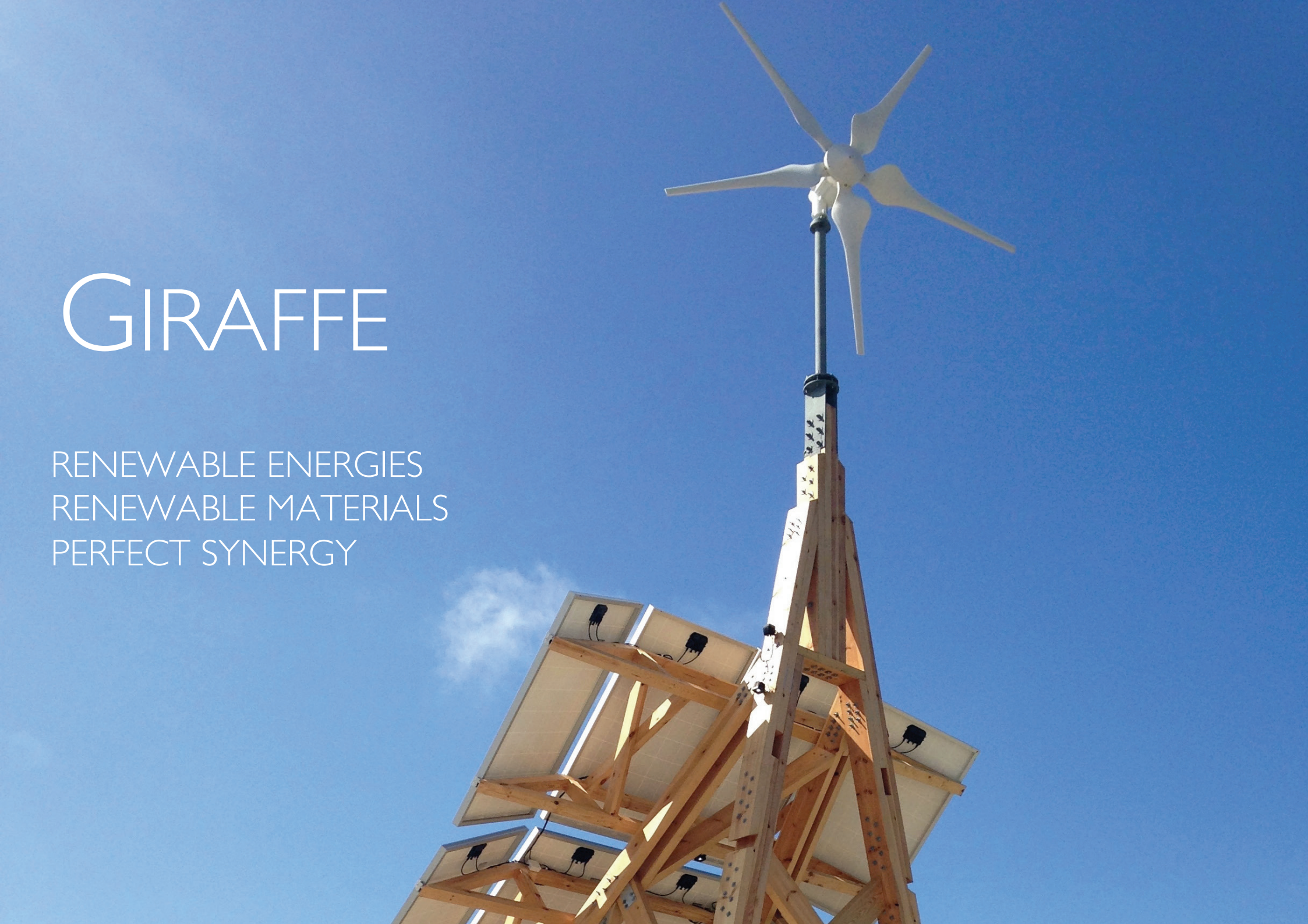
GIRAFFE

RENEWABLE ENERGIES
RENEWABLE MATERIALS
PERFECT SYNERGY



Highlights

The Giraffe is a hybrid power station ready to charge anything from your e-vehicle to your home – by capturing energy of the wind and sun.

