

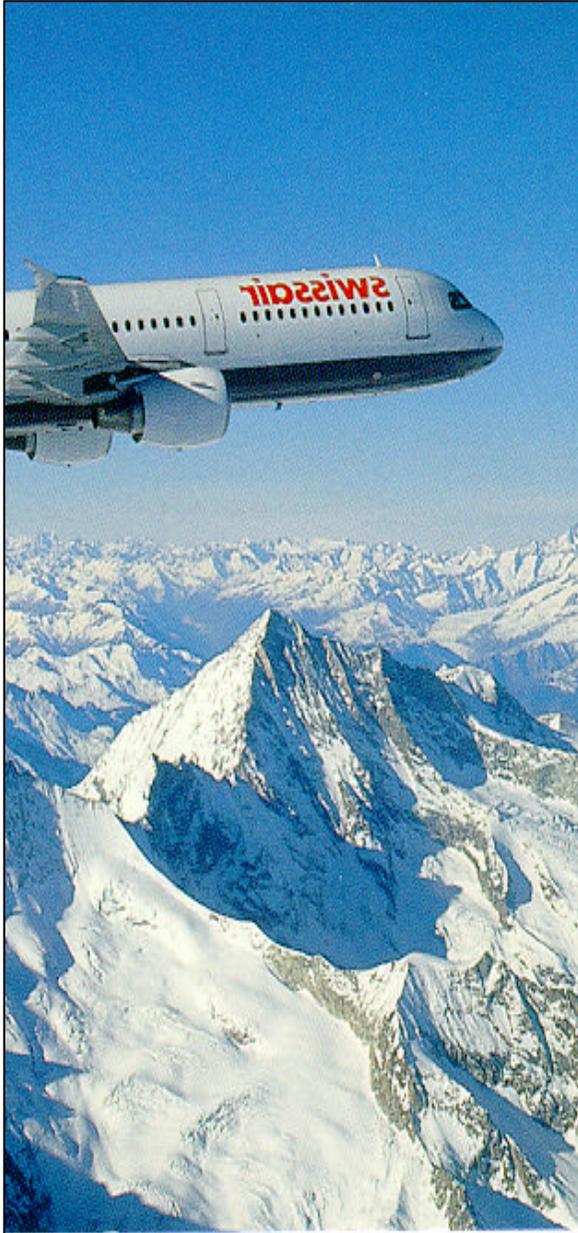


Status Report  
SHC / BCS Task 28 / Annex 38:  
**Sustainable Solar Housing**

49th Meeting of the SHC ExCo  
Bordeaux, France  
13-15 June 2001

The Swiss Federal Office of Energy  
represented by:  
R. Hastings, AEU GmbH





## 1.Overview

**Duration:** April 2000 – April 2005

**Objectives:** Market penetration of sustainable solar housing

**Means:**

- Web site
- Documentation of projects
- Design Handbook
- Demonstration Buildings
- Workshops

**Scope:**

- Energy
- Ecology
- Economy



## 2. Progress last six months

### General:

- Majority of experts funded
- Planned activities begun
- Tools and methodologies tested
- Feedback on Task and mtg. organiz.
- Blds. Docu. and Handbook structured
- Writing and data collection in progress

## 34 Experts from:

Austria  
Australia  
Belgium  
Brazil  
Canada  
Finland  
Germany  
Italy  
Japan  
Netherlands  
Norway  
Sweden  
Scotland  
Switzerland

