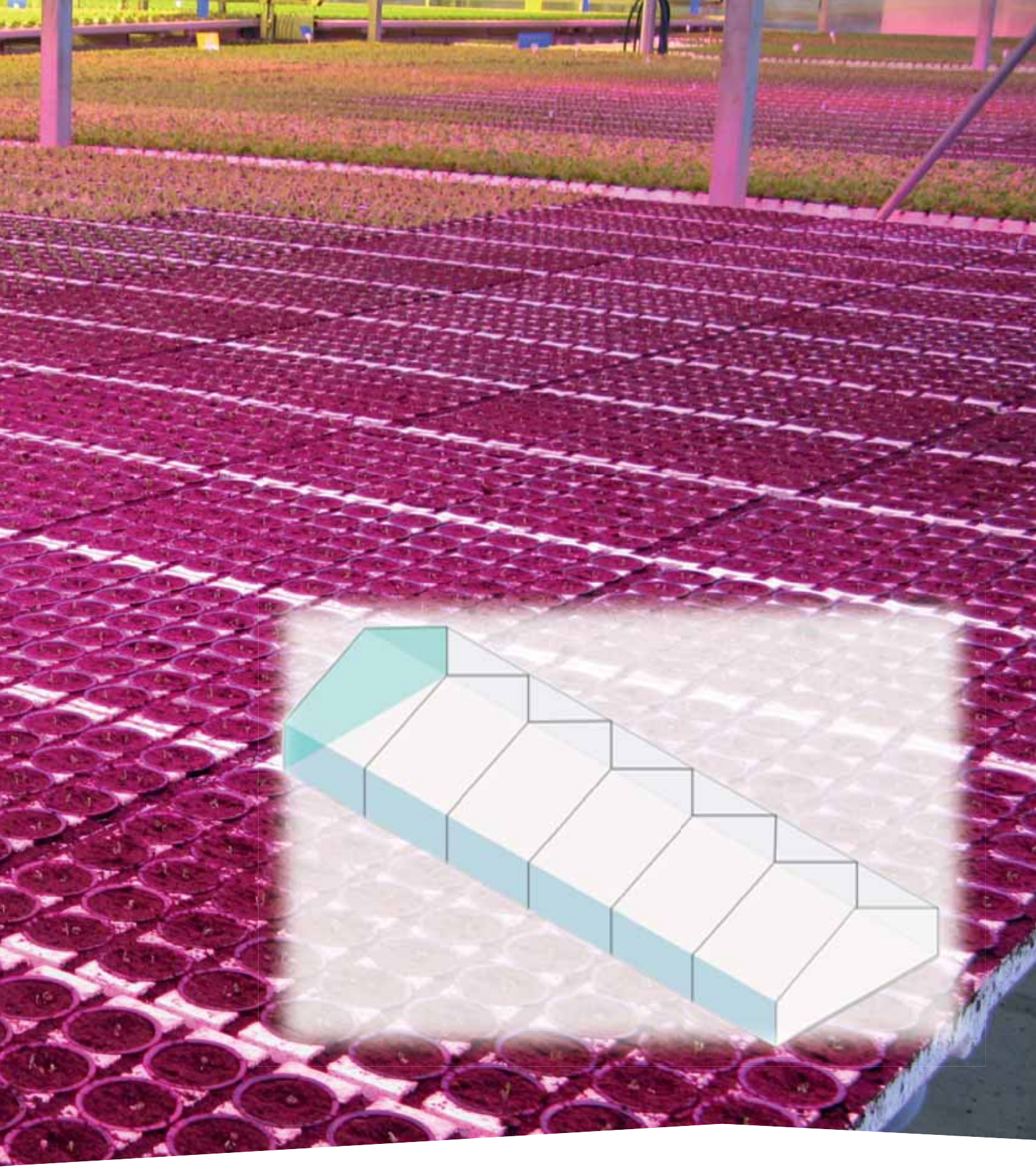

VIRTUAL GREENHOUSE™

TEST CHANGES BEFORE THEY ARE APPLIED

Detailed analyses of plant production, climate and energy

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Virtual Greenhouse™

Test changes before they are applied

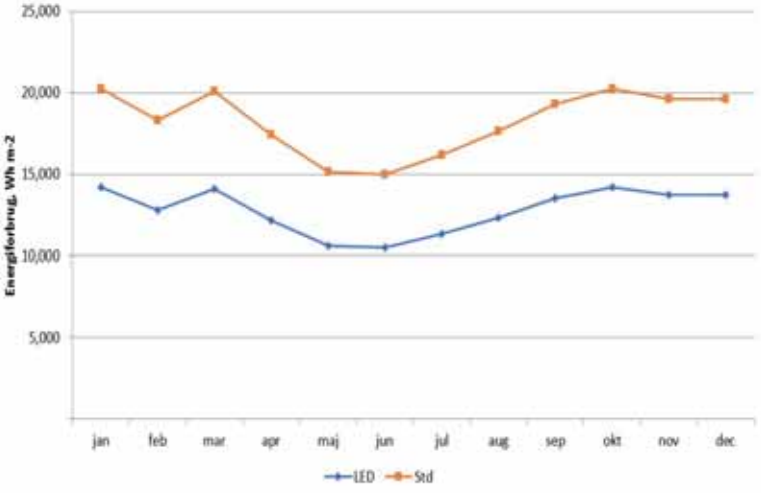
Greenhouse technology develops fast, and there are many products and suppliers that claim to reduce energy consumption. Savings can be achieved by optimizing the climate set points, but even larger savings are possible by installing some of the newest equipment. In the Virtual Greenhouse, new installations are simulated, and savings are documented.

