



# 3rd IWA Development Congress & Exhibition



Capacity-Linked water and sanitation  
for Africa's peri-urban and Rural Areas



<http://clara.boku.ac.at>



University of Natural Resources  
and Life Sciences, Vienna  
Department of  
Water, Atmosphere and Environment

## ***CLARA Simplifying Planning Tool Experiences: Case of Arba Minch Town ,Ethiopian***

14-17 October 2013  
Nairobi, Kenya  
Atekelt A. Ketema

# Introduction



Arba Minch town administration boundary



# Introduction



University of Natural Resources  
and Life Sciences, Vienna  
Department of  
Water, Atmosphere and Environment



- Town population(2012):  $\approx 94,000$
- Area: 84,387 ha
- Elevation: 1200-1320 masl
- Annual average rainfall: 900 mm
- Average temperature:  $24^{\circ}\text{c}$
- Four administrative sub city :

**Abya, Sikela, Shecha, Nechisar**

**Study area : Abaya & Sikela**

- Population (2012):  $\approx 39,000$
- 45% of HH monthly income  $<63\$$

# *Introduction*

## *Water Supply Facts*

- Existing source: Spring (30 l/s)
- Traditional disinfection by chlorination
- Average water consumption < 30l/c/d
- Water supply coverage: 56%

## *Sanitation Facts*

- Onsite sanitation chain (Latrine, UDDT, Fossa alterna, Septic tank...)
  - No municipal waste treatment plant and proper disposal site
  - WSP was practiced by AMU
  - Compost production practice at pilot level
- 





University of Natural Resources  
and Life Sciences, Vienna  
Department of  
Water, Atmosphere and Environment

# *System Planning Approach*

- Planning approach:

**Step 1:** *Study area characterization*

**Step 2:** *Possible water supply system chain and feasible technology identification*

**Step 3:** *Appropriate technical solution selection and plan preparation*

# Appropriate Water Supply Solution



University of Natural Resources  
and Life Sciences, Vienna  
Department of  
Water, Atmosphere and Environment

- ***Two* domestic user feasible alternatives (technical solutions) are:**

**Alt 1:** *Water source from Borehole (67%) and Spring (33%)*

**Alt 2:** *Water source from River (67%) and Borehole Spring (33%)*

# Technologies under alternatives



University of Natural Resources  
and Life Sciences, Vienna  
Department of  
Water, Atmosphere and Environment

- ***Alternative 1 encompass:***

***Source :*** Two boreholes & spring

***Purification:*** Disinfection

***Water distribution:*** Two pumping stations, transport mains, surface reservoir, Supply networks

- ***Alternative 2 encompass :***

***Source :*** One borehole & River water extraction

***Purification:*** Flocculation, Sedimentation, Filtration and Disinfection

***Water distribution:*** Three pumping stations, Transport mains, Surface reservoir, Supply networks

# Simplified Planning Tool \_WS



Project Information

Save

Save As...

Open SPT Manager

Project Title

Arba Minch water Supply Planning

Period of Consideration [Years]

50

Net Interest Rate [%]

3

Expected Annual Growth [%]

3.94

Justification/Source:

Add argumentation here....

Change in cost since release 2013 [%]

