Hybrid systems

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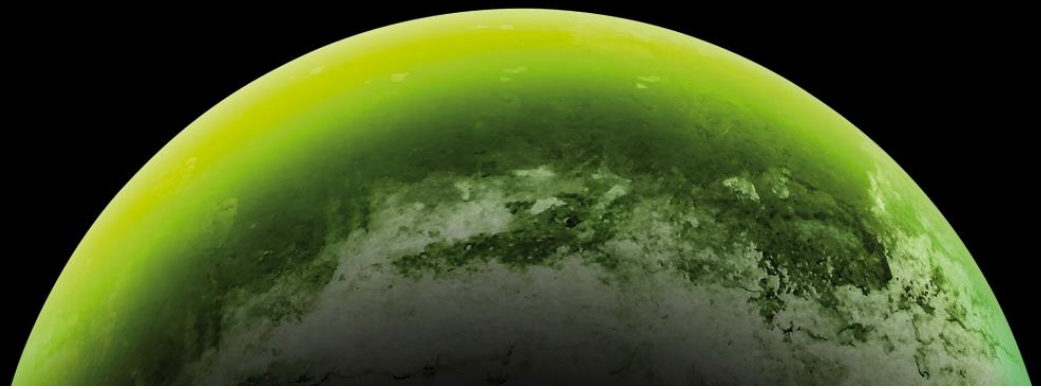
Islamabad August 2013

Lars Elstrom, Director R&D, Alternative Energy

Tariq Sagheer, Manager Technical , Eltek Pakistan

WHO WE ARE

- A world leader in high-efficiency power conversion and electronics
- An industry pioneer with more than 40 years experience
- We help customers save energy and money while reducing their environmental impact



LOCAL PRESENCE – GLOBAL REACH

ONE BRAND
SALES IN MORE THAN 100 COUNTRIES
OFFICES IN 30 COUNTRIES
2400 EMPLOYEES, 200 IN PAKISTAN



ELTEK always on

GLOBAL INSTALLED BASE



ELTEK always on

GLOBAL INSTALLED BASE, 4000+



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Customer centric solutions - optimization

