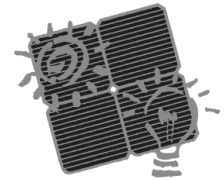




IEA PVPS Task VII
Photovoltaic Power systems in the Built Environment



Outcomes Workshop May 2001

The Netherlands, Amsterdam Rai, 9 May 2001

Outcomes IEA Task 7 Workshop
Building with PV - New product opportunities
Amsterdam RAI, 9 May 2001

This document contains the information written on the flip-charts during the workshops, organised in the afternoon.

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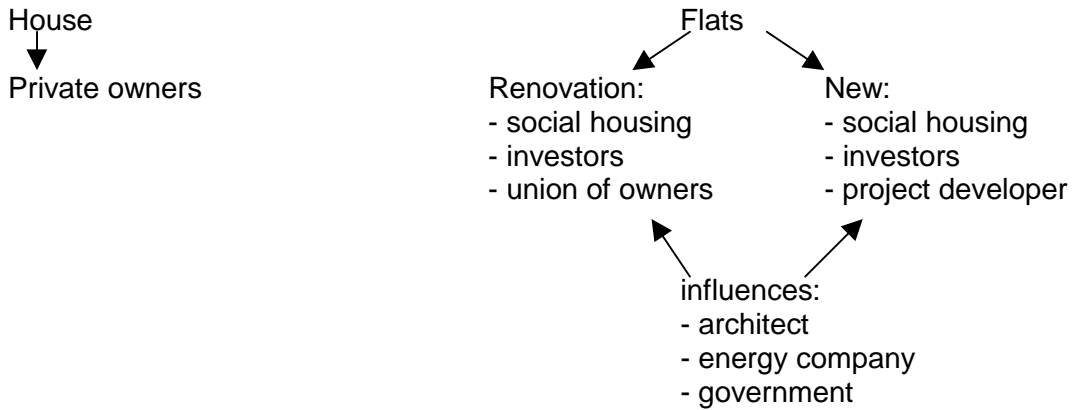
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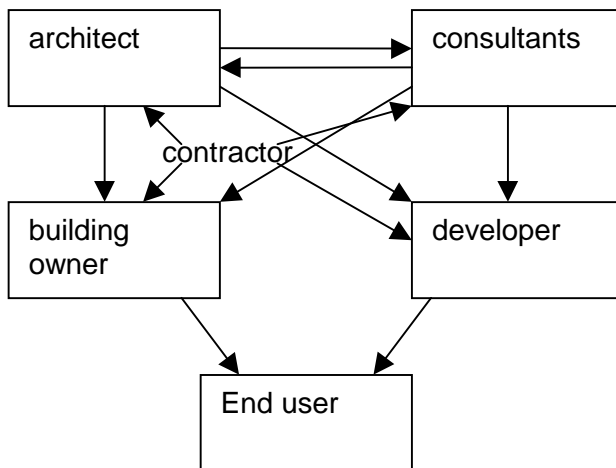
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1. WORKSHOP FACADES BY OLAF VAN PANHUYS

Where is the market for pv facades?



Who are the relevant building parties?



Who are the buyers, Clients / decision makers?

- Building owners
- Banks / insurance
- Headquarters
- Government
- (Simple offices)

What are the motives to buy PV?

	A	B	C	D	E
Image	++	++	++	+	+
Learning	+	+/-	+	++	++
Electricity	+/-	++	+/-	+/-	++
Shading/ comfort	+	++	+/-	+/-	++
Color	+	+/-	+/-	+/-	+/-
Architectural design	++	+	+	+	+/-
Environmental issues	+/-	++	+/-	+/-	+

Regulations	+	+/-	+	+/-	++
Economics	-	--	--	-	+
Durability	+/-	+	+/-	+/-	++
Reduction peak loads	+/-	+	+/-	+/-	++
Independence	+/-	+	+/-	+/-	+/-

A = Architect
B = Private Owner
C = Developer
D = Contractor
E = Consultant

2. WORKSHOP LARGE SCALE SYSTEMS ON UTILITY BUILDINGS BY TON VAN DER WEKKEN

Discussion between 12 people, 5 nationalities

Where is the market for large scale utility systems?

Definition of large: > 100 kWp

Definition of utility: non residential (government, public, offices, industrial)

Buyers/market

- Private venture capitalist (Germany); must be profitable
- Electricity utility; investment in green power
- Government
- national; CO2 reduction, Kyoto obligations
- local government; mandatory
- IT society; PV part of large UPS systems
- Property developers / architects;
- added value & marketing values
- Industrial areas

What are the required product specifications?

- Experienced installers
- Safety
- Standardisation / norms / harmonisation; also in products
- Prefabricated components / elements
- More choice in displays
- Production guarantee, part of contract
- Maintenance contract

3. WORKSHOP 'DO-IT-YOURSELF'-PRODUCTS BY CHRISTIAN ROECKERWhere is the market for 'Do-it-yourself' products?

Target market	On grid	Off grid
Individual home owner	X	X
Small installers (1-5 kW)	X	X
Consumer market		X
Apartments building owners	X	
Holiday cottage owner	X	X

What are the required product specifications?

Electrical Options:

- AC module
- IF string -> safe plugs up to inverter, there AC wiring D.I.Y. or by electrician
- No series / parallel wiring for D.I.Y. market

Market options

- Should be offered as a complete kit (IKEA-like!). As simple as possible (especially electrically).
- Promotion should be on the value market, not price market
- Fun, pride etc.
- Key Word – Toy!!

