Sustainable Business Breakfast

Chichester, 21st March 2013

Sustainable Business Network

Agenda

08:30	**Welcome** Rowan Wallis, Sustainable Business Network
08:35	**Air Source Heat Pumps: Right for your Building?** Graham Hazell, The Heat Pump Association
08:50	**Voltage Optimisation: Does it Really Work?** Peter Newell, EMSc (UK) Ltd
08:55	**Best Practice Case Study** Gemma Lacey & Glenn Waters, The Southern Co-Operative
09:15	**Round-the-Tables & Announcements**
09:30	**Networking & Refreshments**

Heat Pumps

Sustainable Business Breakfast,
Chichester, 21st March 2013

Graham Hazell, Heat Pump Association

The Heat Pump Association…

- Is a Trade Association representing manufacturers and distributors of heat pumps in the UK
- Focal point for the exchange of knowledge and information regarding heat pumps
- Liaises with Government departments to provide expert advice with regards to legislation, standards, guidance and financial incentives
- Informs the public and the wider HVAC industry, working with other trade associations and NGO's

The Heat Pump Association…

– Our Members

So…. What exactly is a heat pump?

A device which pumps heat!

It transfers energy from a low temperature level to a higher level!

Pumping Heat

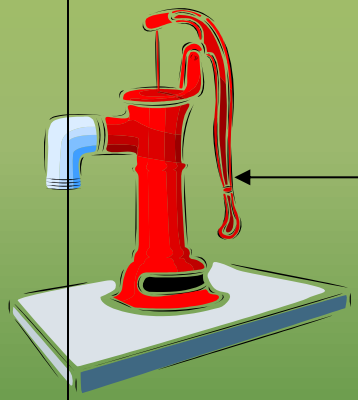
Inside

45°C

3 kW

Efficiency = output power/input power

Efficiency = “Coefficient of Performance” (CoP)



1 kW

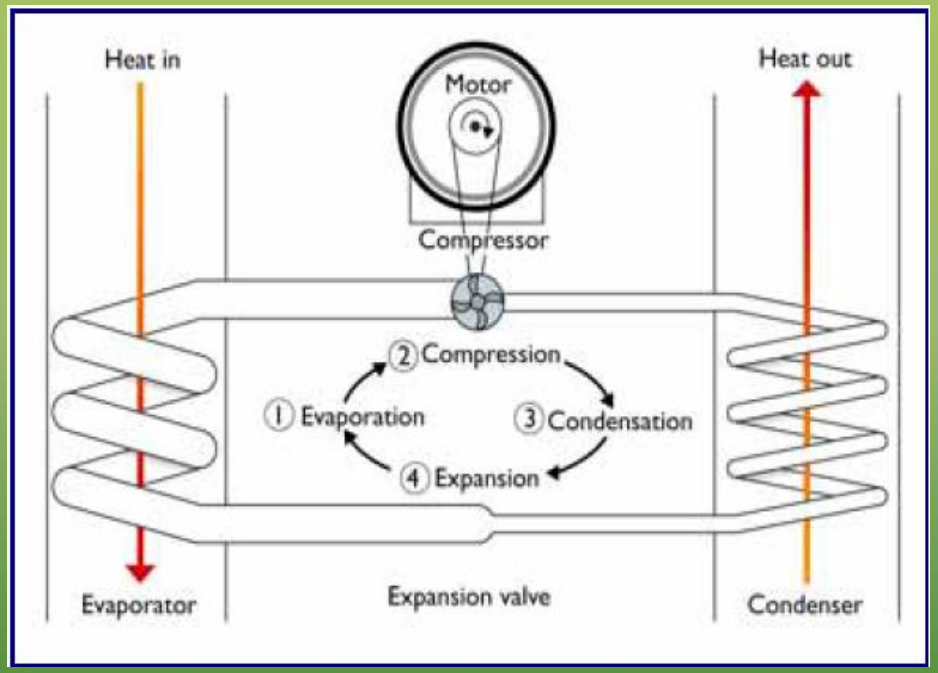
Efficiency > 100%

2 kW

0°C

CoP here = $3kW_{heatout}$ /$1kW_{electricity\ in}$ = 3.0 (or 300% efficient)

Heat Pump Operation



Evaporator - Turns refrigerant from a liquid to a gas - this 'boiling' needs heat

Compressor - compresses gas from cool, low pressure gas into very warm high pressure gas.

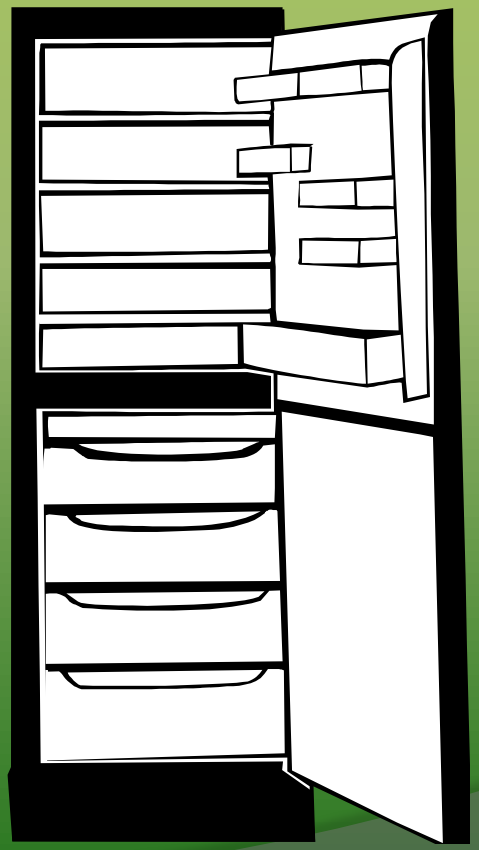
Condenser - high pressure gas turns to liquid - condenses - gives up latent heat