Energy split, after Eltek upgrade

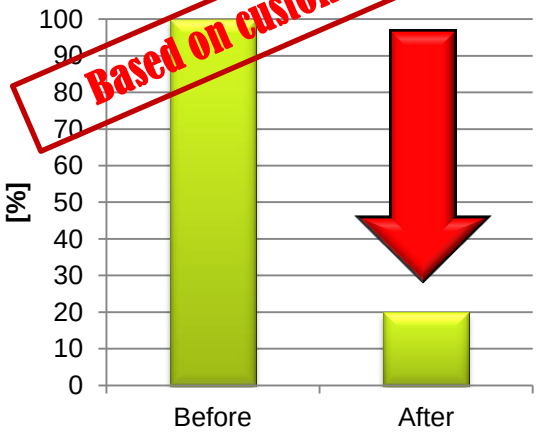


Diesel

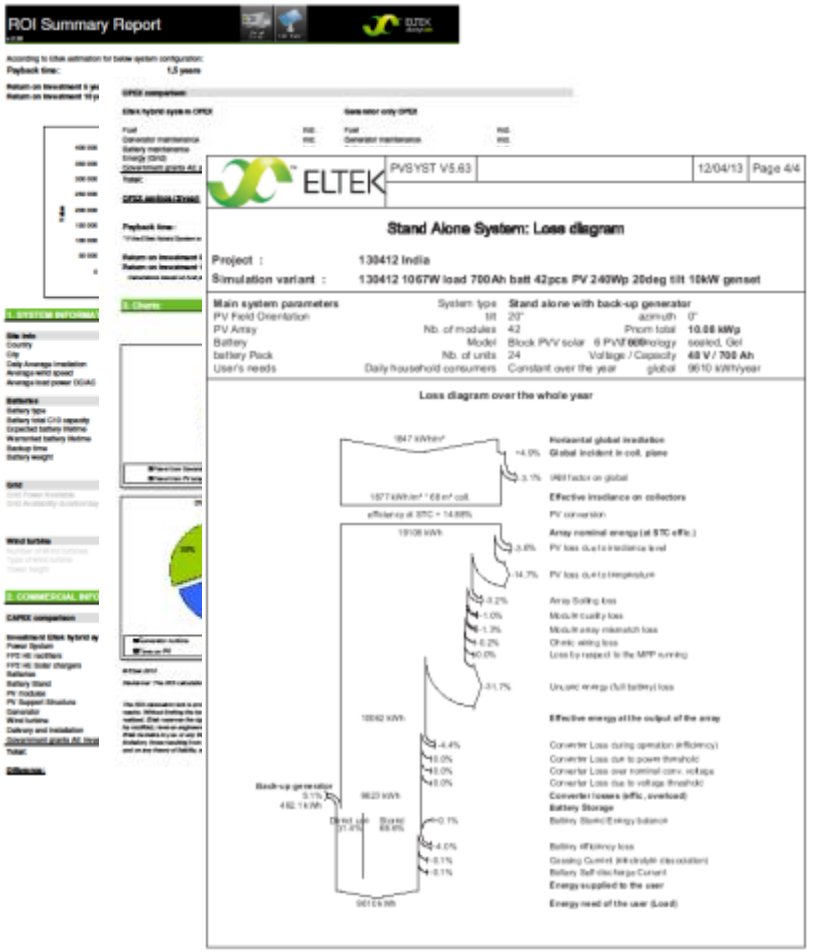
PV

Fuel consumtion

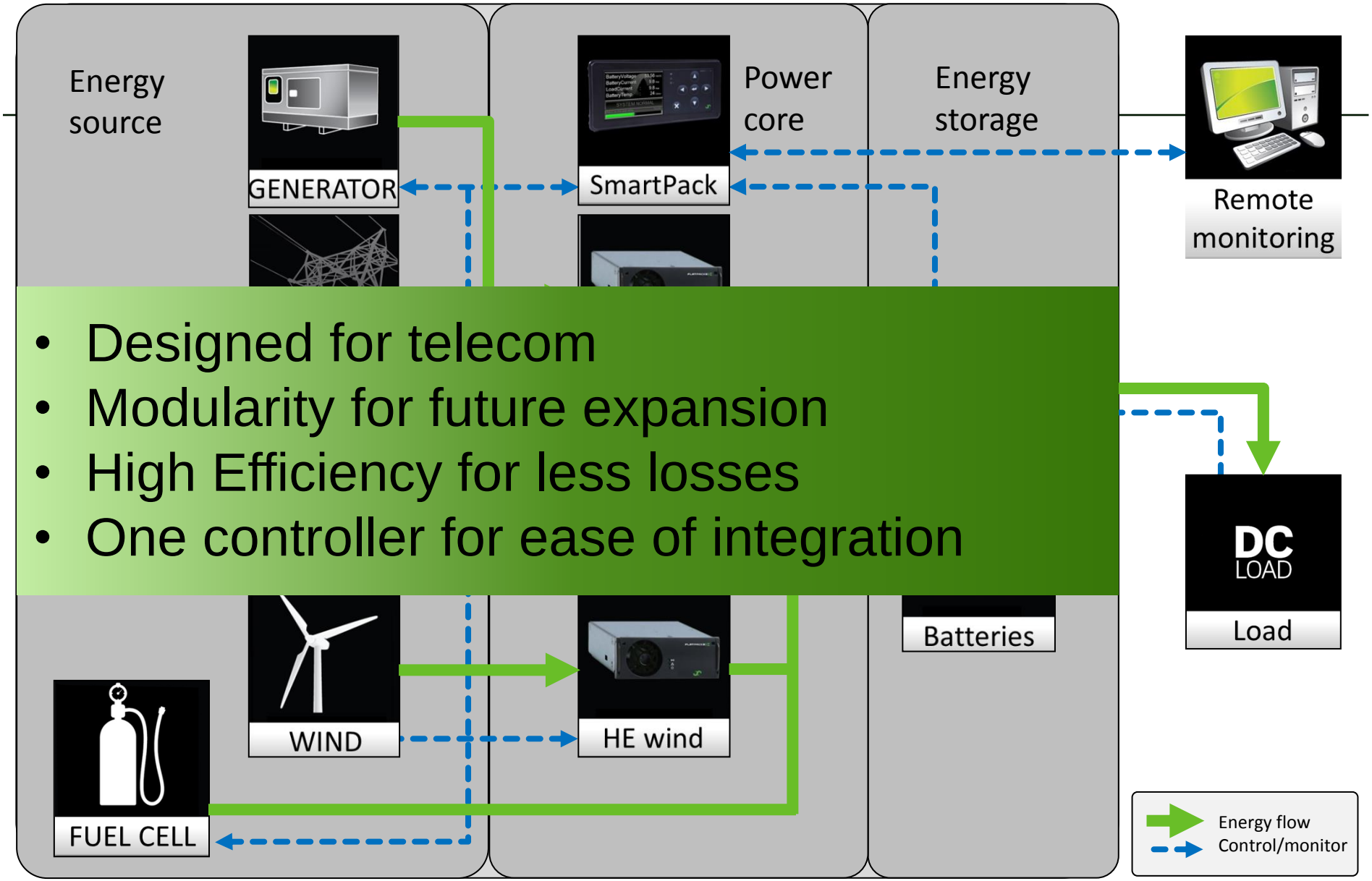
