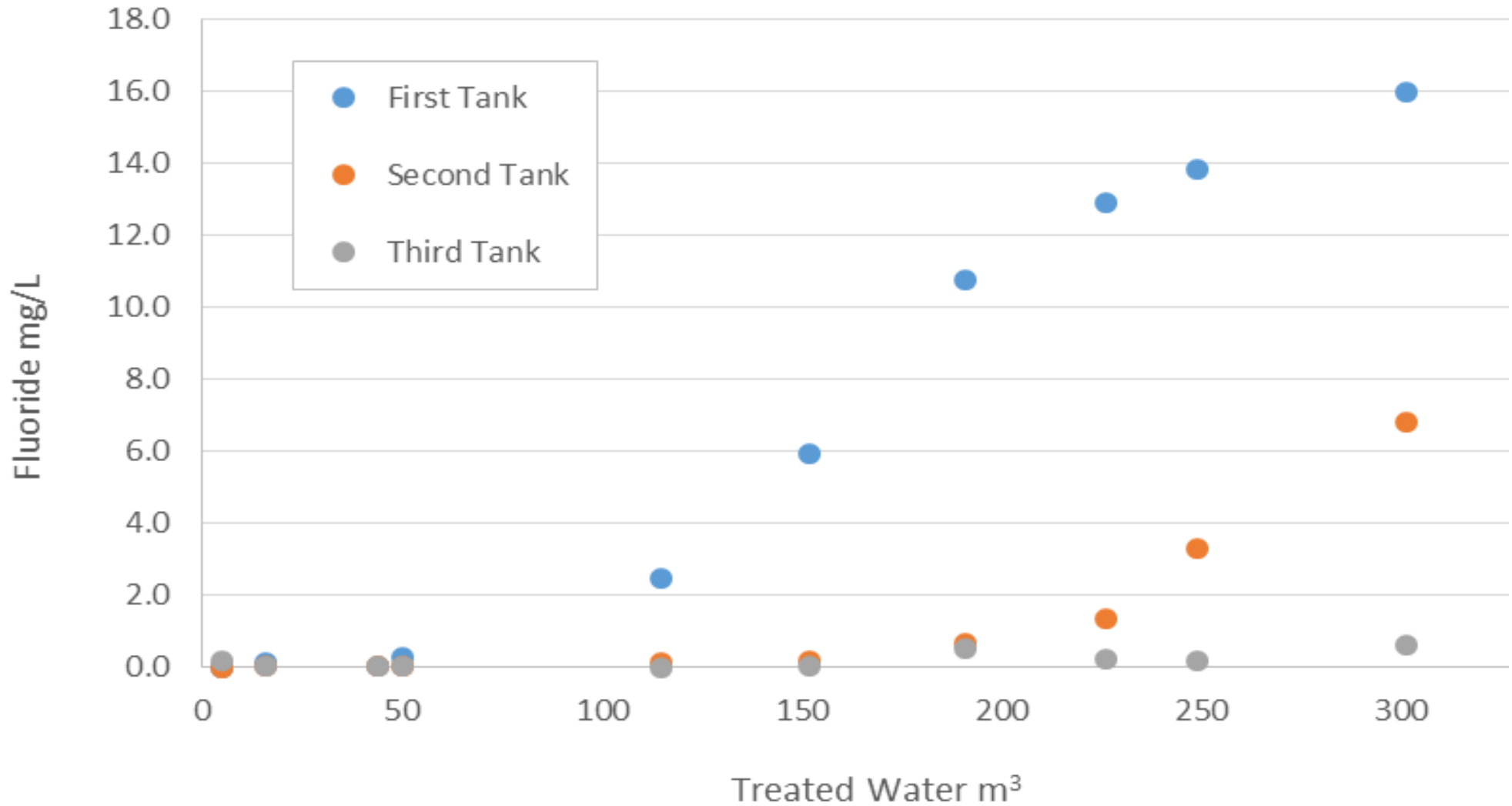
(5) Drying



(6) Final product

Low-Cost Defluoridation

Technical Performance HAP



Case Studies

	Kenya	Ethiopia
Organization	Nakuru Defluoridation Company (NDC)	Oromo Self-Help Organization (OSHO)
Start of fluoride work	1998	2007
Non-profit	Catholic Diocese of Nakuru Water Quality Program (until 2012)	Fluoride Mitigation Program
Social business	Nakuru Defluoridation Company (since 2012)	Fluoride Removal Technology Center (since 2015)
Employees (in 2015)	9	9
Scale of operation	150 Community filters	12 Community filters

