



# Eco-Library Design

John A. Flannery · Karen M. Smith

---

# Eco-Library Design



---

John A. Flannery • Karen M. Smith

# Eco-Library Design

 Springer

John A. Flannery  
Boston Spa Media  
Boston Spa, Leeds, LS23 6DR  
United Kingdom  
www.bostonspamedia.com

Karen M. Smith  
Boston Spa Media  
Boston Spa, Leeds, LS23 6DR  
United Kingdom  
www.bostonspamedia.com

ISBN 978-94-007-4077-8      ISBN 978-94-007-4078-5 (eBook)  
DOI 10.1007/978-94-007-4078-5  
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013944288

© Springer Science+Business Media Dordrecht 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# **ECO-LIBRARY DESIGN**

John A. Flannery and Karen M. Smith



# ECO - LIBRARY DESIGN

## 4 Introduction

### New Build

- |    |  |     |  |
|----|--|-----|--|
| 6  | Amsterdam Public Library, Amsterdam, Netherlands                         | 68  | Oak Park Public Library, Oak Park, USA           |
| 20 | Ballard Library and Neighborhood Service Centre, Seattle, USA            | 76  | The Open-Air-Library, Salbke, Germany            |
| 32 | Centro Culturale Elsa Morante, Rome, Italy                               | 86  | Phoenix Central Library, Phoenix, USA            |
| 40 | Gando School and Library, Gando, Burkina Faso                            | 98  | Traverwood Branch Library, Ann Arbor, USA        |
| 48 | King Abdullah University of Science and Technology, Thuwal, Saudi Arabia | 112 | University of Aberdeen New Library, Aberdeen, UK |
| 58 | Liyuan Library, Huairou, China   | 122 | University of Arizona Poetry Center, Tucson, USA |



## Adaptive Re-Use

- 132 City of Sydney Library Customs House, Sydney, Australia
- 140 Cybertheque, McGill University, Montreal, Canada
- 148 Old Market Library, Bangkok, Thailand
- 156 Willingboro Public Library, Willingboro, USA

## Hybrid Construction

- 166 Albertslund City Library, Albertslund Kommune, Denmark
- 174 Arkansas Studies Institute, Little Rock, USA
- 186 Centennial Library Winnipeg, Winnipeg, Canada
- 190 Central Library of Law University of Hamburg, Hamburg, Germany
- 204 Library on Cork Street, Winchester, USA
- 214 UC Berkeley School of Law, Berkeley, USA
- 226 Photo Credits
- 228 Index



# Introduction

“A university is just a group of buildings gathered around a library.”

Shelby Foote

**“The only thing that you absolutely have to know, is the location of the library” Albert Einstein**

Pick your own favourite quotations about libraries, there are many to choose from. In a world where the cost of a university education is now so daunting that it precludes many, I was interested to read the following: “I spent three days a week for ten years educating myself in the public library, and it’s better than college. People should educate themselves - you can get a complete education for no money. At the end of ten years I had read every book in the library and I’d written a thousand stories.” Ray Bradbury (1920 - 2012).

My own particular granite columned haven was the Leeds Central Library in the industrial north of England. Built between 1878 and 1884 to a design by architect George Corson, this imposing example of Victorian architecture is now a grade 2 listed building. Aware of the economies of scale that the building would provide, Leeds City Council determined a hybrid model for the Central Library building. It would include not only a free public lending library, a reading room, and a reference library, but also municipal offices where the people of Leeds would pay their gas, water and rates bills. The first and second floors housed the Borough Engineers and the City Sanitary departments. The city’s art gallery was opened in the same building in 1888. Constructed from locally quarried Yorkshire stone in the 19th century, and surviving almost 130 years of continuous and adaptive re-use to date, the Leeds Central Library is manifest proof in my home town that sustainable library

architecture is not a new phenomenon.

The worldwide perspective of this publication reveals a diverse definition of the modern eco-library. In the developing world, a simple room in which to read, carefully constructed from locally salvaged materials can change the lives of a poverty stricken population. This is demonstrated in both the flood prone Old Market Library of Bangkok and the dust dry Gando School Library.