Based on customer feedback



Fuel consumtion

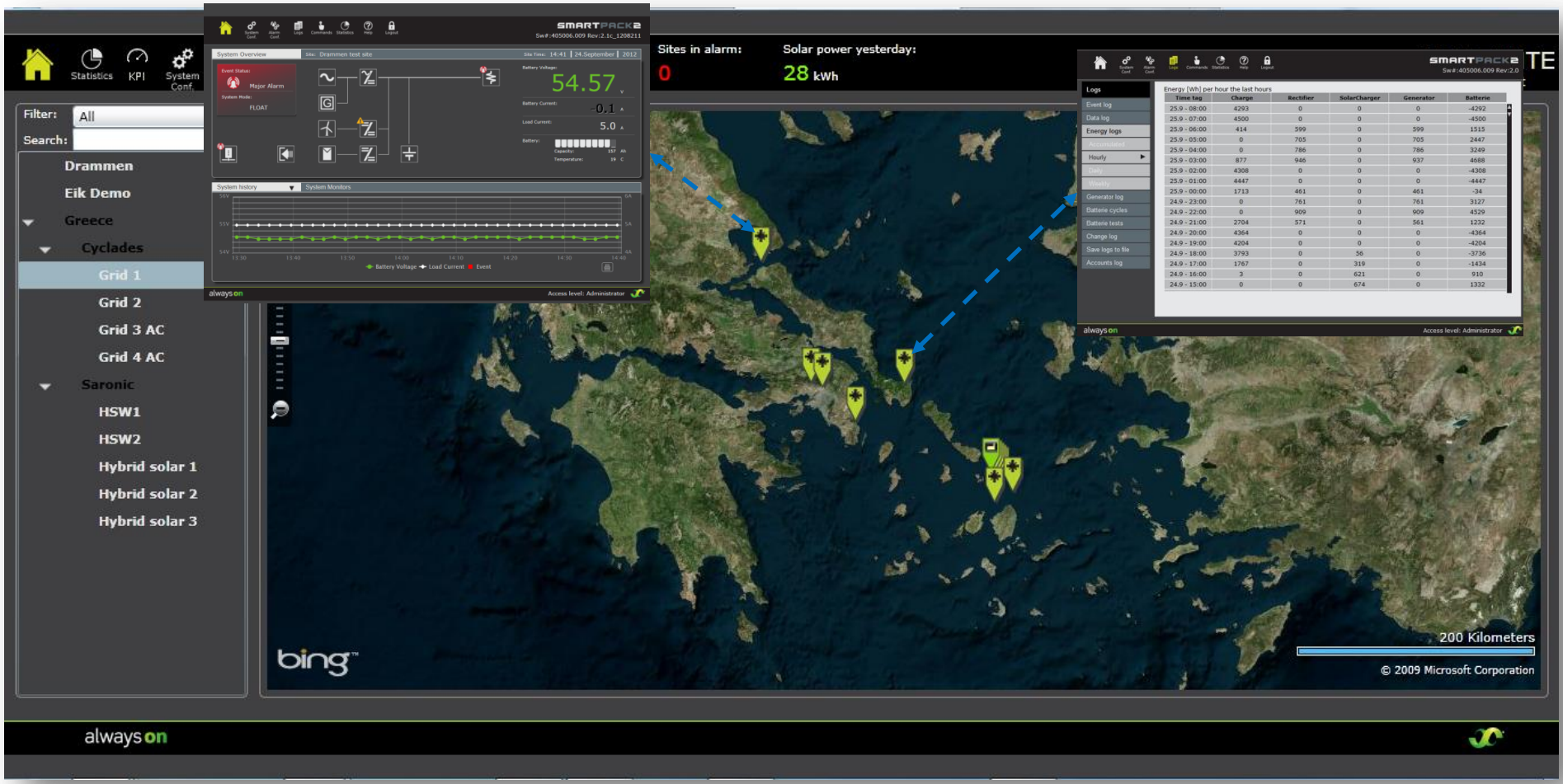


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MSM - Background



MSM – Energy analysis, PV contribution



MSM – Energy analysis



MSM – Fuel consumption analysis



ELTEK SYSTEM

Having the right building blocks is important

But optimum sizing and system field performance is the real challenge.