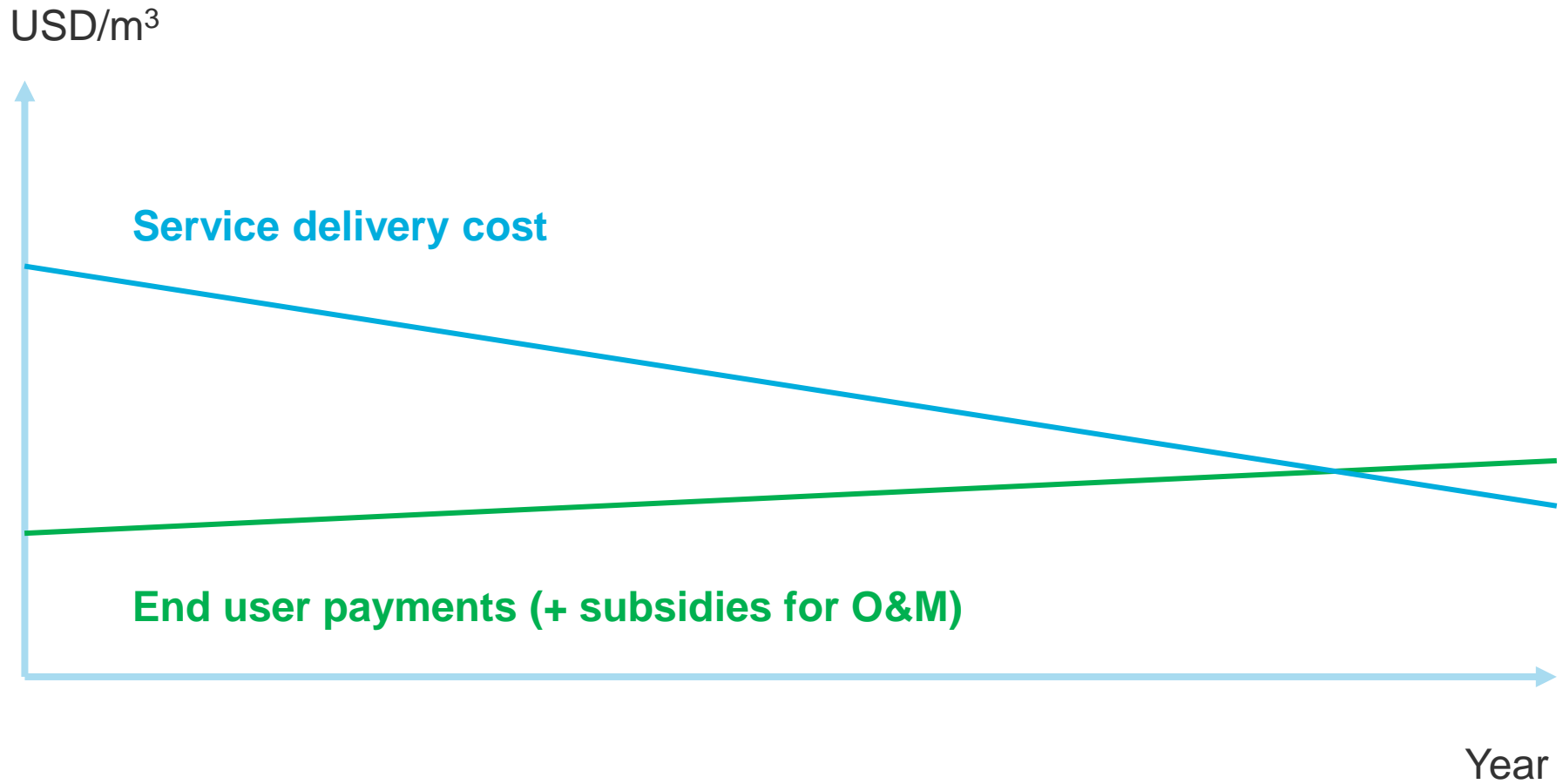
Successes & Challenges

The technology works!

BUT

- ... the filter material needs to be replaced regularly
- ... limited ability and willingness to pay for fluoride-safe water by end users
- **Cost for treatment currently exceeds the revenue collected from end users**

Challenge



Business Model



Business Model Innovation

What is offered to the customer?

Products, Services

Who is the customer?

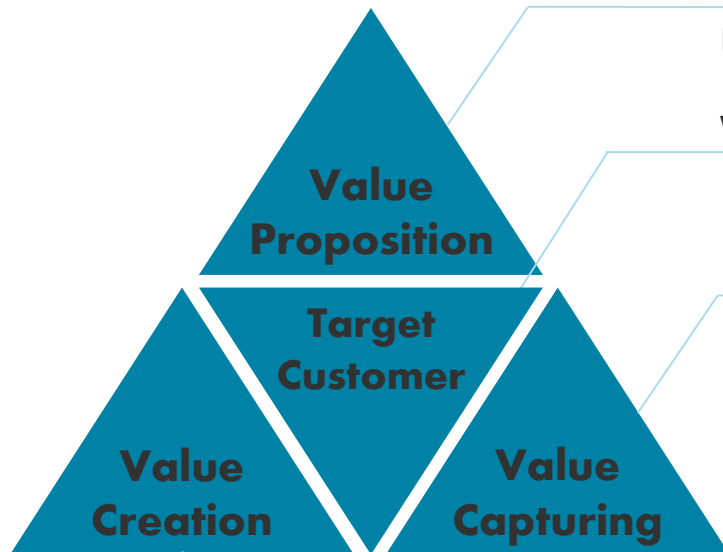
Market segment(s), customer clusters

Why is the business model profitable?