This futuristic yet natural construction comprises a wooden structure supporting 16 solar modules as well as a wind turbine mounted at a 8 or 12 meter height.

Smart positioning of PV panels in 12 different angles allows for stable energy production – providing solar energy during four (!) additional hours compared to a classic PV mounting

The Giraffe can be equipped with various wind turbine solutions from 1,75 to 3,5 kW

The solar panels provide a power capacity of 4,0 kWp

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Installation Examples

Malmö, Sweden

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KORPAEL


MALMÖ ARE

Giraffe Configurations

There are 2 main configurations of the Giraffe:

URBAN

PERFORMANCE

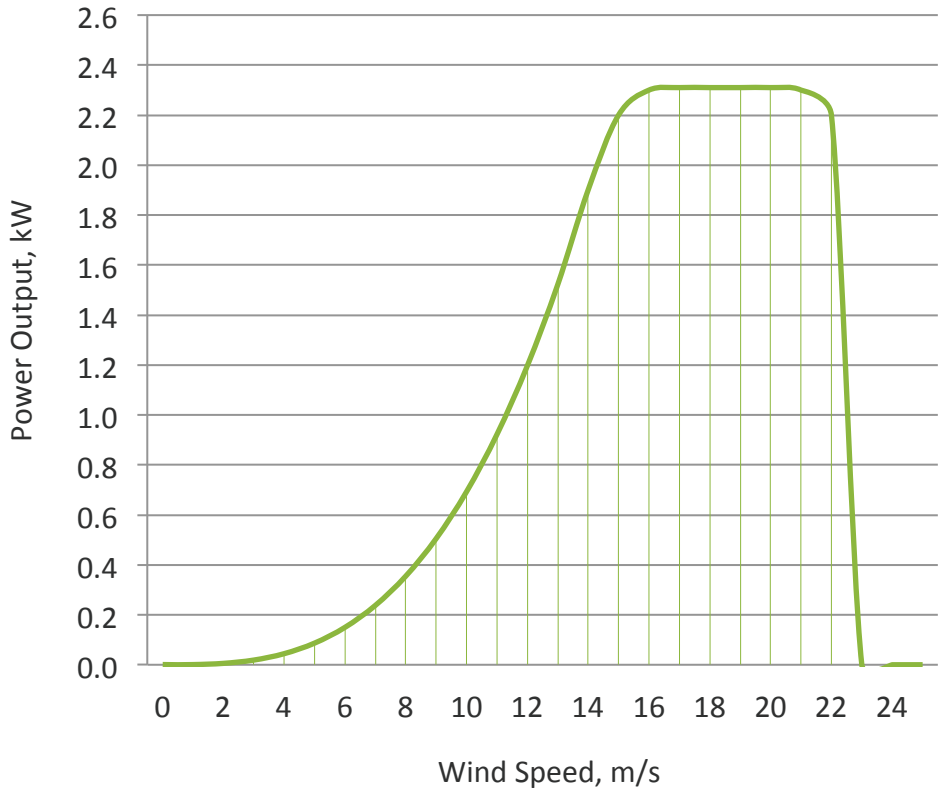
	URBAN	PERFORMANCE
Rated output, turbine	1,75 kW	3,5 kW
Rated output, PV	4,0 kWp	4,0 kWp
Annual energy production at 6 m/s	5300 kWh	11300 kWh
Grid connection	220 V – 50Hz	220 V – 50Hz
Available as off-grid	No	Yes
Height to rotation axis	from 8 to 12 m	from 8 to 12 m
Space for installation	5,6 m x 3,4 m	5,6 m x 3,4 m
Building permission	Not required	Required

Giraffe Urban:
Detailed Turbine Specifications

URBAN

Rated / Max power output	1,75 kW / 2,25 kW
Type	Horizontal axis venturi wind turbine
Estimated annual energy yield	1 800* kWh at 6 m/s
Rotor diameter	1,5 m
Number of blades	3
Blade material	Nylon, glass fiber reinforced
Blade type	3D CFD Optimized
Expected lifetime	> 20 years
Rated wind speed	13,5 m/s
Rated rotating speed	1100 RPM
Cut-in wind speed	2,9 m/s
Cut-out wind speed	25,0 m/s
Braking method	Electric brake
Anti-twist mechanism	Trapezoidal screw mechanism
Duct material	ABS with stainless steel construction
Duct diameter (max)	2 m
Turbine weight	110 kg

Power Curve



* The figures are given for reference only and are no guarantee of the indicated annual energy yield.