Eltek have a proven track record of satisfied customers



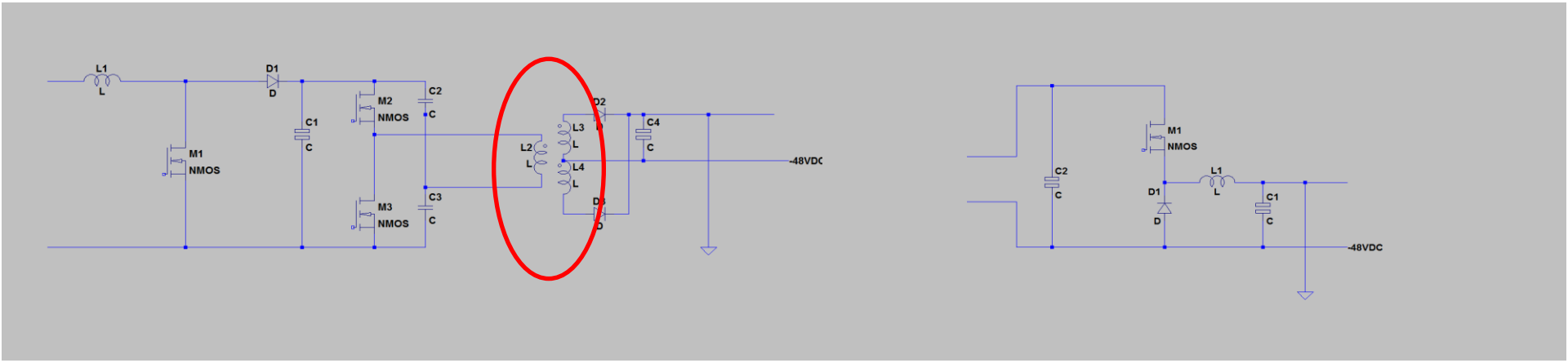


ELTEK HYBRID SYSTEMS

LESSONS LEARNED

Importance of galvanic Isolation

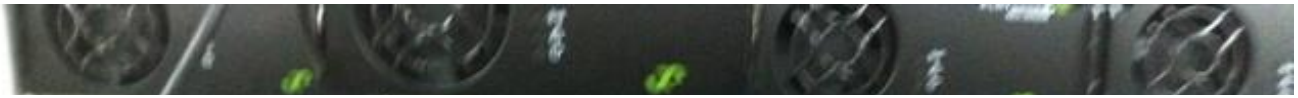
- The galvanic isolation is achieved with a high frequency transformer.
- The galvanic isolation serves two purposes
  - Di-electric withstand
  - Over voltage protection



EXAMPLE – site hit by lightning



EXAMPLE – site hit by lightning



After incident

- System operating!
- PV panel, solar chargers and distribution panel, SPD needed to be replaced,



