

building sustainability



a swiss brazilian exchange

Thursday, November 12th 2015
11:00 am – 19:00 pm
at the Expo Arquitetura Sustentável,
Expo Center Norte – São Paulo



Values, Principles and Goals

With the **Swiss** Resort, we want to show that our values are not limited to products, but can also be applied to developments with a deep and long lasting impact. **The dialogue with the local environment is essential.** Ideas and principles are not simply exported but used in local symbioses to strengthen the concepts, reflecting **Swissness** principles in a Brazilian environment.

Goals of the Swiss Resort:

- Preserving the environment through climate neutrality
- Enhancing local culture and customs through regional products
- Incorporating education into the project
- Creating a secure environment through social interaction
- Add value over many years

Region and access to the Swiss Resort São Roque

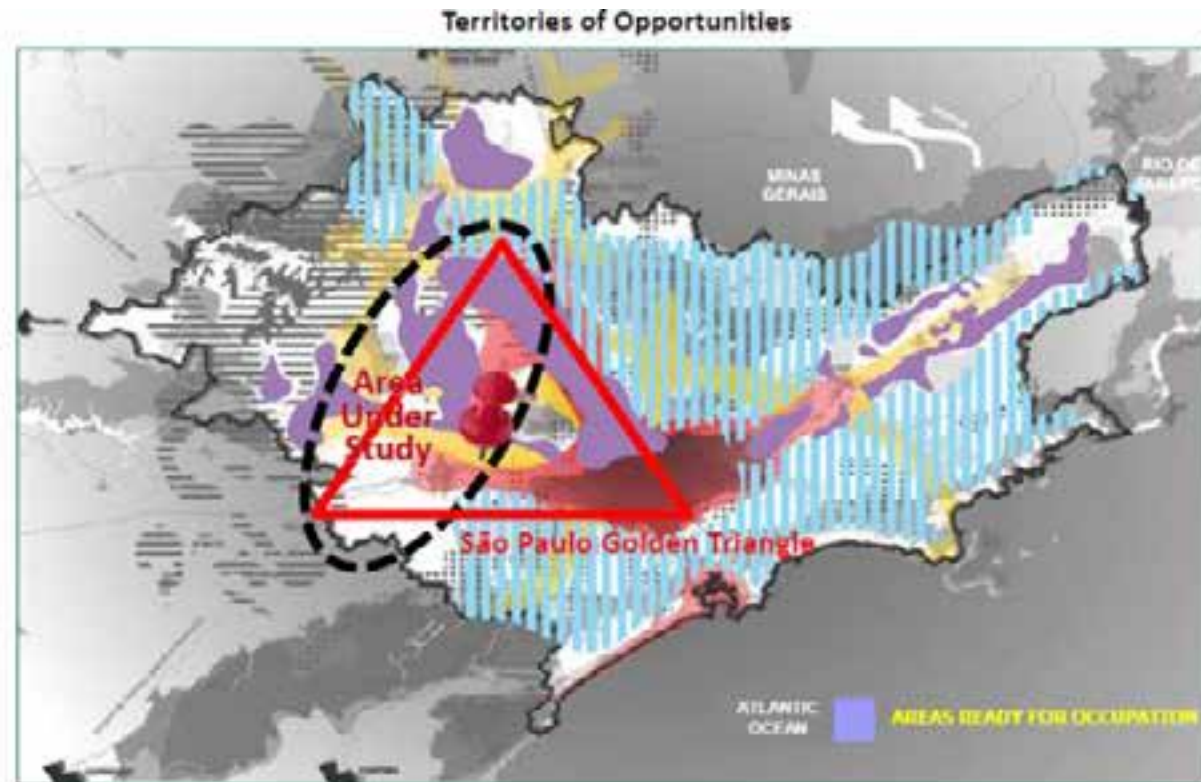


The **Swiss Resort** will be implemented in the municipality of São Roque, in the Green Belt of the city, far 66 km east of São Paulo. Accessed by Road Castelo Branco and Raposo Tavares, the municipality of São Roque occupies an area of 307 km² and has a population of 78.821 inhabitants.

São Paulo Macrometropolitan Area and the Golden Triangle

Golden Economic Triangle

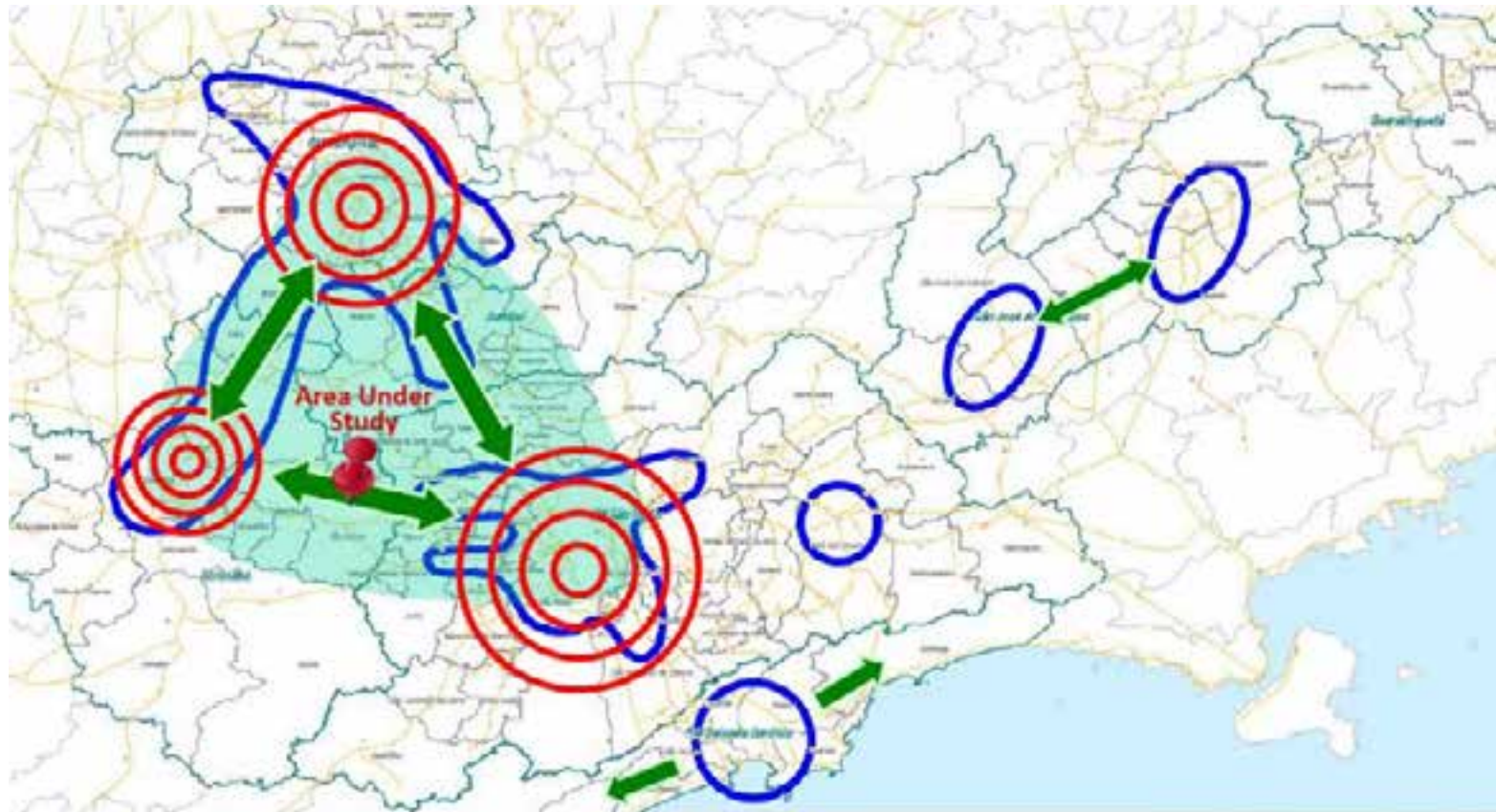
- The intersection of physical and territorial restrictions with areas of greater economic growth takes us to the evaluation of territories with a higher development trend.
- The largest areas ready for occupation correspond to the connections São Paulo-Campinas, Campinas-Sorocaba and Sorocaba - São Paulo, emphasizing the potential of the so-called Golden Triangle.



