



SOLTEQ ENERGY **FreshWaterMill**

Wind driven desalination: An alternativ for coastal araes.
First project in the world: Johnny Cay – Colombia



One Windmill for Electricity and Freshwater



The new SolteQ Freshwater-Mill

Features:

- 100% sustainable
- low cost price
- fresh water from:
 - sea water
 - brackish water
 - waste water
- electricity from excess energy

Locations:

areas with need for fresh water with

- ✓ sufficient wind
- ✓ non-drinkable water as source

Such as

- Islands
- Tourist resorts
- Delta's
- Coastal areas
- Golf courses



SOLTEQ ENERGY **FreshWaterMill**



The new SolteQ Freshwater-Mill

Features:

Capacities (depending on wind conditions)

50 m³/day – 1.000 m³/day (almost continuous)

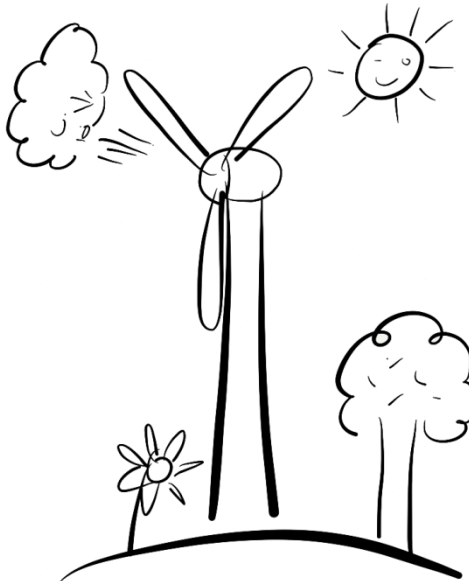
0 – 80 kW electricity (or more, if needed)

Also systems with more power possible, if desired



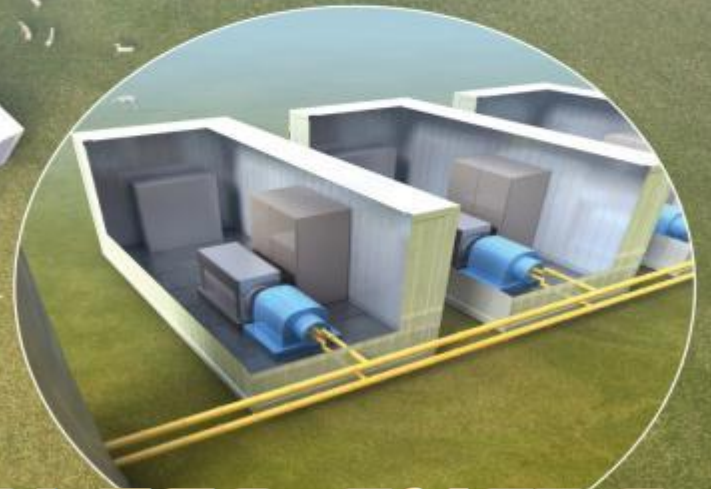
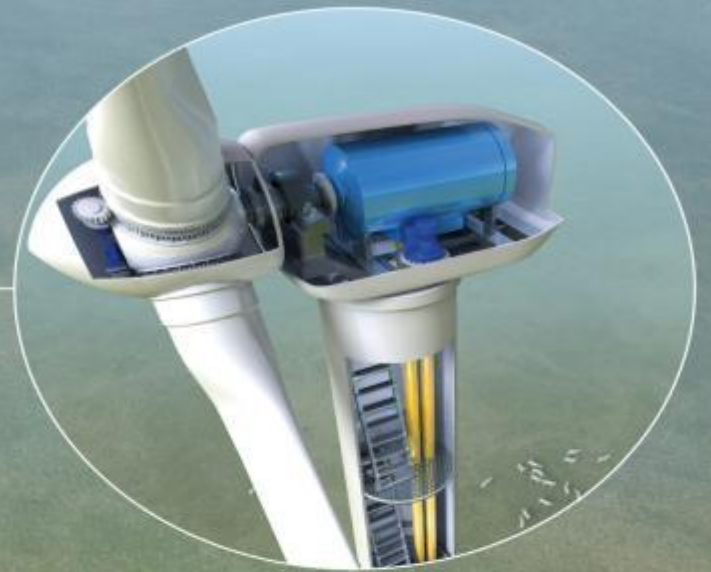
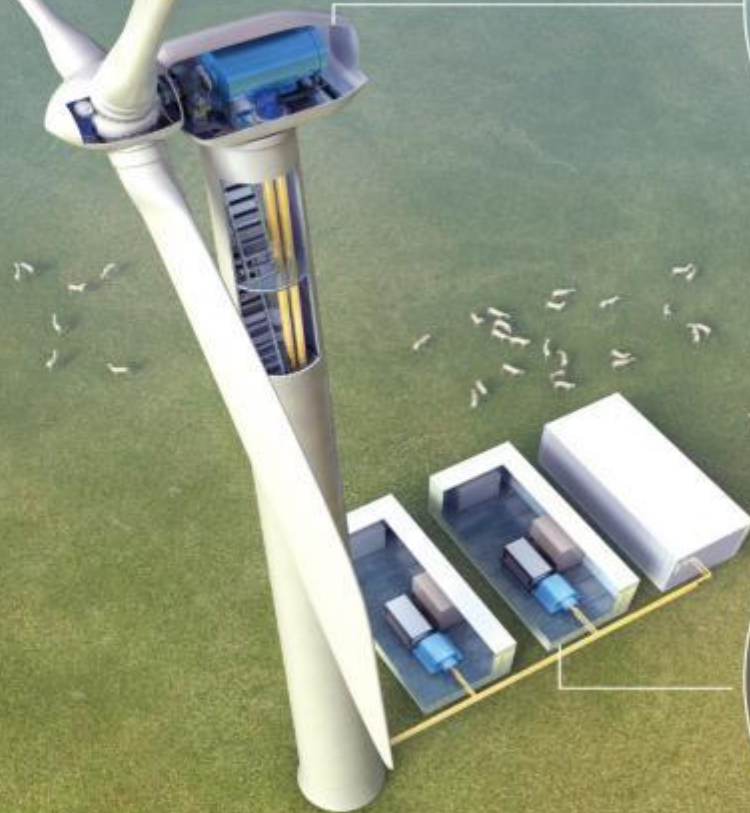
Saltwater desalination with SolteQ-Hydro-Technology

No diesel or external electric energy needed
Only driven by wind
For nearly ZERO costs



Clear drinking water directly from the wind

**Without intermediate energy, and this way
with maximum efficiency and
clear water production.**



SOLTEQ ENERGY
FreshWaterMill

SolteQ-Wind Energy

... the next generation !

Water is more than gold

The human can exist lifelong without gold and diamonds, but not only one day without water.



The water reservoir of the earth consists 97% salt water and only 3% fresh water.

From this 2% are fixed in the polar ice capes.

So only 1% can be used.

Advantages in comparison with present methods:

1. **98 % efficient use of the wind energie**
2. **Very high efficiency**
3. **Without intermediate energy**, such as electricity with generators to drive electric Pumps
4. **Low service and maintenance**, nearly limited to the osmosis membrane
5. **System works full autarcic** – to place everywhere , where freshwater is needed
6. **Statically very solid**, like a buoy, because no weight in the head (nacelle)
7. **Long lifetime of the components**, there are no wearing parts, except Osmosis membrane
8. **Extremely low operational costs**
9. **Every power class easy to realize**
10. **SolteQ-Hydro-WES are very silent**
11. **Resistant against sand and dust**, so absolutely suitable for deserts
12. **Made for Offshore conditions**



Example for financing and payback time

| Baie de Joao d'Evora | | | |
|---|-------------------|------------------|--------------------|
| Water | 2016 | 2017 | 2018 |
| m ³ /day | 192 | 196 | 196 |
| m ³ /year | 70.080 | 71.540 | 71.540 |
| €/year (€6/m ³) | € 420.480 | € 429.240 | € 429.240 |
| Cost of FreshWaterMill | € 275.000 | | |
| RO 200m ³ (capable for 400m ³) | € 350.000 | | |
| FWM + RO | € 625.000 | | |
| extension 100 m ³ /day | | € 50.000 | € 50.000 |
| Operations | | | |
| Cost investment | € 625.000 | € 50.000 | € 50.000 |
| Operations + control + 1 visit | € 40.000 | € 40.000 | € 40.000 |
| Total costs | € 665.000 | € 90.000 | € 90.000 |
| Cost of Water | € 420.480 | € 657.000 | € 876.000 |
| Rest Investment | -€ 244.520 | | |
| Profit | | € 567.000 | € 786.000 |
| Accumulated loss/profit | -€ 244.520 | € 322.480 | € 1.108.480 |

Payback time:

FreshWaterMill: Amortisation after 7.8 months !

FWM + RO: Amortisation after 18.2 months !

PROFIT after: 17,6 months or less than 1,5 years !