Solar Hybrid Green Project 1





Solar Hybrid Green Project 1



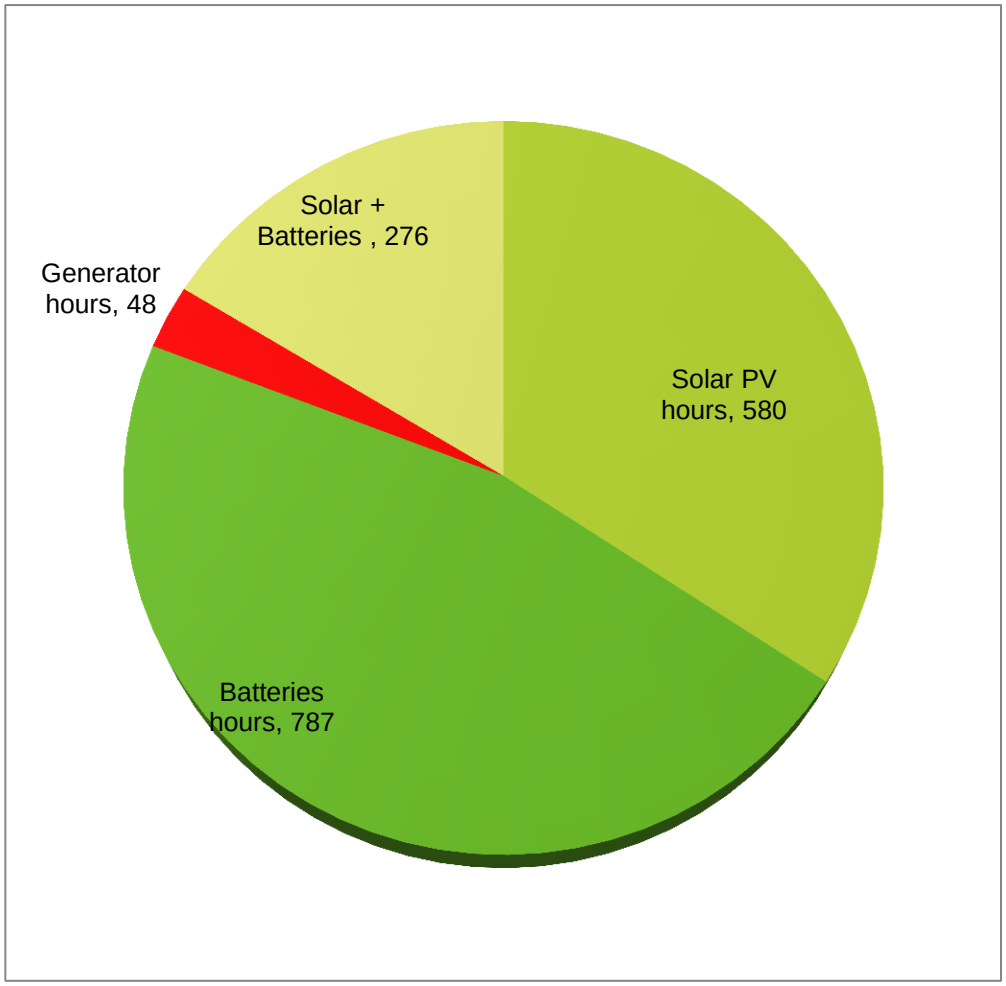


System Total Running Hours Division, 10 weeks

Site Configuration, Site 1

Average Load	888watts
Peak load	1900watts
DOD	50%
Solar	7050watts
Diesel Genset	20Kva

Before Deployment of Solar Hybrid Solution , Energy split into 8 hours on battery and 16 hours Genset Per day

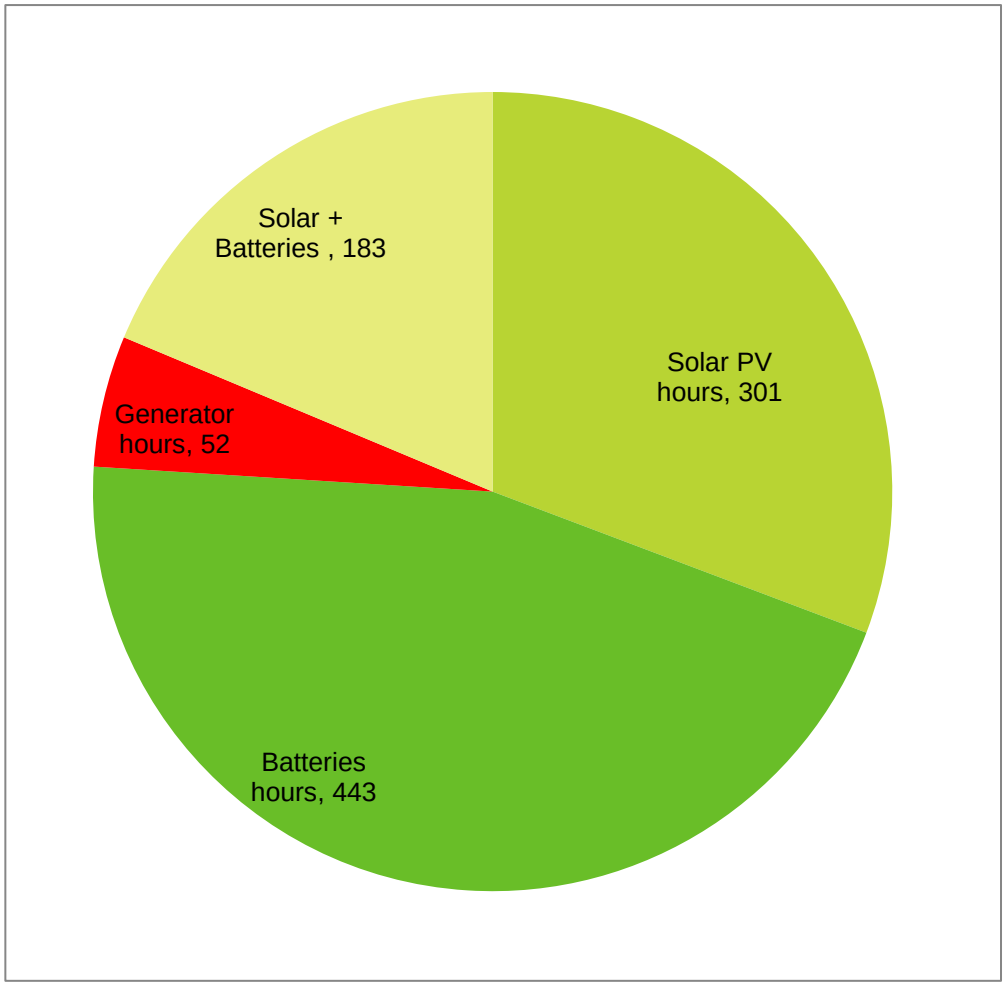


System Total Running Hours Division, 6 weeks

Site Configuration, Site 2

Average Load	1147watts
Peak load	2161watts
DOD	50%
Solar	5640watts
Diesel Genset	20Kva

