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» Future Solutions for Demand-Controlled Indoor Environment – New Sensor Technologies, Wireless Communication and Innovative HVAC Systems «

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The challenge of future HVAC installations – facing a Paradigm Shift?

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Trends in building construction

Drivers and their effects

Trends in HVAC

Focus and drivers

Future HVAC components and installations

Requirements?

Perceptions?

Solutions?

Wrap-up and Discussion

Drivers

- **Socioeconomic** factors
- Urge for **individualisation**
- **Societal focus** on **energy** and **health: Building regulations**
- User focus on **convenience, well-being** (and health)
- Commercial focus on **cost** and **value** for money

Effects

- **Modular** construction
- **Pre-fab** concepts
- Continuous **customization** e.g. through **relocateable** elements
- Increased **energy performance requirements**
- Increased **requirements on IEQ**

Trends in Building Construction

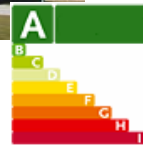
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Modular pre-fab homes



Seest-huse (Denmark)



hjem.as (Denmark)



Maple Homes (Canada, US)



Danhaus
DAS ENERGIESPARHAUS

Danhaus (Germany)



Bo-Klok (Sweden)



Pinc-House (Sweden, Finland)



norden

Nordic Innovation Centre



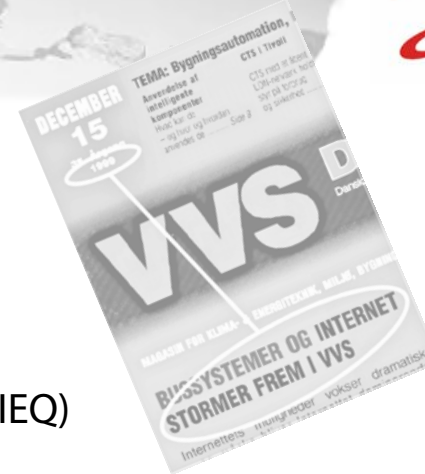
Multisensors and Other New Technology for Improved Indoor Environment in buildings

Focus

- Up-front **cost**
- Proprietary **Functionality**
- **Energy** consumption (and health impact - IEQ)
- **Convenience** and ease-of-use
- **Solutions** – heating, cooling and ventilation becoming commodity
- (**Integration** – with other systems, e.g. windows, lighting)

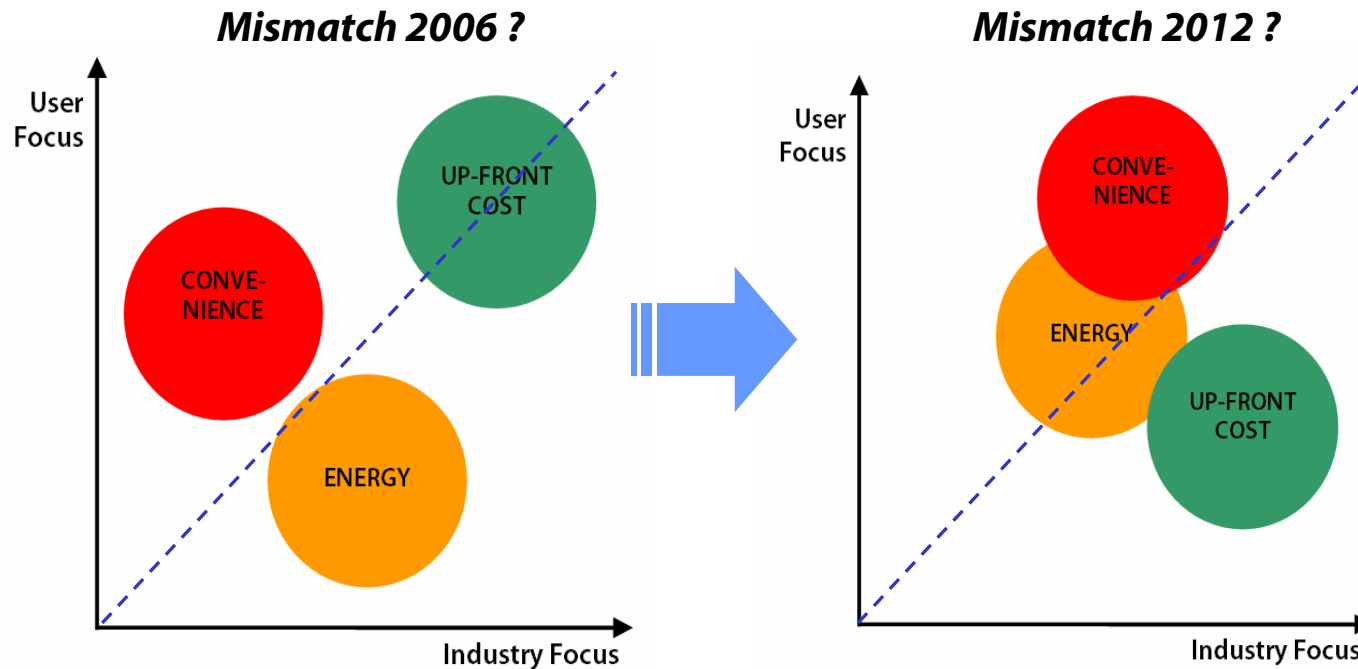
Drivers

- Increased **energy performance** requirements (Building regulations)
- Focus on **cost** (and value for money) at **all levels**
- User focus on **convenience, well-being, health** and **IEQ**
- Increased user requirements on **IEQ**



Priorities – User versus industry

- Do we have a mismatch of focus ?



Future HVAC components and installations

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The **increasing focus** on

- **energy consumption** of buildings
- **modular** and standardized **"fit & forget"** solutions
- quality of **indoor climate**

poses a requirement for

- **better control** systems
- **integrated systems** for heating, cooling, ventilation (*and safety, security, convenience...*)
- **integrated sensors** for heating, cooling, ventilation (*and safety, security, convenience...*)
- new concepts of **modularized installations** and components to support pre-fab building construction

Future needs – Building Management Systems

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Building Management Systems

- **True integrated systems** – solution thinking
- **Modular installation** concepts
- **Cooperation** with constructors
- **Standardized component** joints and interfaces
- Remote **connectivity**

- **Affordable sensors** integrated into HVAC/IAQ system components
- Long-life (10 yr+), low-power, communicating **multi-purpose sensors** – preferably wireless
- Firm identification of **general markers** and levels for good indoor climate

Future needs – Residential Systems

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Residential systems

- **True integrated systems** – solution thinking
- **Modular installation** concepts
- **Cooperation** with constructors
- **Standardized component** joints and interfaces
- Remote **connectivity**

- **Easy-to-install** self-configuring HVAC/IAQ system components
- **Affordable** long-life (10 yr+), low-power, wireless **multi-purpose sensors**
- Firm identification of **very general markers** for good indoor climate
- **Documentation** of system effects and pay-back

Wrap-up



Future needs

- **Integration** for **solutions** rather than singular systems
- **Modularization** and **standardization** of components and systems
- **Cooperation** with constructors

- Well established *and effective* system **control strategies**
- More **dedicated components** (Low cost, Low power)
- Multi-purpose, **multi-function sensors** and **installation components**

- **Full-range concepts** – commissioning + operation + service

- **Mixed system operation** concepts
- General component- and system **cross-brand communication and connectivity**

- Identification of general **suitable climate markers** and levels

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