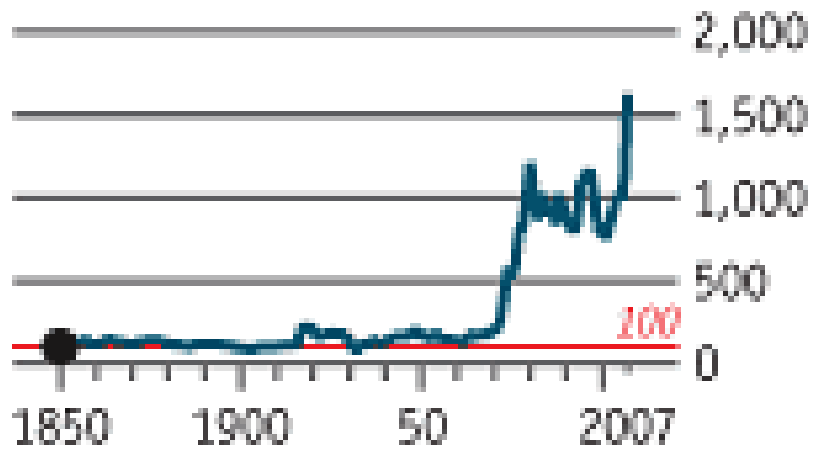
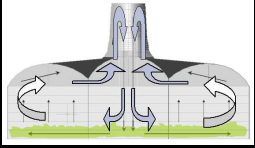


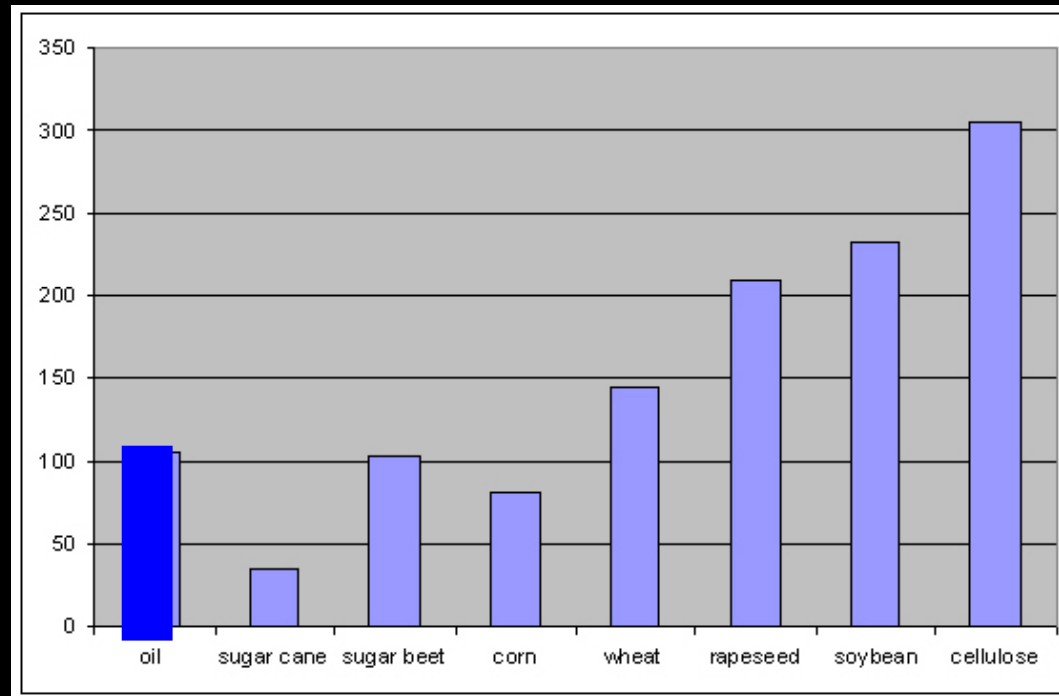
The Economist \$ food index 1845-50=100



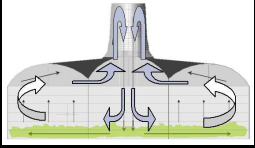


Cycler Support

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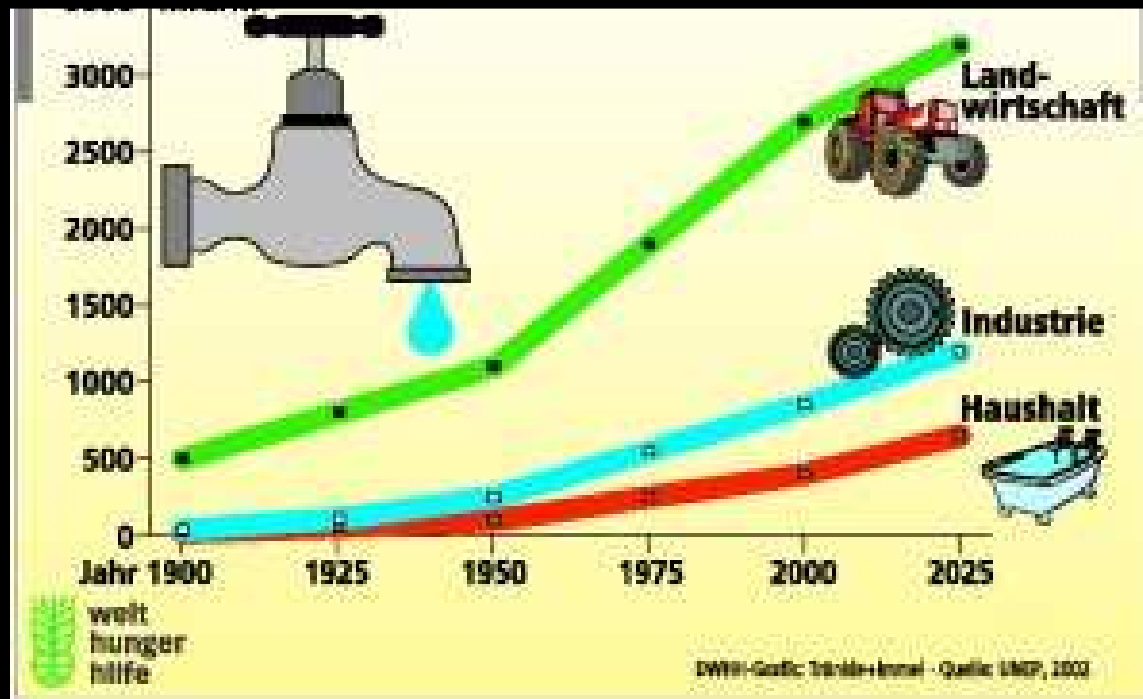