Expansion valve - turns high pressure liquid to low pressure liquid

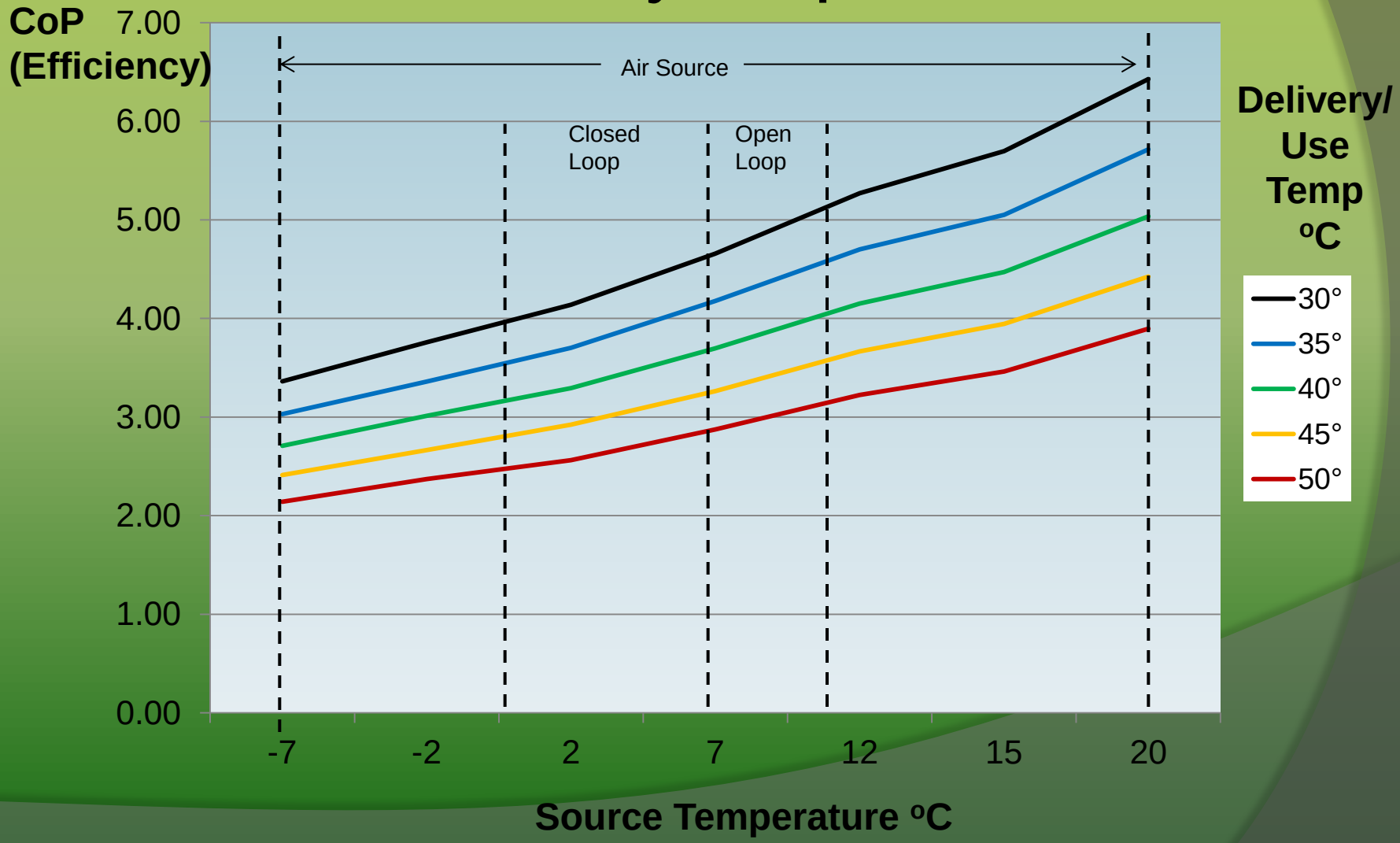
The process is continuous.

You all probably have a heat pump at home!

A domestic refrigerator!



Efficiency Varies with Source & Delivery Temperatures



Do Heat Pumps Really Provide Renewable Heat?

Since they consume a fossil fuel (usually electricity)?

EU Electricity is produced at just under 40% efficiency (UK 37%)

To produce 0.4 units of electricity requires 1 unit of gas

However, through a heat pump with a CoP of 2.5, 0.4 units of electricity = 1 unit of heat

Compare that with taking the original 1 unit of gas and burning it at 90% efficiency in boiler = 0.9 units of heat.

If CoP 3.0 then original 1 unit of gas becomes 1.2 units of heat.

