



Power Research Electronics

www.PR-Electronics.nl

www.LEDdriven.nl

Highlights 2005–2015

Feb 2016

Menno Kardolus

Erik van Beusekom

PRE – Power Research Electronics BV

- ✓ 30 years of experience in Product Development
- ✓ Core competence = Power Electronics,
- ✓ 20 people in R&D



Who are we – What do we do?

Power Electronics:

- Design services 0 – 20kW (modular: 100kW system)
- Certification (in-house Lab.)
- Outsource production
- Licensing (own IPR)

We work for:

- OEM companies



TEAM

- Menno Kardolus (CEO)
- Erik van Beusekom (CSO)
- Jos Schijffelen (CTO)
- Mark Gröninger (COO)



Organisation structure

MANAGEMENT (3 owners)
Power Research Electronics BV & LEDdriven
(total 25 people, 20 engineers)

Sales
(Erik van Beusekom)

Operations
(Paul Huijbrechts)

LED drivers
(Menno Kardolus)
HP, JZG, BJ, RM, RB

Finance
(Irene & Desiree)
PR, RvD

Outsourcing+ IQC
(Joshua Zhenhua Gao)

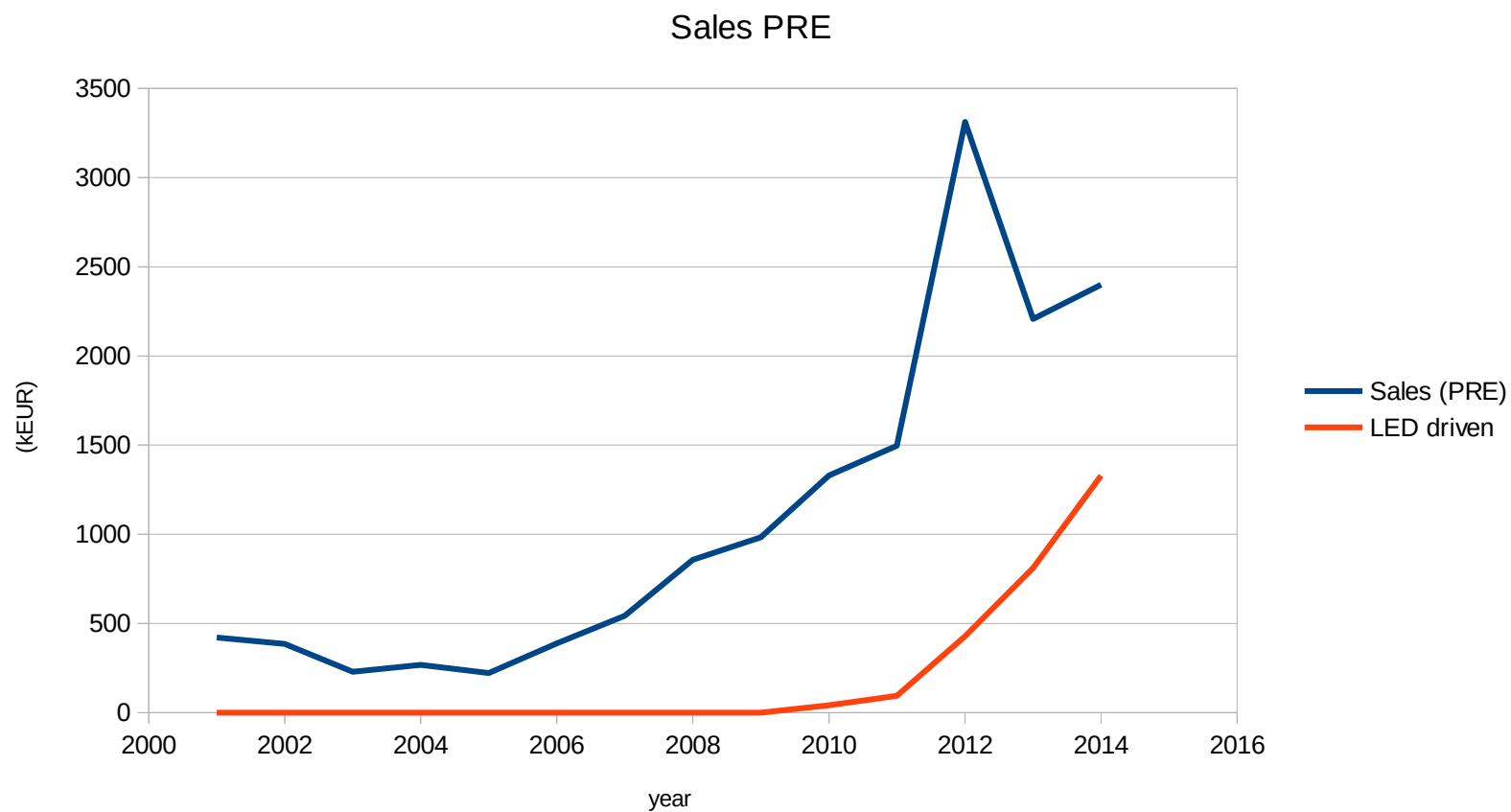
Prototype shop
(John Hendrickx)
SH, SS, HK, TS, D