Oil price and production costs for biofuels
(\$ / barrel equivalent)

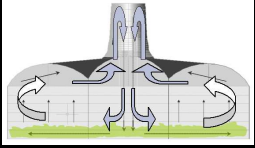


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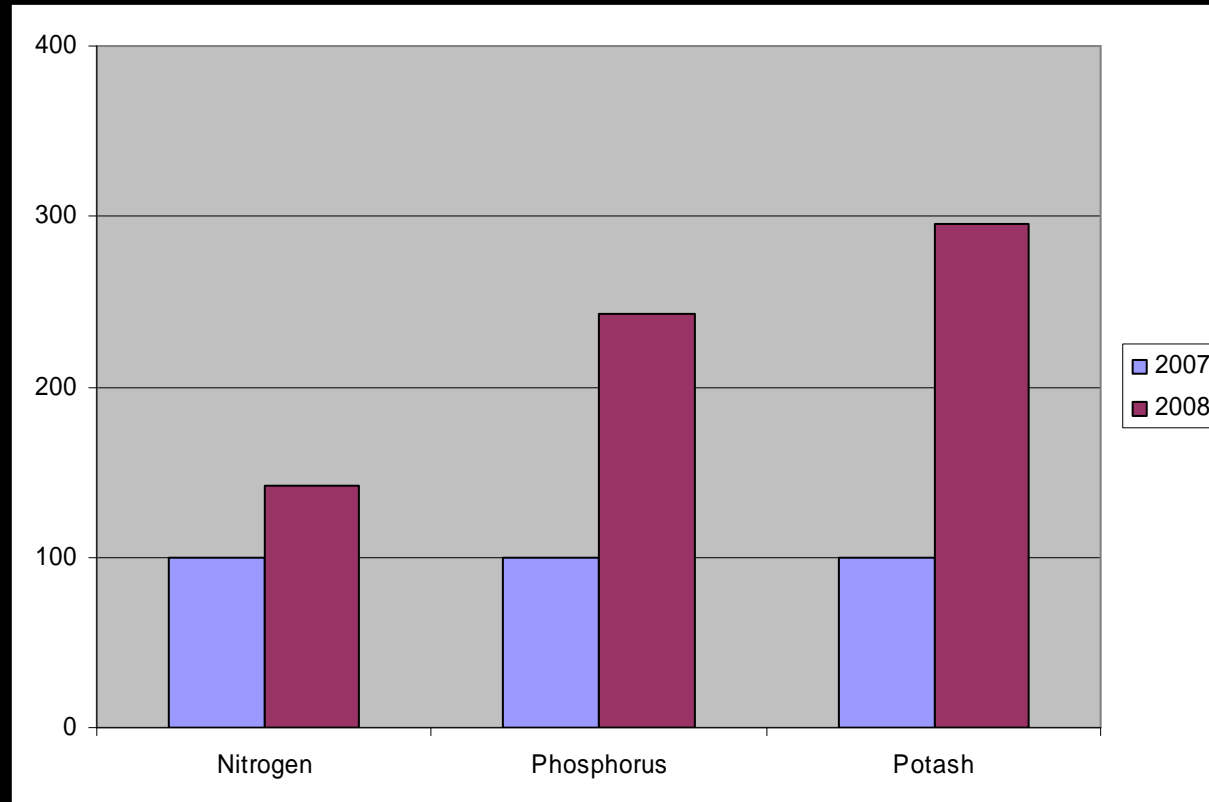


Water demand in agriculture, industry and households

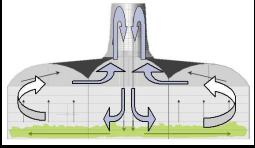


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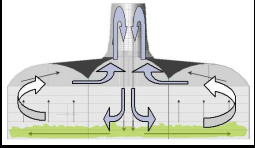


Growth rates of fertilizer sales gross margins at Saskatchewan Inc. due to growing global demand at decreasing supply (2007=100)
(Source www.reportonbusiness.com, April 24, 2008)



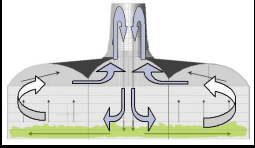
Today, agriculture is a very good area of investment, if...

- ...fertilizers remain affordable
- ...there is sufficient and sufficiently cheap water available
- ...you are even able to turn infertile land into production



In this situation, greenhouse horticulture has several potentials for arid areas:

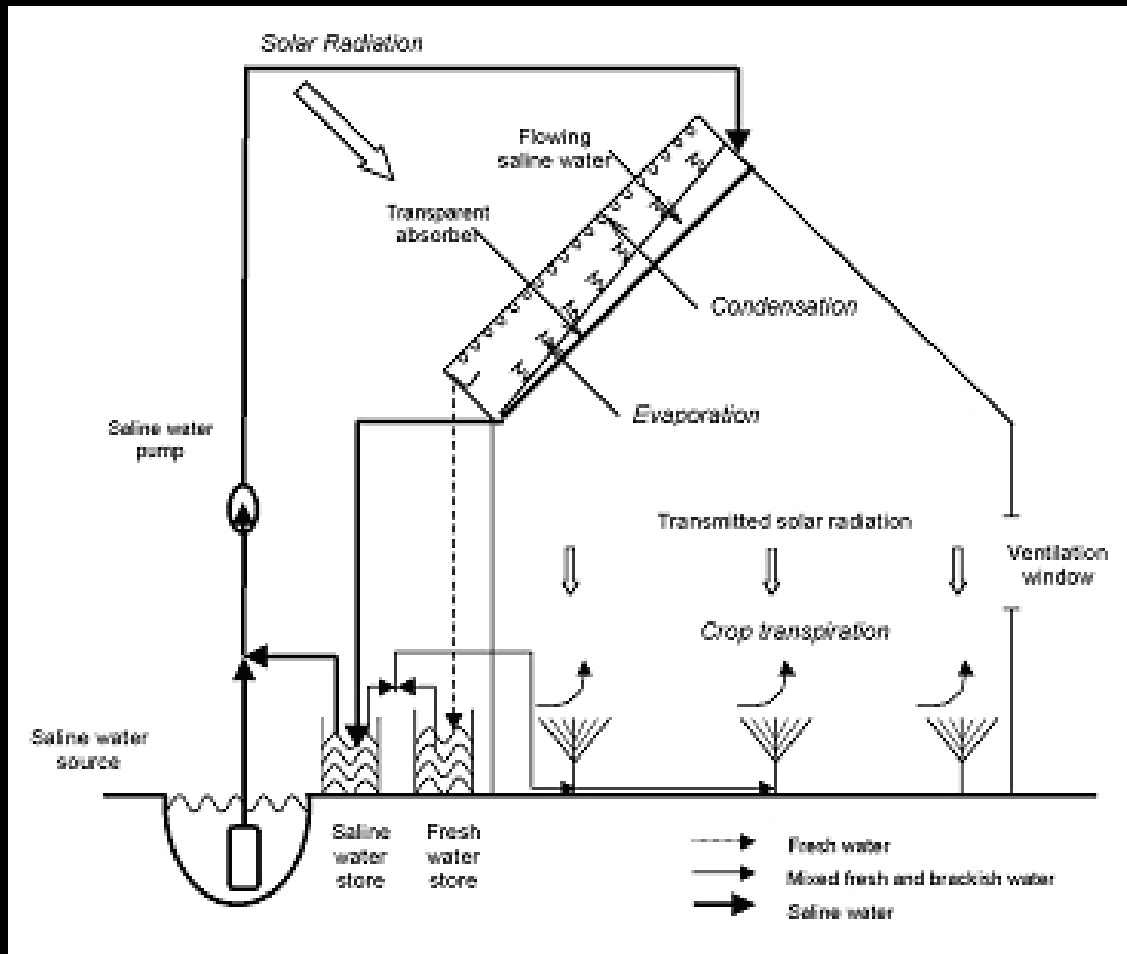
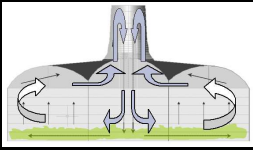
- the higher air water vapour under glas/plastic results in less water consumption
- modern hydroponics, irrigation and automatised fertilisation methods allow to grow on any ground
- urban water and matter cycles can be integrated into these methods as a source of water and nutrients
- and – what this workshop is mainly about...



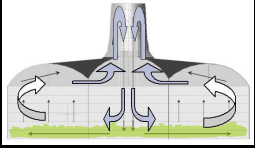
... a new generation of innovative greenhouse technologies allows the condensation of air water vapour.

For the first time, real closed water cycles can be possible.

Greenhouse horticulture could even turn from a water consuming to a water generating technique.