In the developed world, the determination of municipal authorities to develop main and branch libraries as a public demonstration of considered sustainable design is gaining momentum.

From the University of Aberdeen to McGill University’s Cybertheque, Montreal, technologically advanced libraries are now built as working models of best practice, providing an enhanced user experience by adapting to the changes in the way information is now stored and disseminated.

The featured projects consistently demonstrate a determination to reduce energy and water consumption whilst eliminating the wasteful use of material resources. When this can be done with limited finance and the help of the local population, as in the former East German city of Magdeburg, a rewarding renaissance in social and cultural life can often be an additional benefit.

The architects and engineers who have contributed to this book faced the challenge of new build, adaptive re-use, or a combination of the two with the common goal of delivering the best possible Eco Library Design to the communities they serve.

*John A. Flannery*



# Amsterdam Public Library

Amsterdam, Netherlands

2007

JCAU

JO COENEN ARCHITECTS AND URBANISTS

[www.jocoenen.com](http://www.jocoenen.com)

**Amsterdam Public Library** lies on the eastern edge of the historic city centre. With port operations moving westwards, an ambitious plan to urbanise the south bank of the IJouwer inlet was devised to cope with the growth of the city around the main transport hub of the Central Station. The expansion of residential, commercial, recreational and public facilities from the city centre on to the Eastern Dock Island (Oosterdokseiland) was identified as a catalyst for economic growth in the Dutch capital. The new metropolitan area is approximately 48,000 m<sup>2</sup> and will accommodate 225,000 m<sup>2</sup> of contemporary architecture.

The island's infrastructure includes a long-term energy storage system, (LTES), developed, installed and operated by Cofely GDF Suez. By combining heat and cold generation with in-ground storage, the connected buildings benefit from the

maintained sustainable energy source. Winter cooling energy stored in the ground is utilised in summer, with the process reversed in the winter. On the very coldest winter days the heat pumps are supplemented by a bio-oil fired boiler, which provides the last 5 - 10% of demand. Buildings with varying patterns of heating and cooling can balance demand using the residue of energy from neighbouring buildings, as both warm and cold wells are accessible simultaneously. Significant energy savings have been recorded through post construction monitoring. When former state architect (Rijksbouwmeister) Jo Coenen was commissioned to design the Amsterdam City Library, he invoked a Neolithic architectural philosophy for the building. The usable space would be 'internally carved' from a prestigious, stone clad, structure (Figs. 1, 2, 3).

Population | 820,654

Co-ordinates | 52°22'23" N  
4°53'32" E

Elevation | 2 m (7')

Precipitation | 914.6 mm (36.00")

Temperature | Average High:  
13.8 C (56.8 F)  
Average Low:  
6.4 C (43.5 F)