No Generator

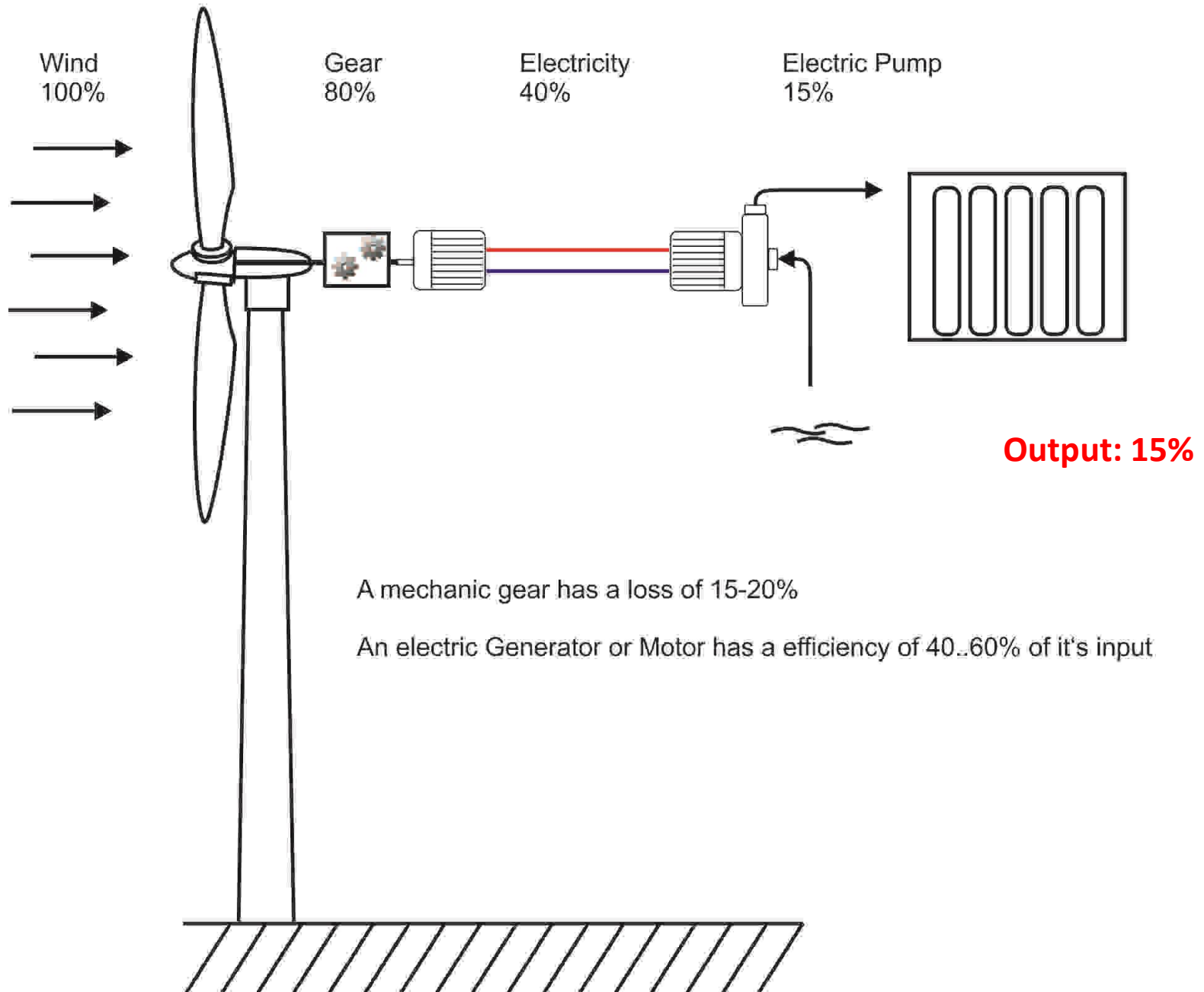


No Gear

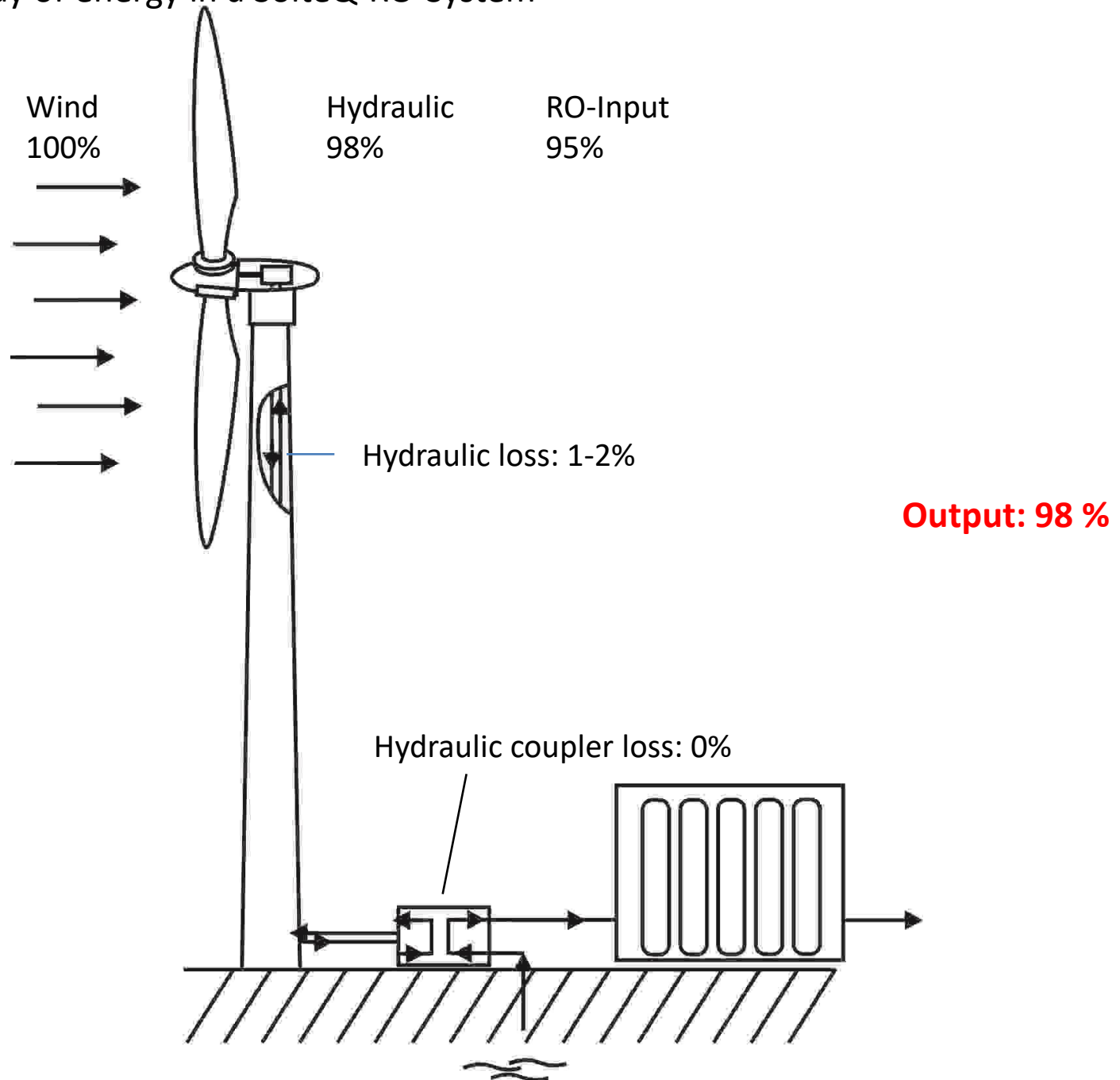
No losses !

Total way of energy in conventional systems

Remaining Energy



Total way of energy in a SolteQ-RO-System





Reverse Osmosis

For the process of reverse osmosis a pressure of 60..80 bar is required. Pressure is the most expensive kind of energy, because the production is by conventional way very ineffective.

The conventional way:

1. Generating of electricity from the wind:

Effectivity ca. 60%

following:

2. Pressure from electricity:

Effectivity ca. 40% (of the previous 60% !)

-> Total effectivity of the chain (from wind/rotor to pressure:

only 15..20%

(estimated)



Effectivity SolteQ-Hydro-Wind-Energy-System:

On this way the pressure will be generated directly from the wind and rotorblades.
The efficiency is according to the drive system, no other components are involved.