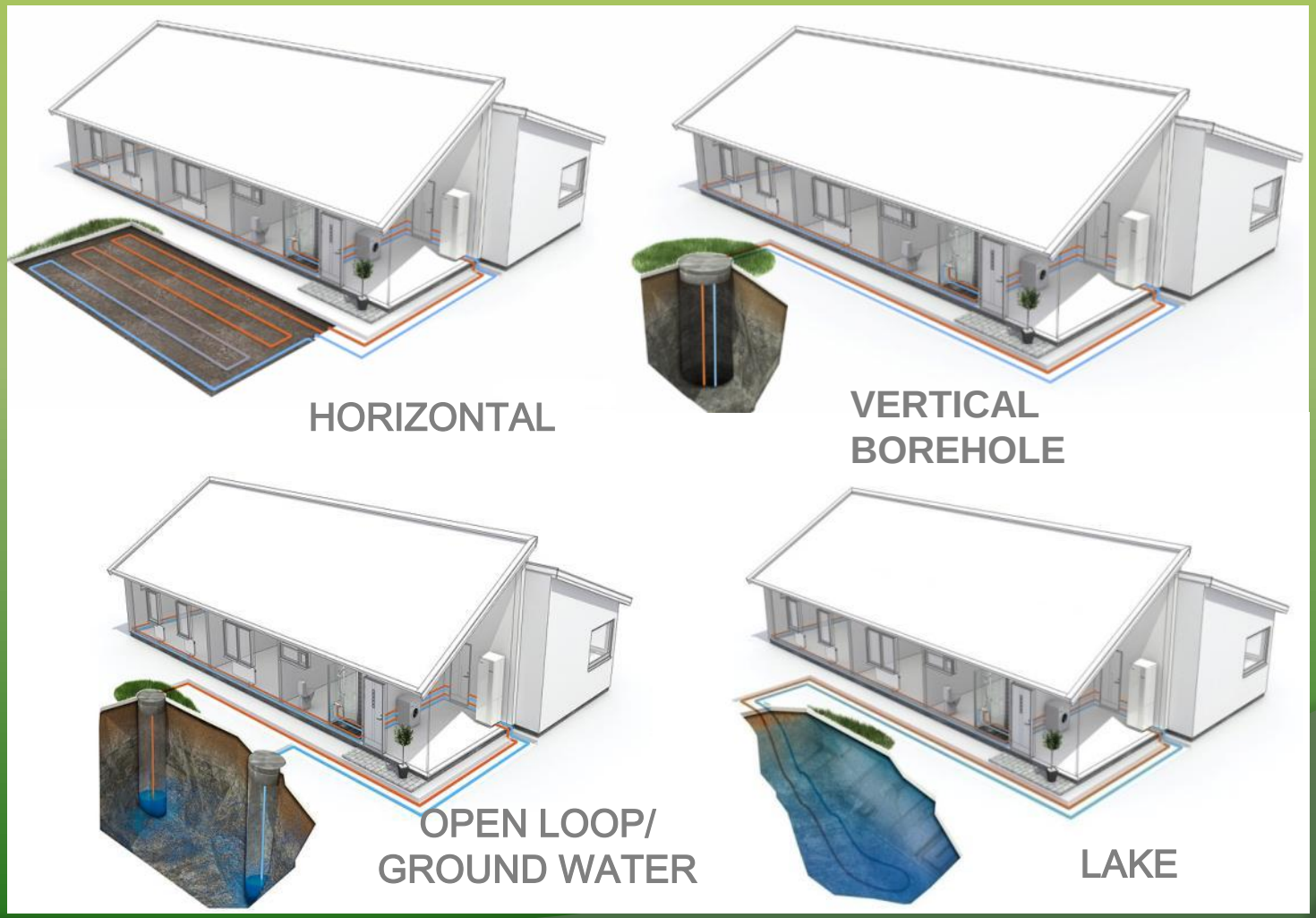
Air to Water Heat Pumps

HPA
HEAT PUMP ASSOCIATION

FETA

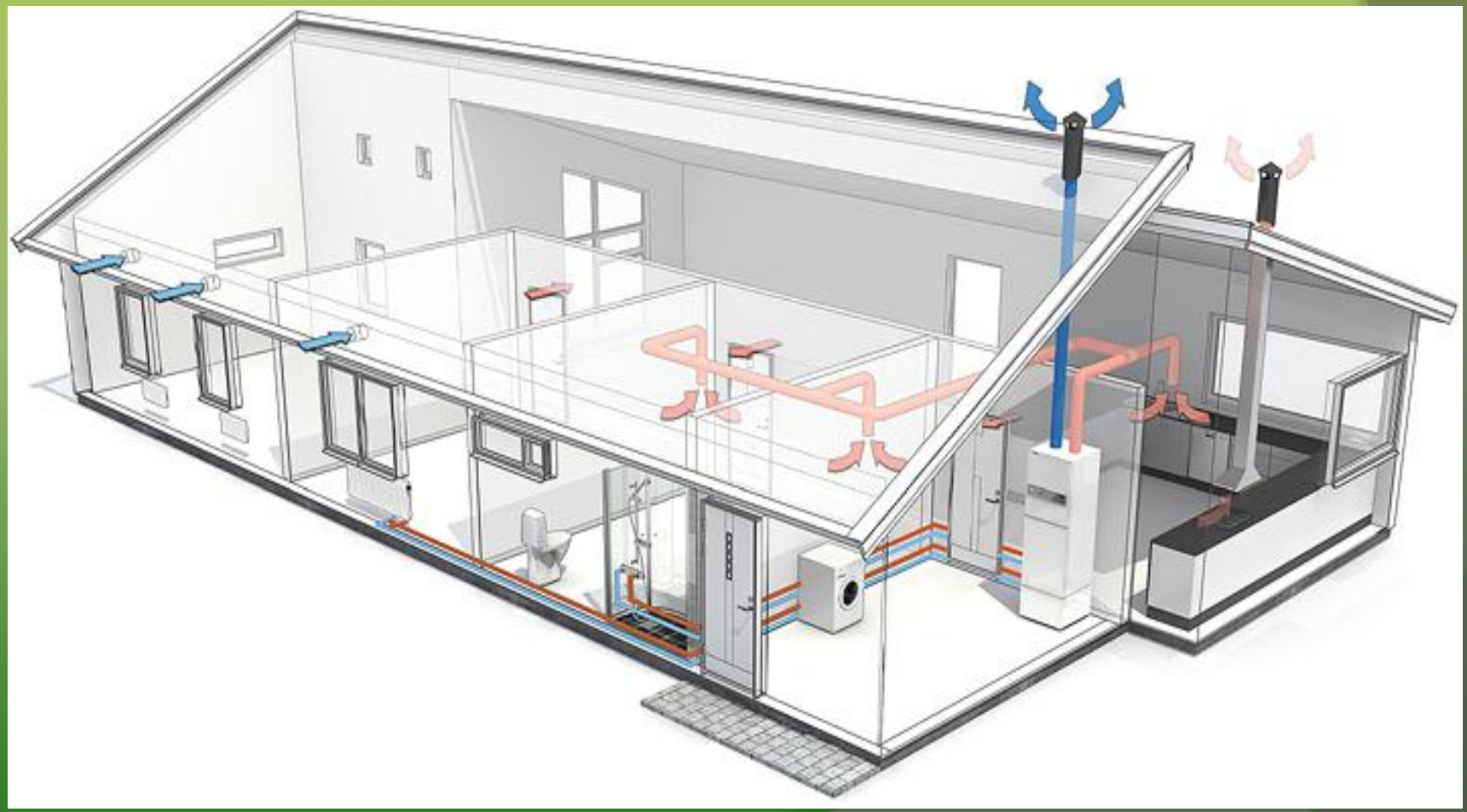
Permitted Development for ASHP

Water / Ground Source Heat Pumps



Exhaust Air Heat Pumps

Air to Water



HPA
HEAT PUMP ASSOCIATION

FETA

Exhaust Air Heat Pumps

Air to Air (Heat Recovery)

STANDARD UNIT

A. Fresh air intake
Complete with prefilter with G4 efficiency

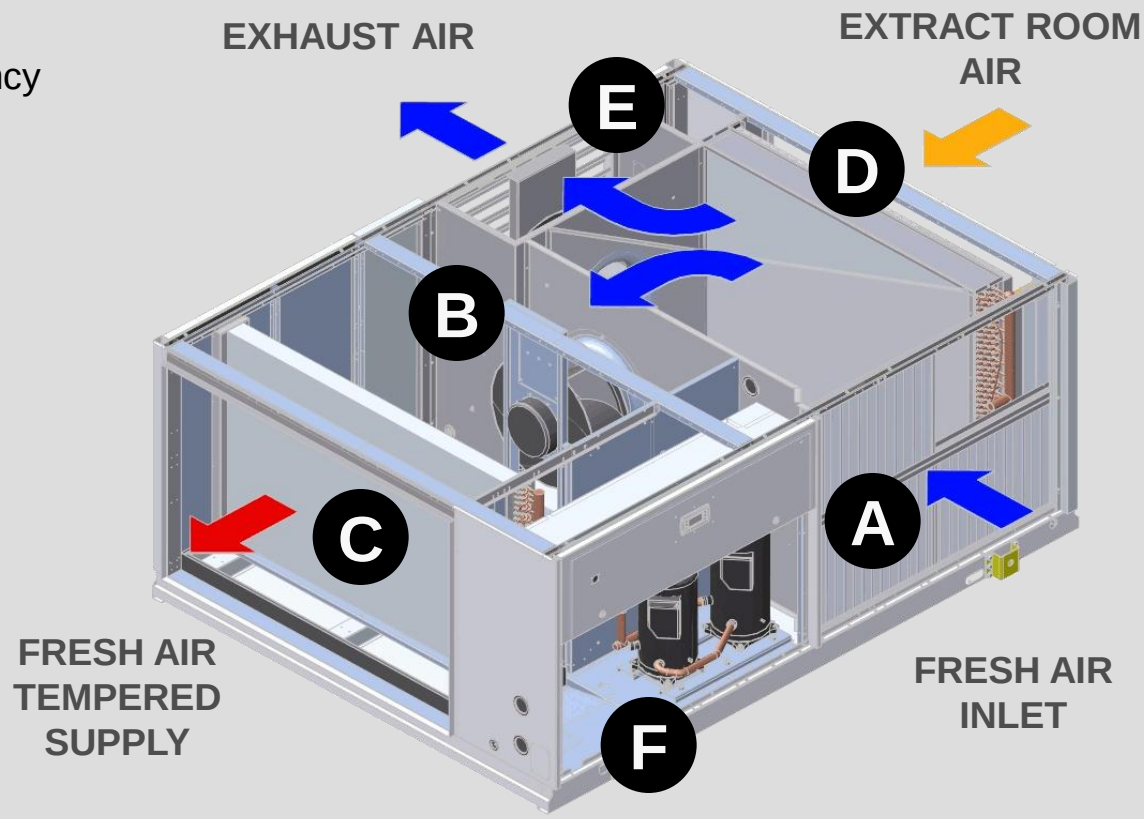
B. Supply fan
Electronic controlled type,
blows pure air in the rooms

C. Internal exchanger
It transfers energy (heat/cool)
to the fresh air

D. External exchanger
It recovers energy (cool/heat)
from the exhaust air

E. Exhaust air fan
Electronic control type,
it rejects the stale air outdoors

F. Heat Pump
It allows the active thermodynamic recovery
system operation



Heat Emitters?