## 3. Expert Meeting,

Amersfoort NL, 2-4 May 2001



**Task participants**

<p><b>Operating Agent</b> Saskia Federal Office of Energy, represented by Robert Hastings</p> <p><b>Australia</b> Robert Hyde Dept. of Architecture University of Queensland AUS-4072 Brisbane r.hyde@mqbau.uq.edu.au</p> <p><b>Venicea Sorbano</b> Dept. of Architecture, Univ. Adelaide</p> <p><b>Austria</b> Caroline Lenzinger</p>	<p><b>Denmark</b> Ove Høben The Danish Housing Fair Rautavaara OY</p> <p><b>Germany</b> Kerstin Voss Fraunhofer Institute for Solar Energy Systems, ISE Chiemstrasse 9 D 79100 Freiburg kerstin.voss@ise.fhg.de</p> <p><b>Hong Kong</b> Hing Eihom 180, Kowloon Road, Kwai Chung</p>	<p><b>Norway</b> Anne Gunnaarsliq Lien SINTEF Civil and Build. Eng. Architecture and Building Technology Arrested vgt 3 N-7065 Trondheim</p> <p><b>Spain</b> Anna C. Lien@ciqa.iesia.es</p> <p><b>Switzerland</b> Jan Rieber Norwegian State Housing Bank</p> <p><b>Sweden</b> Harald N. Rostak Sveinje and Åker Vågar AS</p> <p><b>Scotland</b> Colin Deane</p>
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Four Subtasks




IEA - SHC Task 28 / ECBCS Annex 38  
**Sustainable Solar Housing**  
Marketable Housing for a better Environment

Participants:

- Australia
- Austria
- Bangladesh
- BRUNN
- Canada
- France
- Germany
- Hong Kong
- Italy
- Japan
- Malaysia
- Norway
- Poland
- Russia
- Spain
- Sweden
- Switzerland
- UK
- USA

IEA  
International Energy Agency

SHC - Solar Heating and Cooling Programme  
ECBCS - Energy Conservation in Buildings & Community Systems Programme

## Subtask A: Market Assessment & Communication

Communication      Lead: A. Lien (N)

**Purpose:** Get results into practice

**Foci:** Brochure and Web Site

**Progress:** Task brochure:

- written and illustrated
- reviewed at exp. meeting
- revised per comments
- PDF sent to ExCo

Web site:

- Created and on line





## Market-Assessment

Lead: P.Erdtsiek (NL)

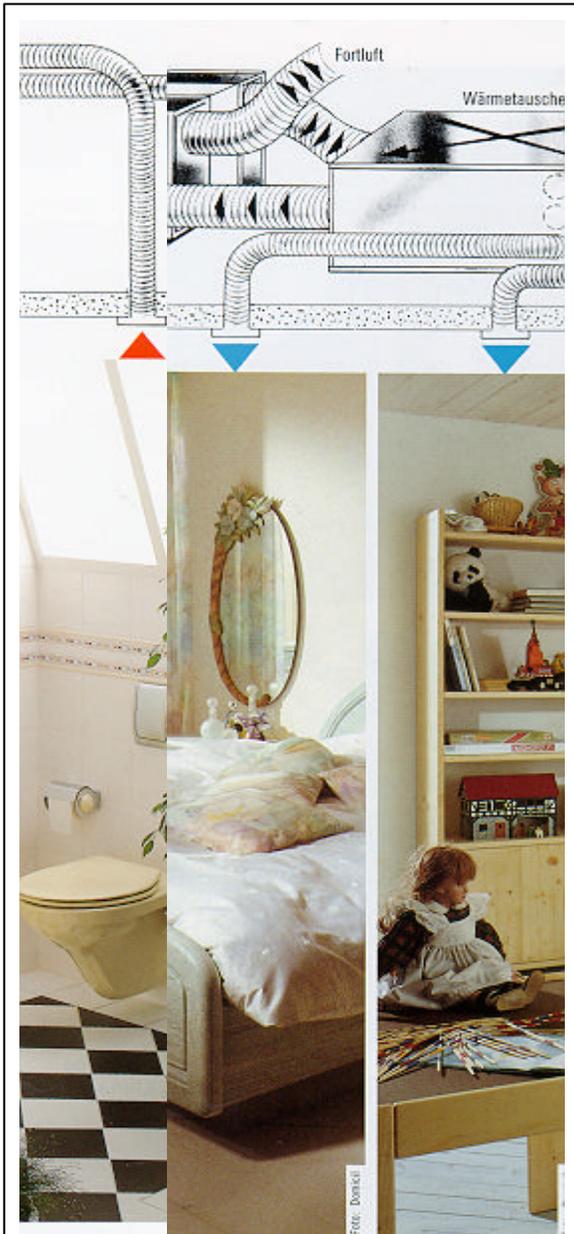
Purpose: Link research to marketplace

Focus: National market situations

Progress: Market situations presented:

- Austria
- Brazil
- Finland
- Italy
- Netherlands
- Norway

Interesting survey results from  
Austria and North America:



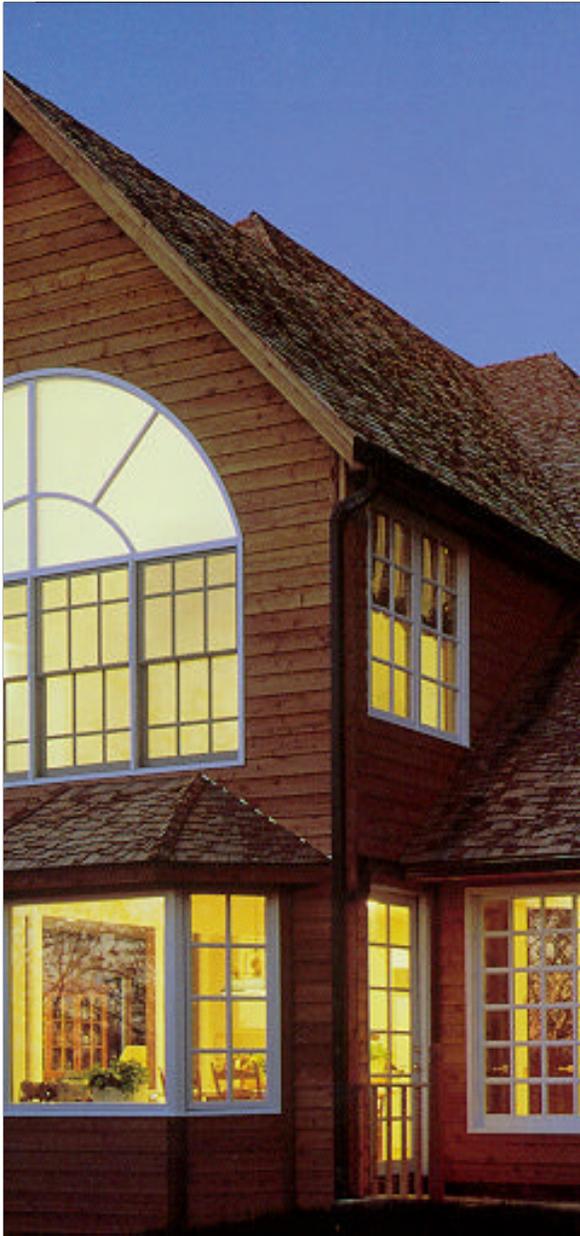
## Austrian Marketing Survey:

### Acceptance of mechanical ventilation

- Questionnaires: 144 residents
- In-depth interviews: 30 residents
- Resulting marketing strategy