The Golden Triangle, has 26.6 million inhabitants and 8.5 million households.

The highest concentration of inhabitants between São Paulo - Sorocaba is in the region of Osasco.

São Paulo Macrometropolitan Area and the Golden Triangle



The urban development trend of the Macrometropolitan Region of São Paulo suggests the consolidation of the conurbation of microregions such as Sorocaba, Campinas and São Paulo. The spot under study lies in São Roque, between São Paulo and Sorocaba development hub.

São Roque

Shopping Hubs and Centralizations



Downtown São Roque concentrates shopping and service activities, emphasizing the existing hospitals and colleges, which create a local attractiveness for everyday consumer activities.

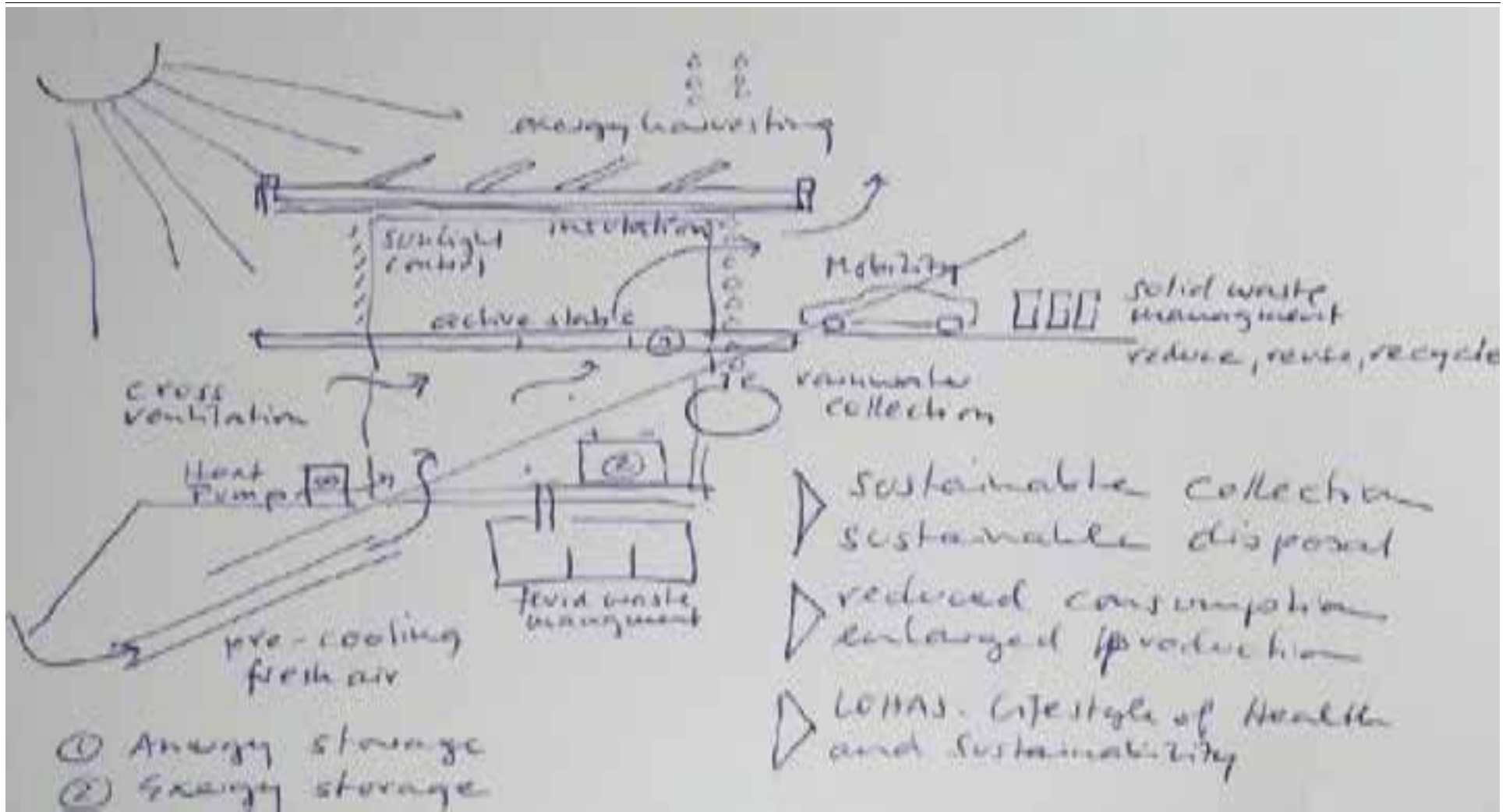
The nearest upscale shopping hubs to the Area under Study are located at the Alphaville Comercial Complex and Granja Vianna.

Masterplan

- A** A1 - Residências 200 m
A2 - Residências 150 m
- B** B1 - Residências 300 m
B2 - Residências 300 m
B3 - Residências 300 m
- C** C - Residências 200 m²
- D** D - Residências 200 m²
- E** Reforma - Entretenimer
- F** Reforma - Pousada, Clt.
- G** Reforma - Pousada



Sustainable Residences – Briefing for five Architects



House Portfolio – 250m² Medium House on (plot A1.10)