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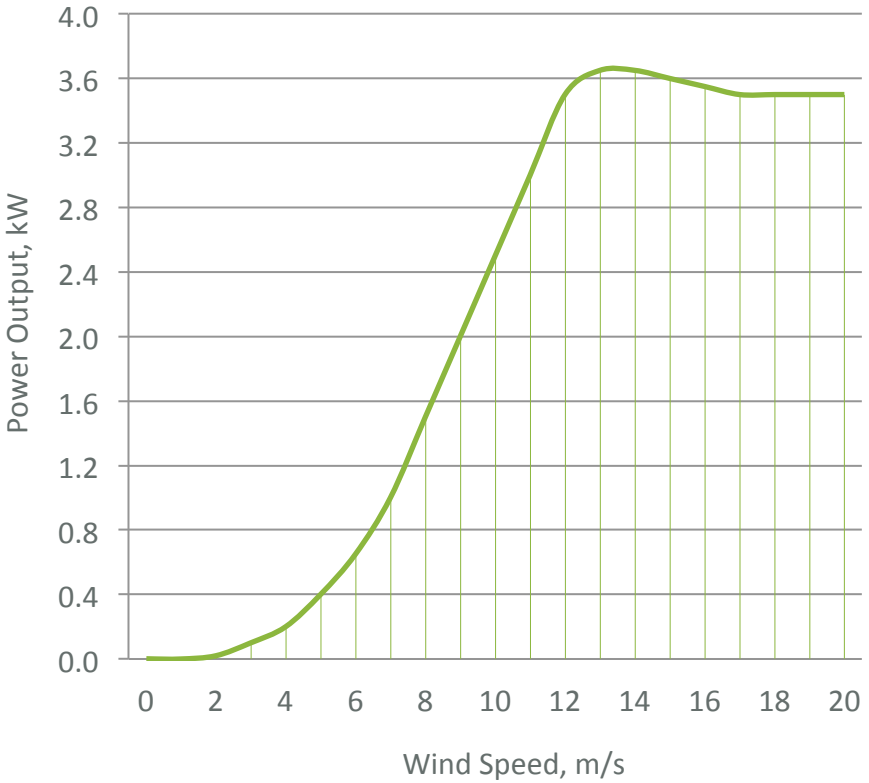
Giraffe Performance: Detailed Turbine Specifications

PERFORMANCE

Rated power output	3,5 kW
Type	Upwind, horizontal axis
Annual energy yield	7800* kWh at 6 m/s
Rotor diameter	4,05 m
Number of blades	3
Blade material	Polyester resin reinforced with fiberglass
Anticorrosion protection	Sealed design + e-coat + anodizing + UV resistant paint
Expected lifetime	> 20 years
Rated rotating speed	250 rpm
Rated wind speed	12 m/s
Cut-in wind speed	3 m/s
Power control method	Passive centrifugal variable pitch system with shock absorber
Braking method	Electric
Anti-twist mechanism	Slip Ring
Grid feeding	120 / 240 V AC – 50 Hz – 1 phase
Turbine weight	185 kg
Noise level at 8 m/s	37 dB(A) at 60 m