Chargers & IPS
(Jos Schijffelen)
MvdH, TT, SK, RH

Logistics
(Sebastiaan Kanters)
CB

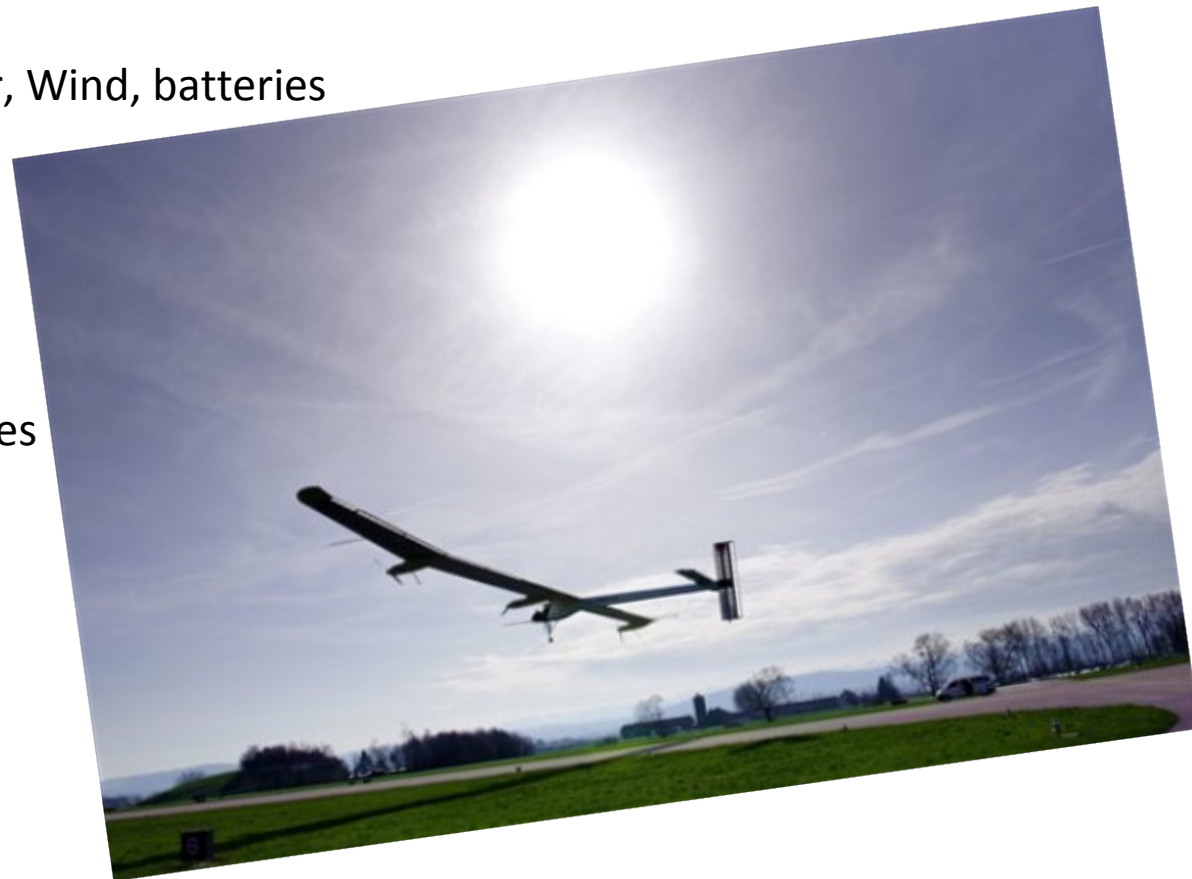
Solar, E-bikes
(Mark Gröninger)
CvdS, CG, vac.