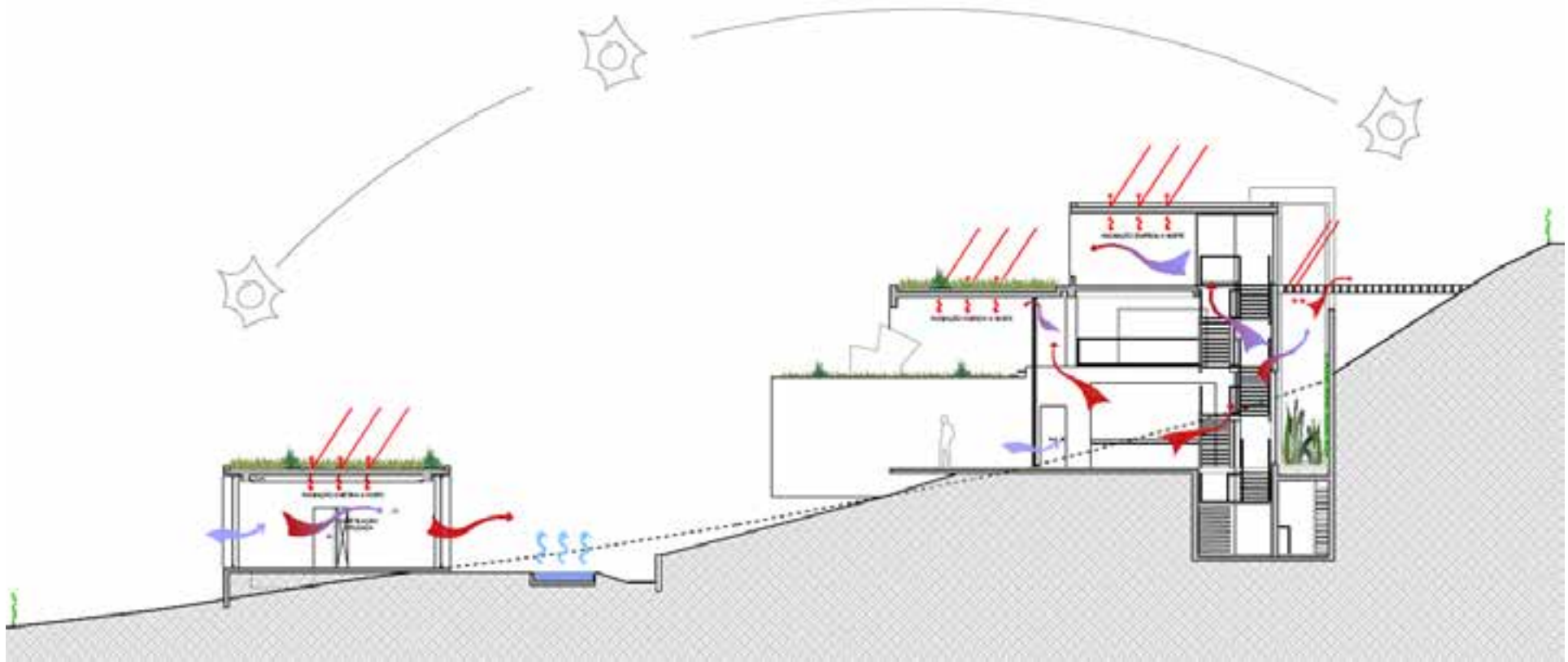
Visualisation_Archipart

House Portfolio – 350m² Villa in B1 (plot 1400m²)



Visualisation_Atelier O'Reilly

House Portfolio – 350m² Villa in B1 (plot 1400m²)

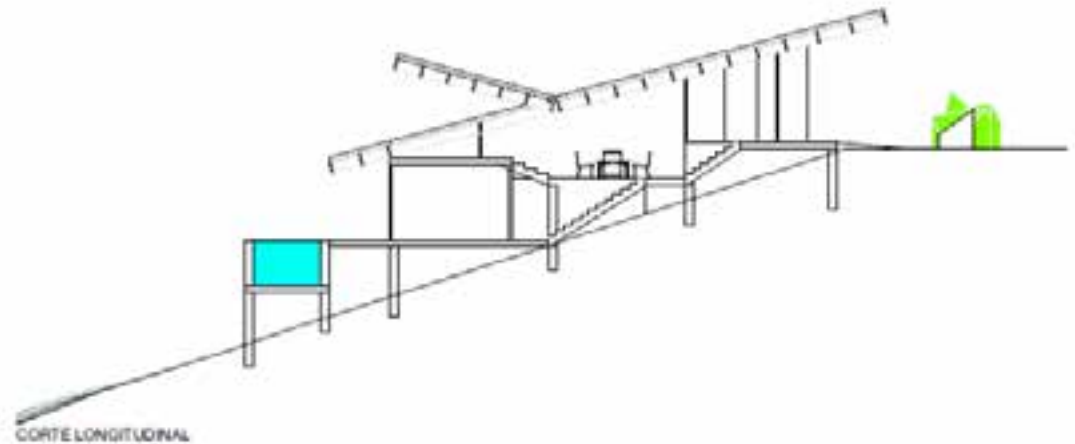
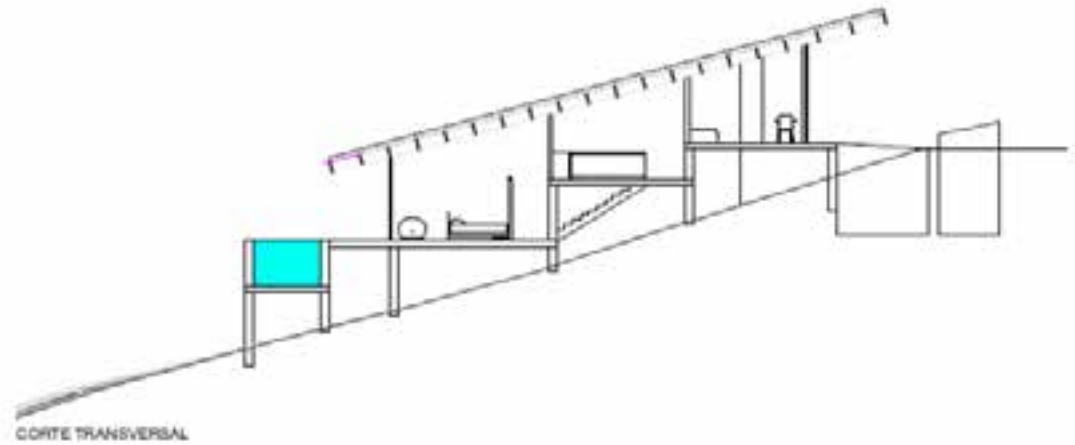
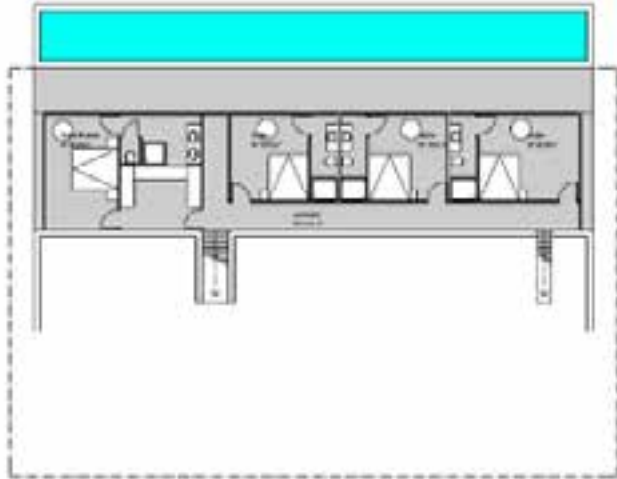
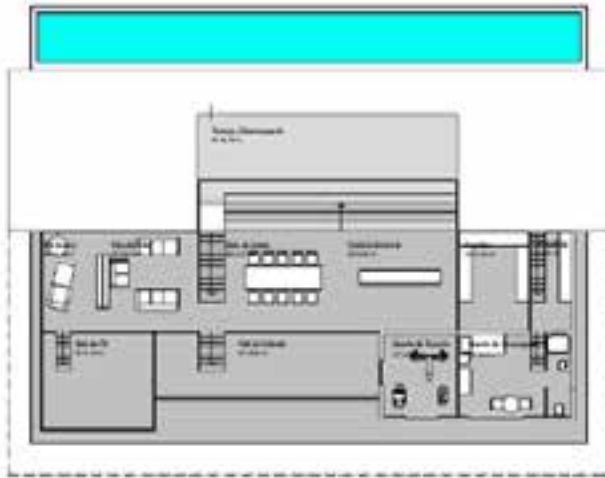