The total efficiency of a desalination system with a SolteQ-WES is

98%

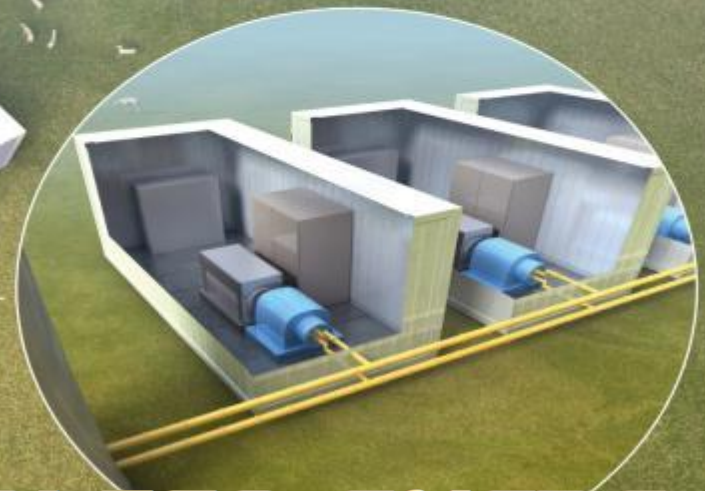
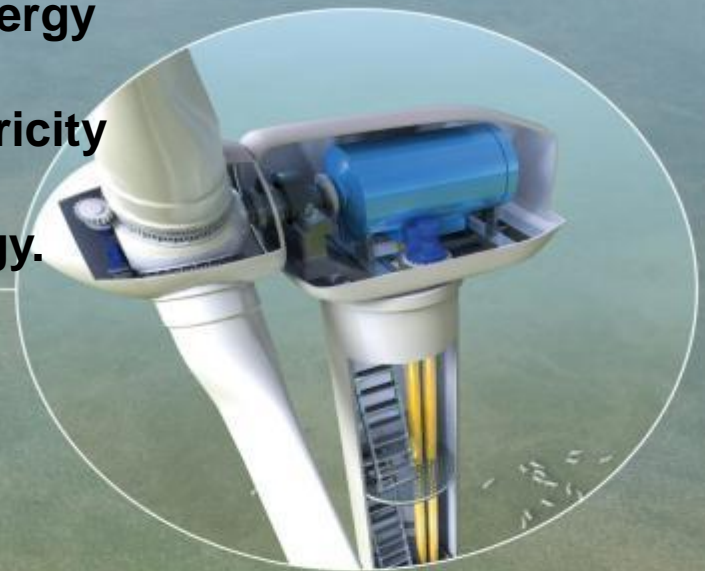
Clear drinking water directly out of windenergy

Without any intermediate energy, like electricity
or fossile stuff.

-> Maximum efficiency from the wind energy.

How that ?

Look at here:



SOLTEQ ENERGY
FreshWaterMill

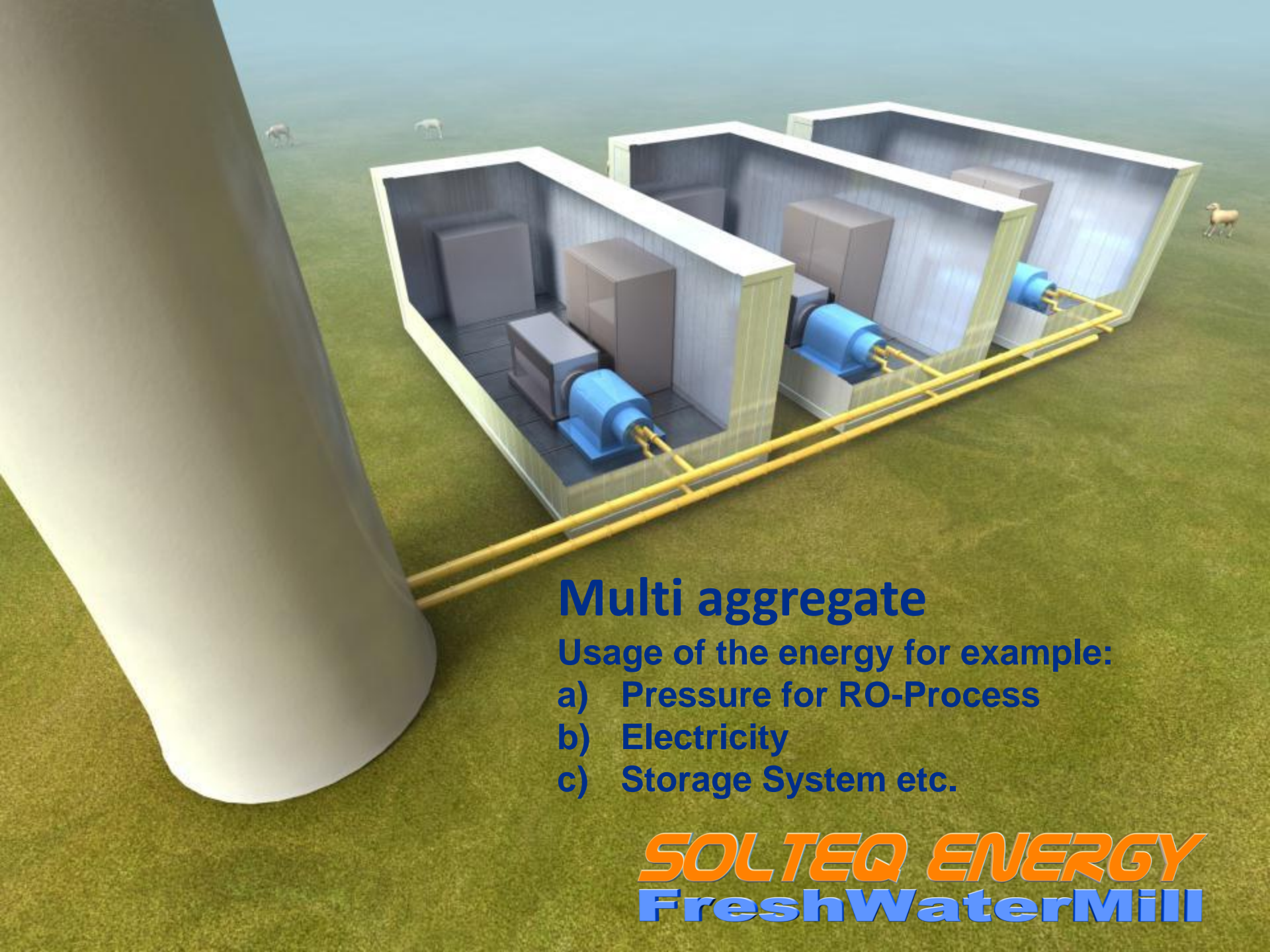


100% Windenergy

**99% transmission by
hydraulic circuit**

**Direct use of the pressure
Oil/Fluid-Pump/Saltwater-Pump
Total efficiency of the system = 98%**

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FreshWaterMill



Multi aggregate

Usage of the energy for example:

- a) Pressure for RO-Process
- b) Electricity
- c) Storage System etc.

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FreshWaterMill



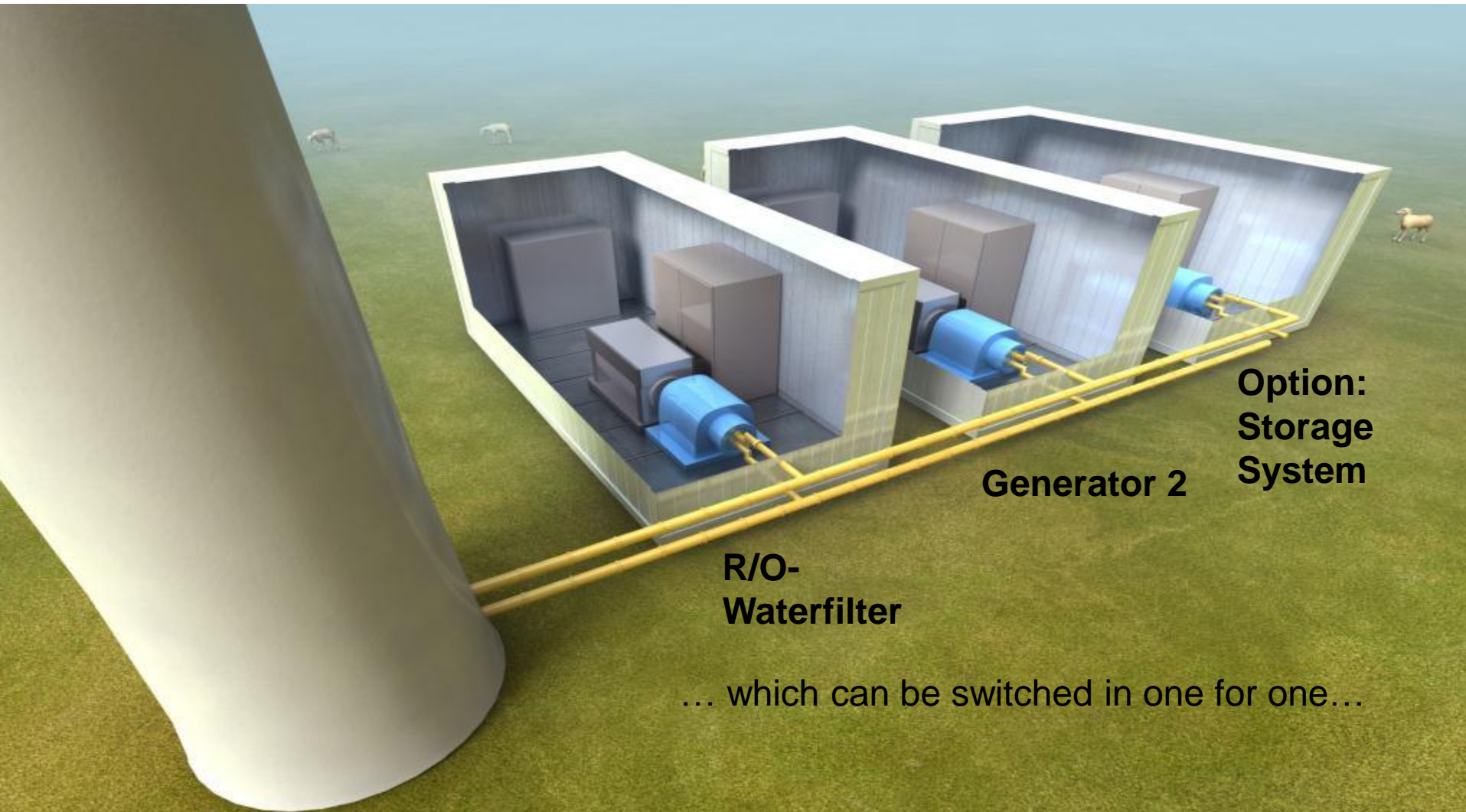
In the nacelle
there is left only a
pump and small
components,
which are
resistant against
sand and dust

All technic is here!