Heat pumps work most efficiently when the heat emitter is designed to work at lower temperatures (compared to fossil fuel combustion systems)

- Radiators and Fan coils design circa 55°C (but there are higher temperature HP's 65-80°C available for retrofit but efficiency penalty)
- Under-floor heating max 45°C (40oC achievable with more tube) – mostly new build

Drivers to Achieve Low Carbon Heating

i) Incentives ?

Renewable Heat Initiative (RHI) / Premium Payment RHPP?

- Appeals to pocket only - purely financial decision
- One off payment to Installer like RHPP ???

ii) Compulsion ?

a) Planning: Renewables Contribution - Narrow?

b) Building Regulations - Effective?

The Case for Heat Pumps

Relative Emissions of Energy Sources

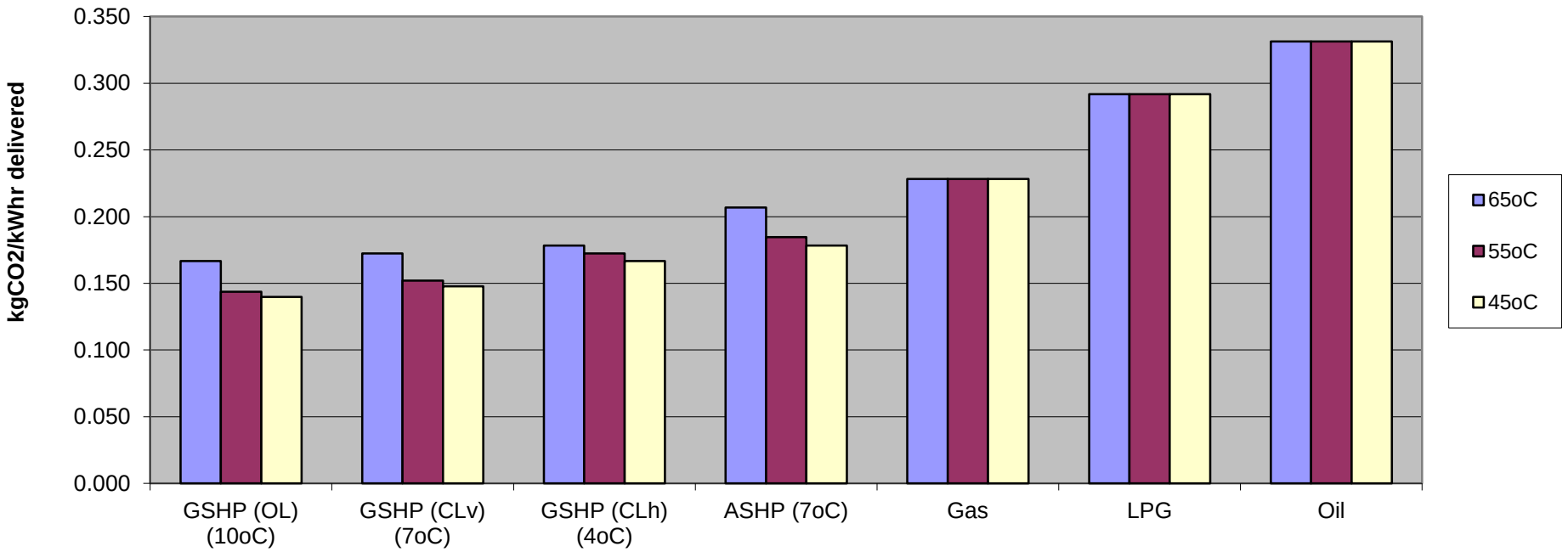
	Gas	Oil	LPG	ASHP	GSHP
Fuel CO2 /kWh	0.194	0.297	0.236	0.540	0.540
System Efficiency	90%	85%	90%	290%	320%
Effective CO2/kWh consumed	0.216	0.349	0.262	0.186	0.169
Fuel Cost p/kWh inlet (average)	4p	6.5p	7.5p	13p	13p
Effective Cost/kWh consumed	4.45p	8.1p	8.33p	4.48p	4.06p

Economic & Emission Balance Points

Coefficient of Performance (CoP) of heat pump required to compete with fossil fuels