House Portfolio – 350m² Villa in B2 (plot 1280m²)



Visualisation_Skyline Development

House Portfolio – 350m² Villa in B2 (plot 1280m²)



Graphics_OOS

House Portfolio – 200m² Medium House on (plot B1.10)



Visualisation and graphic_INI Arquitetura

Energy Concept – Project Vision

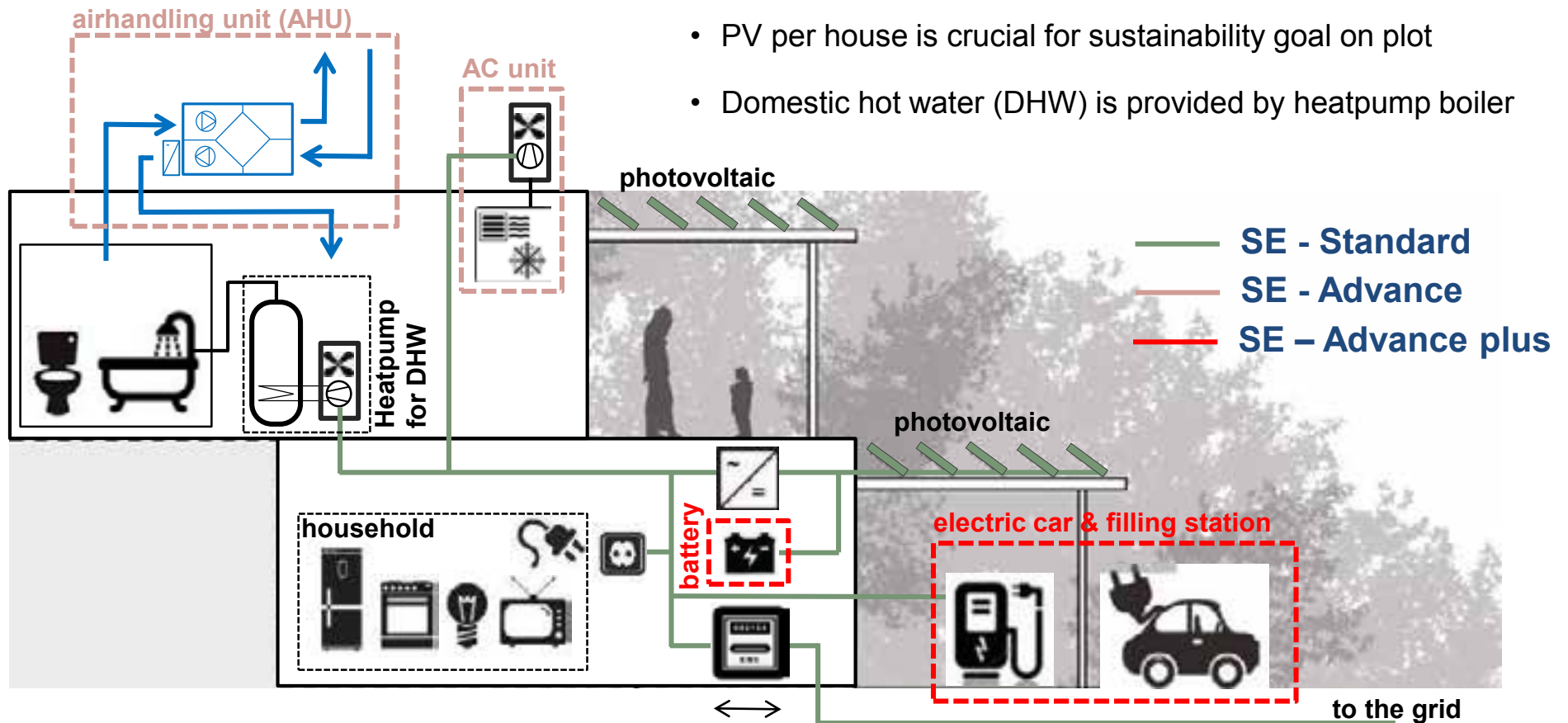
- The **Swiss** Resort São Roque aims at becoming a **carbon neutral** environment
- The project will generate and store its own energy with an **independent smart power system** with generator units in each residence, connected to the grid
- The moderate climate of São Roque requires only limited need for heating & cooling by **solar powered** heat pumps and slab cooling / heating
- **Cross ventilation** with potential to earth tunnel precooling is key to reduced energy consumption
- **Novel solutions** will be incorporated to allow the desired results as soon as such solutions become practical
- The project grows in phases from the beginning in **integrated clusters** responding to the market absorption

Energy Concept – Premises

- Average yearly house energy **consumption**: 4'000 kWh/y
- 100% of energy directly powered by the sun
- Main concept: KISS - Keep it simple
- One unique source of renewable energy only (PV photovoltaic)
- 50% of the building roofs necessary for energy **production**
- **Storage** in house batteries and reservoir; public grid as back-up only

Typical Energy concept – key facts on homes

- Appropriate natural ventilation, insulation and shading design for the houses is needed
- PV per house is crucial for sustainability goal on plot
- Domestic hot water (DHW) is provided by heatpump boiler

