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Climate management in organic greenhouses for energy saving

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Greenhouse horticulture (organic/conventional)

* Small medium businesses
* Widespread in EU
* High technology, innovation ready, adaptive
* Reliable high quality food supply
* Small footprint in terms of water, nutrients (and pesticides)
* Labor and energy requiring
* No subsidies

IntelliGrow as an example of a plant focused Danish research

General principles

- Larger span in climate (temperature and CO_2) linked to natural light level
- Energy savings are from 30 – 40% (and no negative effects!)
- Applicable in many crops in the Europe with lower winter periods.

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Challenges in dynamic conditions in relation to organic plant production?

Lower night temperatures and higher day temperatures might simplify humidity control

More natural fluctuation increase carbohydrates and secondary metabolites

Stress management might improve the quality of crops

Energy use can be adapted to natural fluctuation in climate if needed

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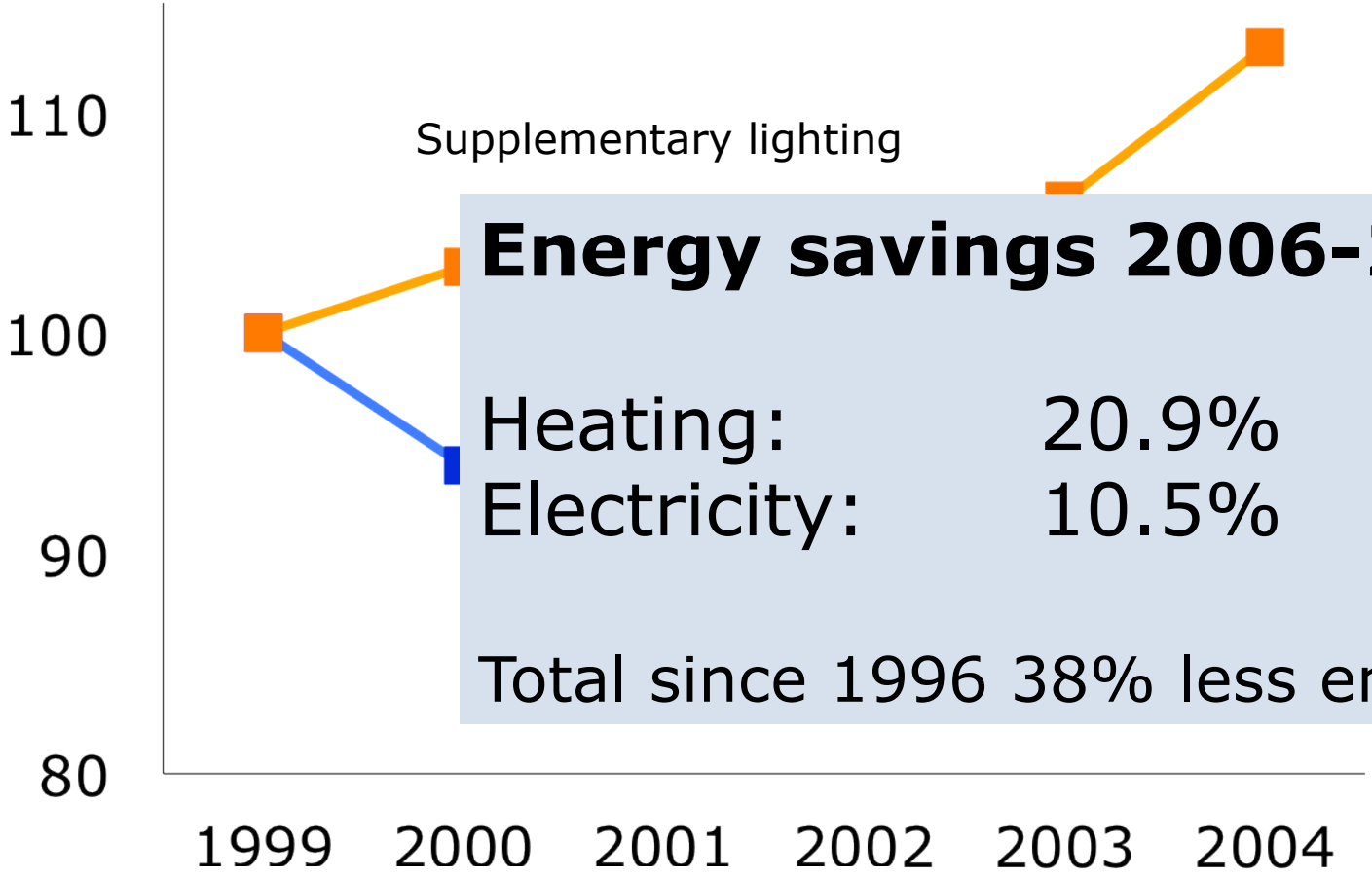
Effects of use of energy for heating and artificial lighting in Denmark