### Main results:

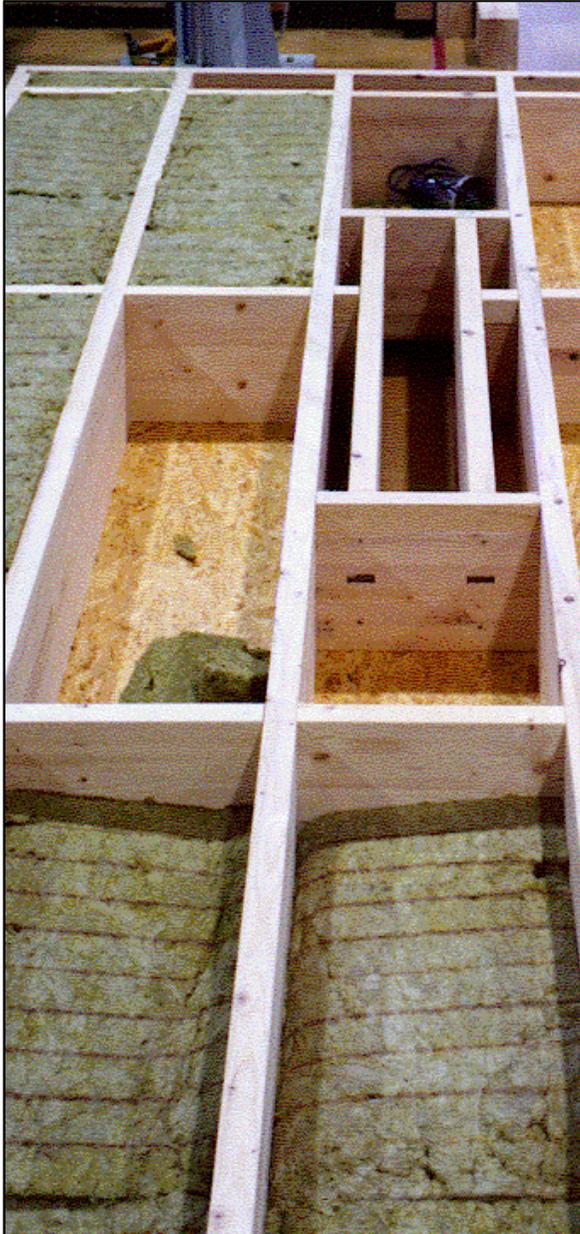
- Satisfaction with ventilation systems  
> 90% of s.f.h. occupants would install system again
- Significant % of neg. responses:
  - noise (41% s.f.h. residents!)
  - too dry air
  - bad control system
- Satisfaction improves for recent sys.



## Homebuilder survey in North America (National Fenestration Council)

- Energy an issue to homebuyers,  
(more so than commercial clients)
- Window selection criteria (rank 1 to 5)

Durability	4.5
Style	4.4
Maintenance	3.9
Heating cost savings	3.8
Price	3.7
Cooling cost savings	3.6
- Lesson for Task 28/38:
  - Maintenance an important issue
  - Aesthetics decisive
  - Energy cost savings a selling point



## **Catalog** Initiator: H. Rostvik (N)

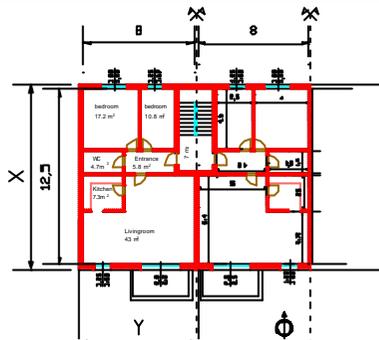
**Purpose:** Share Experts' awareness of key components with designers

**Focus:**

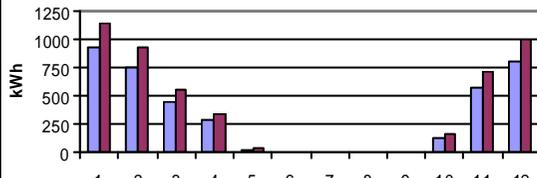
- insulation technologies
- windows
- ventilation systems
- package HVAC systems
- controls

**Proposal:**

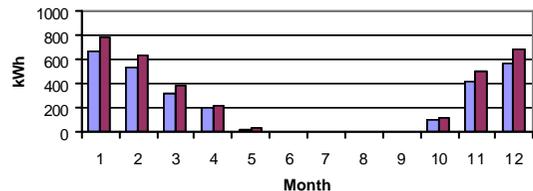
- Make part of our Website
- Use Handbook structure
- Links to manufacturers' & Associations' websites



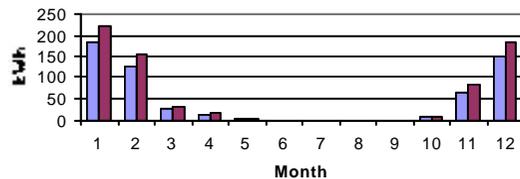
Heating: SIA 380 (44 kWh/m2a)