Humidity | 82.5%





Bibliothèque





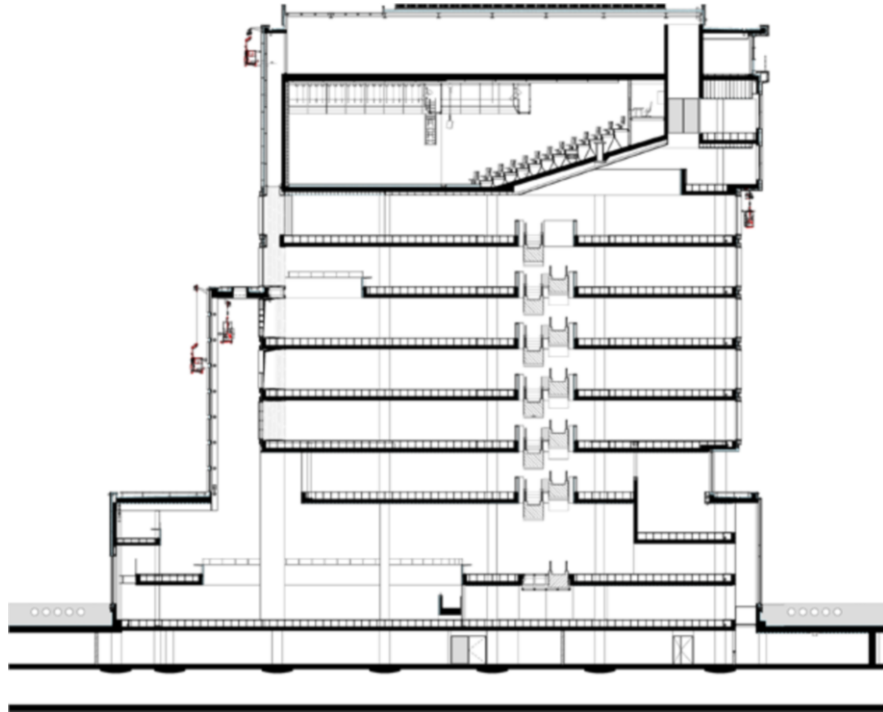
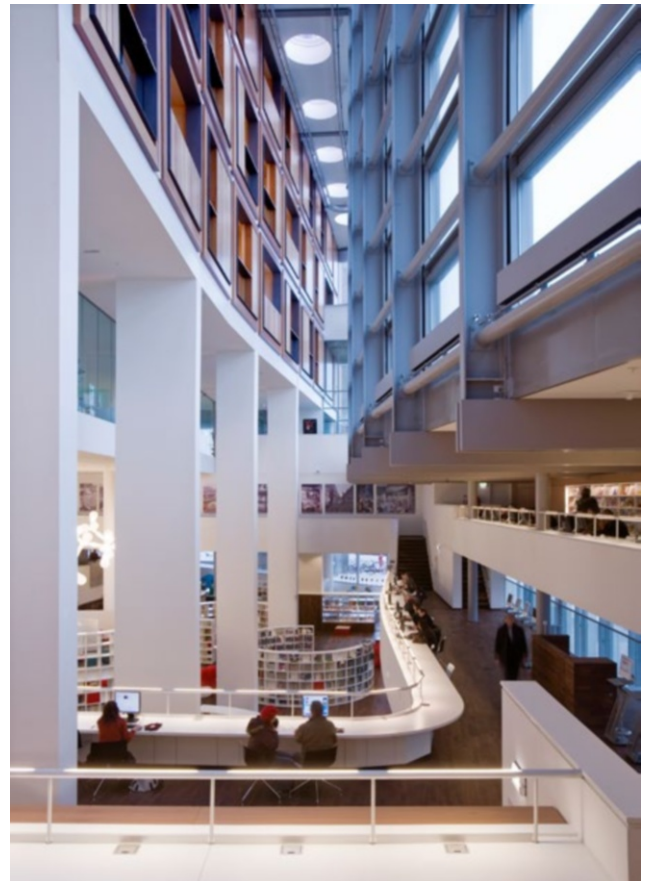


Fig. 4. above | Fig. 5. below

**Within this voluminous,** 28,500 m<sup>2</sup> civic building (the largest library space in Europe), Coenen 'carved' a series of ten, interconnecting, cavernous voids, stacked up to 40 metres high above the old dock. The projections and cantilevers were designed to tangentially harvest, and transfer Northern hemisphere daylight, (Figs. 4, 6). This strategy was enhanced by undercutting, and curving the fenestrated facades (Fig. 5). On plan, the building footprint measures an average of 40 metres wide x 120 metres long (Fig. 7). The structural composition of the building is derived from the desire to keep the internal space open, flexible, and user friendly. By limiting the use of structural columns and walls to maintain future-proof open plan spaces, the fire regulations had to be satisfied through strategically designed escape routes, combined with a sprinkler system. These measures mitigated the requirement to compartmentalise the building. This policy provided the additional benefit of CO<sub>2</sub> level triggered air changes being allowed to flow through the created voids, eliminating the requirement for ducting. Electrical and data cabling was accommodated in the industry standard, raised access flooring.