	Gas	Oil	LPG
Environmental Emissions (CO^2)	2.3	1.9	2.1
Economic (£)	2.8	1.7	1.45

Fuel Emissions

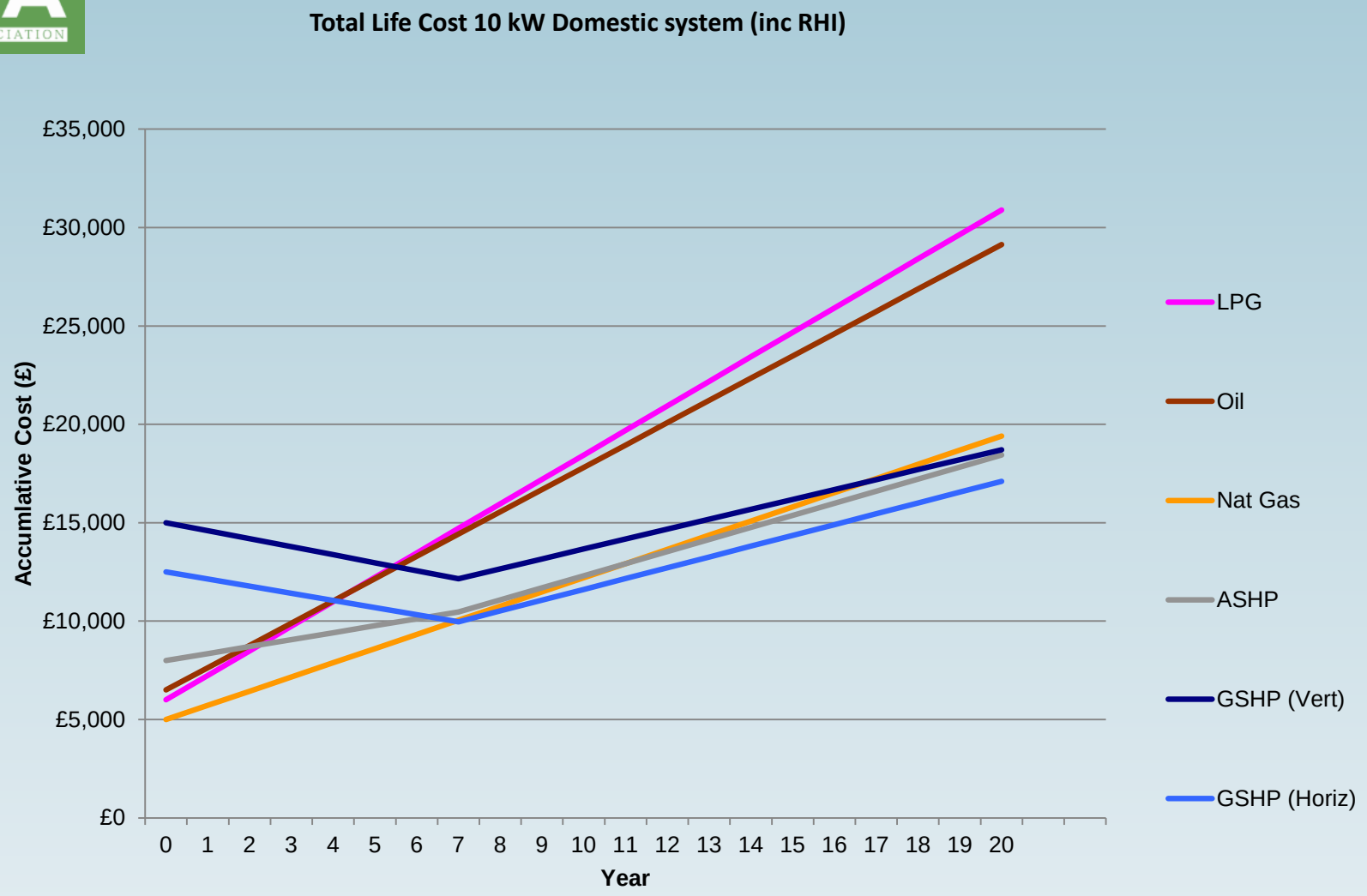


Variables

That's the answer now what's the question?!

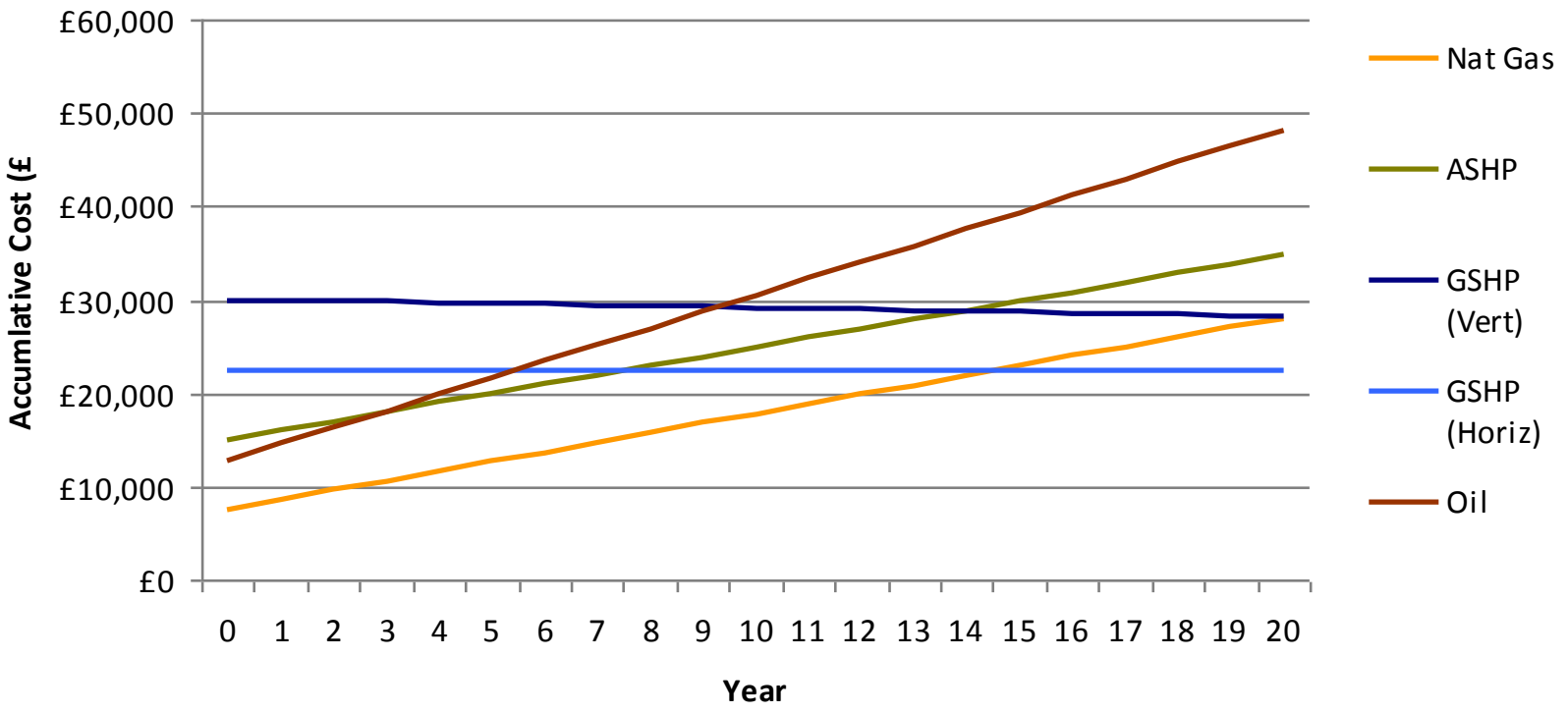
	Oil	Gas	Air Source Heat Pump	Ground Source Heat Pump
Initial or Refurb cost	£0- 2,500	£0- 2,000	£6,000-10,000	£8,000 - £17,000
System Efficiency	90-70%	92-75%	200-320%	250-400%
Fuel Cost p/kWh inlet	5.5 - 6.5p	3 – 4.5p	12 - 14p	12 - 14p
Payback (no support)	Never to 4 years	Never to 6 years		
Payback with RHI gov. support	8 to 3 years	7 to 3 years		

Capital v Running Cost?