- Simulate your greenhouse environment and view how different suggestions to optimize the greenhouse construction and adding equipment, such as screens and lighting, affects energy consumption, climate, climate set points, and plant production.
- Print out a report showing the effects on energy consumption, plant climate, and plant production?

Import your climate data from InfoGrow 2.0™ and make detailed analysis of the production performance and test changes you might want to implement. You can even analyze your data and find energy hot spots with a very high use of energy and test different solutions to avoid them.

	Unit	HPS	LED	Difference	Percent
Greenhouse area	m^{-2}	10,400	10,400	0	0.0
Total use of energy	MWh $Year^{-1}$	4,937	4,854	-83	-1.7
Energy for heating	MWh $Year^{-1}$	2,663	3,262	599	22.5
Energy for artificial light	MWh $Year^{-1}$	2,274	1,592	-682	-30.0
Energy removed by water vapor (ventilation etc)	MWh $Year^{-1}$	-197	-119	77	-39.4
Net Photosynthesis	g m^{-2}	1,071	1,011	-60	-5.6
Light Use Efficency	mg CO2 J^{-1}	0.0149	0.0149	0.0000	0.1
Total energy used to produce 1 kg dry plant material	MW kg^{-1}	426	450	25	5.9
Heating energy used to produce 1 kg dry plant material	MW kg^{-1}				
Light energy used to produce 1 kg dry plant material	MW kg^{-1}				

Above: Main results from simulation
Right: Use of energy for HPS and LED lighting.



Virtual Greenhouse - Overview

1. Input

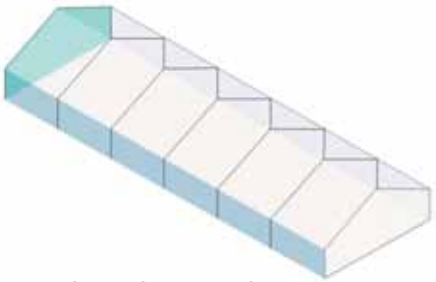
Define the physical of your physical greenhouse setup
(Geography, size, screens, covering, lighting, CO_2, heat pipes, etc.)

Define the climate strategy
(Temperature, humidity, artificial light, CO_2, screens, etc.)

Weather data
(Use weather data for more than 2100 locations or use your own weather data)

Data from production
(Use data from your own production

2. Simulation



Virtual Greenhouse simulates and compare how your defined greenhouse setup will perform.

3. Results

Energy consumption
heat, light

Plant production
Photosynthesis

Hourly data
Climate and production

Resource efficiency
Energy use compared to production

4. Energy and growth analysis

Strategic decisions
What happens if you change climate strategy or hardware setup?