Our steady growth



Working and expertise areas

- Energy supply systems: Solar, Wind, batteries
- (fast) Charging
and Battery mgt. systems
- Drivers for LED lighting
- Programmable power supplies



Example: off-shore anti-corrosion system (iccp)

Models	3kW, 5kW, 10kW
Input (AC)	230V, 400V, 480V
Output (DC)	0 – 200A / 30V DC 0 – 25A / 500V DC
Approval	CE



Solar Inverter concepts (since 1988)

- PRE has a long history in inverter concept development
- Stand-alone and grid connected
- Battery chargers
- GRID TIED: Installed base of more than 300 Mega Watt peak

PRE inside / solar inverters – 300MWp+ installed



SME Innovation Award: Solar mobile phone

Single solar cell

Asic

Patents

Sales: 800.000 pcs

→ top 5

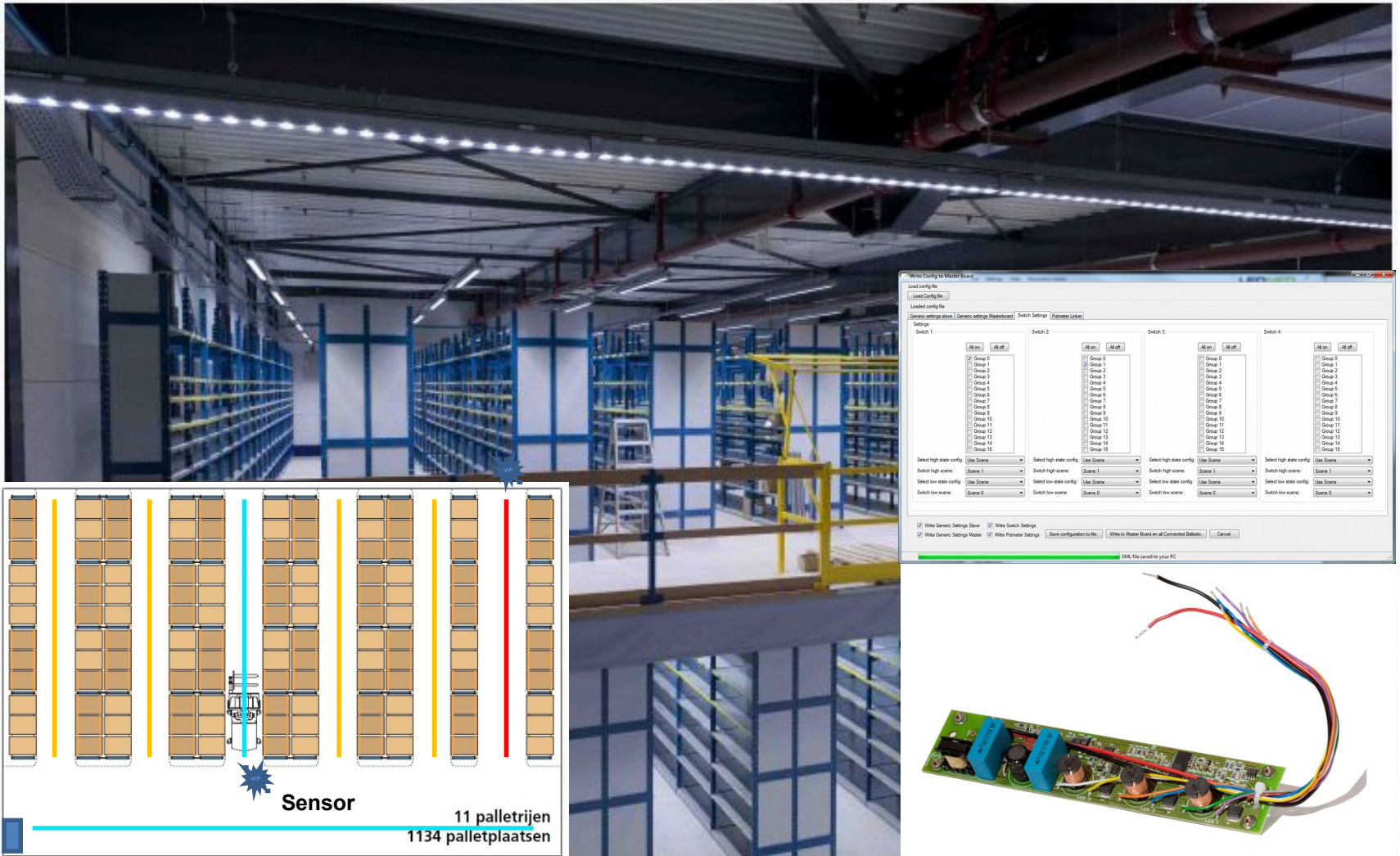


Mini Solar Lamp for Africa / PRE (ASIC) inside (2009)

WakaWaka Light, Safe energy in the emerging markets.....