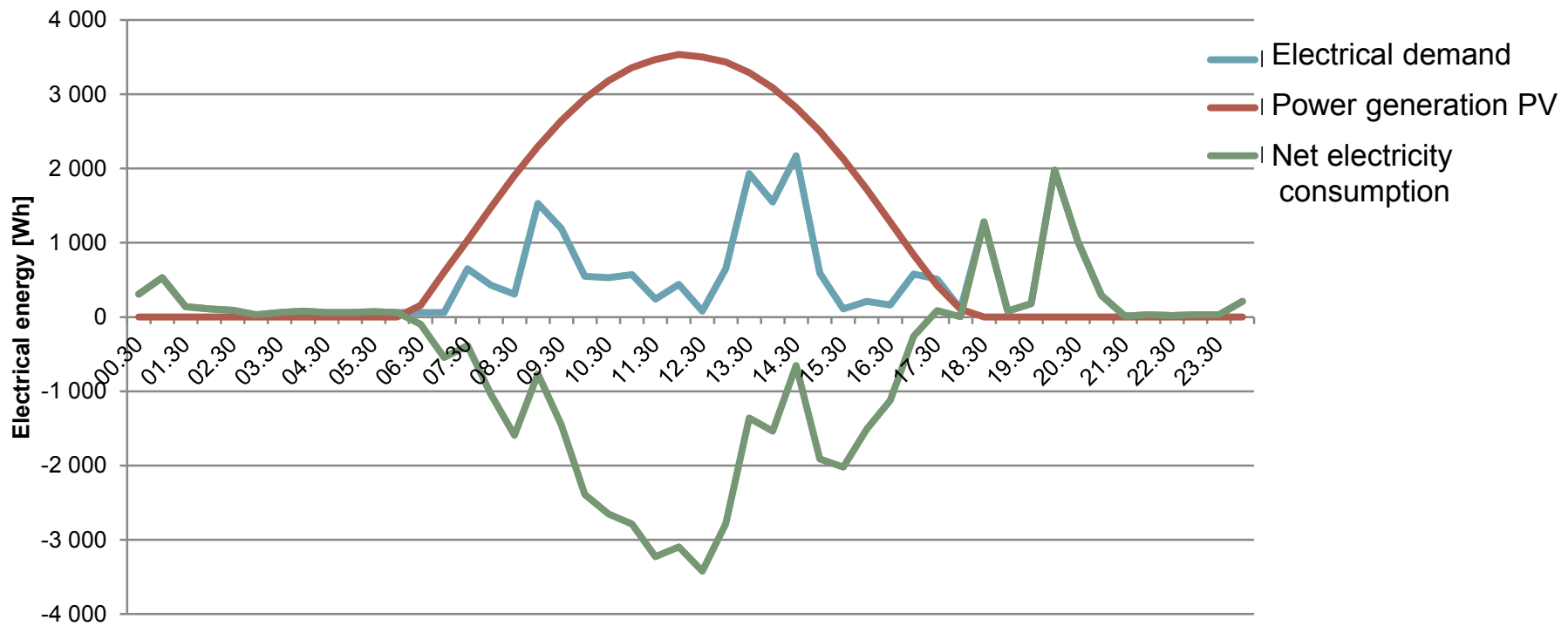


Flexible Energy Concept for each Home

- Power solutions based on customer choice:
 - ES-Basic** – Standard basic solution
(PV + heat pump)
 - **ES-Advance** – optional solution I
(PV + heat pump + air-conditioning)
 - **ES-Advance plus** – optional solution II
(PV + heat pump + air-conditioning + battery + electric car)
 -
- Energy solutions for plot (A) and houses (B) segregated and independent

