

Eco QUANTUM

Computer program developed by IVAM with W/E Consultants for the SBR since 1999.

(IVAM: sustainability research and consultancy department of the University of Amsterdam)
(SBR: Information and Communication agency for the building industry)

Development financed by Government

2 Versions:

Eco Quantum Residence, and Eco Quantum Research

Compute LCA for residences (housing only)

Takes into account:

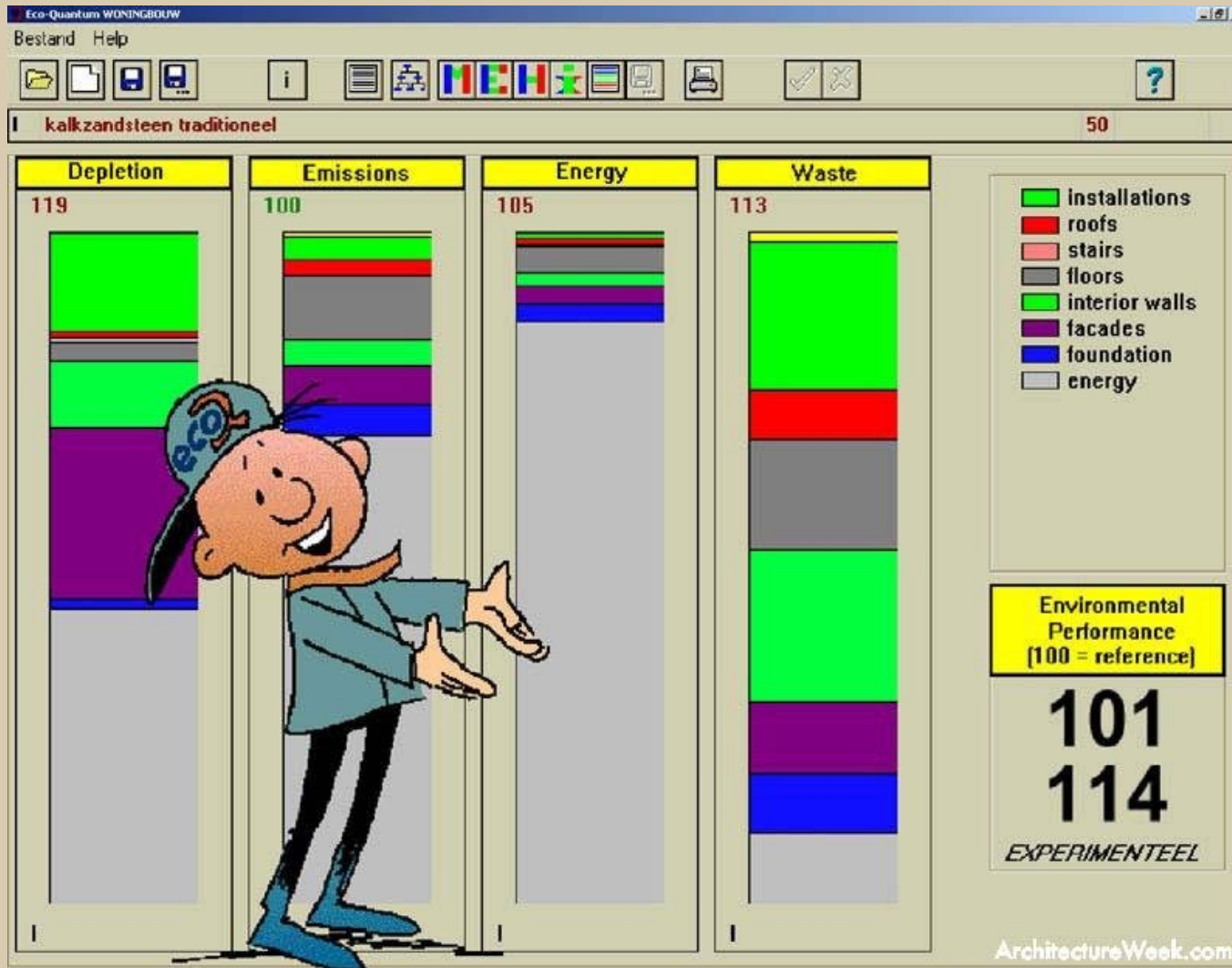
- Installations
- Materials
- Water consumption
- Indoor climate
- Building location



“It is now officially possible to compare apples with oranges.” - SBR



APPLICATION



Version 1.0

Free bloke with hat included.