Main income sources versus expenditures

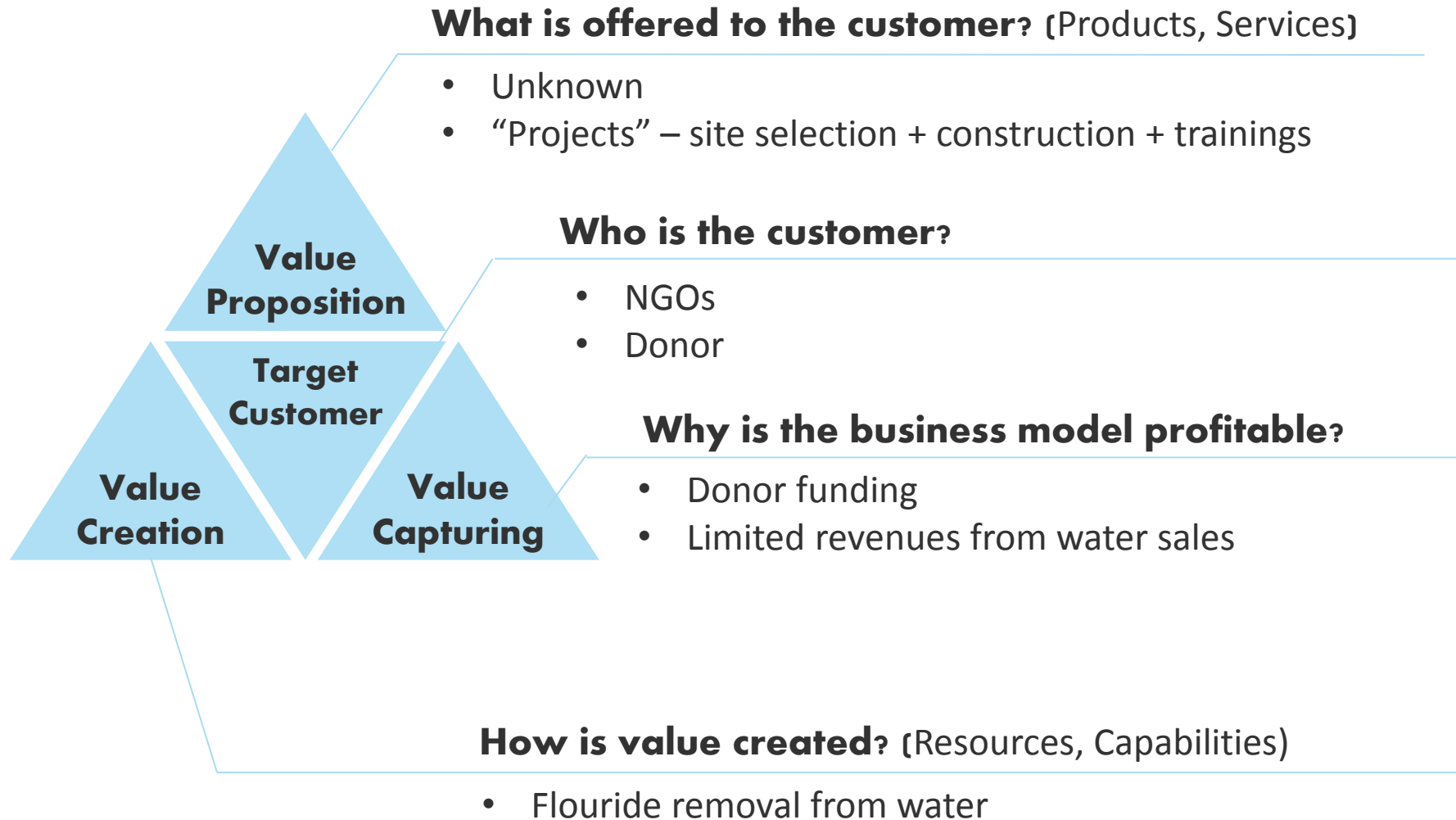
How is value created?

Resources, capabilities, processes, value network
E.g. technological know-how, strategic relationships



Csik (2014)

Initial Business Model






Business Model Innovation



Wider Product Offering

Complementary Products + Bundling



THE HUMBLE TWIN	THE 4X aka "The Lover's Blade"	THE EXECUTIVE
		
\$1/mo +S&H	\$6/mo S&H INCL	\$9/mo S&H INCL
Available August 10		
PRE-ORDER	SELECT	SELECT
5 Cartridges per Month	4 Cartridges per Month	3 Cartridges per Month

Subscriptions

Workshops to explore new operational models:

- Work with operators/water committees to set up savings scheme, so they can replace more regularly
- Change to a service model: take over replacement in exchange for % of revenue
- Other services: laboratory, consultancy, byproducts
 - Need to understand costs + volumes

In conjunction with technical approaches:

- Reduce filter material production cost
- Explore regeneration of filter materials
- Explore filter materials with higher uptake capacity

Conclusions

- Focus on the service delivery and not only on the technology
- Introduction of HAP production and regeneration
- Improve collection of key data (incl. financial data)
- Conduct market assessment (beneficiaries vs. costumers)

Thank you!

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Project Website