

# EUREKA PROJECT E!446 - EUROCARE CAREBUILD

## 1. General description

|                       |  |                           |                        |
|-----------------------|--|---------------------------|------------------------|
| <b>Project</b>        | E! 446 - EUROCARE CAREBUILD  | <b>Status</b>             | Finished - 14-JUL-2000 |
| <b>Title</b>          | <b>Envelope Buildings For Historic Buildings, Monuments, Stone Ruins, Etc.</b>   |                           |                        |
| <b>Class</b>          | Sub-Umbrella   | <b>Technological area</b> | Environment            |
| <b>Start date</b>     | 01-JUN-1990  | <b>End date</b>           | 01-JAN-2000            |
| <b>Duration</b>       | 115 months   | <b>Total cost</b>         | 0.37 Meuro             |
| <b>Partner sought</b> | No   |                           |                        |
| <b>Summary</b>        | Environmental, Climatological, Preservation, Architectural And Economic Aspects Of Protection Buildings For Monuments, Ruins, Etc. |                           |                        |

## Budget and duration

| Phase        | Budget(Meuro) | Duration (Months) |
|--------------|---------------|-------------------|
| <b>Total</b> | <b>0.37</b>   | <b>115</b>        |

## Member contribution

| Member        | Contribution  | Position                 | Since              |
|---------------|---------------|--------------------------|--------------------|
| <b>Norway</b> | <b>88.00%</b> | <b>Notified Finished</b> | <b>14-JUL-2000</b> |
| Sweden        | 12.00%        | Notified Finished        | 14-JUL-2000        |

## Participants

| Company   | Country       | Type                 | Role        |
|---|---------------|----------------------|-------------|
| <b>Dr. Techn. Kristoffer Apeland A/S<br/>(Consulting Engineers)</b> | <b>Norway</b> | <b>SME</b>           | <b>Main</b> |
| Erichsen & Horgen A/S   | Norway        | Large company        | Partner     |
| Lth - Building Science Department Lund<br>Institute Of Technology   | Sweden        | University           | Partner     |
| Riksantikvaren (Central Office Of Historic<br>Monuments/Sites)      | Norway        | Governm./Nat. Admin. | Partner     |
| Nilu - Norwegian Institute For Air<br>Research                      | Norway        | Research Institute   | Partner     |
| Lund Og Slaatto Arkitekter A/S                                      | Norway        | SME                  | Partner     |

## 2. Project outline

### Project description

#### 1. Background:

Degradation of culturally valuable buildings, monuments and ruins has been accelerating in recent years, primarily due to a combination of climatic and polluting effects. The origin of the project was a decision made by the NORWEGIAN INSPECTORATE OF ANCIENT MONUMENTS AND HISTORIC BUILDINGS (RIKSANTIKVAREN) that the ruin of the old cathedral of Hamar, NORWAY would have to be protected by a building, in order to save it from complete demolition. To this end, an architectural competition was held at which the architects Lund and Slaatto won first prize, with Dr. Techn. Kristoffer Apeland as consultant. In 1988 it was decided to carry out a pilot study for the project. In starting up the pilot study, it was realized that the problems encountered were of a general and interdisciplinary character, which would fit in with the EUROCARE concept. It was therefore decided to initiate a EUROCARE project within whose framework the Hamar ruin should serve as a case.

#### 2. Objectives:

The prime objective of the project is to develop criteria, tools and methods for the evaluation of protection systems, and to develop concepts for protection buildings. The following sub-objectives may be stated:

1. Establish and classify criteria for climatological and environmental conditions being relevant for the field.
2. Develop architectural and technological criteria for protection buildings.
3. Establish archaeological and preservation criteria in accordance with the environmental and technological criteria for protection buildings.
4. Apply and evaluate criteria and methods in connection with the construction of envelope building for the Hamar ruin and other cases.
5. Develop appropriate designs for combination of light structures and glass or other transparent materials, in accordance with architectural, climatological and preservation criteria.

### Technological development envisaged

Criteria for evaluating the need for protection buildings will be developed. Architectural and technological requirements and criteria for envelope buildings will be developed, scrutinized and evaluated. Preservation problems in connection with envelope buildings will be investigated so that criteria can be developed. Methods for the preservation of archaeological layers in the ground will be evaluated. Classification of problems pertaining to variations in outer climate will be developed.