Two stages:

- Sketch Design

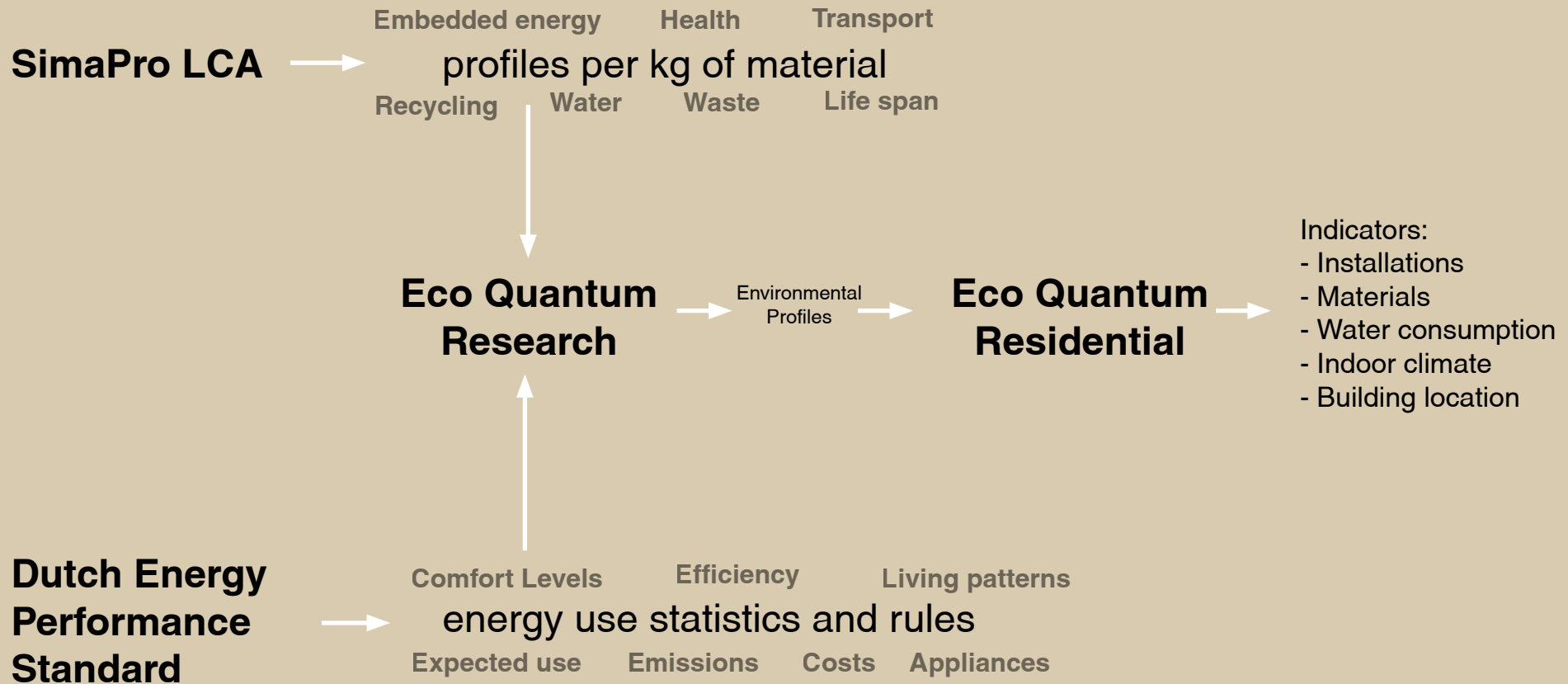
Preliminary crude estimation of energy use to be used in early stages. Easy to set up and get estimates.

- Final Design

Complete analysis of detailed materials, energy, etc to evaluate final design.



HOW IT WORKS



USES

Architects: evaluate different designs

Policy makers: targets for environmental programs

Certification programme

Catalogue

Guideline

Final outcome is intended to be a document to be presented to a third party.