Power Curve



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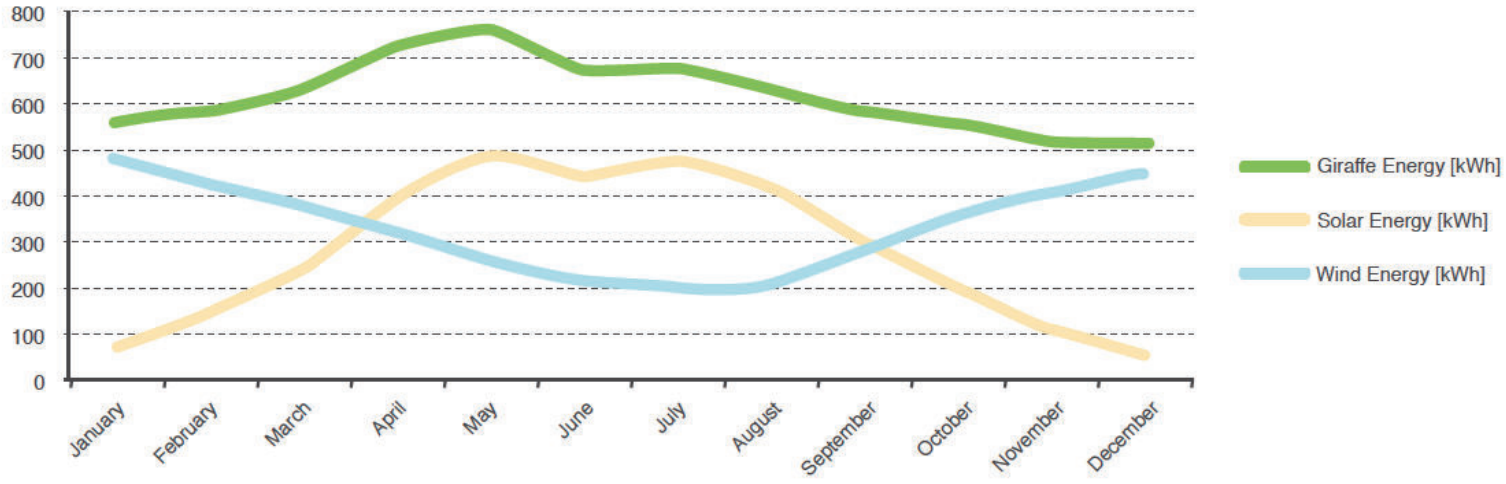
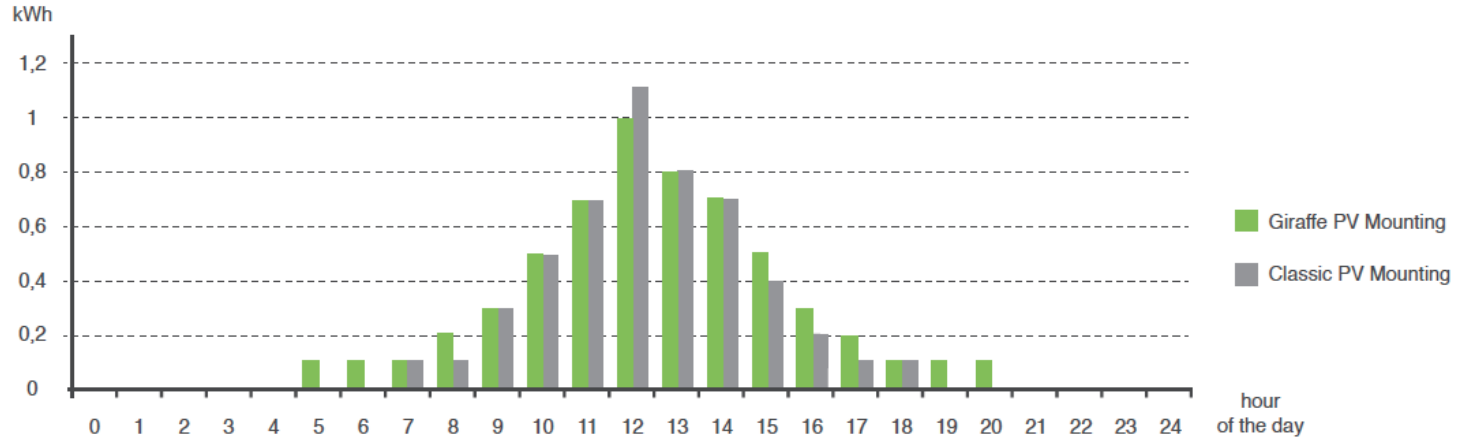
Stable Energy Production