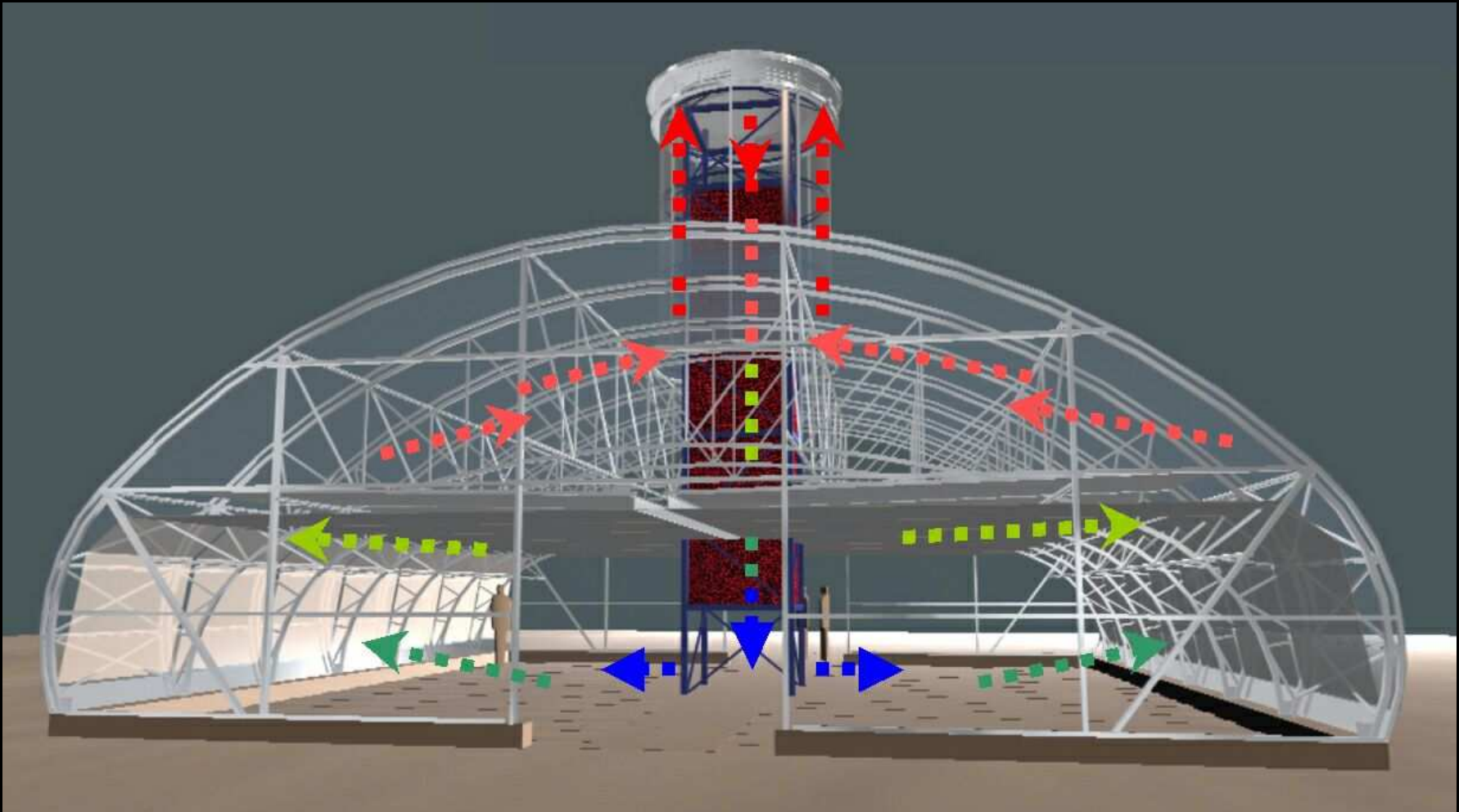


Roof integrated solar still

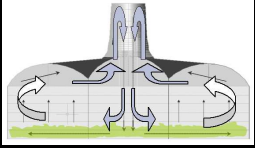


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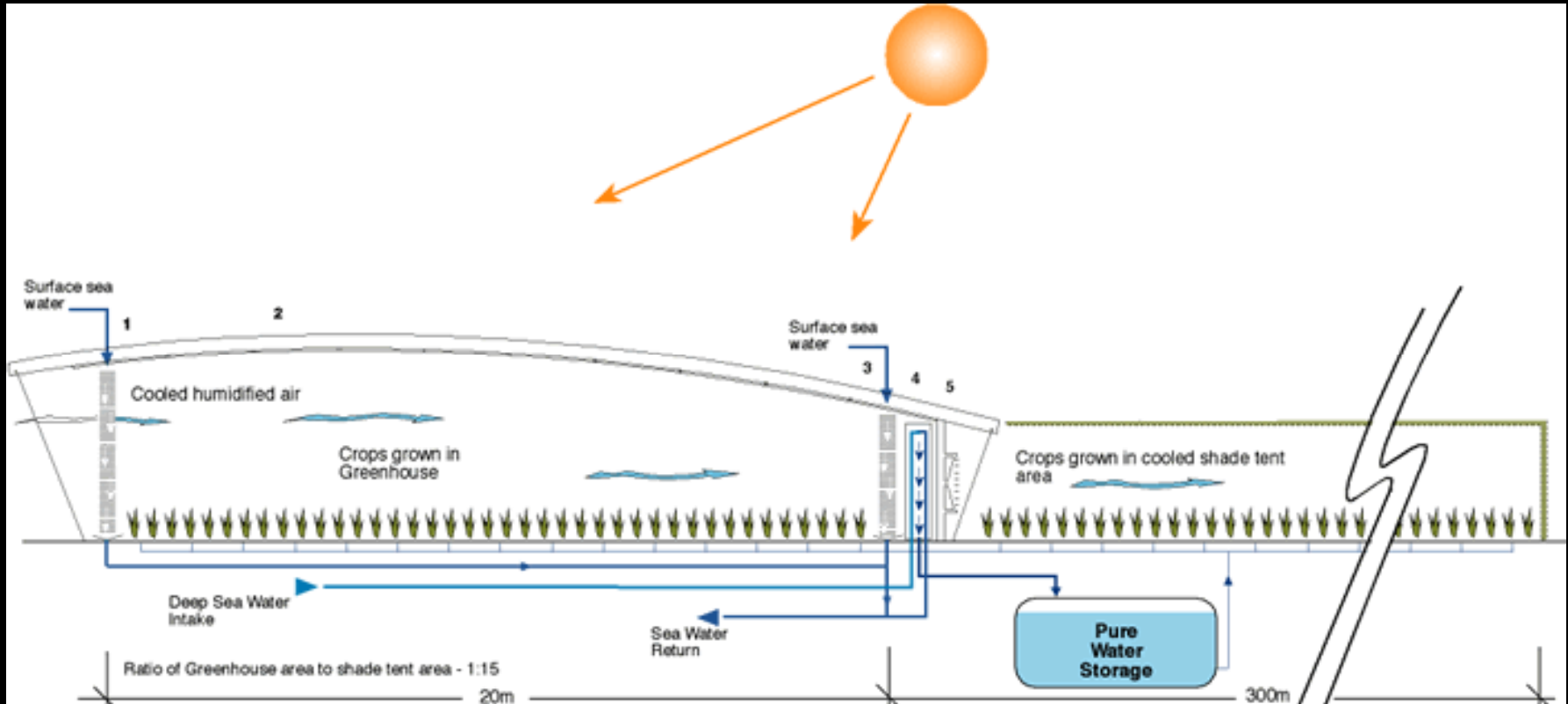