Before Deployment of Solar Hybrid Solution , Energy split into 6 hours on battery and 18 hours Genset Per day



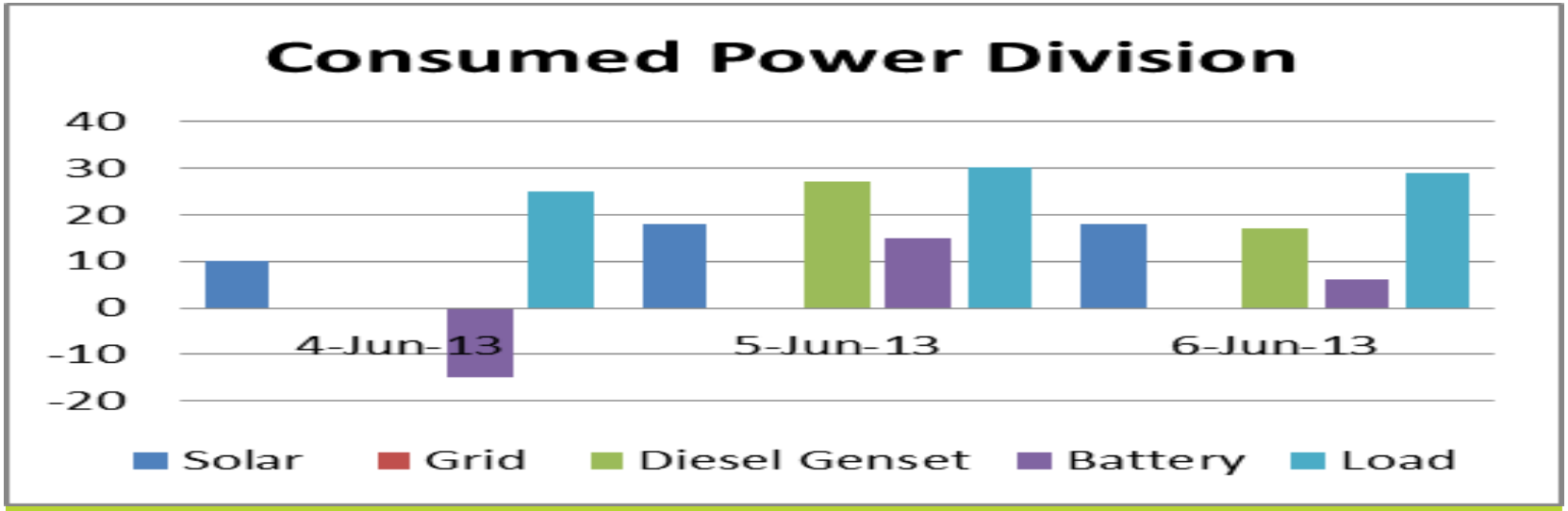
Solar Hybrid Green Project 2





Site Configuration:
Load: 1.55Kw
Solar power: 4.22Kw
Grid Tie Genset: 20kVA

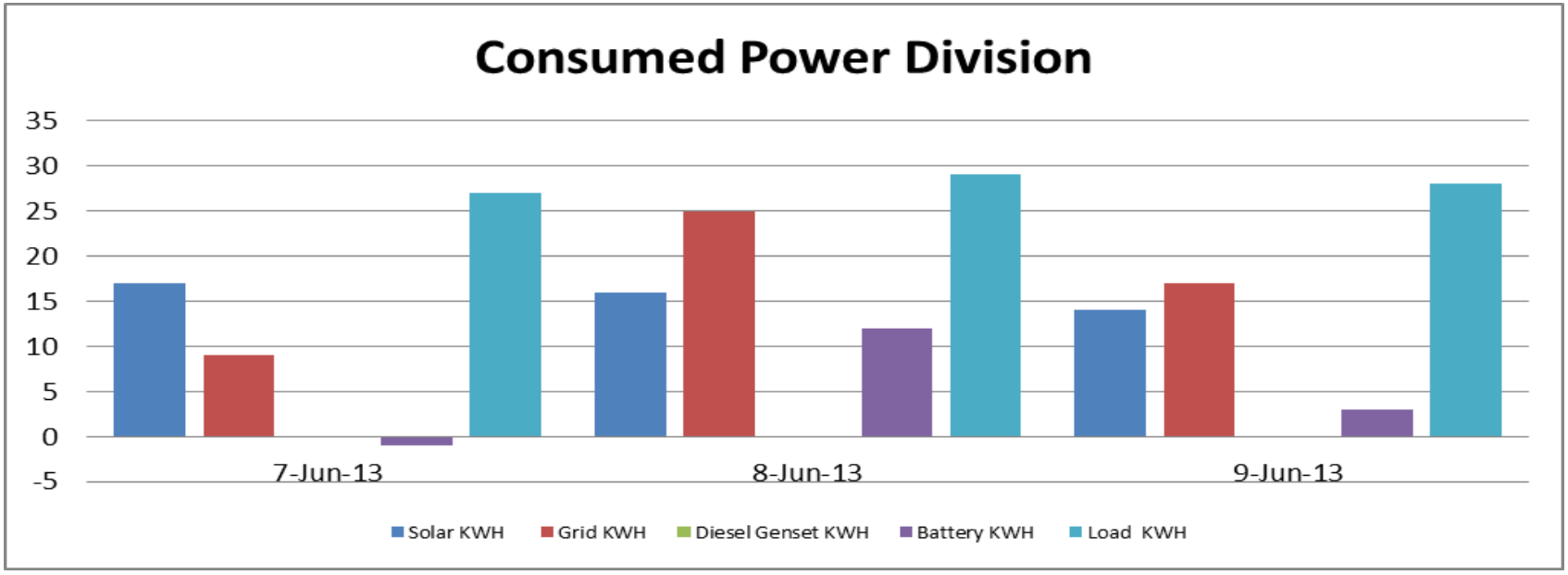
Off Grid



Consumed Power Division (KWH)

Date	Solar	Grid	Diesel Genset	Battery	Load
4-Jun-13	10	0	0	-15	25
5-Jun-13	18	0	27	15	30
6-Jun-13	18	0	17	6	29

On Grid



Consumed Power Division (KWH)					
Date	Solar	Grid	Diesel Genset	Battery	Load
7-Jun-13	17	9	0	-1	27
8-Jun-13	16	25	0	12	29
9-Jun-13	14	17	0	3	28

Wind Hybrid Green Project 3

Salient features of site

- No commercial power
- 4 Site of USF in PTCL
- Peak load of 1.5KW

Eltek Solution

- 2 x 5 KW Ghre Power Wind Mill
- 480Ah x 2 Battery Bank
- Eltek Power Cabinet + CE+T Inverter





Wind Hybrid Green Project 3

- Before deploying Wind Hybrid Solution, generator running was 18 hours per day.
- Per hour diesel consumption is 2.25 Liters at 50% load. (16KVA Gen.)
- After the installation of Wind Hybrid Solution, generator running hour reduced to 1.4 Hours per day.
- Saving in terms of fuel 1173 Liters Per month.

Eltek Hybrid solution value add

- Designed for Telecom
- Modularity for future expansion
- High Efficiency technology ’HE’
- One controller for all functionality
- Fully industrialized production line
- Complete AND COMPACT design
- Site optimization with respect to fuel usage
- Market leader on technology



Remote monitoring

Make sure that the investment in hybrid is paying off!

END OF PRESENTATION



ELTEK always on