The Giraffe is able to produce 5 000 – 11 000 kWh per year even in countries with low solar radiation and moderate winds – providing power 24 hours a day, all year round



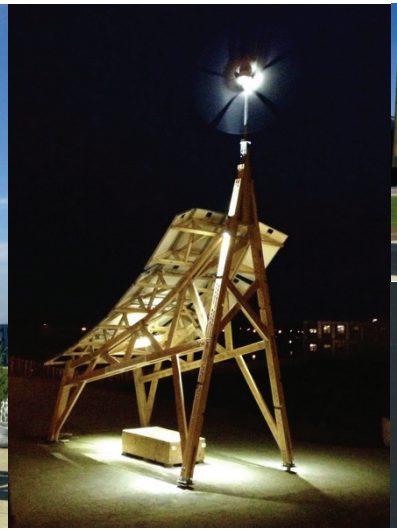


Giraffe Application: Off- or On-Grid Power Station

Residential use: can provide power to a household or a summer cottage. Can be used for charging e-vehicles, power electric appliances, heating, support warm water supply.

Urban use: can power lights, wi-fi, outlets for electronic devices. It can become a perfect spot for picnics, children's playgrounds and a gathering place for people.

Malmö Hyllie near Malmö Arena (Eurovision Song Contest 2013 venue):

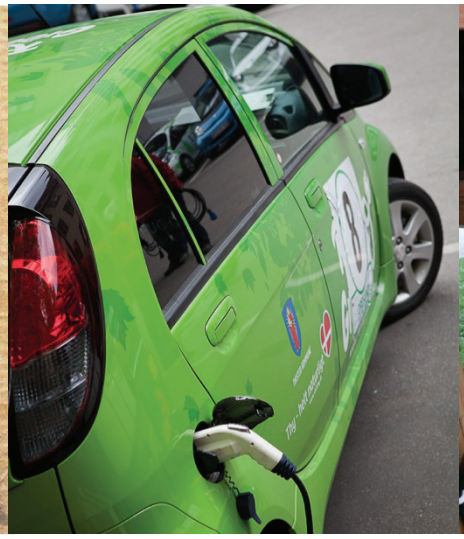


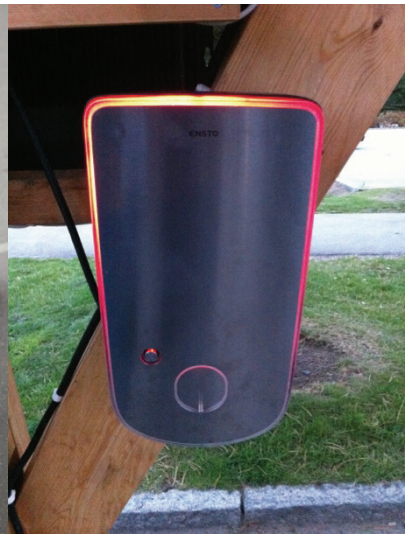
Giraffe Application: E-vehicle Charging Station

Charging electric vehicles in urban environment. Ideal for EV-related events and activities.

With 32 Amp Fast Charger, the Giraffe charges a Nissan Leaf in 2 hours.

Malmö Västra Hamnen (Öresund Electric Car Rally & Green Vehicle Days 2013):





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Charging Stations - Examples

The GIraffe is compatible with any EV-charger standard, including CCS and CHAdeMO, please send us an inquiry to info@innoventum.se for more information

For your home (on- and off-grid):

eFill
Type 1 plug (SAE J1772)
Type 2 plug ("Mennekes")
Rated current: 16 A
Rated voltage: 230 V AC

For public areas (fast charging):

	Pole	Point
Positioning & type	Ground mounted Type 1 & 3	Wall mounted Type 1; 2 & 3
Rated output	16/32 A	32 A
Rated voltage	230/400 V	230/400 V