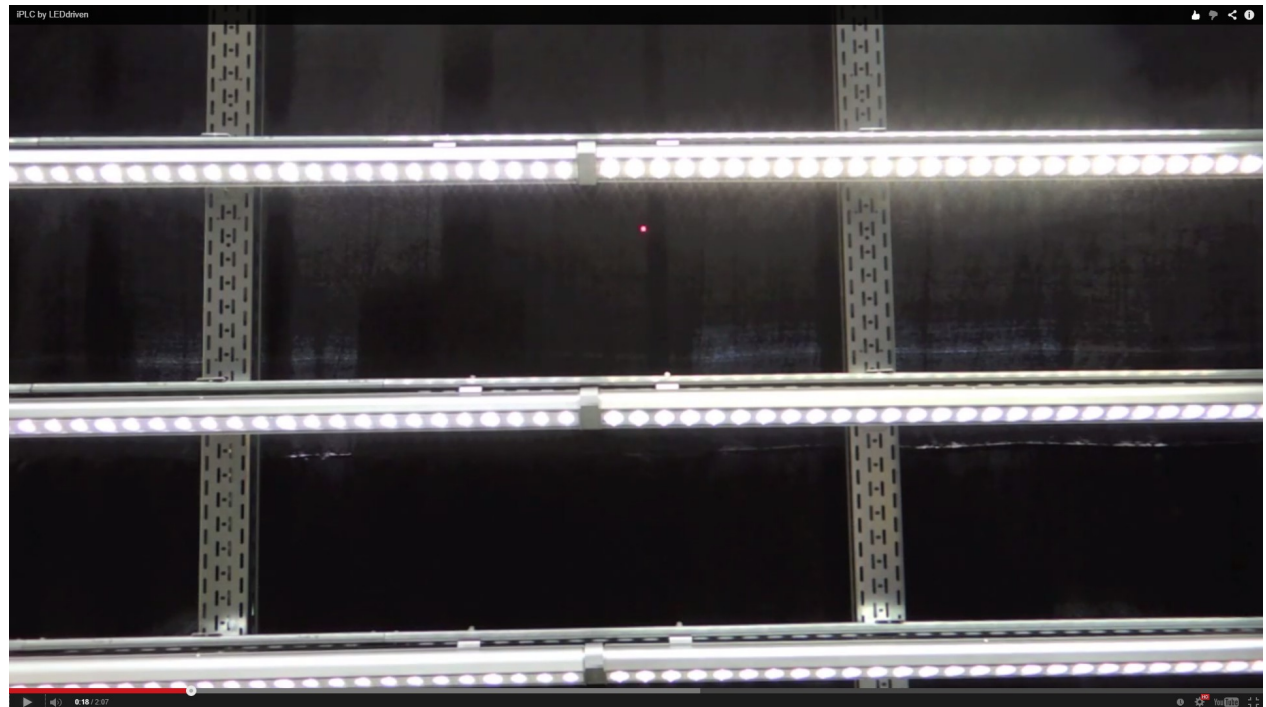


iPLC system → Selected by Deutsche Post (DHL)