Teh containers are
hermetically
complete close and
safe against sand
and dust.

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FreshWaterMill

The Energy can be forwarded to three generators for water, electricity...



R/O-
Waterfilter

... which can be switched in one for one...

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FreshWaterMill

... or the energy can
supply several
independend
technologies, like:

1x

All with one Windmill!

+

+

+



Electricity

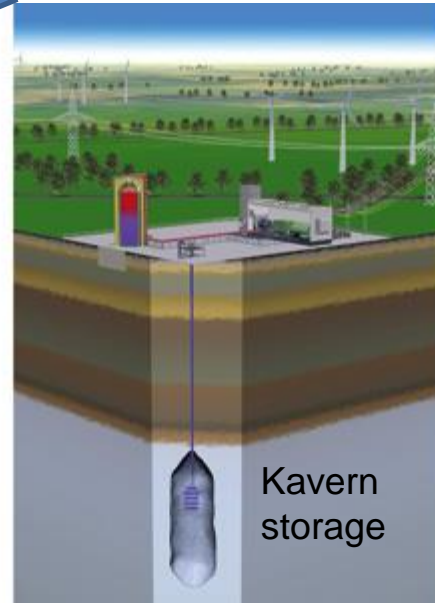


Reverse
Osmosis



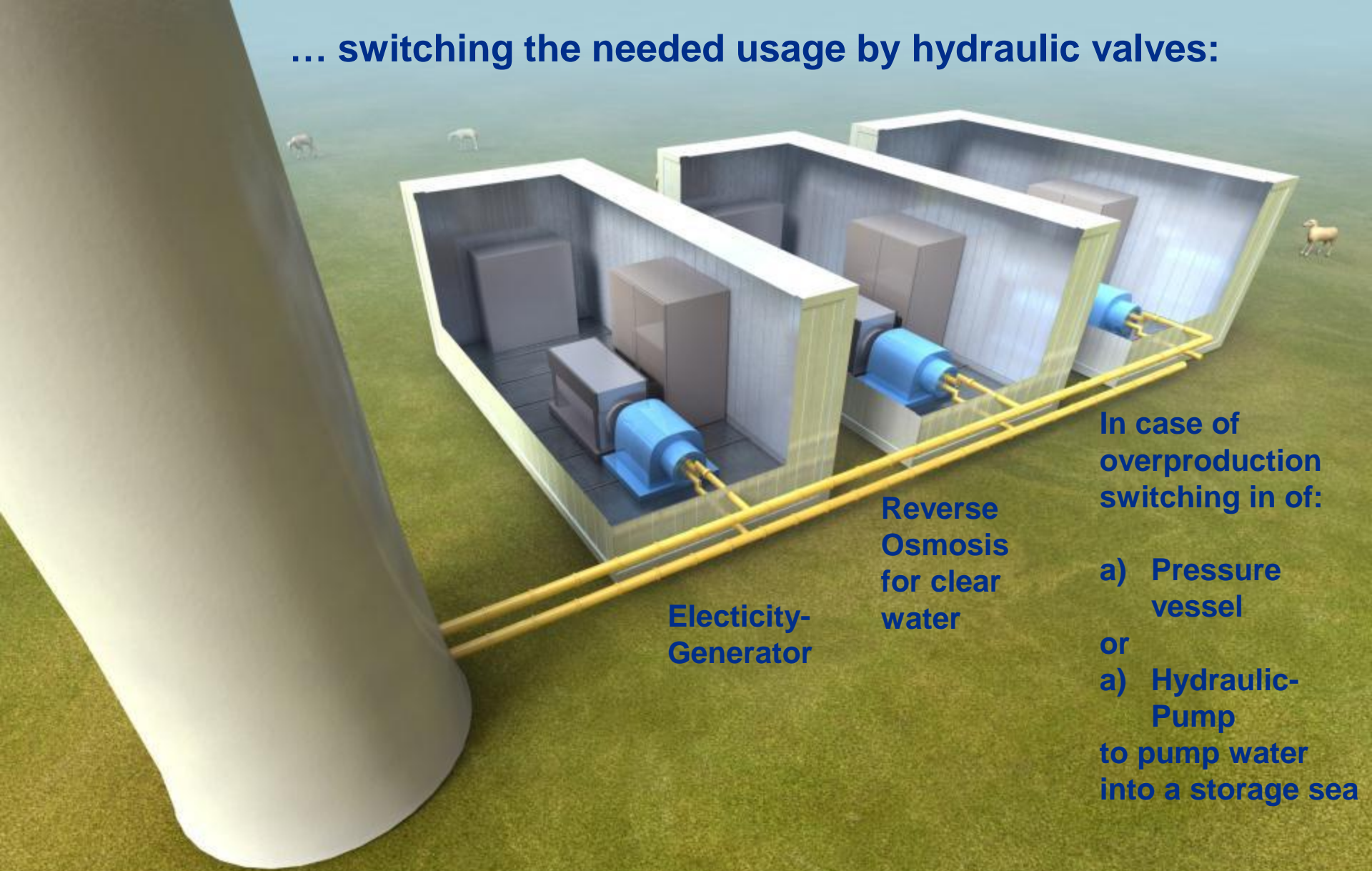
Pressure vessel for
5 hours storage

CAES
Compressed Air
Energy Storage



Kavern
storage

... switching the needed usage by hydraulic valves:

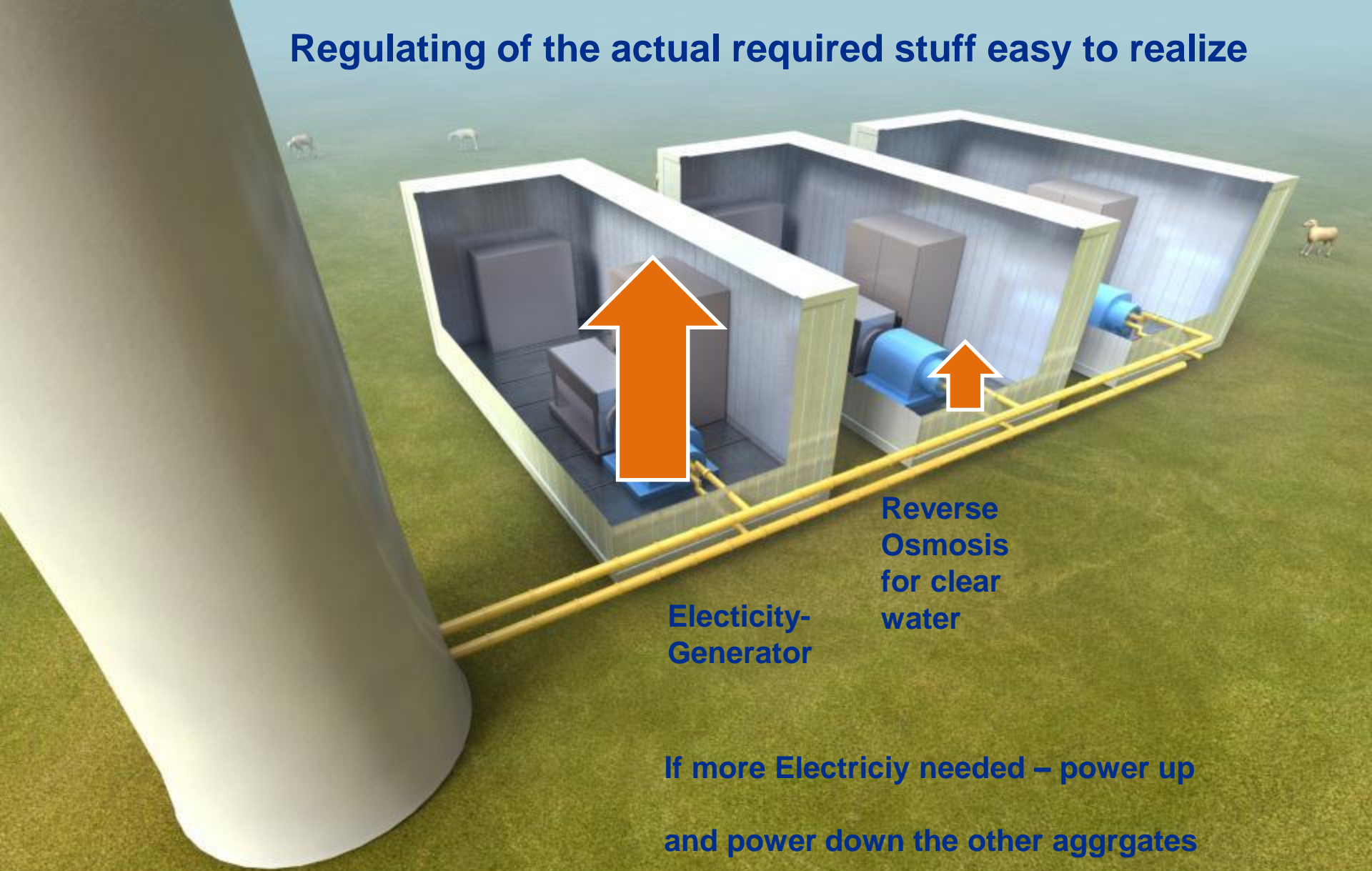


In case of
overproduction
switching in of:

- a) Pressure vessel
- or
- a) Hydraulic-Pump
- to pump water into a storage sea

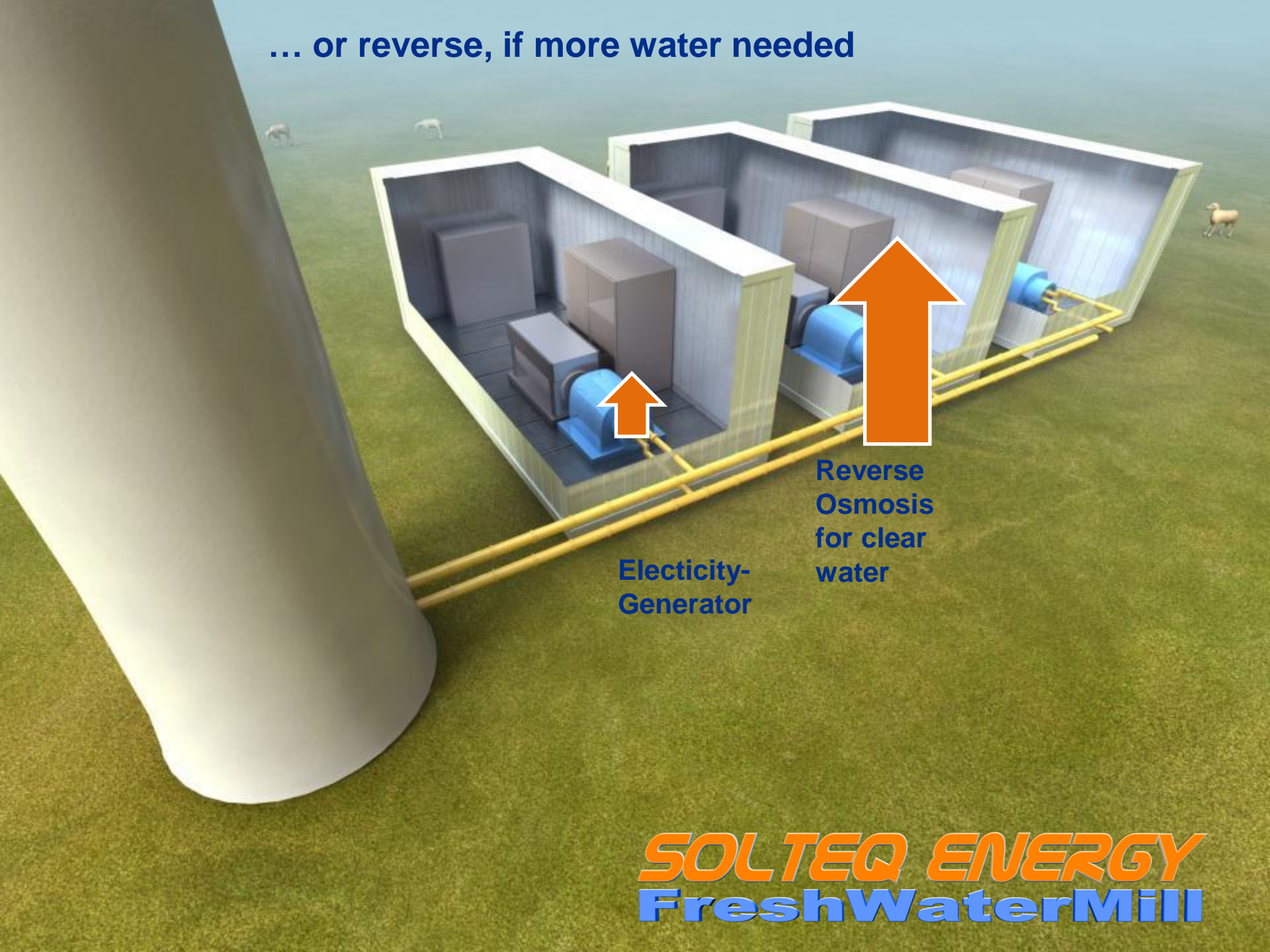
SOLTEQ ENERGY
FreshWaterMill

Regulating of the actual required stuff easy to realize



SOLTEQ ENERGY
FreshWaterMill

... or reverse, if more water needed

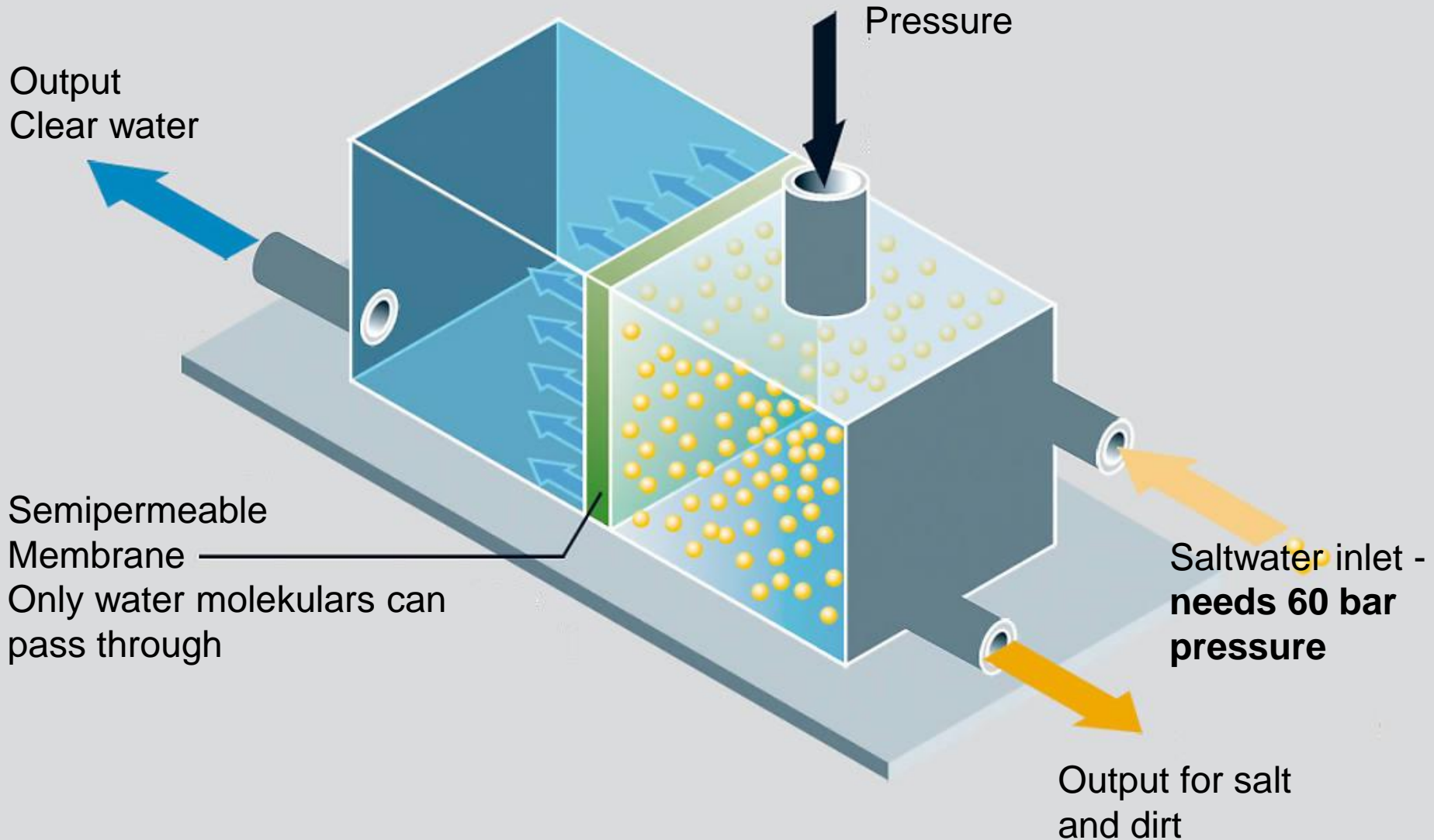


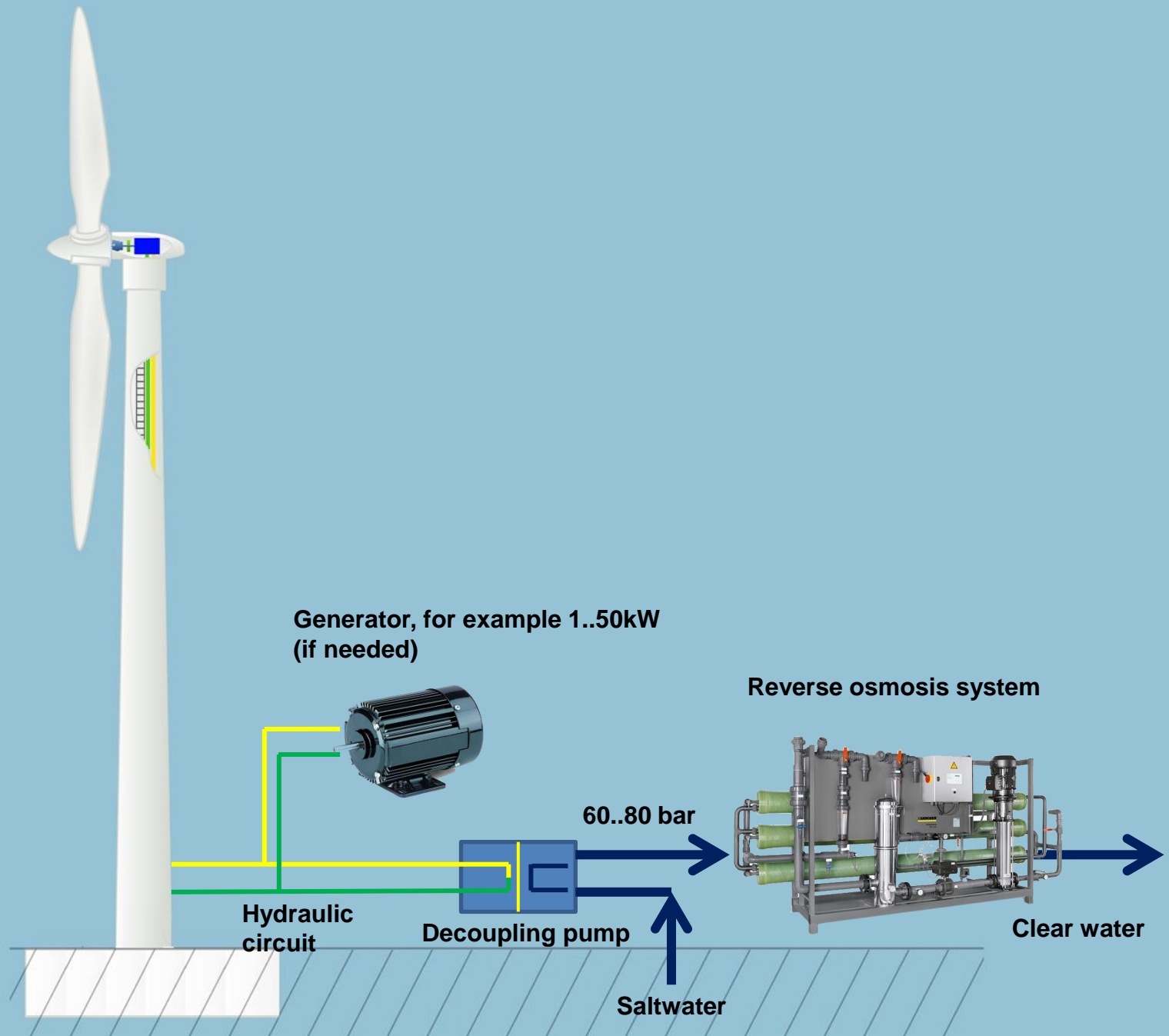
Electricity-
Generator

Reverse
Osmosis
for clear
water

SOLTEQ ENERGY
FreshWaterMill

Prinzipal of Reverse-Osmosis





SOLTEQ ENERGY

FreshWaterMill

The new Revolution !





Delivers Fresh Water and Electricity

- for free -

Total supply for islands, coastal and rural areas

*Free Freshwater & Electricity
with one Windmill*