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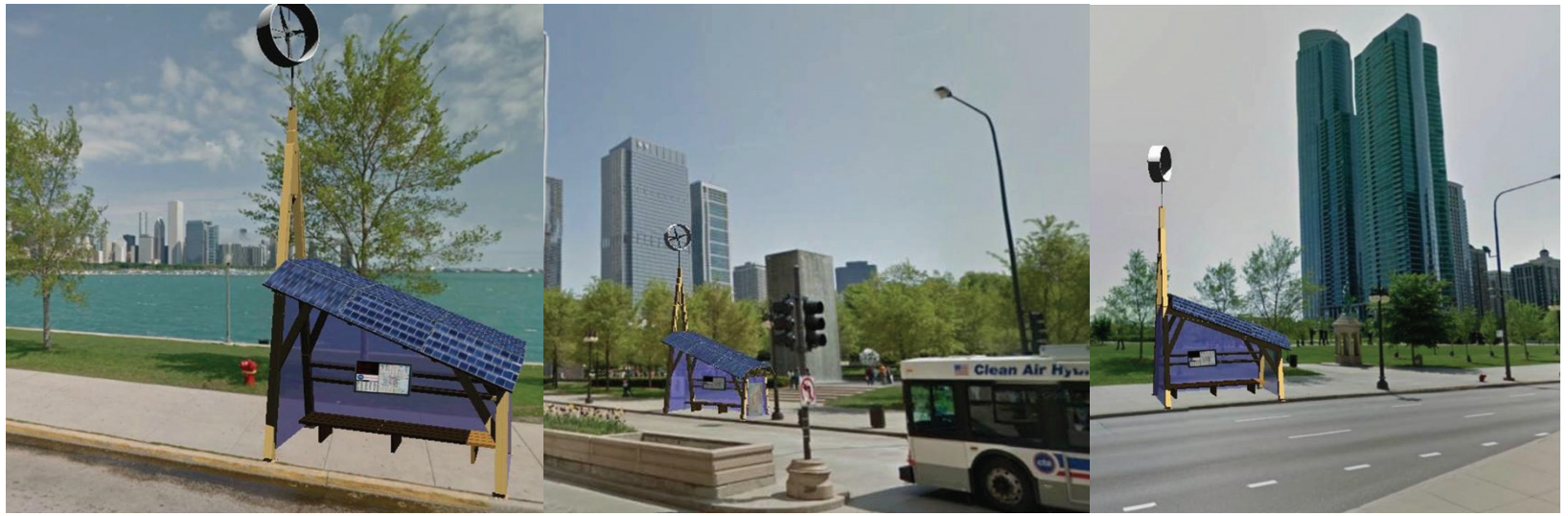
Giraffe Application: Bus Stop

Powers lights, bus timetable, LED screen used for adverts and/or entertainment.

NEXT STOP design contest contributions in Chicago



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Environmental Benefits

of the Giraffe Wooden Structure

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Wood & CO_2

Wood has the unique ability to capture and store CO_2 while reducing carbon sources

There are 2 ways to reduce CO_2 in the atmosphere:

- reduce emissions or "carbon sources"
- remove CO_2 and store it - increasing "carbon sinks"

Wood has the unique ability to do both.

Each cubic metre of wood saves a total of 2 tons of CO_2. Every cubic metre of wood used as a substitute for other building materials reduces CO_2 emissions by an average of 1,1 ton CO_2. If this is added to the 0,9 ton of CO_2 stored in wood, we get a total of 2 tons CO_2

Source: Tackle climate change, USE WOOD

Why Cutting Trees is Good?

Managed forests are more efficient carbon sinks than forests which are left in a natural state. Younger trees, in vigorous growth, absorb more CO_2 than mature trees, which will eventually die and rot, returning their store of CO_2 to the atmosphere, while most of the CO_2 of the trees harvested from a managed forest continues to be stored throughout the life of the resulting wood product.

InnoVentum always procures wood grown in sustainably managed forests.