Heating: Minergie (33 kWh/m2a)



Heating: P.House (10 kWh/m2a)



1<sup>st</sup> DEROB Simulations, Zürich

## Subtask B: Design and Analysis

Handbook Lead: M. Wall (S)\_\_\_\_  
& R. Hastings (CH)

Purpose: Provide detailed advise to specify components for for design strategies of typical solution sets

Focus: Economical and ecological design: low energy buildings

Progress: Chapter outlines tested:

- Daylighting R. Hastings
- Fenestration B. Kaufmann
- Ventilation F. Heidt
- Solar Elec. K. Voss

## Design Strategies

Landscaping  
Form & Orientation  
Direct Solar Gains  
Indirect Gain  
(sunspaces)  
Heat Storage  
Daylighting  
Shading and Venting

## Technologies

Building Envelope  
Ventilation  
Heat Delivery  
Heat Production  
Storage  
Electricity  
Control Systems  
Water

## Handbook Structure

- I. Introduction
- II. General Principles
- III. Advice by Building Types and Climates
- IV. Typical Solution Sets
- V. Design Strategies
- VI. Technologies

### Appendices

Tools / Methods

Climates

Calculation Assumptions

Key Data



## Energy Analysis      Lead: M. Wall (S) & R. Hastings (CH)

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Purpose: Quantitative advice for the HB on relative importance of design decisions