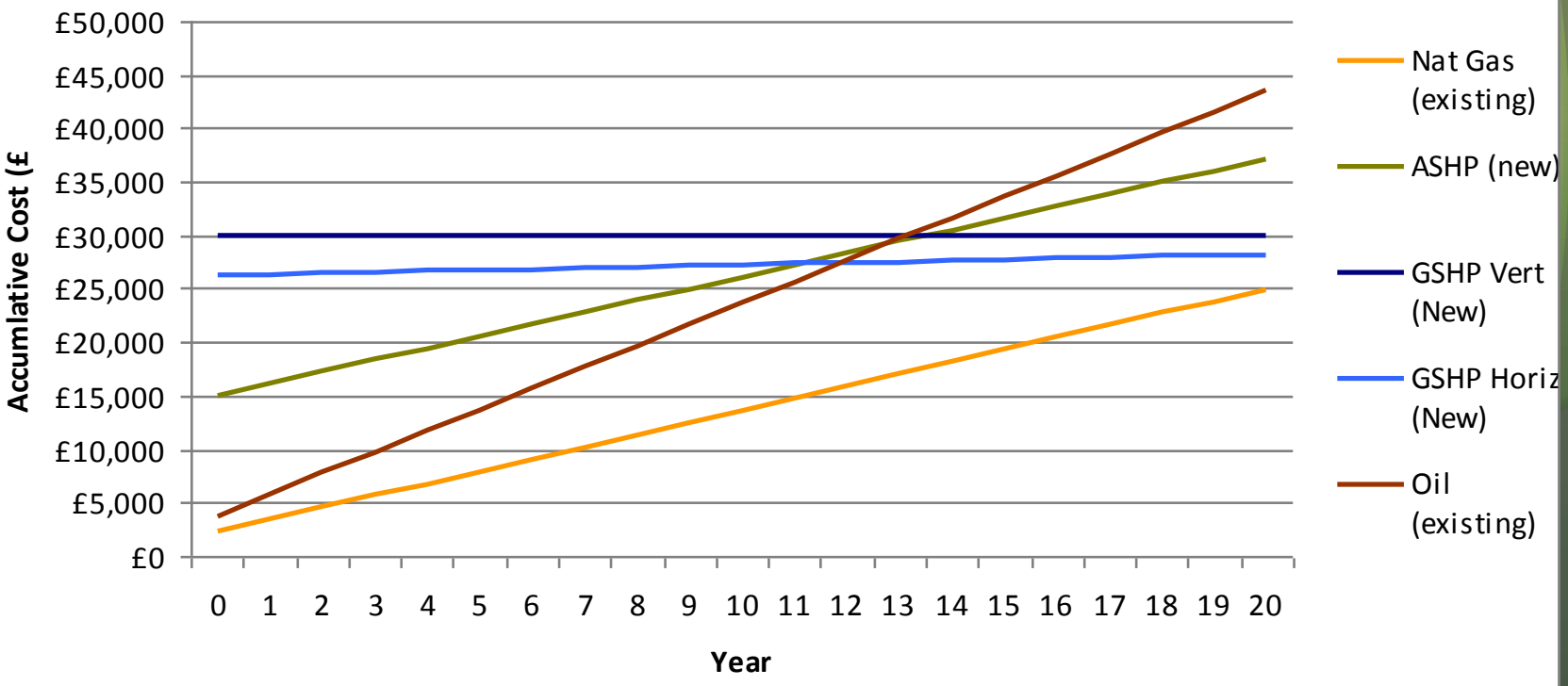


Gas 90%,4.5p/kWh; LPG 88%, 7.5p/kWh; Oil 87%, 6.5p/kWh; Elec: 13p/kWh; GSHP (V) 340%; GSHP (H) 310%; ASHP 280%;

Whole Life Cycle Cost: 15 kW Heating Technologies NEW BUILD 120229



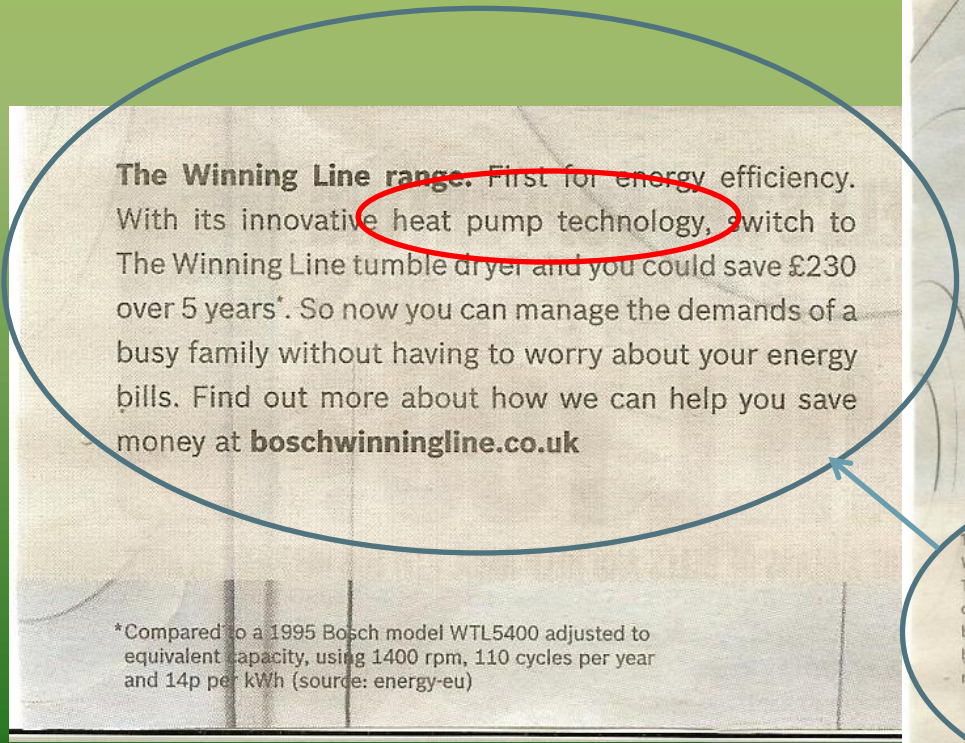
Whole Life Cycle Cost: 15 kW REFURB 120229
Change Heat Emitters (radiators)



Connecting to other renewable sources

What's New?

Tumble Dryer Heat Pumps!



The Winning Line range. First for energy efficiency. With its innovative heat pump technology, switch to The Winning Line tumble dryer and you could save £230 over 5 years*. So now you can manage the demands of a busy family without having to worry about your energy bills. Find out more about how we can help you save money at **boschwinningline.co.uk**

*Compared to a 1995 Bosch model WTL5400 adjusted to equivalent capacity, using 1400 rpm, 110 cycles per year and 14p per kWh (source: energy-eu)

Energy efficient technology that lasts a lifetime.

The Winning Line tumble dryer is 40% more energy efficient* – perfect when you're juggling a busy family and the household bills.

the winning line

The Winning Line range. First for energy efficiency. With its innovative heat pump technology, switch to The Winning Line tumble dryer and you could save £230 over 5 years*. So now you can manage the demands of a busy family without having to worry about your energy bills. Find out more about how we can help you save money at **boschwinningline.co.uk**

BOSCH
Invented for life

*Compared to a 1995 Bosch model WTL5400 adjusted to equivalent capacity, using 1400 rpm, 110 cycles per year and 14p per kWh (source: energy-eu)