INPUT

Eco-Quantum VO-tool (Variantenboek 2003)

Nieuw Openen Opslaan Eco-Quantum Print Help

ONTWERP


Basistype: Tuinkamerwoning, tussen, met score berging

Project:

Aantal woningen: 1

Aantal bouwlagen: 2

TOTAAL GO 111,4 m²



MATERIELEN (1 WONING)

Begane grond vloeren	47,8 m ²	beton: ribcasette
Verdiepingsvloeren	95,7 m ²	beton: breedplaat
Gevels: Totaal opp.	61,6 m ²	bi:kzs + bu:baksteen
Open delen	29 %	hout: duurzaam
Dragende binnenwanden	59,6 m ²	kalkzandsteen
Platte daken	0 m ²	beton: breedplaat
Hellende daken	62,1 m ²	hout: dakelement
Trappenhuizen	0	
Liften	0	
Hout met FSC keur o.g. Beperken uitloging	<input type="checkbox"/>	
PV-cellen	0 m ²	
Zonnecollectoren	0 m ²	

ENERGIE (1 WONING)

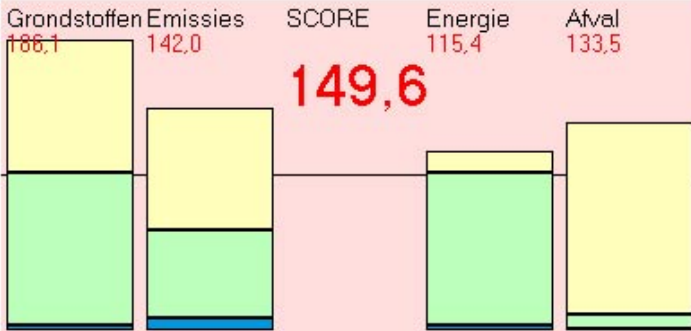
	elektrisch [MJ]	gas [MJ]	<input checked="" type="checkbox"/> NOx-arm
ruimteverwarming	0	22944	
warmtapwater	0	17693	
hulpenergie	2612	0	
verlichting	6284		
ventilatoren	2468		
koeling	0		
bevochtiging	0		
zonneenergie	<input type="checkbox"/>	<input type="checkbox"/>	
TOTAAL	11364	40637	MJ

WATER

Waterbesparende maatregelen

RESULTATEN (GEMIDDELDE WONING)

Grondstoffen	Emissies	SCORE	Energie	Afval
186,1	142,0	149,6	115,4	133,5

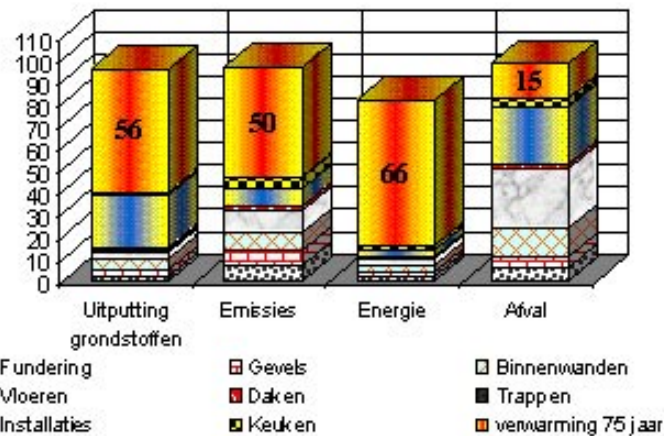
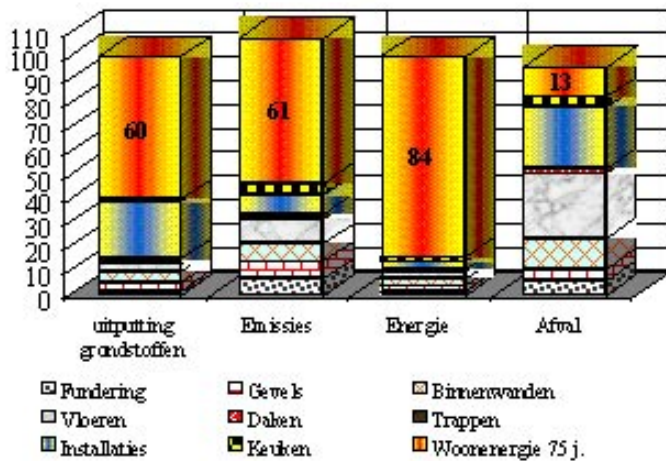


- Easy interface
- Usable without training
- Large library of materials
- Customisable



OUTPUT

- An overview of materials streams,
- Twelve effect scores according to the lifecycle analysis
- Four environmental indicators: resource depletion, emissions, energy and waste.
- As well as one all-encompassing score.