...and let the fossils rest in peace



Reverse Osmosis



+

Electric Generator



Battery Storage



Photovoltaic
(Hurricane safe)

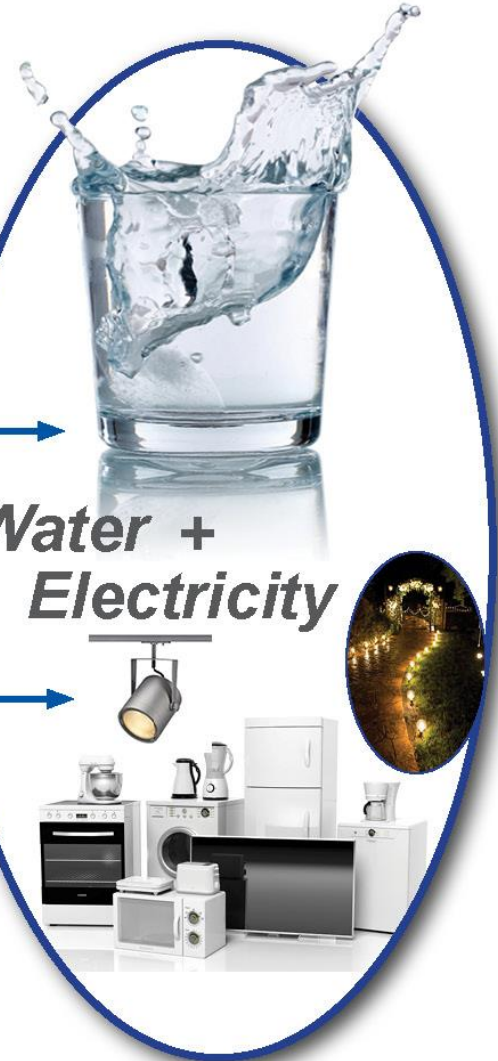


Free Freshwater & Electricity

Driven only by wind

- No Grid, no Diesel required -

Water + Electricity



FreshWaterMill v 2.0

Standard version



FreshWaterMill v 2.0

The HINGE TOWER



FreshWaterMill v 2.0

The HINGE TOWER



The new SolteQ Freshwater-Mill with Hinge Tower

1. Easy and cost safe installation

The complete Tower will be installed on floor level and can be erected

2. Hurricane safe

When hurricane is expected, the tower can layed down and is safe

3. Easy maintenance

The tower can layed down for service and maintenance works.