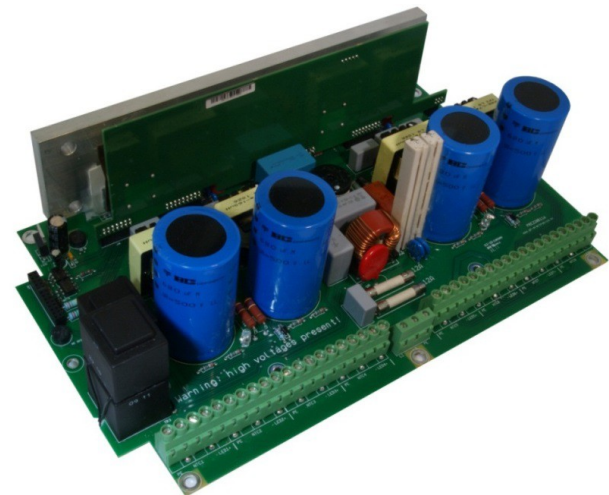
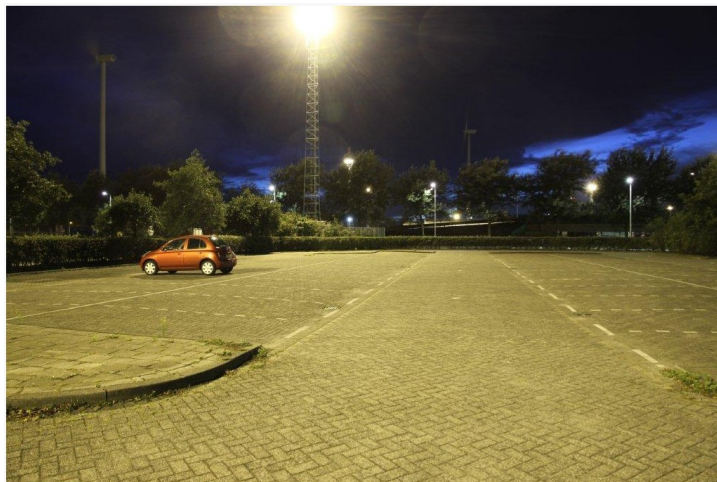


Demonstration video...