ADVANTAGES / DISADVANTAGES

— Allows comparisons between different designs

— Accessible and usable by different parties

— Easy to see what factors influence the scores the most

— Usable at different stages in the process of design

— Only usable for residences

— Only in that awkward Dutch language

— Shortcomings of LCA's apply to Eco Quantum, e.g. no relation to space and time and numerical indicators are non-qualitative.

— Not useful for existing building stock



INSTITUTE FOR FORESTRY AND NATURE RESEARCH (ALTERRA)



Wageningen, The
Netherlands

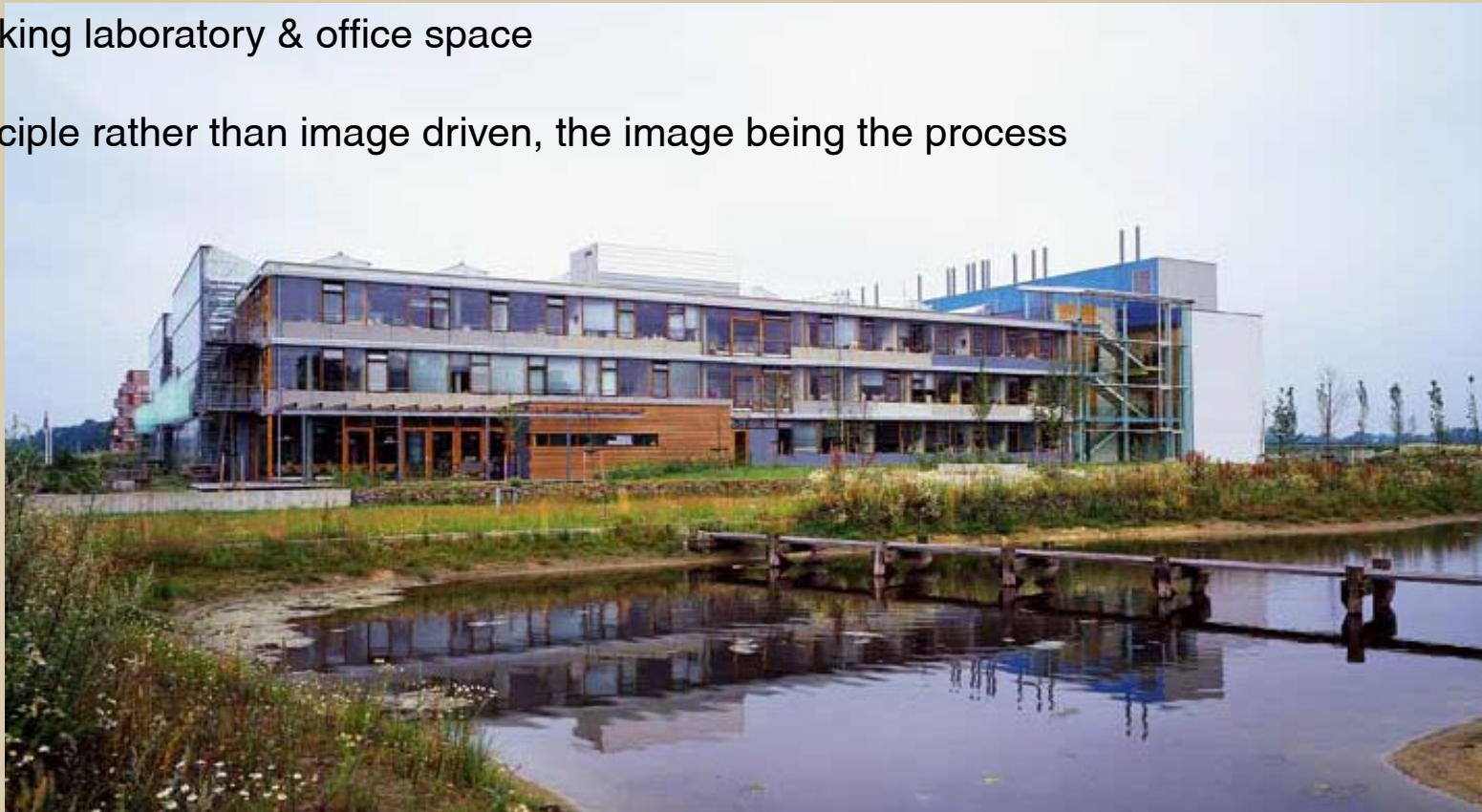
Stefan Behnisch

1998



PROCESS

- European Union pilot project for ecological investigation
- Motto “human & environmentally friendly building for the future”
- Demonstration project for financially feasible green architecture
- Working laboratory & office space
- Principle rather than image driven, the image being the process