Model shown WTW86350GB

Thank You

The Heat Pump Association

- www.heatpumps.org.uk
- T: 0118 940 3416

Sustainable Business Breakfast

Chichester, 21st March 2013

Sustainable Business Network

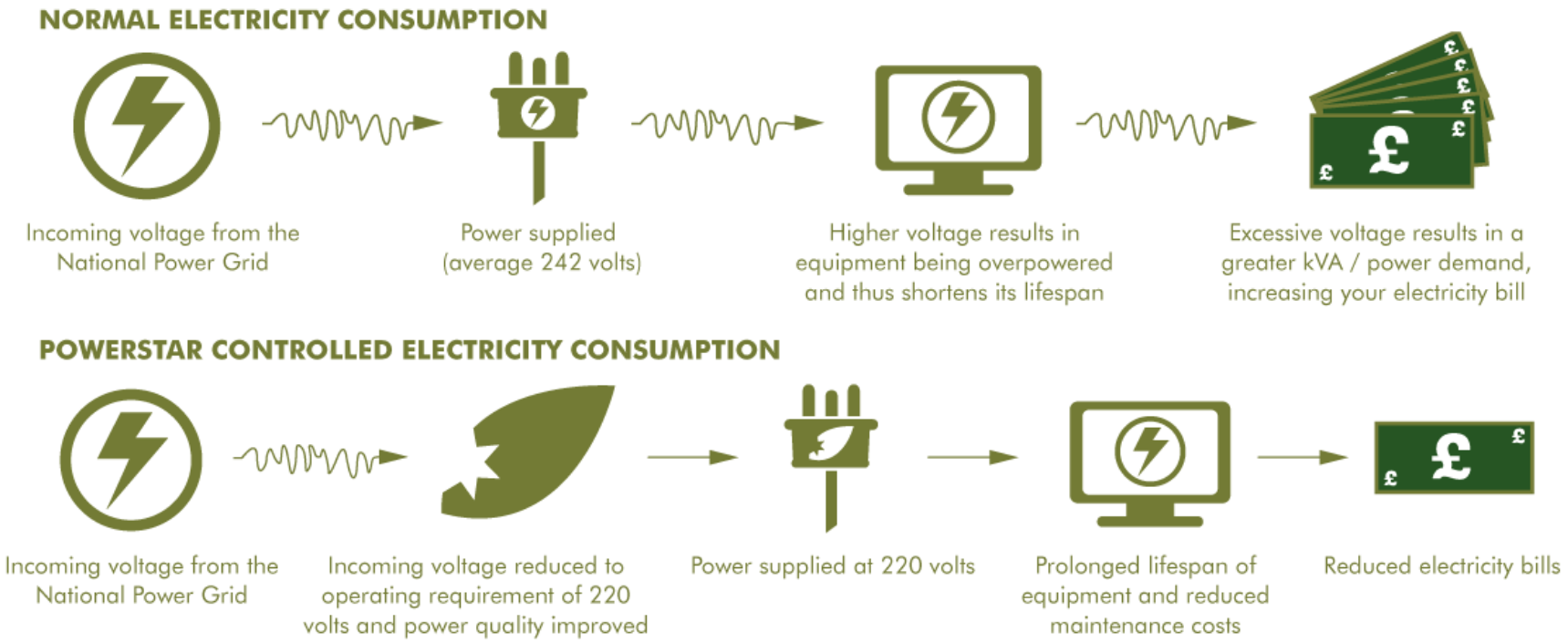
10 YEARS of UK DESIGN & MANUFACTURE

ems®

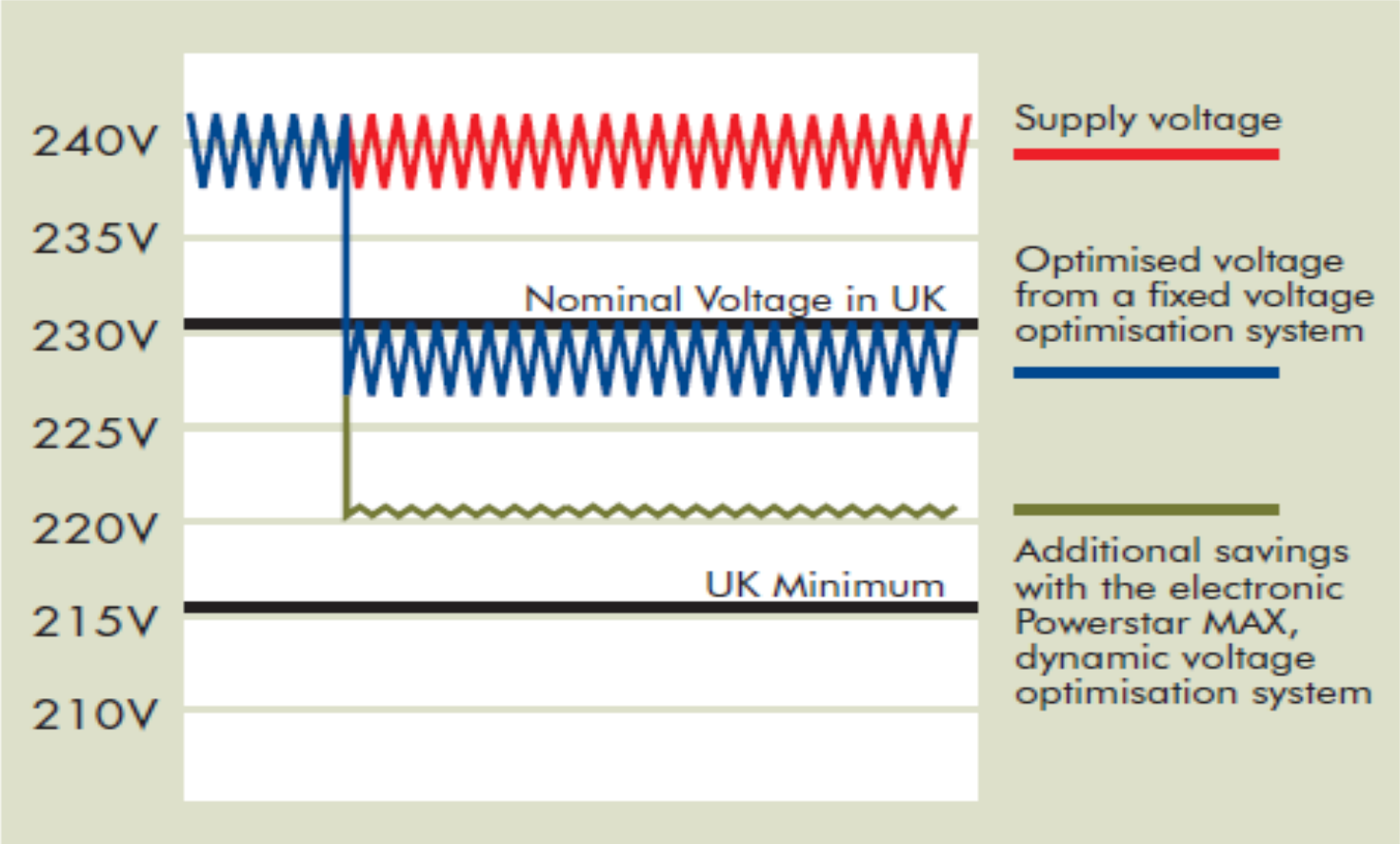
ENERGY MANAGEMENT SYSTEMS

powerstar airstar lightstar hotelstar motorstar autostar

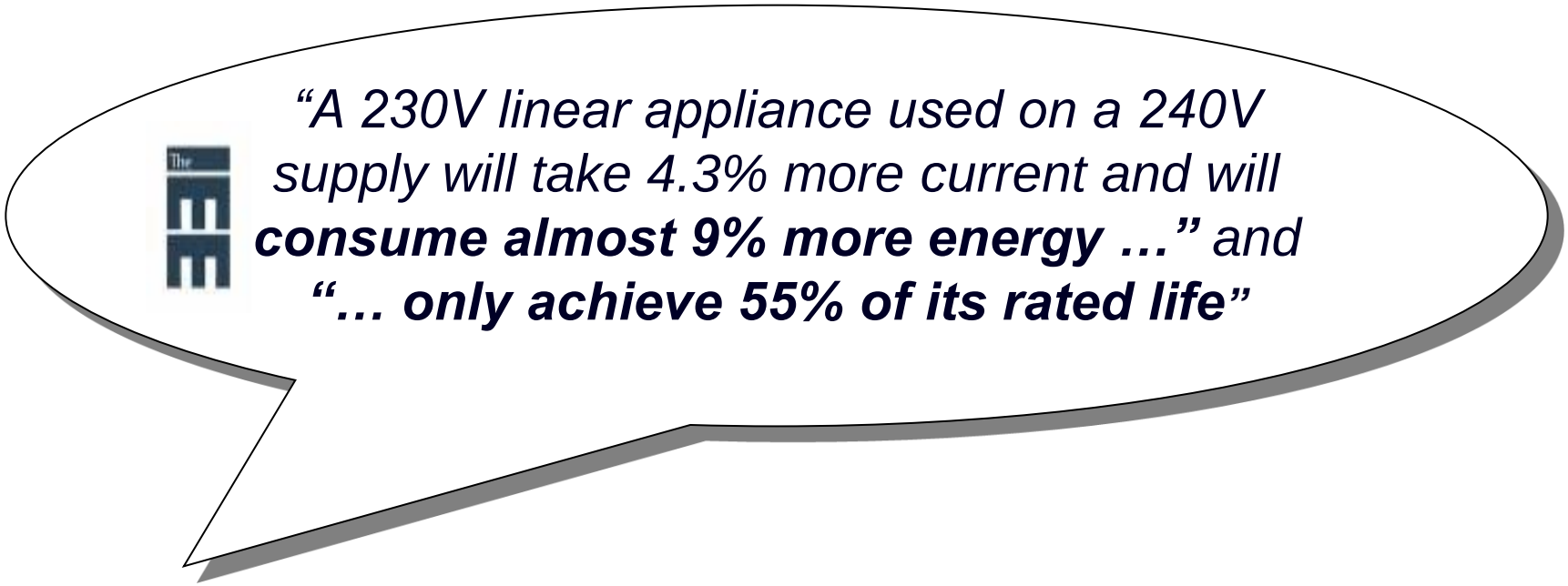
What does voltage optimisation do?



What is Voltage Optimisation?



What do the Experts say?