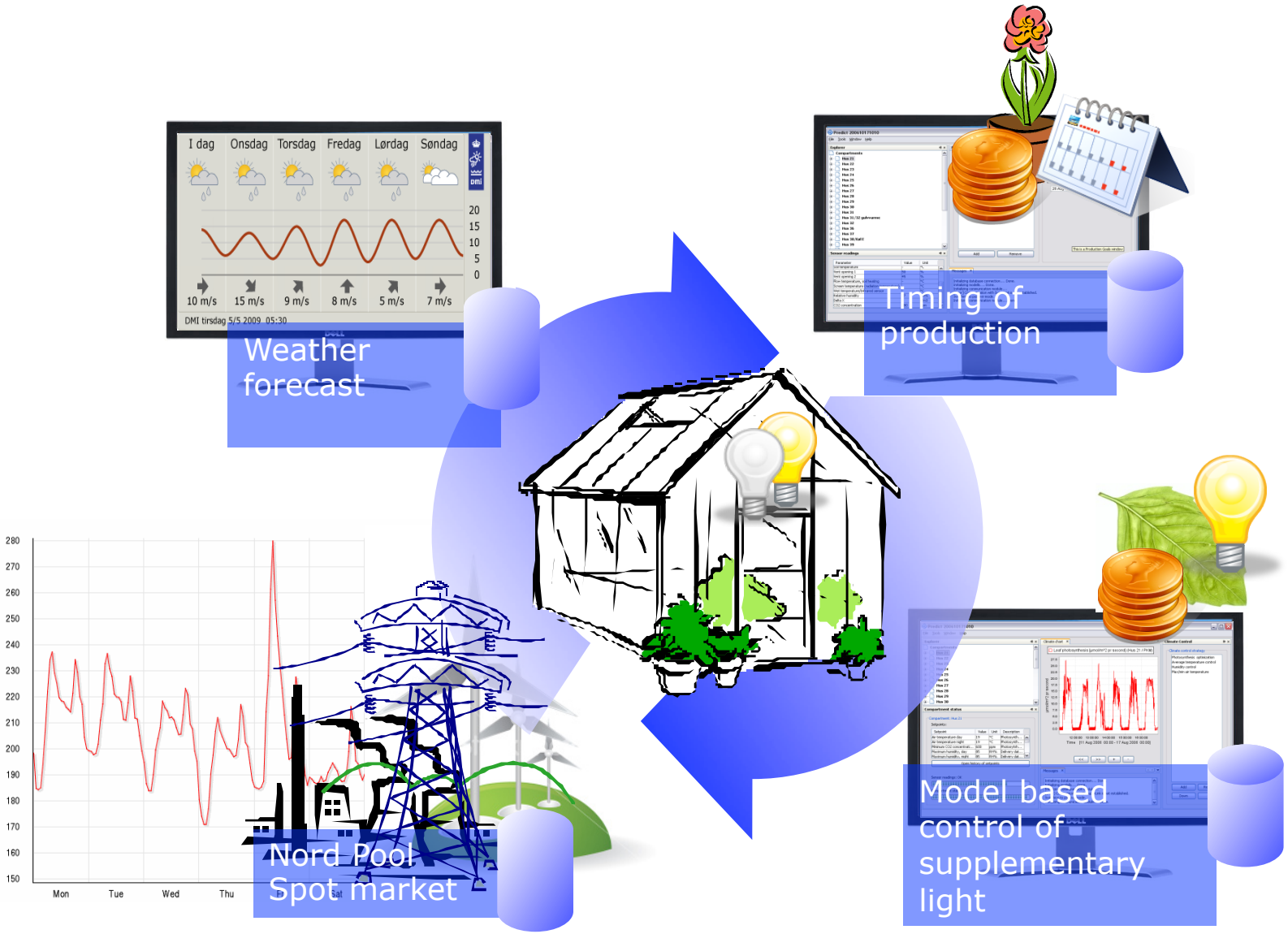
Energy savings 2006-2010

Heating: 20.9%
Electricity: 10.5%

Total since 1996 38% less energy

› Data from ca. 180 nurseries in Denmark

Dynalight – reduction in electricity use



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Overall targets

- implement strategies for energy savings in existing and future greenhouse production
- identify plants with superior productivity under conditions of reduced energy input
- Use ICT to promote implementation
- secure a collaborating platform for regional and national bodies to improve background for policy making and decision making

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Greenhouses connect to the world – Innovation possibilities

- Plant production in greenhouses **is energy variable**
- Production linked to the electric grid so greenhouses can use or supply energy when grid is unbalanced (due to increased non fossil supply)
- Waste or Biogas heating systems
- Possible to make zero energy production and reduce leaching of nutrients and water

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Developing (organic) Greenhouse horticulture in the future

* Large benefits for SME irrespective of crop
* Technology transfer can be made to most parts of Europe
* Close interaction between research and implementation
* Increases the possibilities for reliable local high quality food supply
* Footprint in terms of water and nutrients efficiency need to be improved in organic systems
* Extending the season for local food production

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Thanks for your attention

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