### Markets application and exploitation

The results will be of interest all over the world.

Commercial exploration for consulting services as well as technology packages will be drawn up.  
The NATIONAL HERITAGE TRUST, Restoration and Conservation companies, Research Institutes and Training Centres.

## Project codes

### **BSI**

|       |                            |
|-------|----------------------------|
| BKK   | meteorological measurement |
| GD    | air pollution              |
| RBJ.D | building conservation      |
| ZO    | history                    |
| ZV/ZY | culture                    |

### **NACE**

|      |   |
|------|---|
| 7310 | Research and experimental development on natural sciences and engineering |
|------|---|

### 3. Main participant

**Company** **Dr. Techn. Kristoffer Apeland A/S (Consulting Engineers)**  
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0360 Oslo  
Norway

Tel +47 22 46 50 80  
Fax +47 22 69 03 19

**Contact** **Prof. Kristoffer Apeland**  
Technical Director

Tel +47 22 46 50 80  
Fax +47 22 69 03 19

**Organisation type** SME  
**Participant role** Main

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### Contribution to project

133,000 NOK. Share from NTNf: 744,000 NOK.

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### Expertise

Envelope buildings, structural safety, maintenance of buildings, materials technology, degradation of building materials, building construction, concrete research, service life for concrete.

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### 4. Partner

**Company** **Erichsen & Horgen A/S**  
Hansteenst., 5  
0253 Oslo  
Norway

Tel +47 22 44 18 40  
Fax

### Contact

Tel  
Fax

**Organisation type** Large company  
**Participant role** Partner

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## Contribution to project

10,000 NOK.

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## Expertise

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### 4. Partner

**Company** **Lth - Building Science Department Lund Institute Of Technology**  
(Not Available),  
221 00 Lund  
Sweden

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[www.lth.se](http://www.lth.se)

**Contact** **Mr. Bo Adamsson**

Tel  
Fax

**Organisation type** University  
**Participant role** Partner

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## Contribution to project

220,000 NOK. Share from NUTEK: 300,000 NOK.

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## Expertise

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### 4. Partner

**Company** **Riksantikvaren (Central Office Of Historic Monuments/Sites)**  
0034 Oslo  
Norway

Tel +47 22 94 04 00  
Fax +47 22 33 29 22

**Contact**

Tel  
Fax

**Organisation type** Governm./Nat. Admin.  
**Participant role** Partner

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## Contribution to project

1,377,000 NOK.

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## Expertise

Responsible for the care and protection of NORWAY's cultural heritage, whose main duties include: - establishing the aims and objectives, both short and long-term, for the care and protection of the country's cultural heritage - establishing and maintaining guidelines and criteria for preservation and conservation work - drawing up guidelines for the care and maintenance of specific buildings, sites and other objects related to NORWAY's cultural heritage - dissemination Government information relating to NORWAY's cultural heritage.

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## 4. Partner

**Company** **Nilu - Norwegian Institute For Air Research**  
Instituttveien, 18  
2007 Kjeller  
Norway

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**Contact** **Ing. Svein E. Haagenrud**  
Eurocare Chairman

Tel +47 22 96 55 55  
Fax +47 22 69 94 38

**Organisation type** Research Institute  
**Participant role** Partner

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## Contribution to project

15,000 NOK.

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## Expertise

Air pollution research, climatic research, impact on materials - studies on effects, field test sites, climatic chambers, measurements and the analysis of microenvironmental variables, especially time of wetness

measurement.

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## 4. Partner

**Company** **Lund Og Slaatto Arkitekter A/S**  
Drammensveien, 127  
0277 Oslo  
Norway

Tel +47 22 55 48 00  
Fax +47 22 44 80 53

### Contact

Tel  
Fax

**Organisation type** SME  
**Participant role** Partner

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### Contribution to project

46,000 NOK.

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### Expertise

Architectural firm with a wide range of design experience from cottages (Aal Hytta) to NORGES BANK headquarters. Prize winners in the national architectural competition for an envelope building protection for the ruin of Hamar Cathedral.