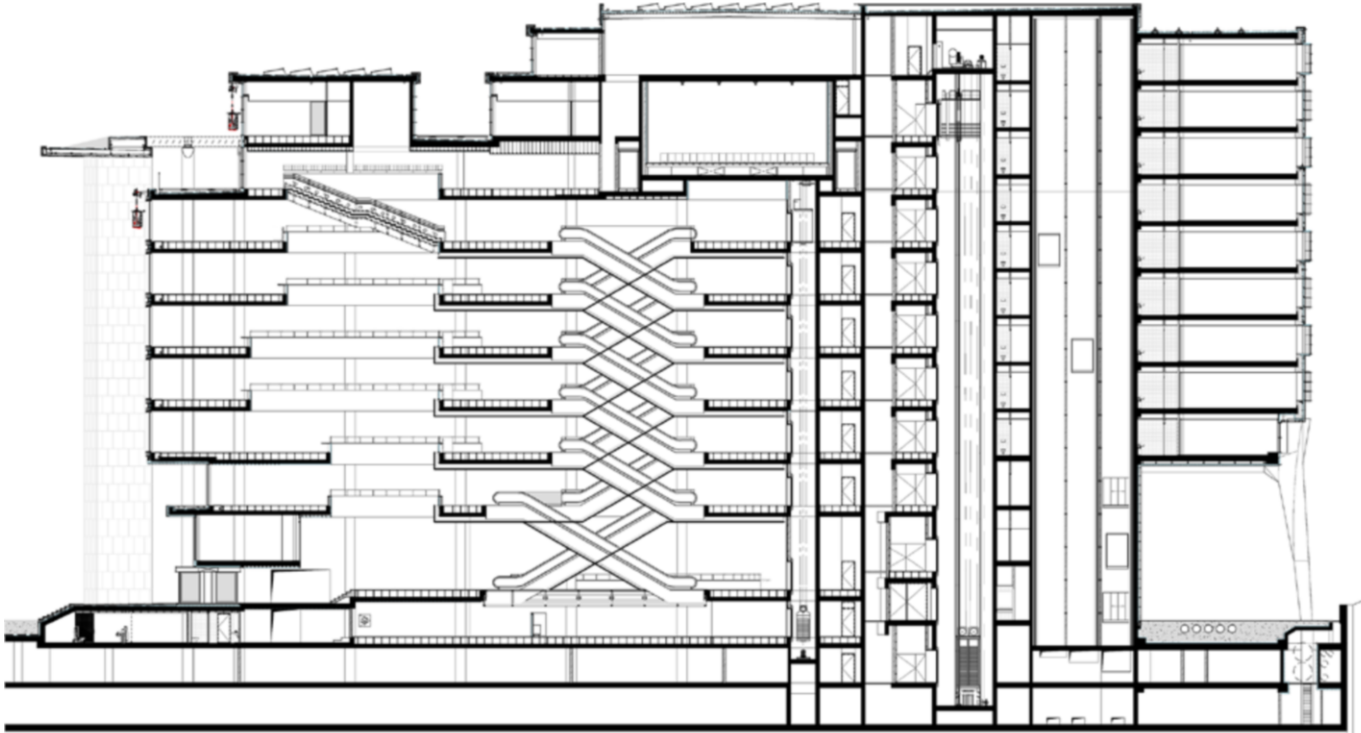