1

Alternative Labels/Names

Alternative #1

Borehole & Spring

Alternative #2

Alternative #3

Riverwater + Borehole

Alternative #4

General Assumptions

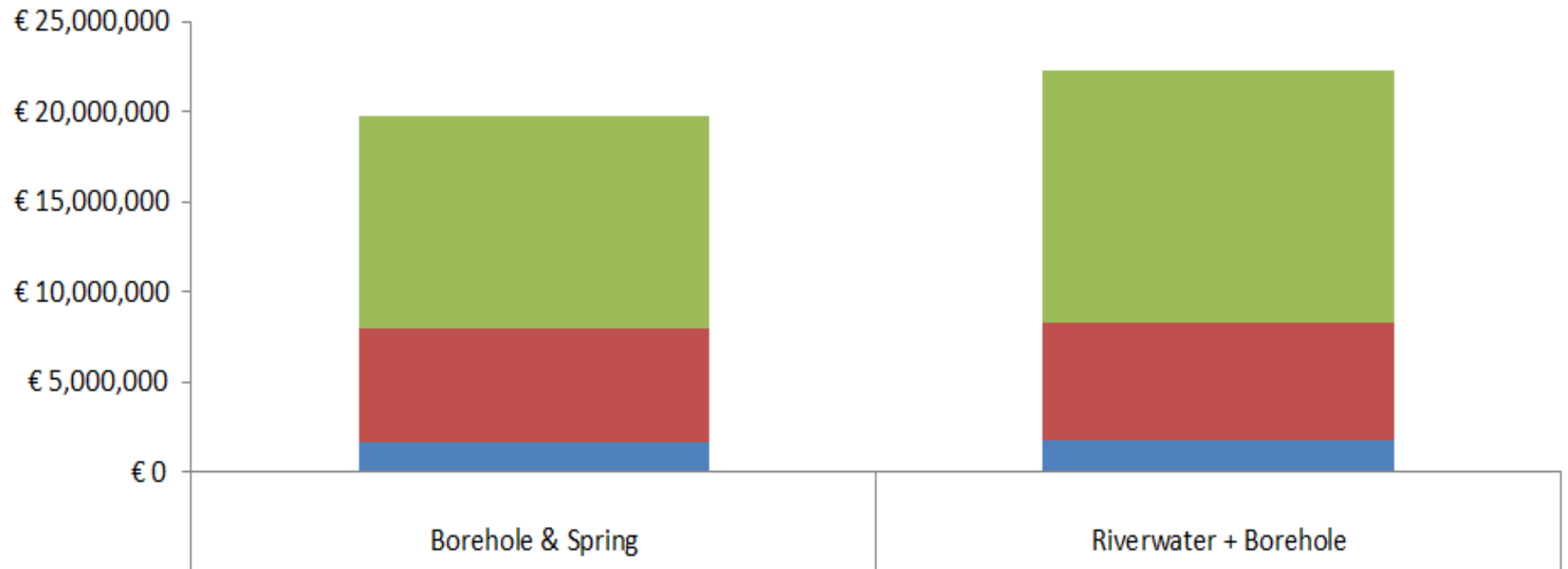
CLARA SPT Draft Version 1.1.2



# Simplified Planning Tool



## Cost distribution of alternatives

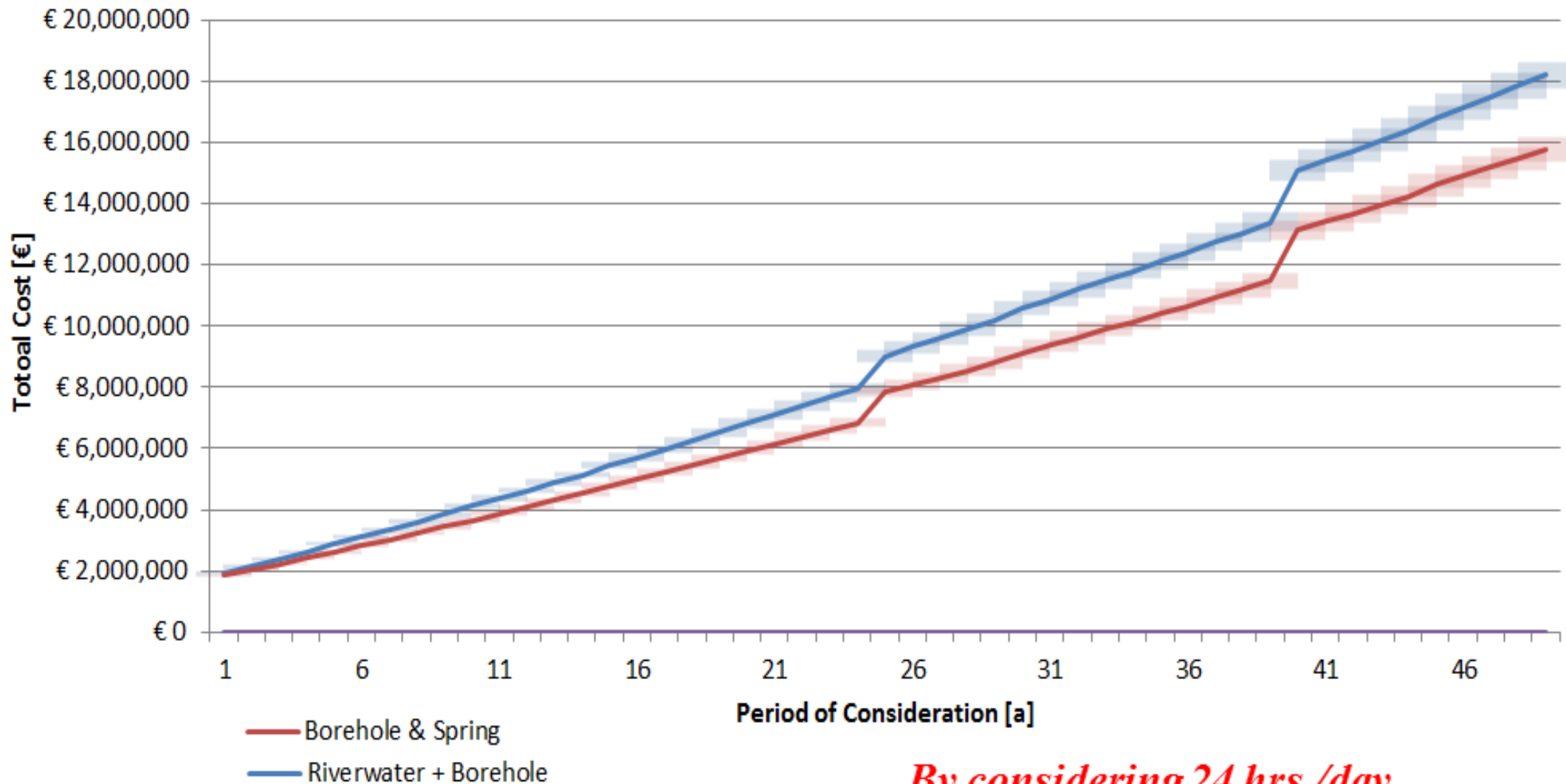


Alternative Name	Investment Costs €	Σ Reinvestment Costs €	Σ O/M Costs €	Σ Revenue s €	Total Costs/Profits €	Final Residual Values €
Borehole & Spring	1,645,254	6,294,132	11,830,359	0	15,769,123	867,769
River water + Borehole	1,703,908	6,525,442	14,015,584	0	18,194,290	840,465