**Our first Pilotproject:
Island Johnny Cay (Columbia)**

**350.000 Tourists per year
Will be supplied by a SolteQ FreshWaterMill**

with

**Water ($12.5\text{m}^3/\text{day}$) and
Electricity (15kW-Generator)**



Production of Water + Electricity

Hydraulic
windmill

Electricity

Fresh Water

Reverse osmosis system

Hydraulic
circuit

Decoupling pump

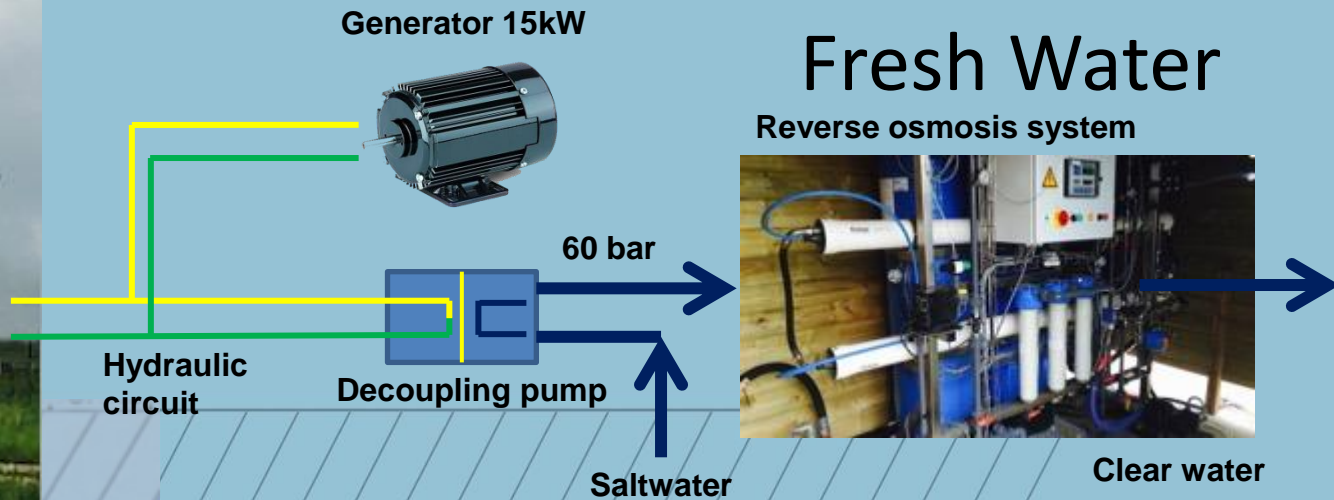
60 bar

Saltwater

Clear water

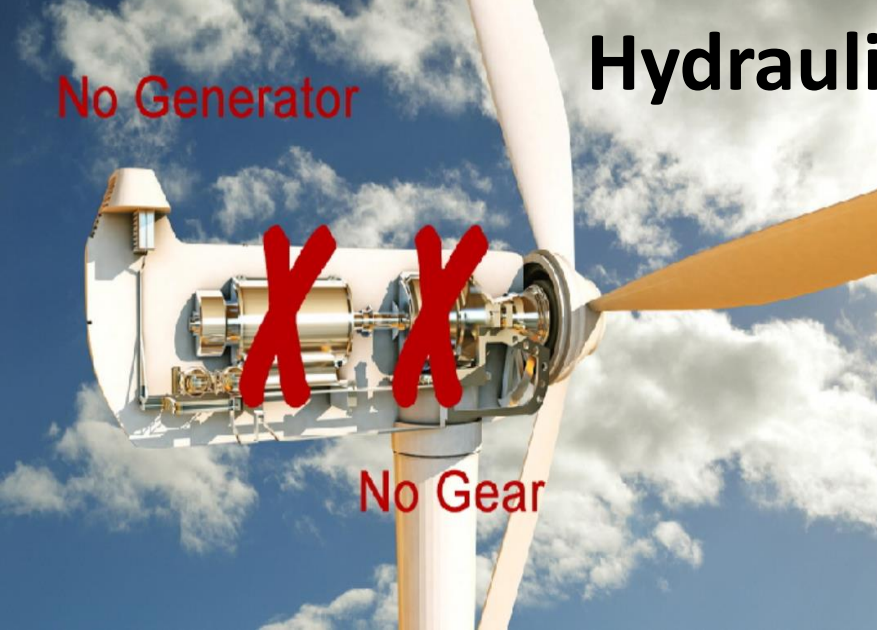
only 15 m

Pilot Project

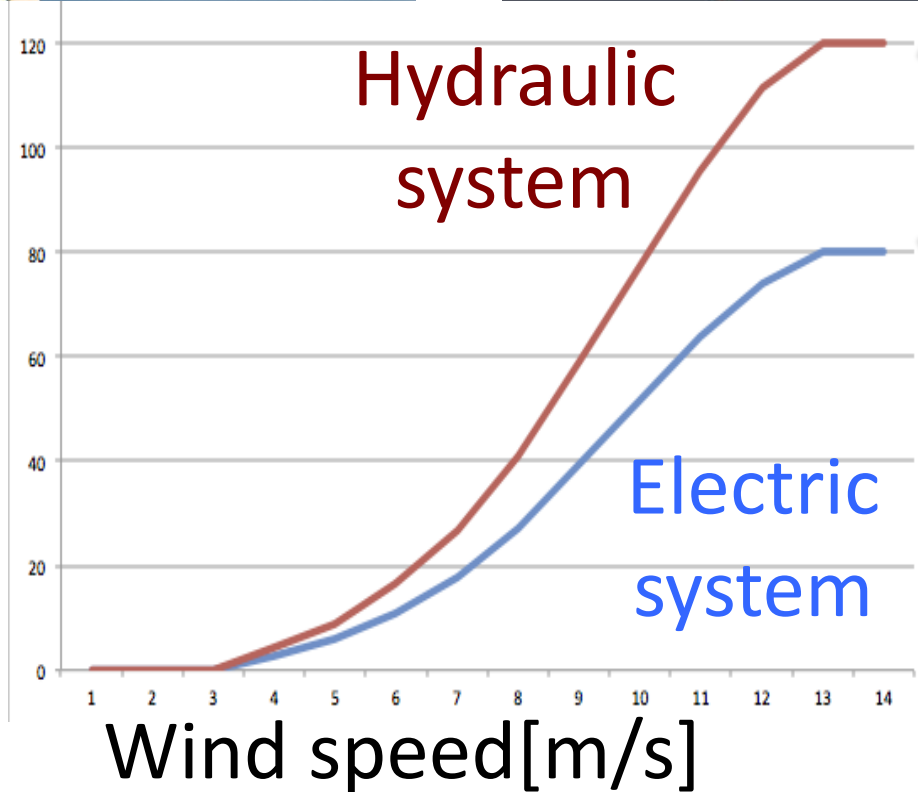


Hydraulic Windmill

No Generator



kW



Reverse Osmosis 12,5 m³/day for Johnny Cay



LENNTECH

WATER TREATMENT SOLUTIONS

**Pilot project in Leeuwarden
May – September
Baptize 1 October**

**Installation in Johnny Cay
November**

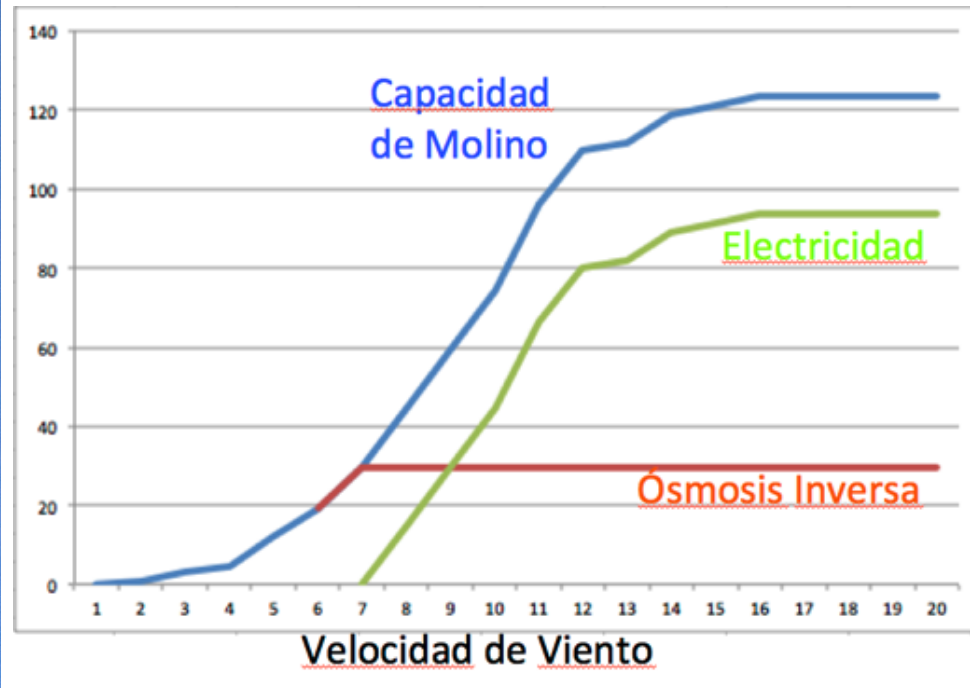




System Design in Leeuwarden

1. For Johnny Cay
 2. in general (for other locations)
- Johnny Cay:
 - Low column
 - RO of 12,5 m³/ day
 - 15 kW de electricity
 - Micro electricity grid
 - In general:
 - Capacities 300 – 600 m³/day
 - 0 - 80 kW electricity (or more)
 - New developments
 - Columns up to 52 meter