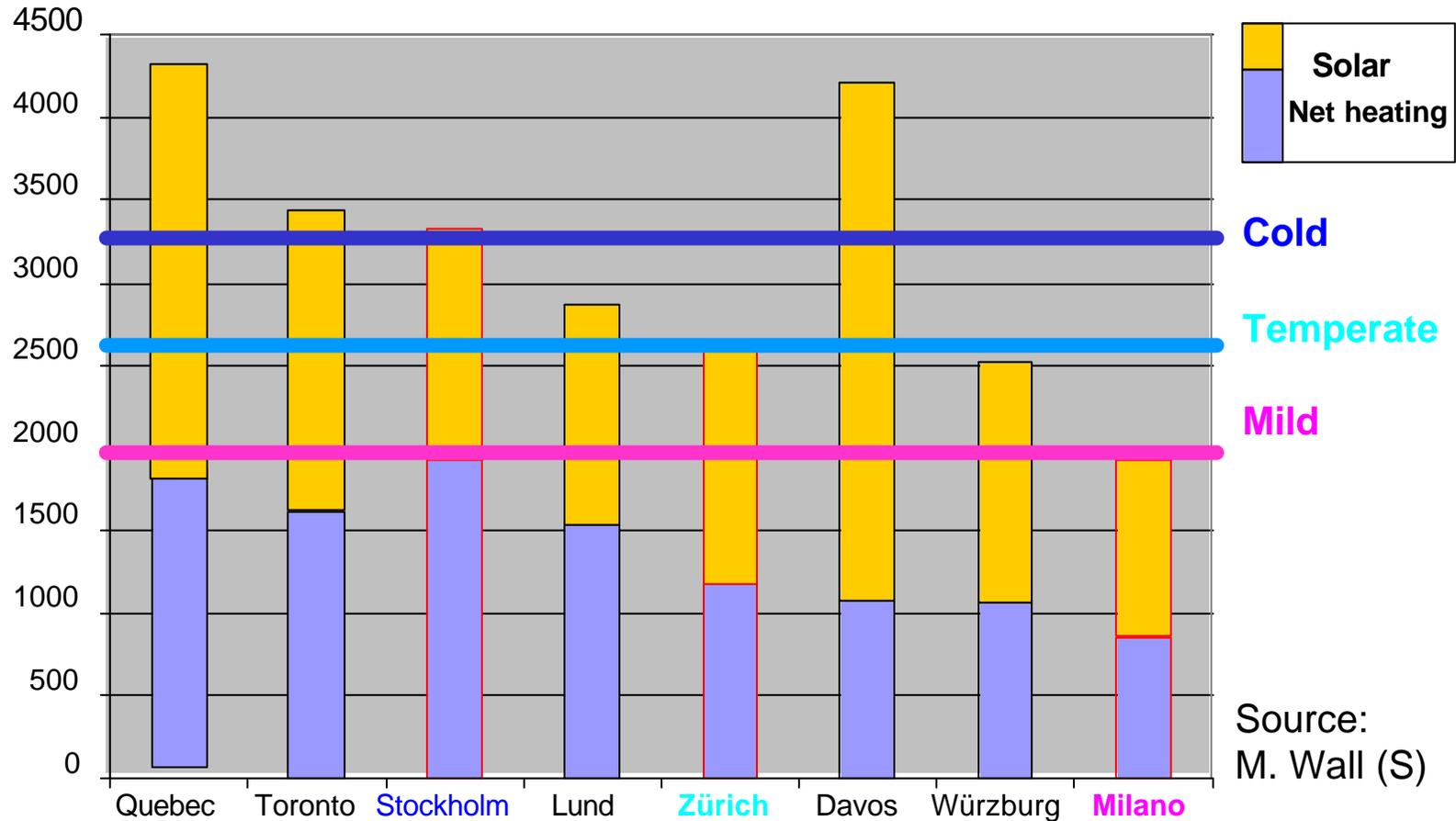
Focus: Typical solution sets for

- three ref. building types
- three climates

Progress:

- Ref. buildings defined
- Construction specified per 10 nat. bld. codes
- Climates analyzed, selected
- Test simulations done

## Heating Demand of the IEA Reference Row House - unoccupied





## LCA Analysis      Lead: A.Lalive (CH)

**Purpose:** Check if less energy used over building life justifies conservation and solar

**Focus:** LCA of selected bldgs. and typical solution sets

**Progress:** Criteria developed to characterize houses

Sources:

- GBC'98
- E-Top Rating (BFE)
- SIA D0164
- Univ. Le Louvain, Arch. & Climate Group



## **Subtask C: Demonstration**

(Lead: R. Hyde (AUS))

**Purpose:** Help market penetration by showing results as built projects

**Focus:** Design briefs to specify goals and preferred technologies  
(Rules for the design)

**Progress:** Outline for a working doc.



## **Design Briefs (Working Doc.)**

### **Part 1: Design Brief Elements**

- Function
- Environment
- Eco - Cost-efficiency

### **Part 2: Example Design Briefs**

- NL: World Wild Life Brief
- N: Norwegian Bank Brief
- BR: Low Cost Brazilian House
- D: Gelsenkirchen Solar Housing
- AU: Low Cost Australian House
- CD: Healthy Home
- J: Misawa Home Co
- I: Saline Sustainable Solar Typ.
- S: Gothenburg Project
- A: Solar City Innovative Linz  
House of the Future



## Subtask D: Monitoring and Eval.

Lead: K. Voss (D)

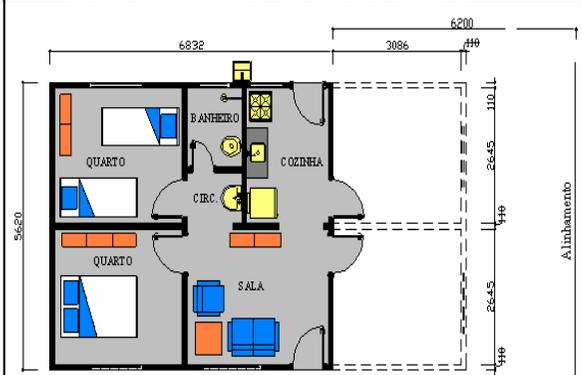
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**Purpose:** Characterize exemplary sustainable housing in a standardized way