Watergy, a closed greenhouse

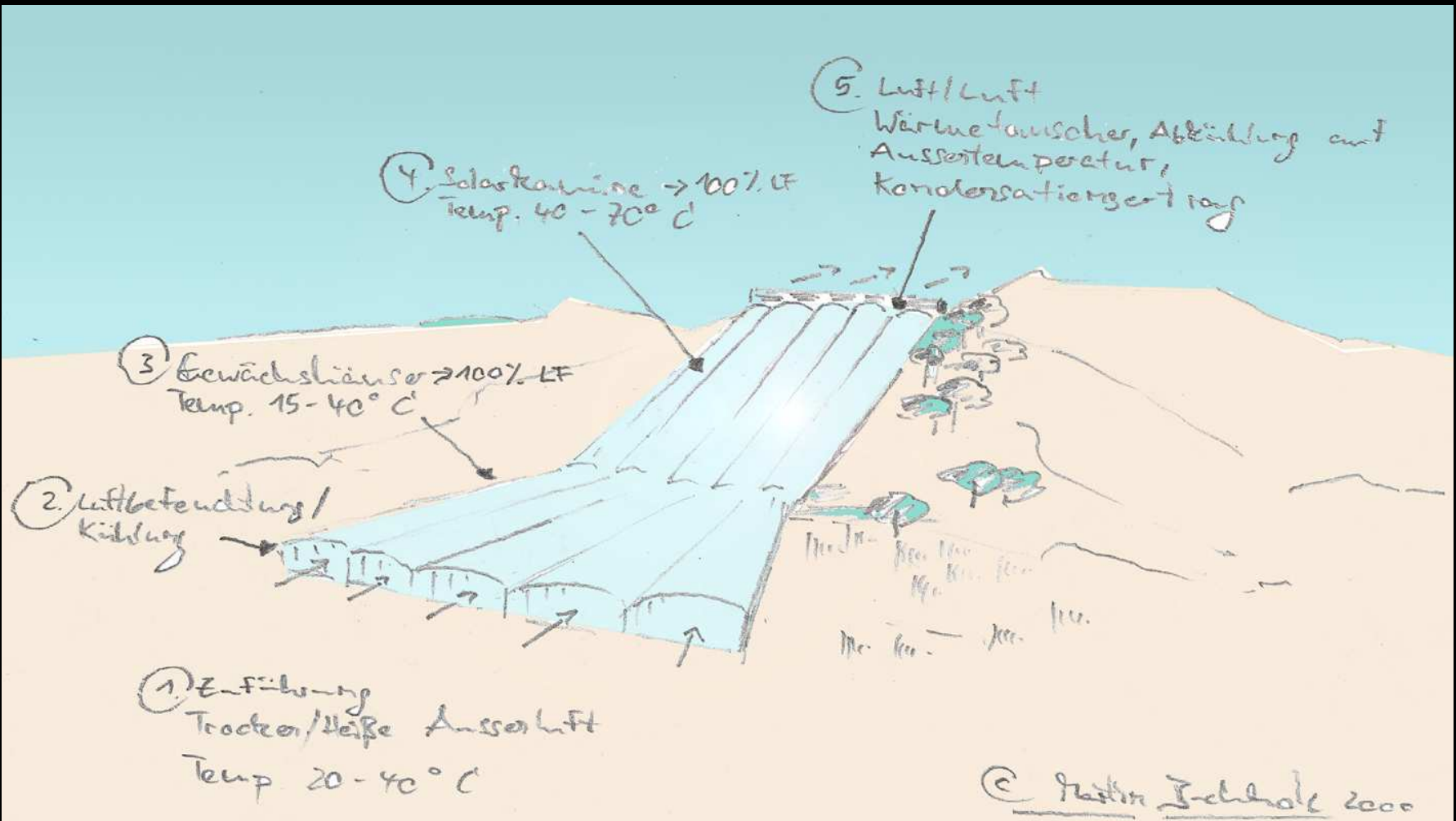
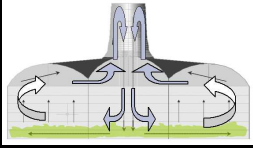


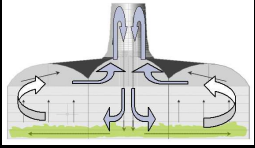
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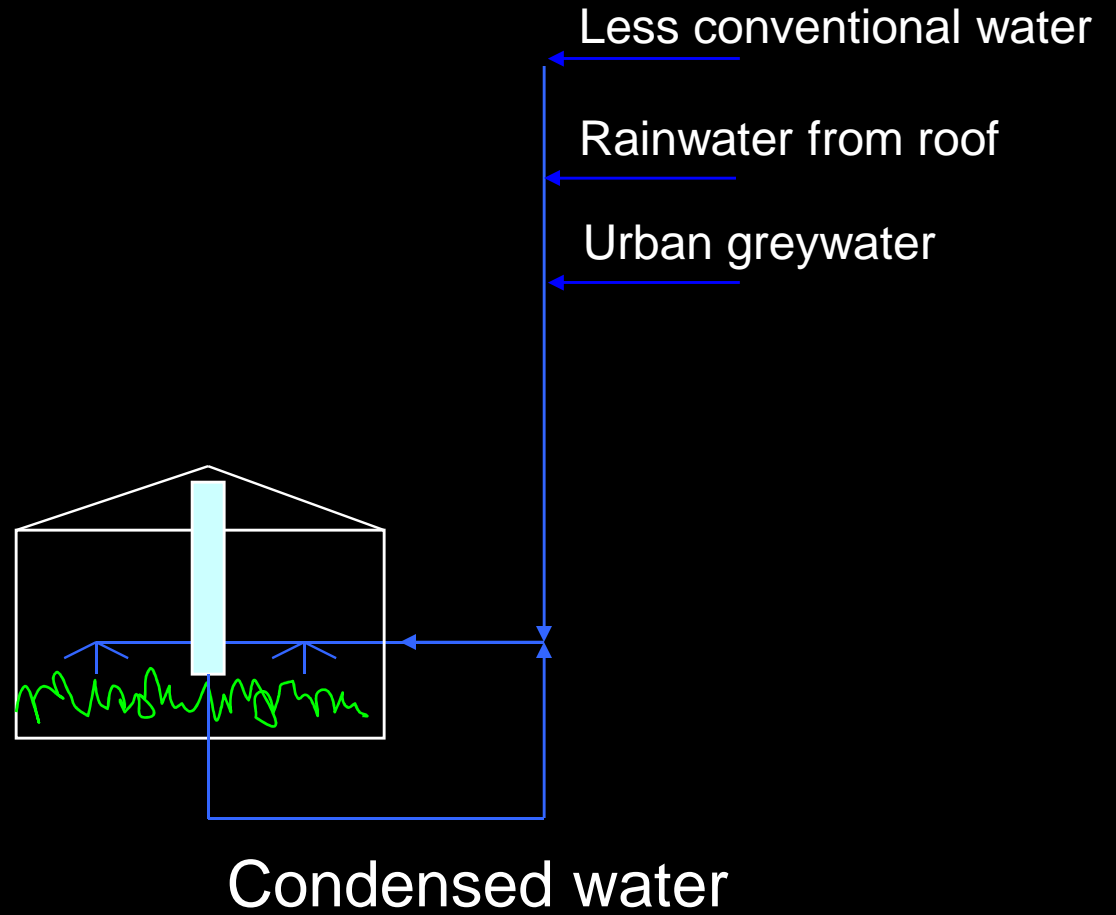
Seawatergreenhouse