# Simplified Planning Tool



## Alternatives Cost-Behaviour

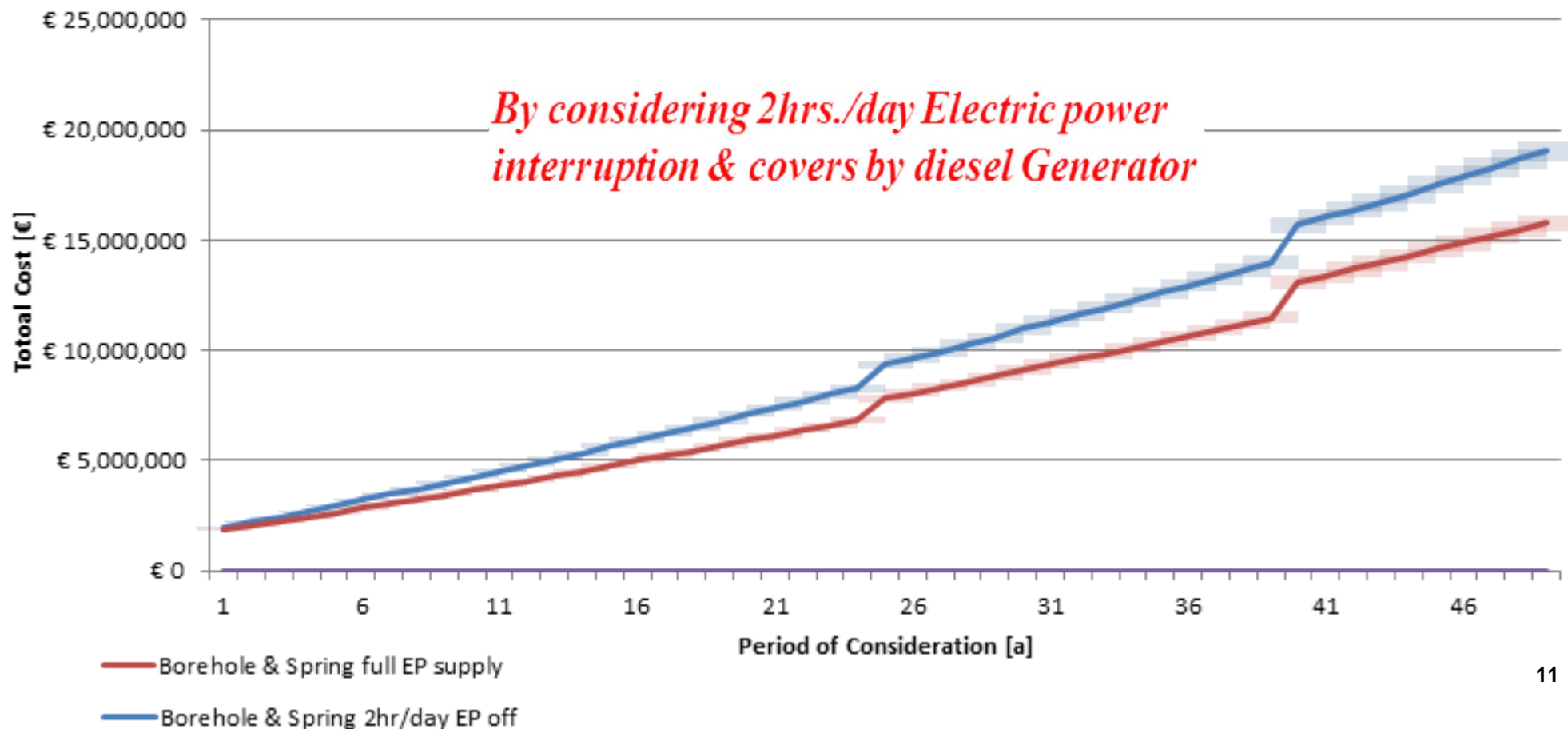


*By considering 24 hrs./day,  
7 days/week electric power*

# SPT\_ Electric Power Vrs Generator

	Borehole & Spring full EP supply	Borehole & Spring 2hr/day EP off
Σ Revenues	€ 0	€ 0
Σ O/M Costs	€ 11,830,359	€ 14,906,031
Σ Reinvestment Costs	€ 6,294,132	€ 6,559,828
Investment Costs	€ 1,645,254	€ 1,645,254

## Alternatives Cost-Behaviour





**University of Natural Resources  
and Life Sciences, Vienna**  
Department of  
Water, Atmosphere and Environment

***Thank You***