4. WORKSHOP ATRIA GLAZED ROOFS BY PAUL RUYSEVELTParticipants:

Henk Kaan, ECN
 David Strong, BRE
 Anna Helgesson, Vattenfall
 Patrick Hofer, Tcfnaa (Atlantis)
 Luca Zingdale, Ambient Italia Research Institute
 Dan Davies, Solar Century
 Paul Ruysevelt, ESD
 Ami Elazari, Millenium Electrics Inc.

Where is the market for Atria Glazed roofs?Integration types

Sloping roof
 'flat' roof
 'zig-zag' roof
 curved roofs
 pyramids
 canopies

Conditioned or not?

Building types with:

Atria		Glazed roofs	
Hotels	1, A	Leisure facilities	1, 2, A
Shopping centres	1, A	Industrial buildings	1
Offices	1	Conservatory roofs for homes	3
Banks	1	Public buildings:	2, A
Universities	2, A	- stadium	1, A
Conference centres/ Exhibition halls	1, A	- filing stations	1, A
		- airports	1, A
		- green houses	1

1 = commercial
2 = public sector
3 = individual consumers

A = open to public

What are the motives to buy PV?

	Private	Open to public
M a r k e t	Public relations to: <ul style="list-style-type: none"> - employees - shareholders - investors - customers External relations: <ul style="list-style-type: none"> - local authorities - via planning etc. Utility investment: <ul style="list-style-type: none"> - obligation for renewables - prefer visible image - flattening peak demand More money	Open to wider public audience but they are less connected to installation Civil pride <ul style="list-style-type: none"> - respect for built environment Raising awareness <ul style="list-style-type: none"> - riding "green wave" high impact: greater access to public funds? Less stringent investment criteria
View in dry & warm & potential for explanation		
T e c h n i c a l	Holistic design: <ul style="list-style-type: none"> - electricity - saving electricity by: <ul style="list-style-type: none"> - daylighting - shading (avoids a/c) - diffusing light Easier maintenance Easier security/safety Maybe smaller 'token' installation	Same benefits as by private More difficult maintenance More difficult security/safety Opportunity for larger installations

Opportunity for larger installations because of less stringent investment criteria and the "setting an example" effect by the government.

Who are the buyers, clients / decision makers?

- Architects
- Engineers
- Specifiers
- QS
- Users
- Agent (risk)
- Building companies (risk)
- Legislators
- Local authority
- Planning departments
- Investors (pv in SRI)
- Corporate Boards (pv role in CSR)
- Utility regulators (government or quango)(remove barriers)

What are the required product specifications?

- Opaque & transparent in Grid
- Semi-transparent modules (cells with gaps that let light/sun trough)
- Transparent modules (laser etched, thin film (limited to one size?))
- Shading devices over roof
- Other glass products, eg. Screen-printed, tinted, etched etc.
- Products other than glass
- PV thermal hybrid (can be transparent)

Good range of product types with lots of opportunities for multi-function

Issues to be addressed for Atrium glazed roofs

- tougher regulations
- fire (fire fighting??)
- breakage
- cleaning/ maintenance
- lightning

Benefits & added value

Added value is more persuasive for atrium glazed roofs than for other pv applications, because of the high visibility, multi-purpose of pv in glazed roofs and expensive alternatives. Capital cost – too expensive

People to influence

Architects	Know about pv
Engineers	Lack of information
Specifiers	Lack of time to research
Qs	Pv not presented as building material
Users	Comply with standards & codes
Agent (risk)	Cross-over technology, i.e. who is responsible?
Building companies (risk)	Too many reasons to do pv
Legislators	Pv can be differentiated
Local authorities/ planning departments	Need means to present benefits & added value to clients & others
Investors (pv in SRI)	One stop shops make specification easier
Corporate boards (pv role in CSR)	
Utility regulators, gov't or quango (remove barriers)	

Summary

Aria & Glazed Roofs applicable to many different large building types. Two categories are distinguished: "Commercial/public" and "Private/open to public"

Products: good range available, lots of opportunity for multi-function
Many different types & shapes of integration – highly visible

Many market & technical benefits (slight differences between private and open to public)

Key selling points:

- viewed from inside dry/warm
- potential to explain system
- relative marginal cost lower (atrium & glazed roofs already expensive)
- tougher regulations (must be dealt with)
- lots of people to influence and much information needed
- key need for pv 'champion' who has all the persuasive arguments

5. WORKSHOP LARGE SCALE HOUSING PROJECTS BY EMIL TER HORST

Participants

Henrik Sørensen
Pieter Nuiten
Erwin Groen
Gerard den Ouden
Bas Vos
Emil ter Horst

Where is the market for large scale housing projects?

- Large scale projects new built
- Large scale projects existing
- Few people taking decisions (dependence)
- eg. Housing corp.: PR, eco-minded, lot of money, mission, monitor their customers

- Existing house stock

- Man in the street (slow starter)
eg. Need good examples, opinion important for man in the street

Large scale project – few decision makers share of ~2% per year

Existing house stock – man in the street share of ~100% per year

Actors in large scale projects get into early adoption phase while the innovators are in the street.

What are the required product specifications?

PV in large scale projects

- special position PV only in the beginning (demo-phase)
- next decade: pv as one of the factors (how to market environmental drive?)
- step wise approach
- also projects in existing stock (housing ass./corp.)
- new approaches :ordering from the catalogue

- example function
- pv versus other measures

Urban planning

- not so critical as first thought
- bad planning is pity afterwards
- creating conditions for S.E., doesn't cost extra
- renewable building check list