iPLC: <http://www.leddriven.nl/iplc>



2000W LED lamp (2011) – lonely at the top



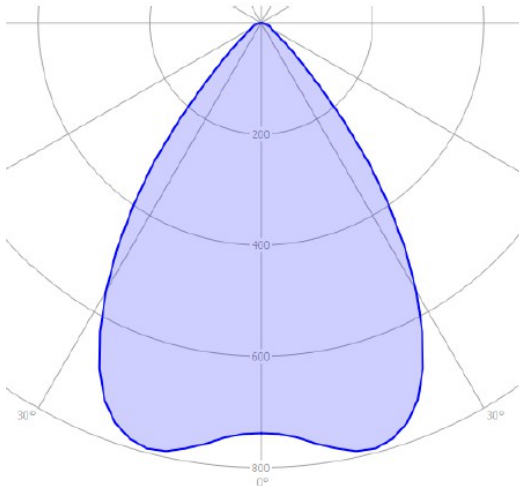
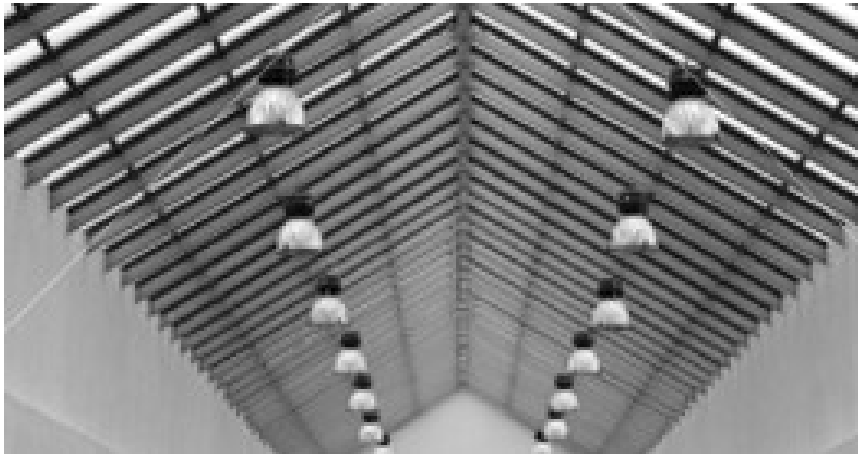
Multi-channel Office light driver



In 2010 PRE developed an innovative power converter.
Today ABB is the main licensee of PRE's technology which
is used on global scale



Best-in-class High Bay: 24k lumen / >140LPM!



m.	Ø 50%		C0-180: 34° C90-270: 34°		E (lux)	Luminaire Efficacy
	C0-180	C90-270				141 (lumen per Watt)
1	0.62	0.62		49922	Half-peak diam C0-180	
1.5	0.92	0.92		22188	0.62 x diameter(m)	
2	1.23	1.23		12480	Half-peak diam C90-270	
3	1.85	1.85		5547	0.62 x diameter(m)	
4	2.46	2.46		3120	Illuminance	
6	3.69	3.69		1387	49922 / distance² (lux)	
8	4.92	4.92		780	Total Output	
					23084 (lumen)	

SME innovation award /2014 – top 13

<http://www.mkbinnovatietop100.nl/site/Power-Research-onics-Elektrische-autos-in-15-tot-25-minuten-opladen>