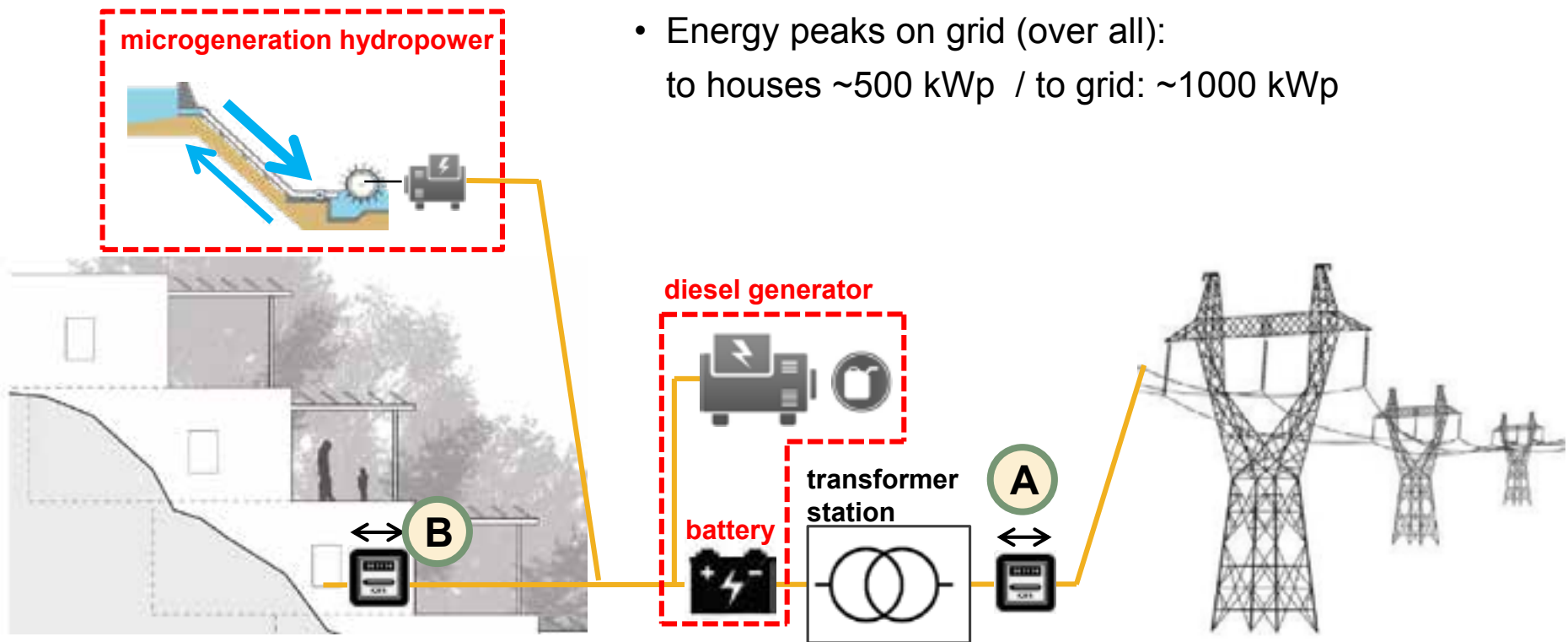
Energy concept – Demand & Supply

Electrical energy flow

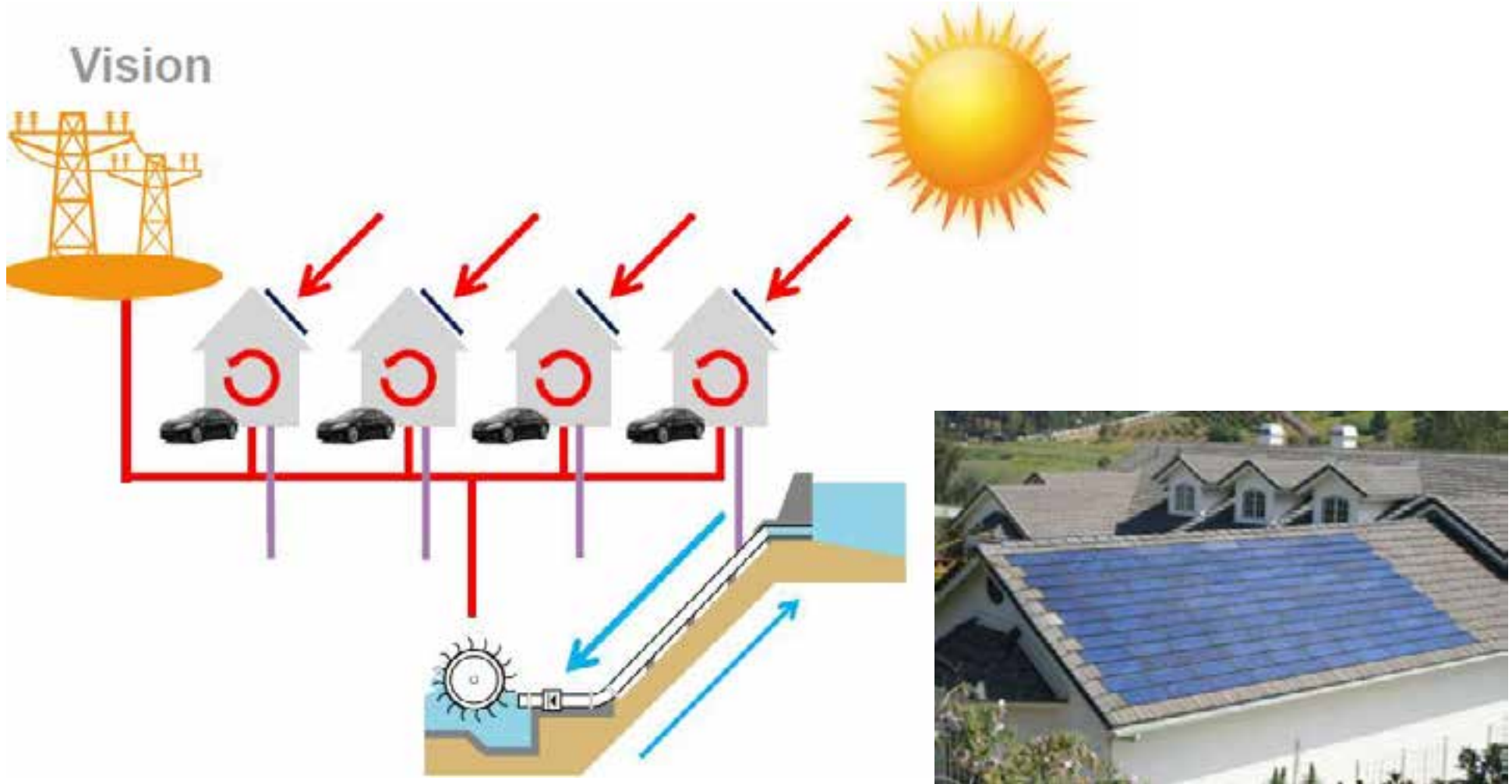


Energy concept – key facts on plot

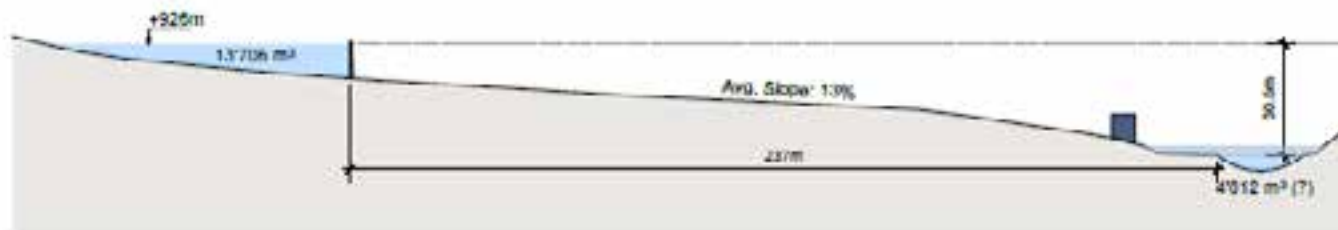
- public illumination is not part of the cluster power grid
- hydropower facility perform an educational roll
- Energy peaks on grid (over all):
to houses ~500 kWp / to grid: ~1000 kWp



Typical **Swiss** System for hydro power Storage



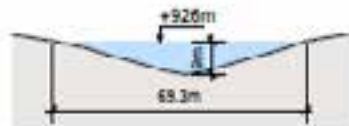
Reservoir as Hydro Power Storage Mini Pump Station



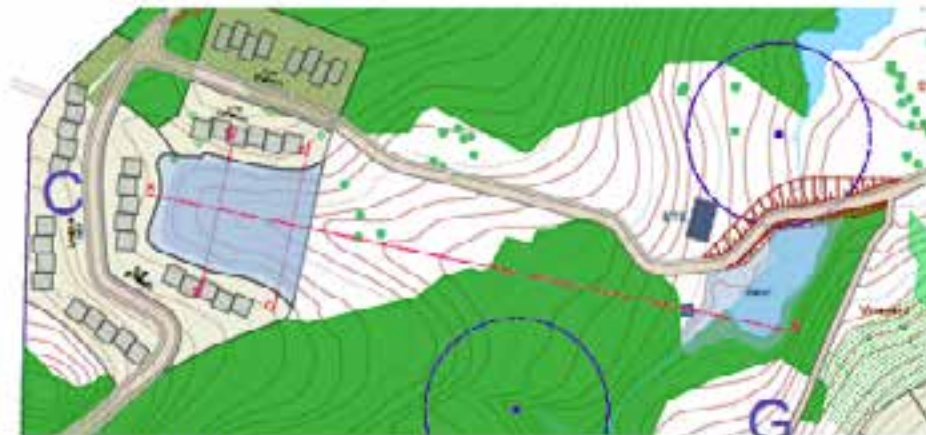
Longitudinal Section A-A (1:11000)



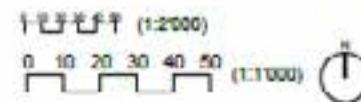
Cross-section B-B (1:1'000)



Cross-section C-C (1:1'000)



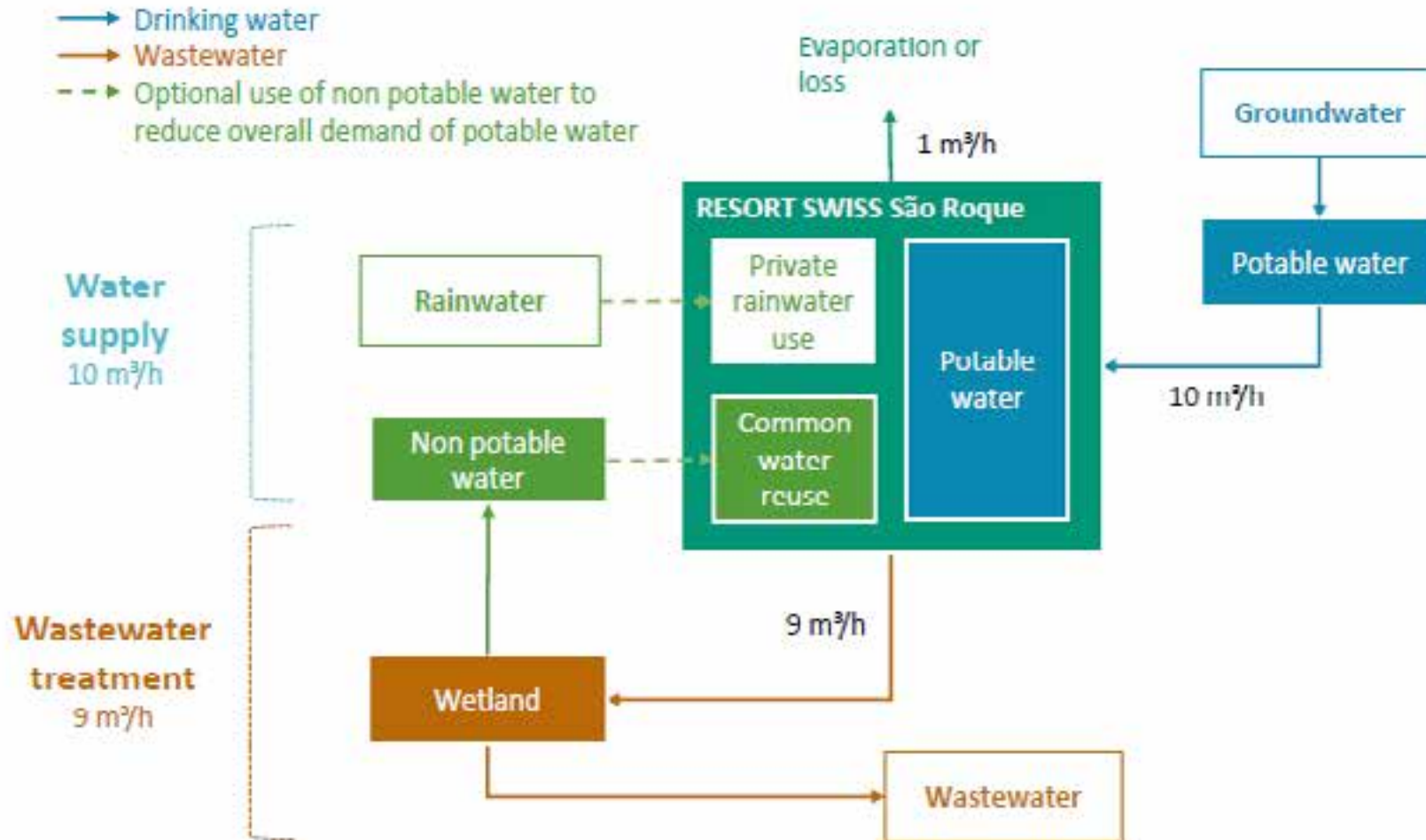
Masterplan (1:2'000)