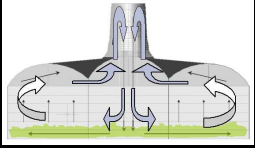




Cycler Support

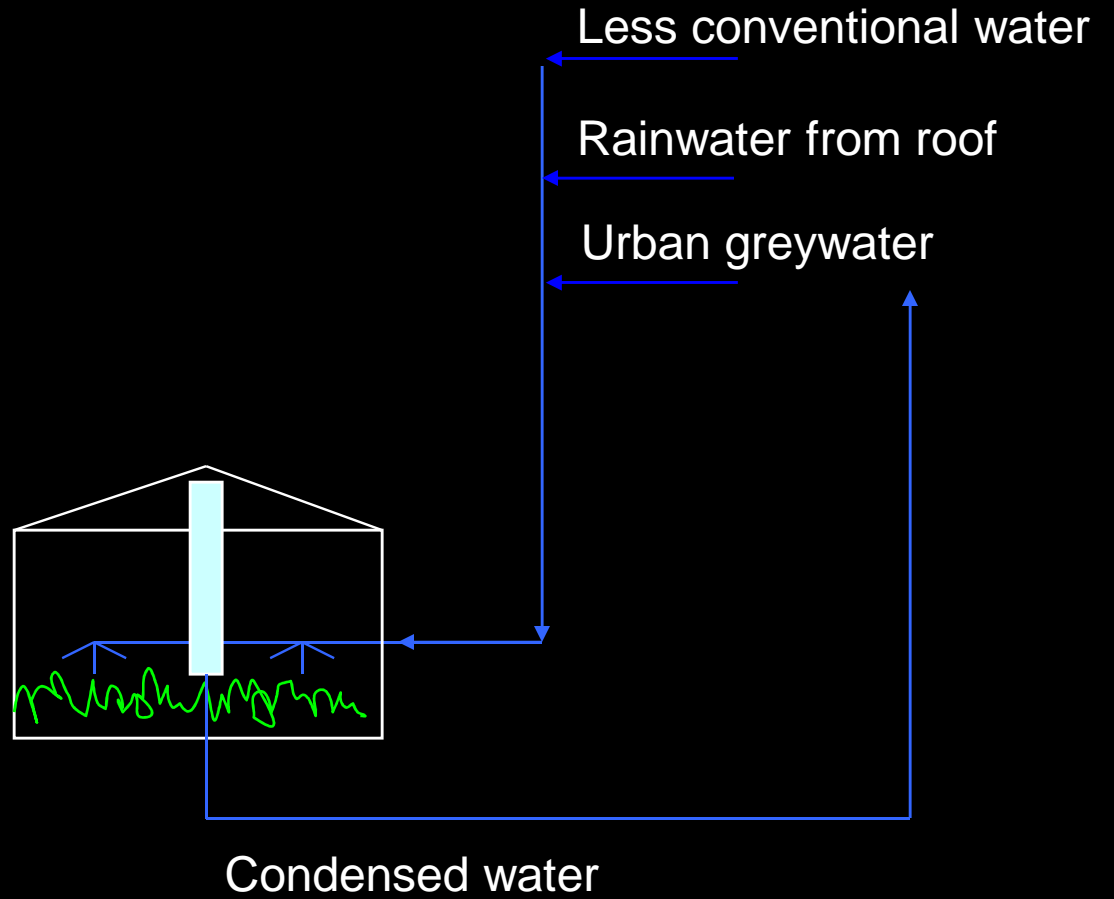
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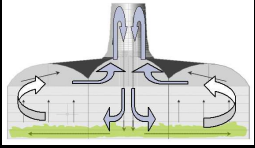