SITE

- Restored as an experimental ecological area
- Create a green corridor between Rhine valley & the Hoge Veluwe Park
- Handle water on site with grey water system using rain collection & sequence of ponds

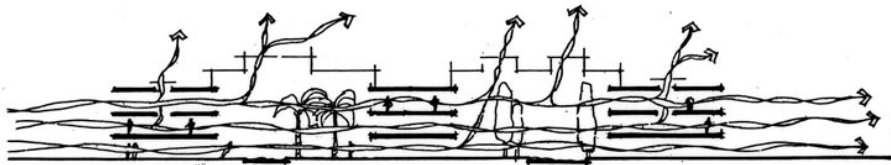
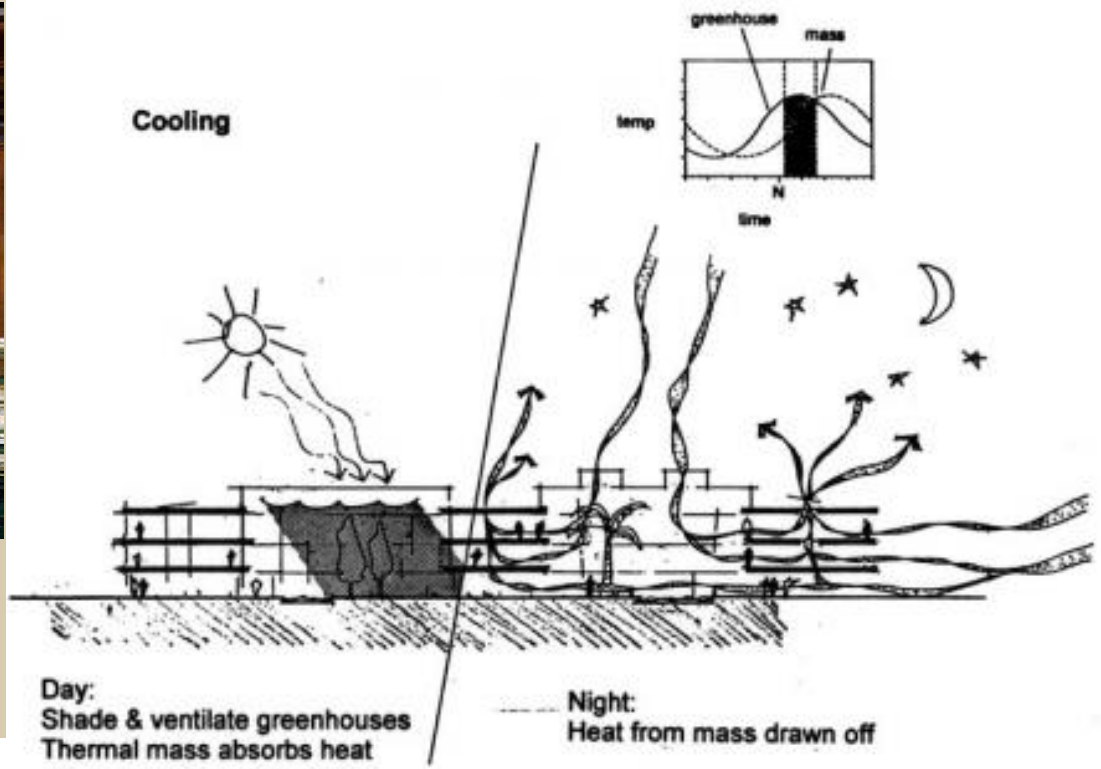


GARDENS

- Two spaces between office wings; not indoor space; all workplaces in direct contact
- House experiments, provide views, recreation & meeting for staff, & control temperature “lungs”
- Summer cooling: blinds, roof vents (provide a thermal chimney)
- Winter heating: blinds to capture re-radiation off of plants
- Varied watercourses, terraces, levels, plantings & a meandering route for staff to cross the gardens & link the social facilities (places for people to stop & congregate)



GARDENS



Ventilation

Combination of cross and stack ventilation adapts to seasons



SYSTEMS & MATERIALS

- No air conditioning
- Use of prefabricated systems & elements
- Residual construction site materials used to create external gardens
- Use of local wood products (small & short pieces)
- Lots of daylight
- Operable windows open to gardens