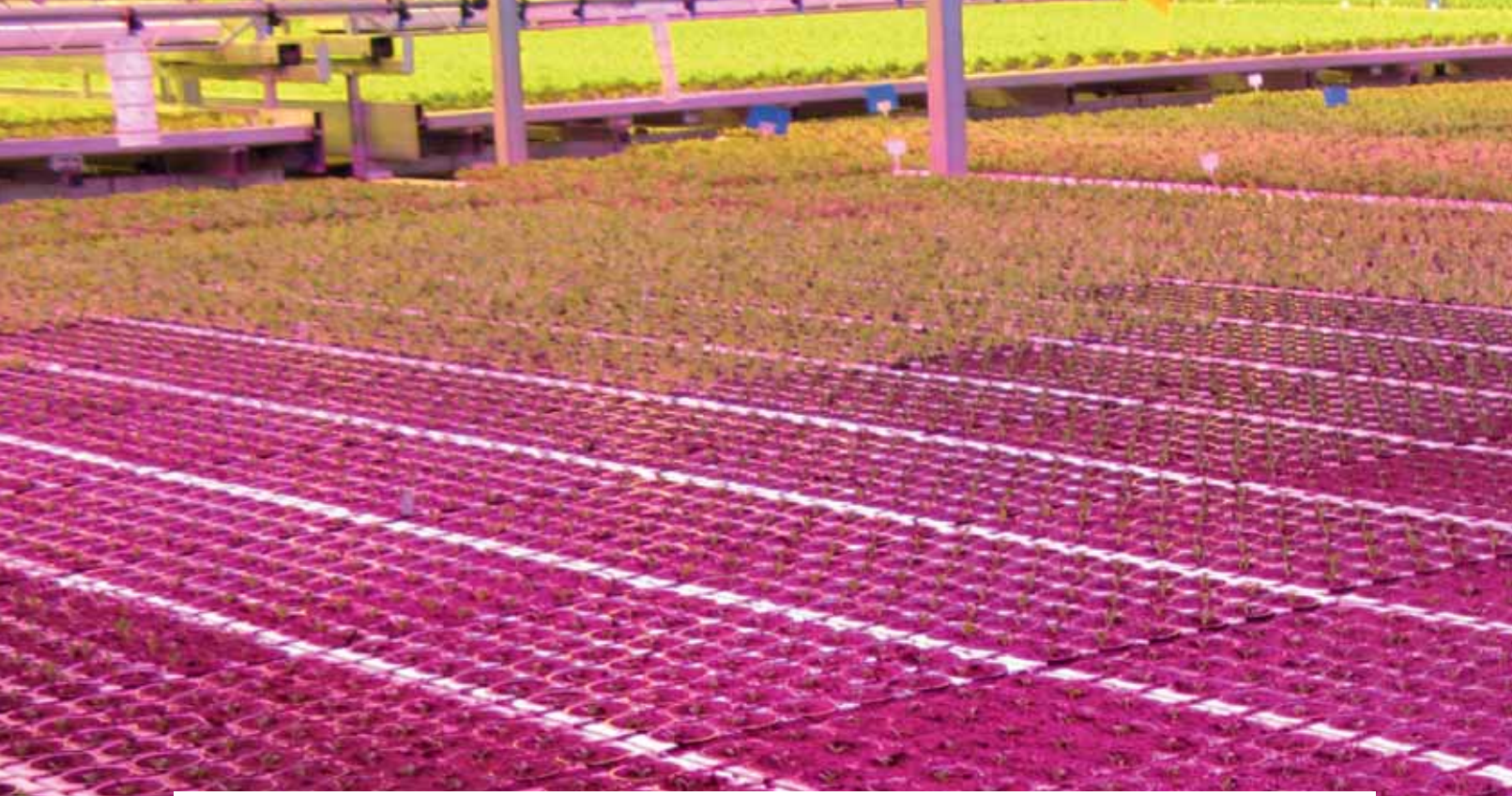
Analyze your production
Find situations where it is possible to change strategy and optimize production or resource efficiency.

5. Reports

Make reports that documents your production and changes.

6. Calculated parameters

Crop:	Photosynthesis, transpiration, and canopy temperature.
Energy:	Energy for heating and artificial lighting
Climate:	Temperature, Humidity, Light, and CO_2 at plant height in the greenhouse
Efficiency:	Light Use Efficiency, Energy use efficiency



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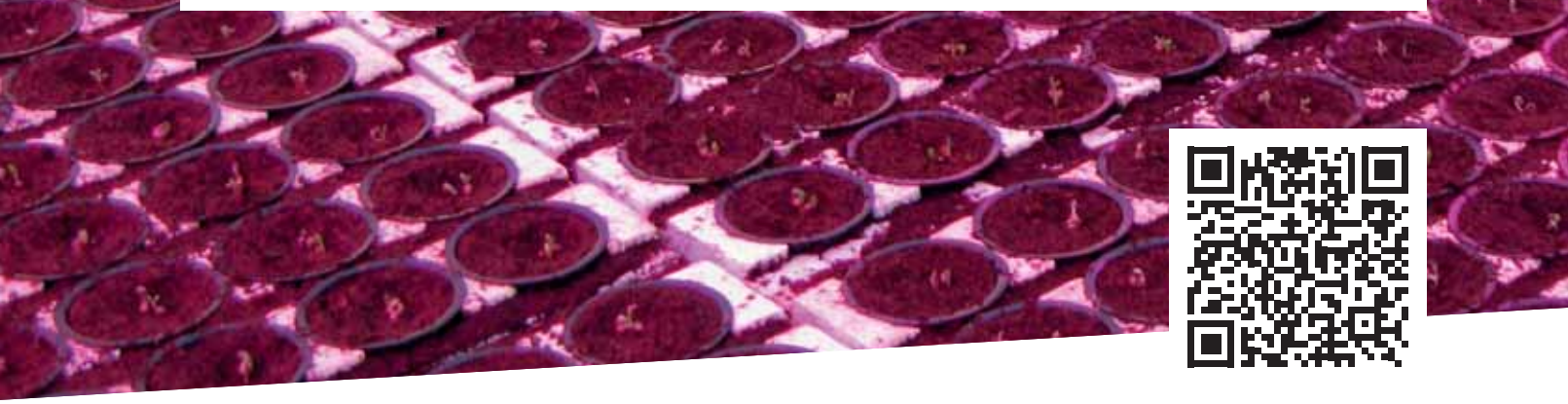
We help our customers convert the newest knowledge and technology into value. We are experts in production, materials, life science, business, energy technology, meat research and more.

Center for Plant Technology
The Center for Plant Technology keep the plant in focus. Our expertise concerns optimizing growth, production and utilization of plants and plant-based bio-resources. We work with optimized plant production, plant breeding and biotechnology, high value bio compounds, plant health and diseases as well as cultivation technology for plants and algae. We offer everything from development of novel plants in our biotechnological service laboratory to field trials, where we test new varieties.



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