Statisches Reservoir 3.5m Höhe

Page No.	Date	Scale	Author
001	12/01/14	1:1000	Veritas
Project Name: Electroplan			
Project No.: reservoir plan + sections			
Company: nueschdevelopment			

Water Cycle Concept



Domestic rain water collection

Use of rain water collected on private houses to reduce overall demand of potable water

- Toilet flushing
- Garden irrigation
- Car washing



Selection Criteria for waste water treatment


- Reliable operation
- Variable hydraulic load
- High effluent quality
- Minimized odor emission
- Economical (CAPEX /OPEX)
- Available in Brazil
- Without attracting attention
- Representing high quality standard (aspirational)
- Consumer Acceptance
- Environmental Agency Acceptance

Water and waste water concept

Previous report

No.	Water supply	Wastewater disposal	Technical Viability	Costs	Environmental Impacts	Environmental Agency Acceptance	Consumer Acceptance
1			Ok	\$\$\$	-	+	+
2			Ok	\$\$\$	-	++	+
3	Groundwater		Ok	\$\$\$\$\$	--	++	++
4			Ok	\$\$\$\$\$	--	+	+
5			Ok	\$\$\$\$\$	--	+	+
6	SABESP		Ok	\$\$\$\$\$\$	---	+	++


 **Concept 2** - Best option

 **Concept 1** - Should be considered in the next steps depending on the Environmental Agency evaluation

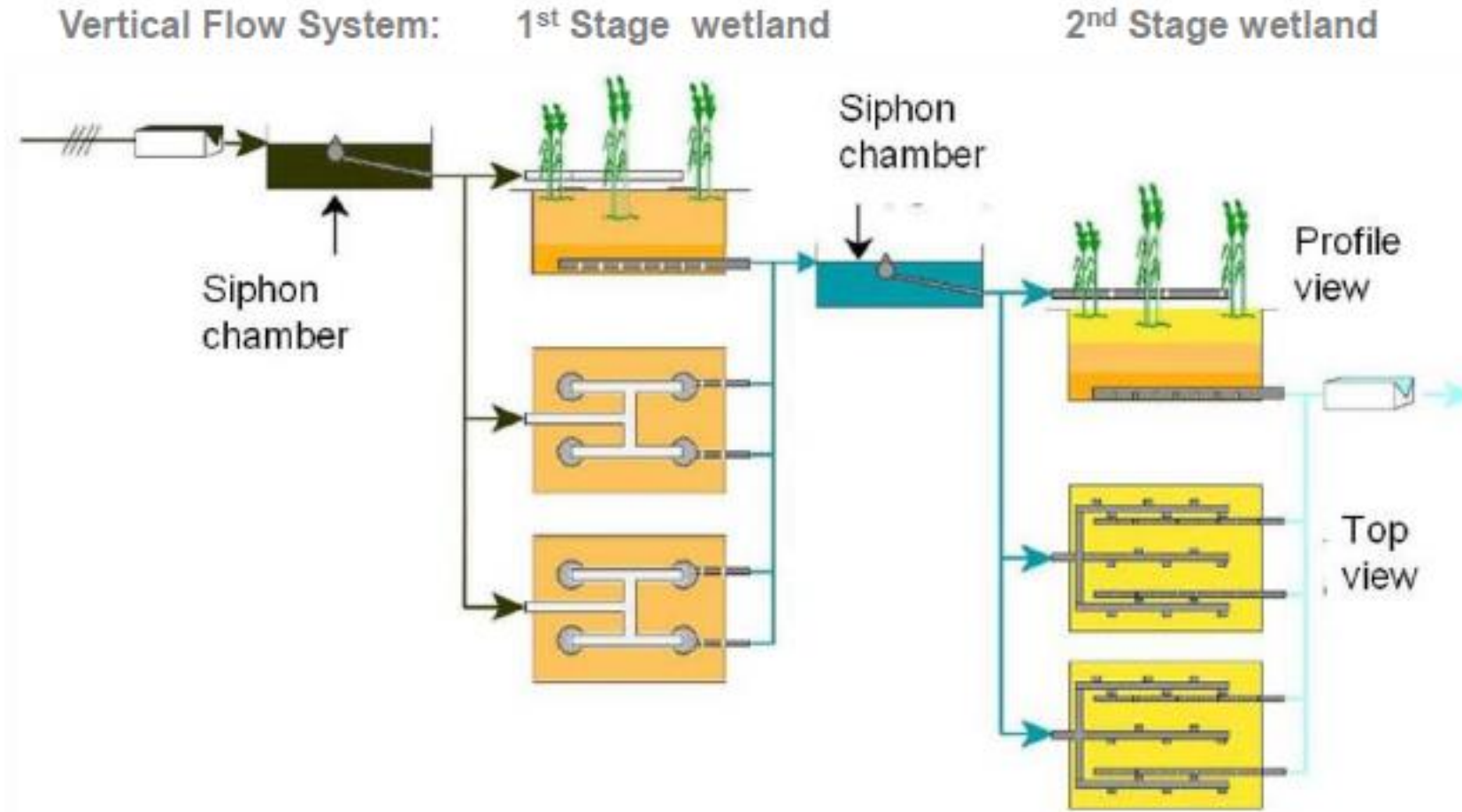
Technical solutions for waste water

Technology	Technical Viability/ Reliable Operation	Investment Costs	Operational Costs	Land use	Availability (Brazil)	Consumer Acceptance
Activated Sludge	--	\$\$\$\$	\$\$	+	✓	+/-
UASB	--	\$\$\$	\$\$	+	✓	+/-
Constructed Wetland (CW)	+	\$\$\$	\$	-	✓	+
Living Machine®	+	\$\$\$	\$	-	✓	++
Reverse Osmosis	-	\$\$\$\$	\$\$\$	++	✓	-