For
islands
rural areas
hotel resorts

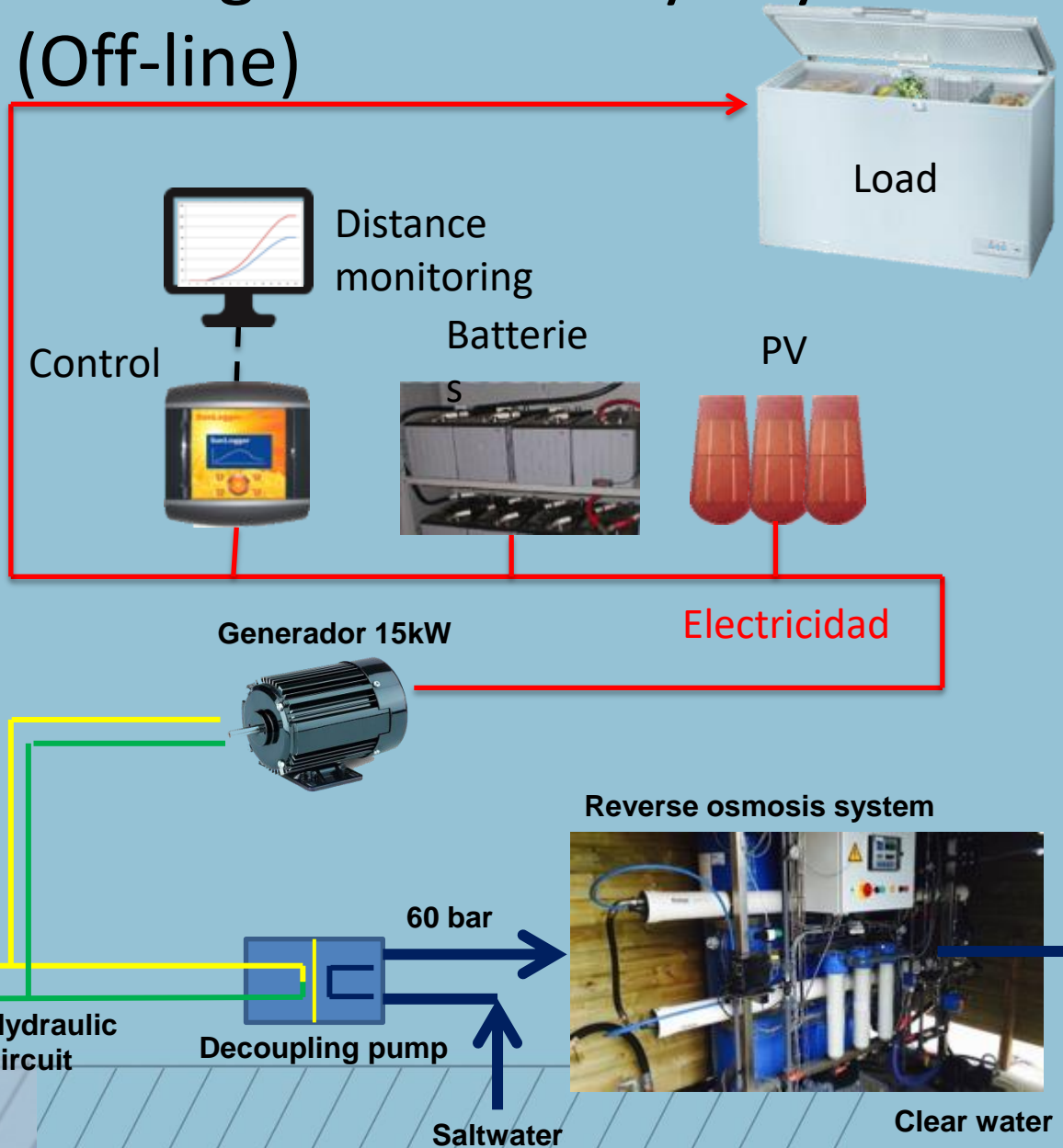


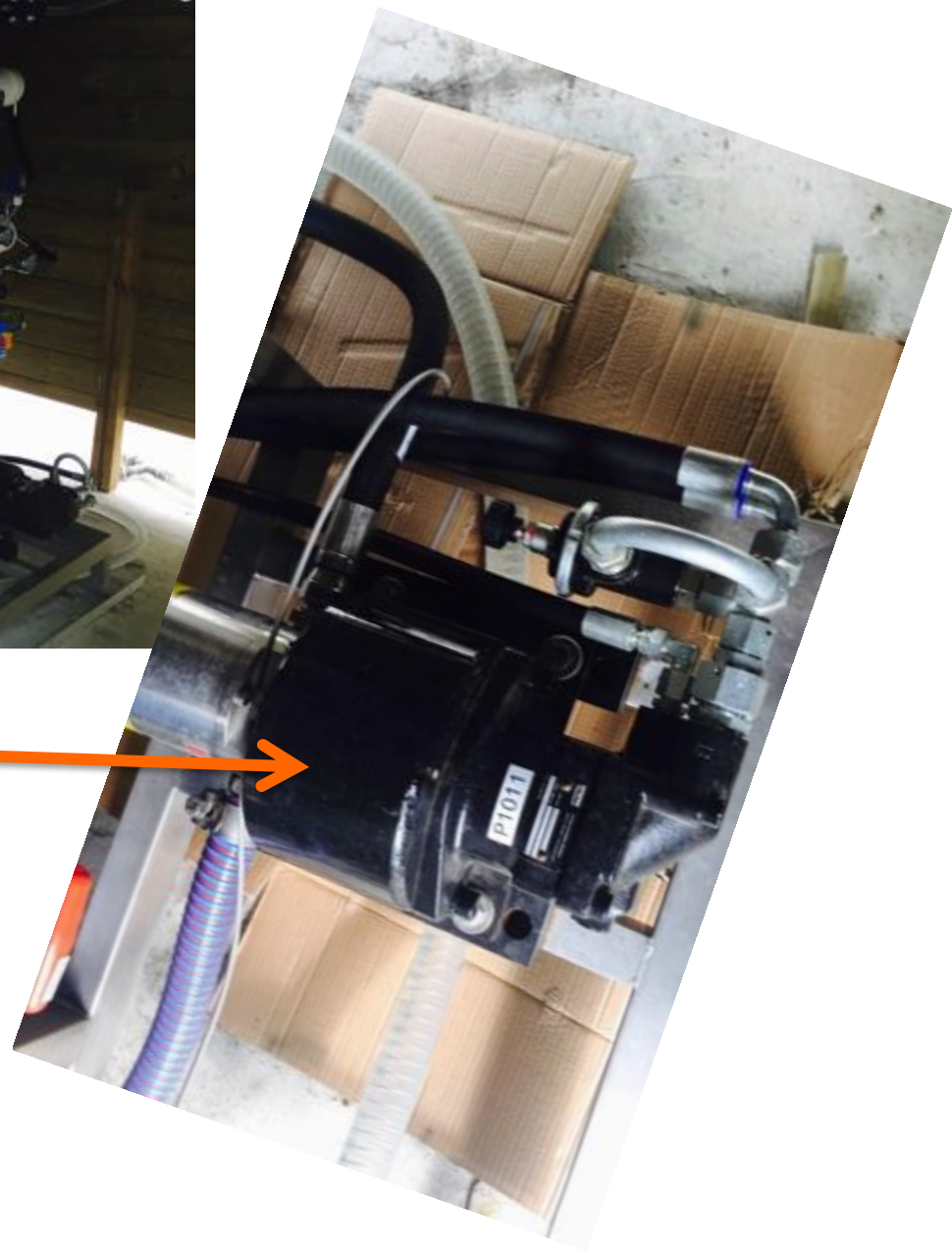
Hydraulic windmill

Micro grid for Johnny Cay (Off-line)

only 15 m

Pilot Project





RO with high pressure driven
pump



Generator

Distribution system of
hydraulic system and
generator

Investment € 400-500.000

Cost prices at different wind speeds

| Avg. wind speed | 7 m/sec | 9m/sec |
|------------------------------------|------------------------|------------------------|
| Reverse Osmosis | 300m ³ /day | 400m ³ /day |
| Production (kWh) | 289.080 | 525,600 |
| Used for water (kWh) | 236.520 | 325.360 |
| For electricity (kWh) | 52.560 | 210.240 |
| Water production (m ³) | 87.600 | 116.800 |



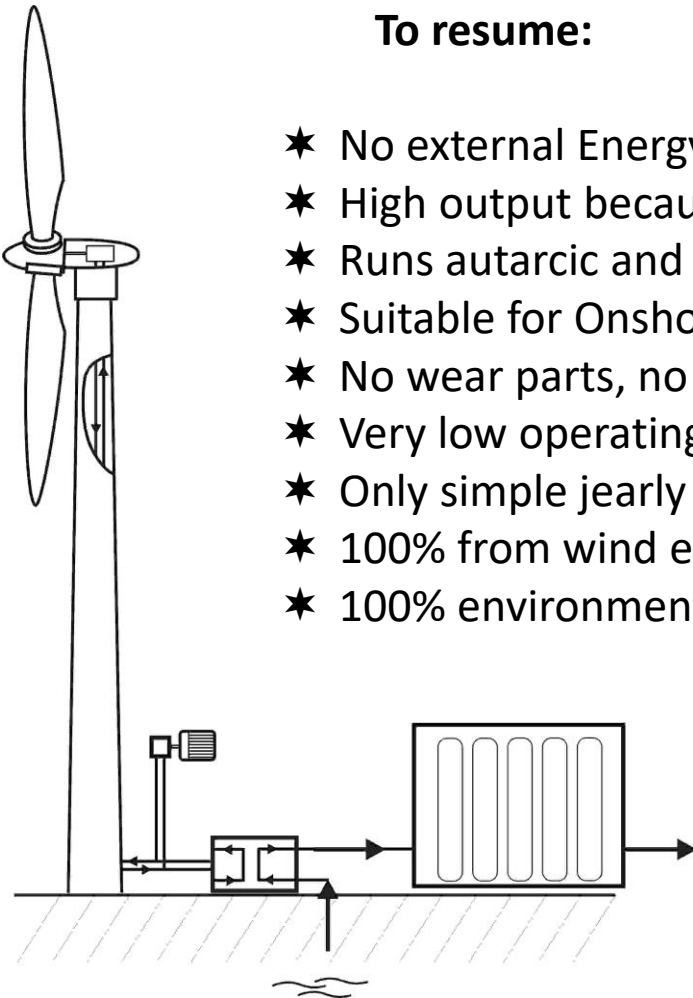
FreshWaterMill for 300 to 600 m³/Day + 0 – 80 kW

For calculation of capacities we need to know:

- Local wind conditions
- Electrical set-up wishes
- Water specifications

To resume:

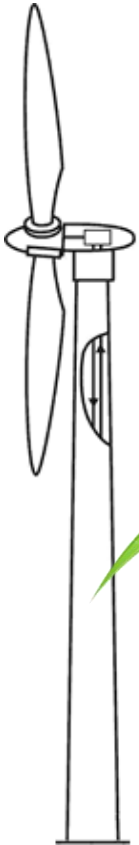
- ★ No external Energy, no costs
- ★ High output because of ca. 8x higher efficiency
- ★ Runs autarcic and for free, 24h per day
- ★ Suitable for Onshore and Offshore (floating Stations)
- ★ No wear parts, no costs (only Filter/membrane)
- ★ Very low operating costs
- ★ Only simple yearly change of the filter, nearly no service works needed
- ★ 100% from wind energy - maximum output
- ★ 100% environmental friendly



Clear water for nearly zero costs !

Free Water for agriculture

Saltwater desalination or
Pumping up the ground water



Autarkic agriculture with own Energy and Water supply **with no energy costs**



Water for agriculture

- ★ Agriculture for human food
- ★ Food and water for Chicken farms

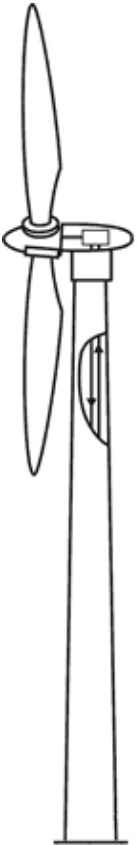
The ground water will be pumped and cleaned only with wind energy



Further Projects:

Autarkic Cow Houses with own Energy and Water supply

- ★ Water for grass
- ★ Water for the cows
- ★ Electric Energy for the cow house
- ★ Electric Energy for the homes



Water for the World

with ***SOLTEQ ENERGY***





FreshWaterMill

Developed and powered by

SOLTEQ ENERGY

Thanks for your attention!
Your SolteQ Team

www.FreshWaterMill.com



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