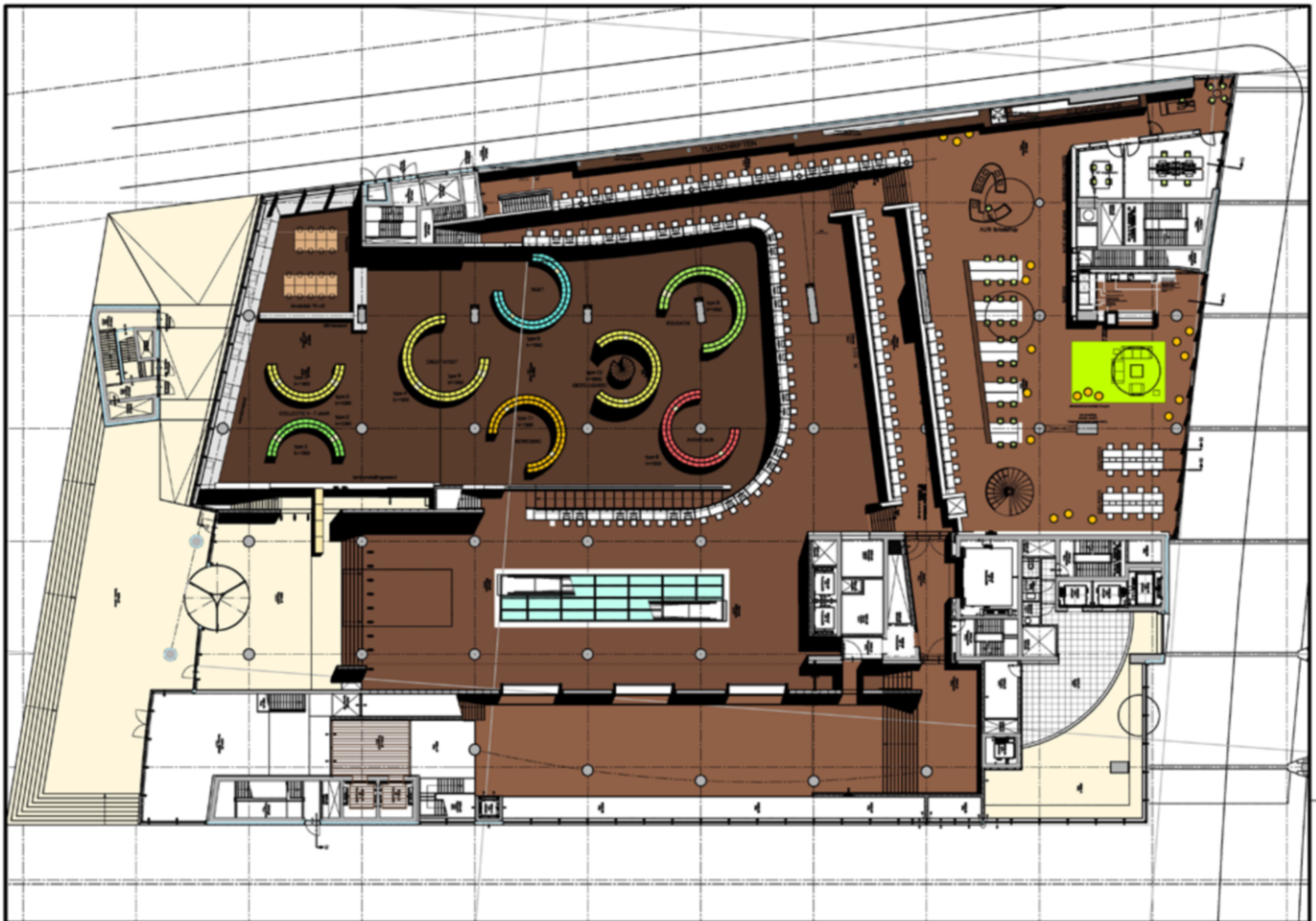