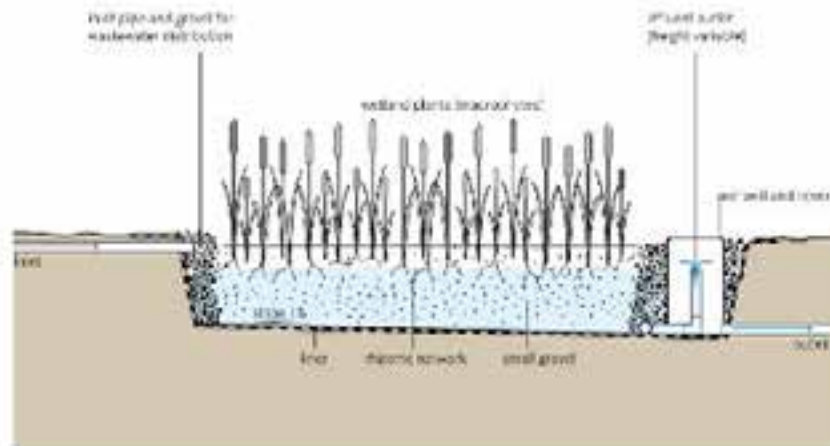
 **Constructed Wetland/ Living Machine** – Best option

Constructed Wetlands – Concept



Constructed Wetland – Preliminary Design

Households	180
PE	1230
Water use	300 L/PE/d
Daily flow	890 m ³ /d
Required area	Approx. 4'000 m²
Cost estimation	CAPEX: R\$ 2'000'000 / OPEX: R\$ 25'000/year



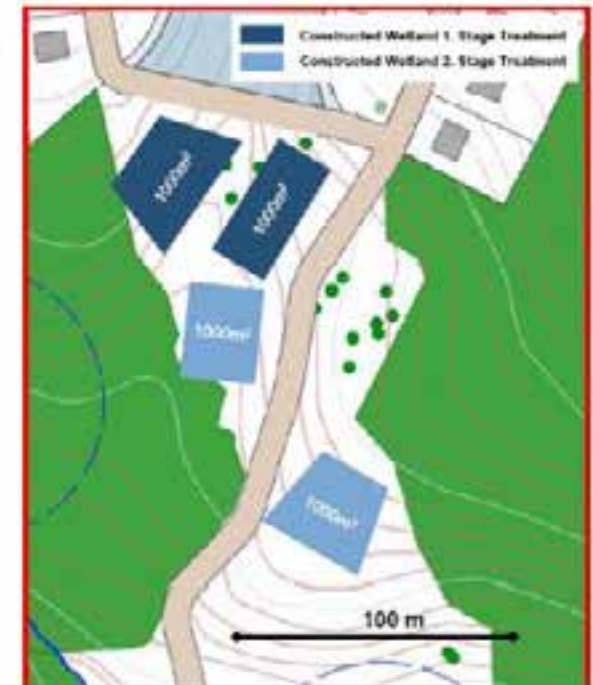
CW - Locations

Location of CW



Location of CW Option 1 (red)

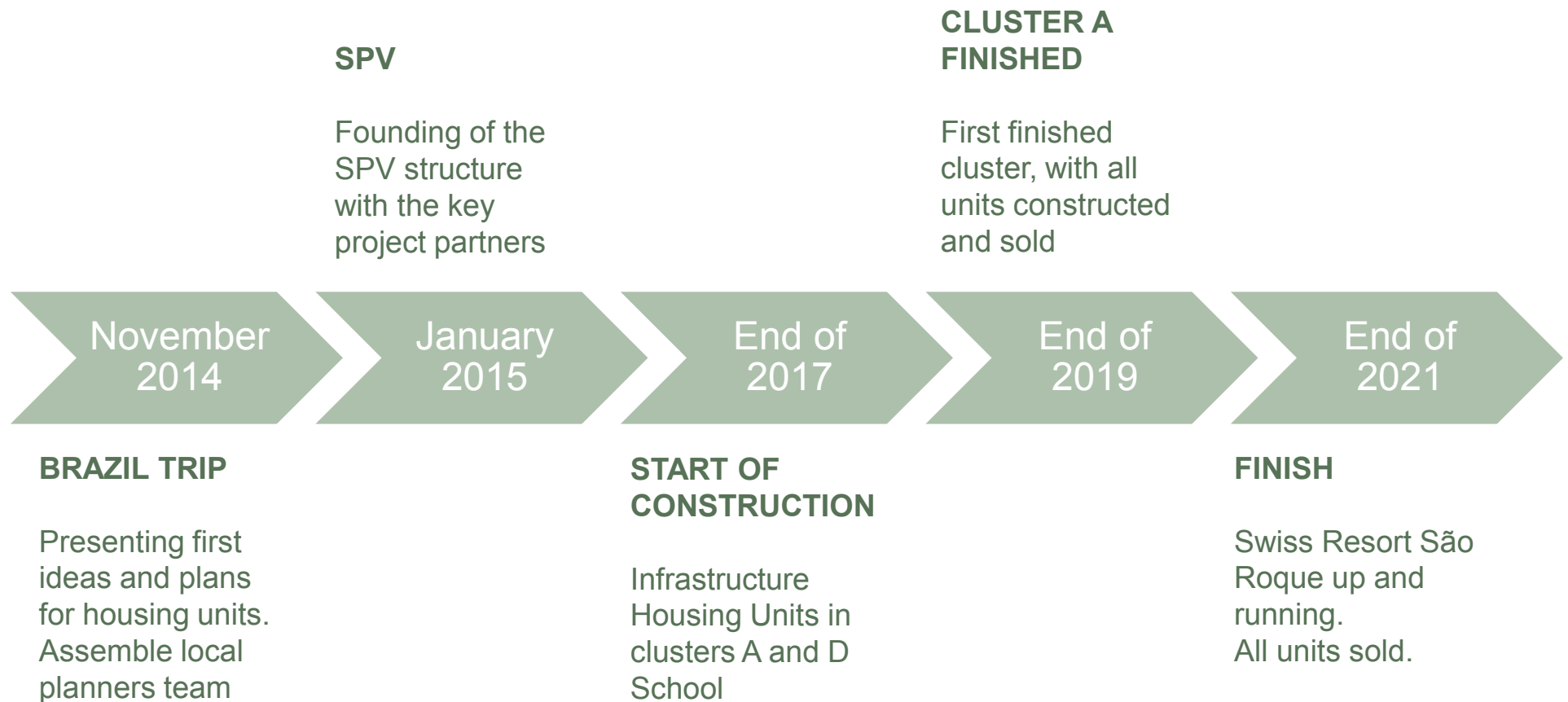
- Embedded in valley, behind lake
- Wastewater flow from 1st Stage treatment bed to 2nd stage treatment bed
- Gravity flow - no energy use
- Effluent re-use for irrigation around Pousada



Quality Monitoring

	Surface water	Soil	Reuse (Non-potable water)	Reuse (Drinking water)
Discharge Standards	Decree n° 8.468/1976 Clause. 18	Not available	Not available	Not available
Parameters	24 parameters	Nitrate. pH. virus. fecal coliform (ABNT NBR 13969:1997 Item 6)	Turbidity. fecal coliform. total dissolved solids. pH. residual chlorine (ABNT NBR 13969:1997 Item 5.6) Inorganic compounds and metals Temperature. color. BOD. DO (usually monitored)	The same parameters presented to reuse in non-potable purposes. The water potability must be checked in water treatment plant.
Sampling Frequency	Once a month (defined by CETESB)	Once every three month (ABNT NBR 13969:1997 Item 6)	Once a month (defined by CETESB) Residual chlorine – every day	The same frequency presented to reuse in non-potable purposes
Annual Costs	R\$ 120,000	R\$ 37,000	R\$ 117,000	R\$ 117,000

Timeline





Swiss Resort São Roque

Sustainable residential project

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