VS

Source: Tackle climate change, USE WOOD

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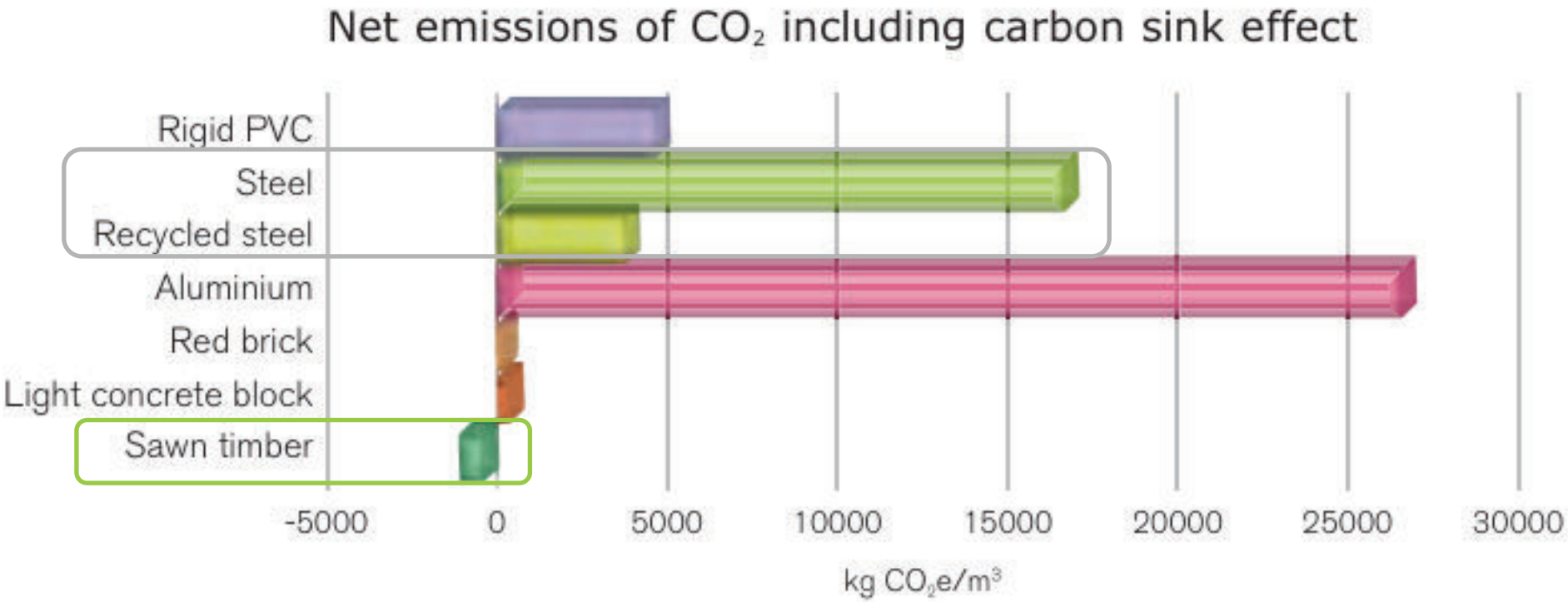
Carbon Impact of Wood compared to Steel

Even recycled steel production is associated with sizeable amounts of CO_2 emissions, while timber required for InnoVentum tower construction reduces CO_2 impact



Source: Tackle climate change, USE WOOD

CO_2 balance of the Giraffe

Giraffe:

- Use of wood contribution, offsetting -3855 kg of CO_2
- Use of steel components, carbon footprint: 110 kg of CO_2

- CO_2 balance -3855 kg + 110 kg = -3745 kg

Considerations:
1 m^3 of wood replacing steel offsets 1500 kg of CO_2 (incl. transportation and processing of wood)
582 kg CO_2 is emitted per ton of steel manufactured
Density of steel: 7850 kg/m^3

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Conclusion: Giraffe - more than carbon neutral

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Interested? Contact us!

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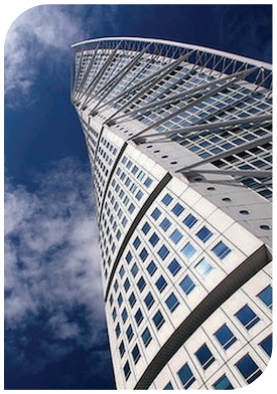

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