Cycler Support

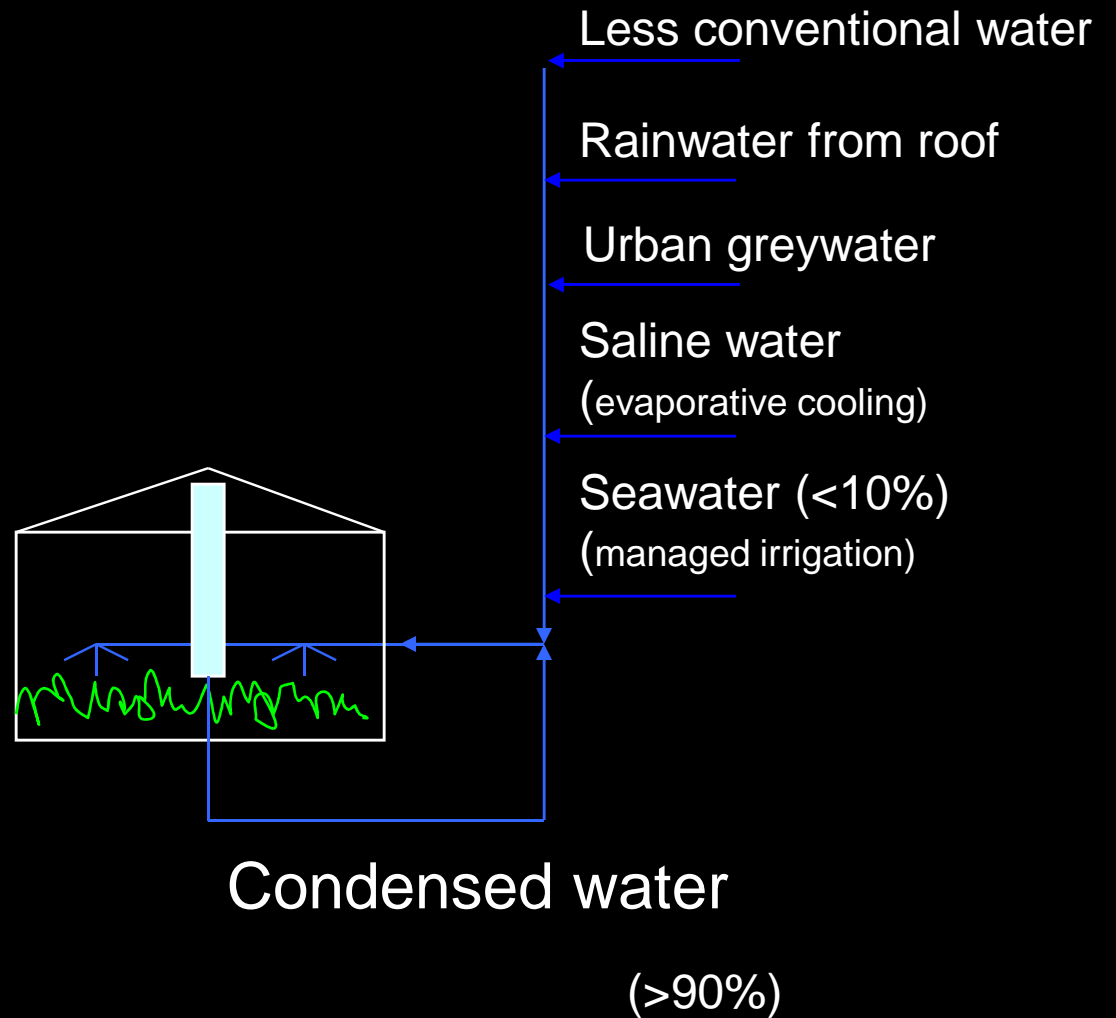
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Less conventional water

Rainwater from roof

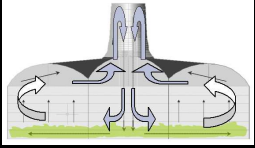
Urban greywater

Saline water
(evaporative cooling)

Seawater (<10%)
(managed irrigation)

Condensed water

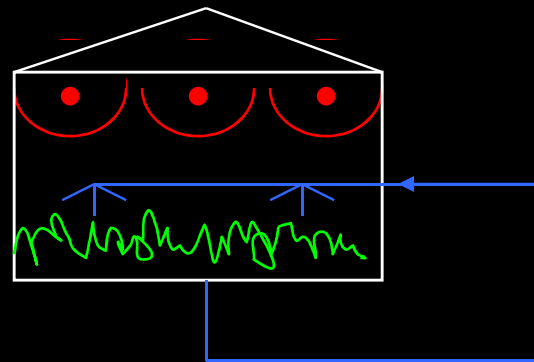
(>90%)



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Greenhouse Integrated
Solar Power
100



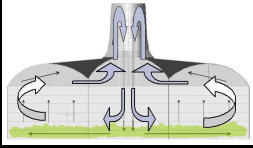
Water Recycling
5 (20 ?)

Urban Water Supply
20 (80 ?)

Service of
Greywater Disposal
5

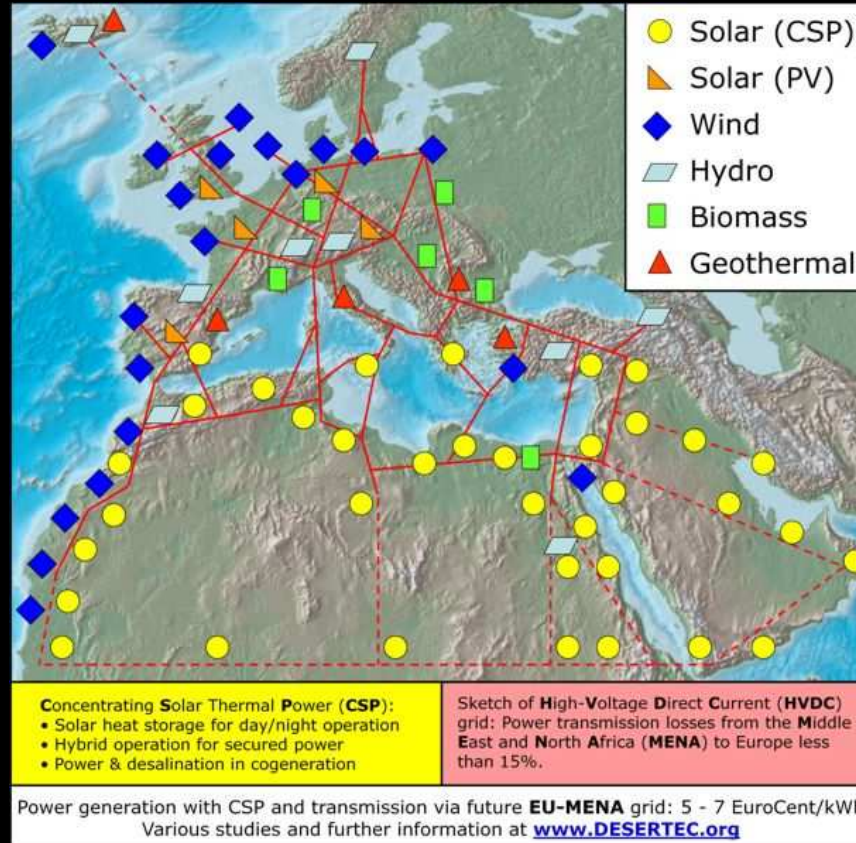
Horticulture
100

Organic Nutrients
10 (30 ?)