Fast Charger IPR for ABB

→ Top 13



2009: Best in class E-bike

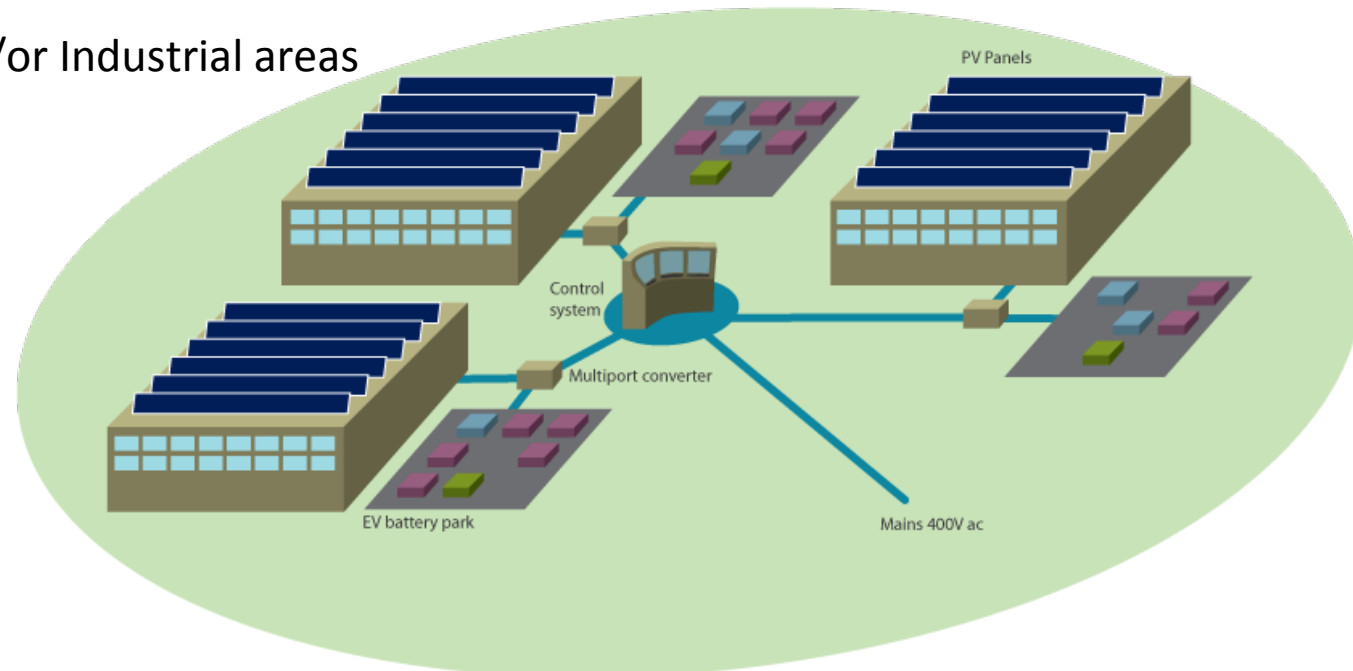
- Target: create the best e-bike in its class
- PRE: Battery, engine, sensorless torque control



PRE / new developments / V2G – EV meets PV

1. Efficient, reliable and cost effective EV Fast Chargers (new technology)
2. Bi-directional function (Smartgrid)
3. Integration with Solar and EV

→ Home chargers and /or Industrial areas



Sponsoring DUT racing team Delft

DC Fast Charger for Delft Racing Team

Fastest racing car in the world - Guinness world record :)



Certification / the 'reach' of our technology

PRE technology reach:

- Europe
- US



For applications

- Industry
- LED lighting
- Automotive; E/e marking
- Ships
- Hazardous environments (ATEX)



Our production partners for worldwide production

- TBP BV (Netherlands) – ATEX, medical (best-in-class)
- Steca GmbH ('made in Germany')
- ElektroWatt BV – small series, rapid prototyping
- GDM (Belgium/Romania) – high power + cabinets
- Zollner AG (Germany, Hungary) – high-power / high volume
- CEI (Singapore) – High-end Asia market
- Leader Electronics Inc (Taiwan) – low power / high volume
- Phihong Inc (Taiwan) — low power / high volume

Reference customers (2005–2015)

- ABB BV
- Mastervolt BV
- MSD BV
- Steca GmbH
- Intivation / Waka Waka Foundation
- Vishay BV
- Several OEM (LED) lighting companies

Summary PRE

- PRE is a knowhow company with global ambitions and network
- Inventor of innovative power concepts (patent holder)
- Provide A to Z services and network
- Work for OEM companies
- Great ambitions in the LED market: LEDdriven company

power developers





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Thank you for your attention!