**Focus:** Data sets, text and graphics

**Progress:**

- Excel sheet distributed
- Data sets submitted from D, SE, FIN, CH (A + NL)
- Cross comparisons begun



## Working Nat. Cooling and Solar Use

Spokesperson: M. Hammerle (BR)

Purpose: Design advise for sustainable solar housing in hot climates illustrated with examples

Focus: Hot, humid climates

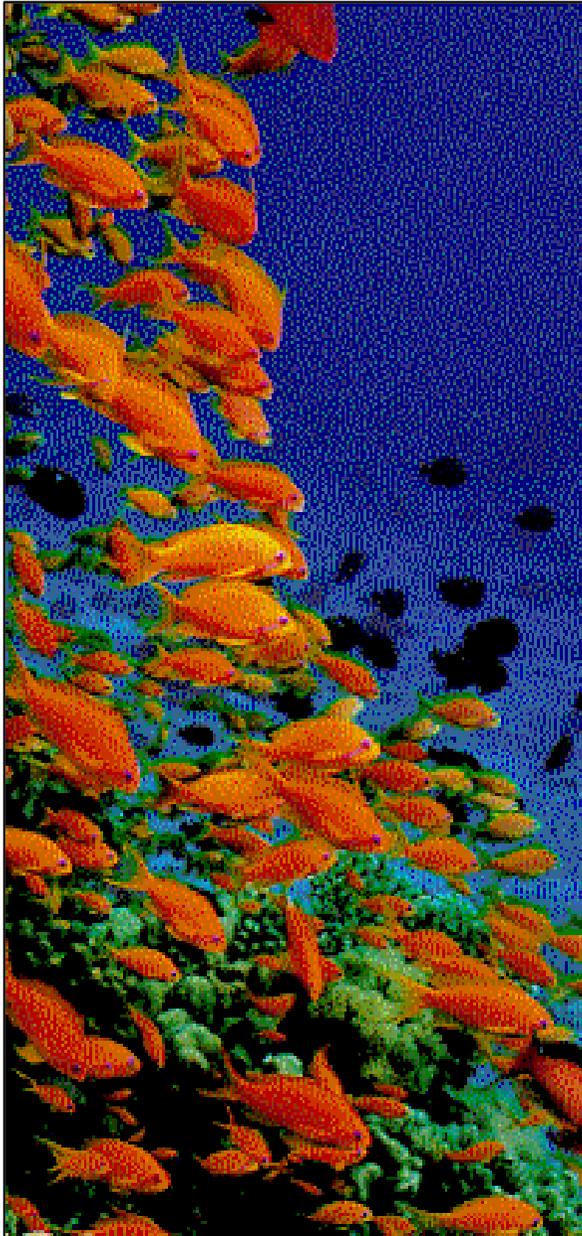
Progress: - Key design indicators identified from buildings

- Technologies and strategies selected

- Prototype designs:

- Houses: BR, AUS

- Facade system: Italy



### **3. Next 6 months:**

#### **A. Communication and Marketing:**

- Print and distribute Task brochure
- Update Website
- Hold Market Analysis Workshop
- Write abstracts: market & strategies
- Start catalog

#### **B. Analysis**

- Outline additional HB chapters
- Calc. ref. energy use per EN 832
- Complete first optimiz. simulations
- LCA of first house



## **C. Demonstration Projects**

- Abstracts of example design briefs
- Task input to Demo-Project designs

## **D. Evaluation:**

- Complete additional data sets
- Draft Working Doc. on Buildings
- Draft of Glossary of Terms

## **Cooling Group:**

- Outline chapters on strategies
- Input to model building codes
- Input to prototype designs



## **4. Issues for the ExCo**

- E-mail approval to print Task Brochure by 30. June, ok to print in July.
- Input and speakers for Workshop Market Assessment, 25. Sept.
- Help identify demo. projects SCH

## **5. Next Task meeting:**

Bregenz (A) 25-29. Sep. 2001

- Workshop: Market Assessment
- Expert meeting
- Workshop: Market assessments
- Technical tour of housing