Fig. 6. above | Fig. 7. below



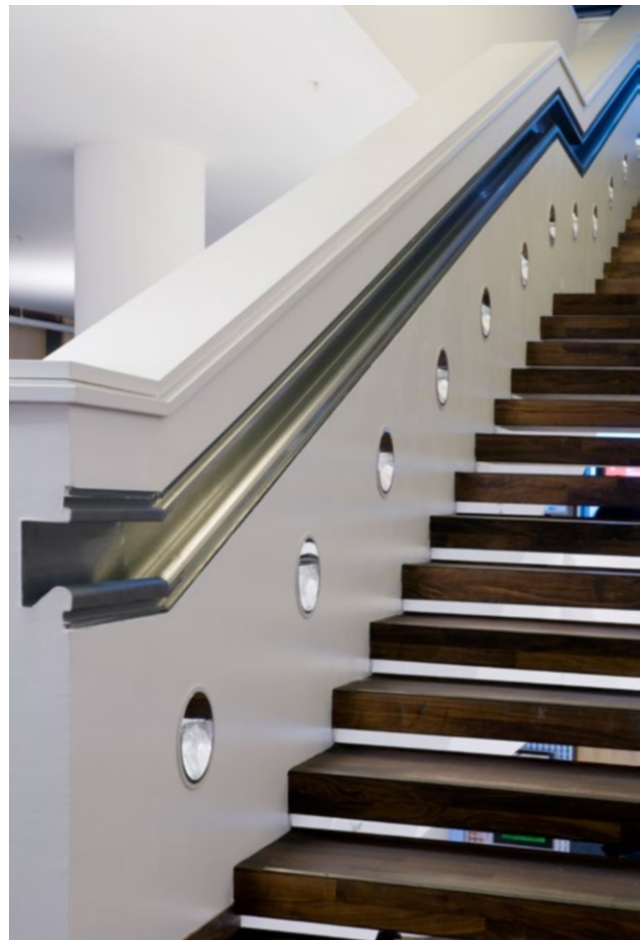


**Openbare Bibliotheek Amsterdam** is one of Europe's new generation of eco-cultural buildings, and has become a major attraction in a city that is also home to the Rijksmuseum and the Van Gogh museum. An average of 7,000 visitors pass through its revolving doors every day of the week from 10:00 a.m. to 10:00 p.m. The annual total is 2.5 million. Other than the library facility, believed to house more than 1.7 million books, visitors are attracted to the Library Museum, The Gerard Reve Museum, a 270 seat Library Theatre, a 50 person Education Room and 6 Meeting Rooms.

Additionally, the library patrons have access to 1375 seats in spaces of varied scale, 50 multimedia workplaces, 110 catalogue terminals, 26 lending machines, print and copy facilities and 600 PC restaurant with internet access and MS Office. Expert advisors serve the quick reference counter.

On the 7th floor a south-facing terrace provides views of the Dutch capital from the La Place self-service restaurant. The library is accessible

from the integrated public transport system comprising, train, tram, bus, and metro. There are 1,200 car-parking places and 2,000 bicycle racks for Amsterdam's cycling citizens. A total of 200 staff serves this metropolitan moveable feast. In designing the library's interior spaces, the architect sought to provide a series of "pleasant spots" to enhance the reader's comfort. Visitors can meet, socialise, browse or relax in a tranquil space, surrounded by books or overlooking the city (Figs. 8, 10). Where natural light fades in the core of the building, illuminated elevators provide a beacon to aid navigation. Light transmission to the stairwells via portholes provides a reminder of the site's nautical heritage (Figs. 9, 11). Similarly, a curved bay window, redolent of the stern of historic ships, provides a panoramic watery view. An opposing convex facade allows light penetration deeper into the building (Figs. 2, 3, 12, 16). The tradition of grand, balconied reading rooms is carried vertically through the library around the light filled atrium (Fig. 13).









**The ECO-Culture** project set up and funded by the European Commission DG-TREN with 1.93 million EUR. had the aim of “Demonstration and dissemination of ECO concepts for high-performing European cultural buildings”. The project’s primary objectives were to demonstrate reductions in energy usage and consequential falls in CO2 emissions. The project monitored the design, construction and operation of three new millennium buildings: the Royal Playhouse in Copenhagen, Denmark, the Opera House in Oslo Norway, and the Amsterdam Public Library in the Netherlands.

The varied technologies applied in the Netherlands included: energy storage, ground-source heat pumps, demand controlled hybrid ventilation, building integrated photo voltaic (PV) systems and advanced Building Energy Management Systems (BEMS). The EC final report (executive summary) concludes that the ‘whole building approach’ has proved to be a most effective tool for ensuring low energy consumption and appealing architecture.

Post-construction monitoring using the Building Energy Management System has revealed the following results for the library operation, compared to targets set by the ECO-Culture project:

**Reduce energy consumption related to cooling.**

Target reduction 75-80 %: Actual reduction 60%

**Reduce CO2 emissions related to cooling.**

Target reduction 75-80%: Actual reduction 60%

**Reduce energy consumption related to heating.**

Target reduction 35-50%: Actual reduction 41%

**Reduce CO2 emissions related to heating.**

Target reduction 35-50%: Actual reduction 15%

The systems are constantly reviewed via the BEMS to optimise performance. Amsterdam Public Library possesses an Energy Performance Certificate with an impressive rating of A + 0.51.

A final ECO-Culture goal of dissemination is achieved with the public face of the library being punctuated by a photovoltaic solar energy system, enhancing public awareness of renewable energy in a highly visible location (Figs. 15, 16).