Cyclers Support

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Trans-Mediterranean Renewable Energy Cooperation (TREC)

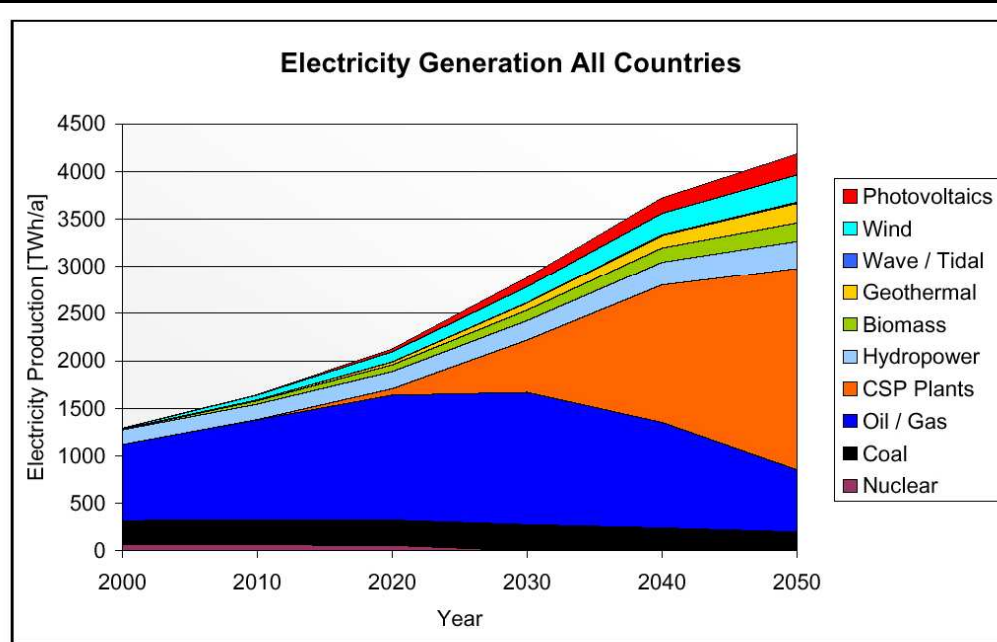
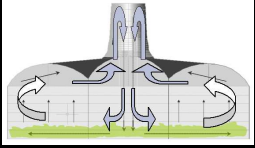
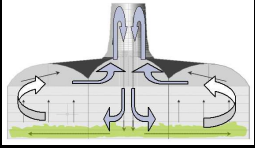


Figure 2: Annual electricity demand and generation within the countries analysed in the MED-CSP scenario

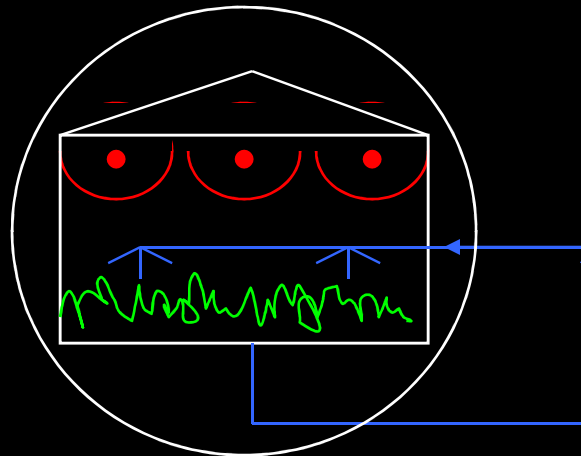


Cyclotron Support

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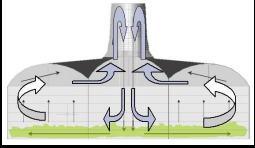
Greenhouse Integrated
Solar Power
100

Closed Greenhouse:
Increased Productivity by
CO₂ Enrichment
100
Production without
pesticides
50 + 50



Horticulture
100

Water Recycling
5 (20 ?)
Urban Water Supply
20 (80 ?)
Greywater Disposal
5
Organic Nutrients
5 (20 ?)

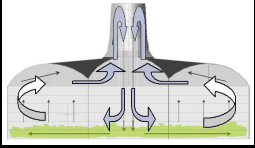


Conclusions:

Common policies today, do not provide convincing solutions for the specific needs of agriculture in the present energy, water, food and general resource crisis

The Cyclor Support Project at this workshop intends to:

- present the potential of the new generation greenhouse technology
- present technological details of closed urban water and nutrient cycles
- present technological details of managing unconventional water like rainwater, wastewater, greywater, and saline water in irrigation
- discuss the different methods available, their specific potentials and risks
- discuss and declare the demand and the direction of further research
- call for action – release of a conclusion communiqué



Cycler Support

Martin Buchholz, Technische Universität Berlin

Thank you !

Partners Cycler Support

- Technische Universität Berlin (Germany)
- Institut Agronomique et Vétérinaire Hassan II, Agadir (Morroco)
- Verein zur Förderung des Technologie Transfers an der Hochschule Bremerhaven e.V. (Germany)
- Ecole Nationale d'Ingénieurs de Tunis (Tunisia)
- Istituto Agronomico Mediterraneo, Bari (Italy)
- International Center for Agricultural Research in the Dry Areas, ICARDA (Tunisia)

www.cycler-support.de