Savings with Voltage Optimisation completely depends on the load the company has and therefore a full site survey is essential.

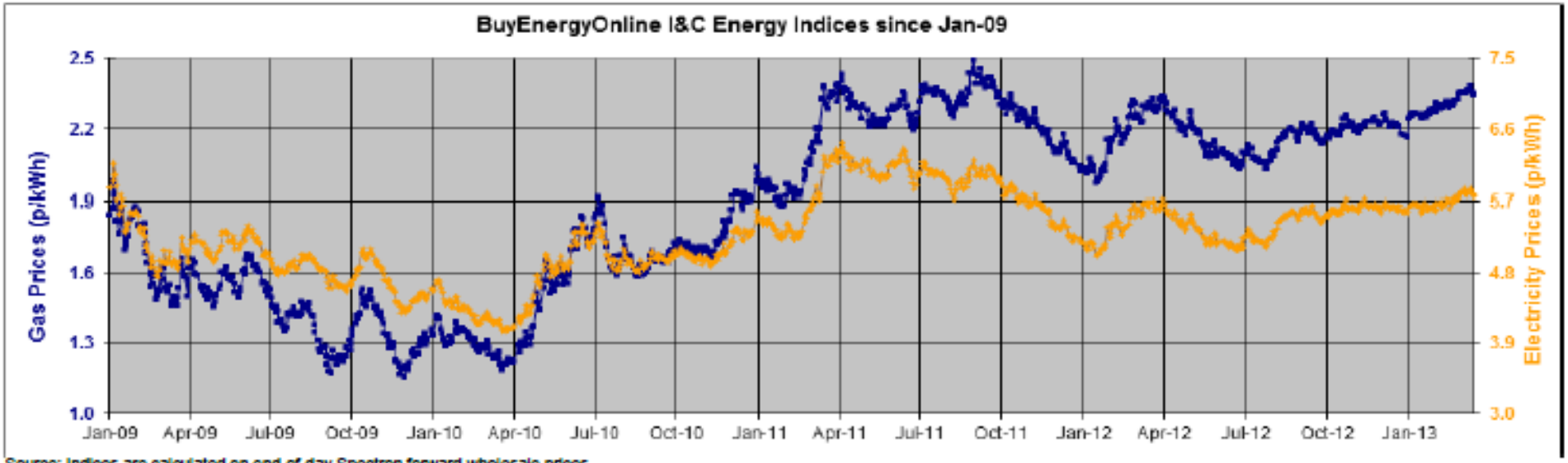
Why is it important to optimise site voltage?

In addition, VO helps with Targets, obligations, pressures…

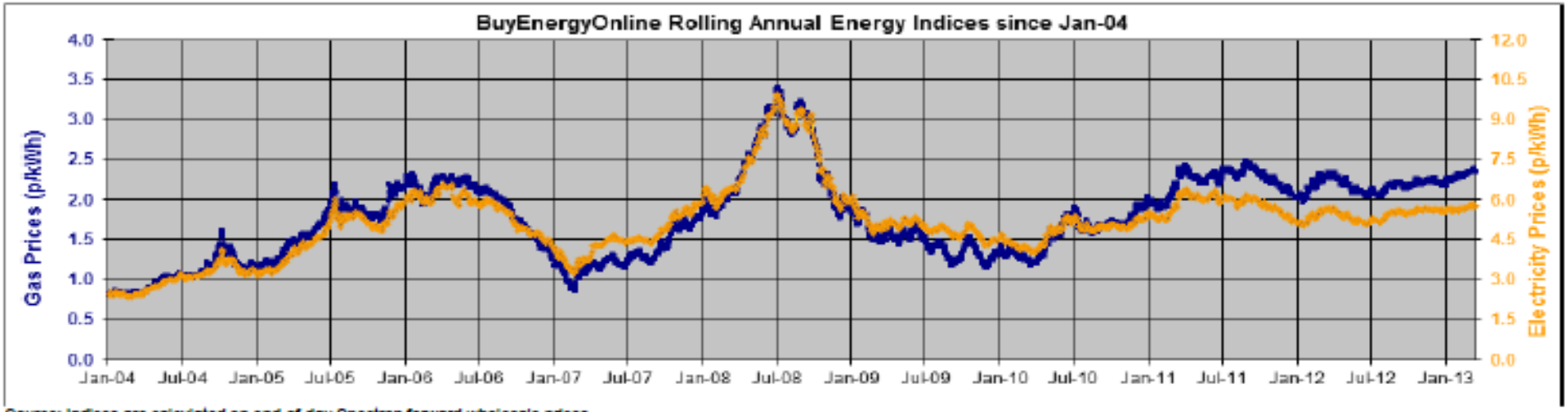
- Reduce kWh
- Reduce CO_2
- CRC, CSR
- **Save money**

BuyEnergyOnline Price Watch Report – 15th March 2013

Prices moved as follows on 15/03/2013: **Gas -0.27%, Elec +0.10%.**
Prices moved as follows last week: **Gas +0.76%, Elec -0.47%.**



Source: Indices are calculated on end-of-day Spectron forward wholesale prices.

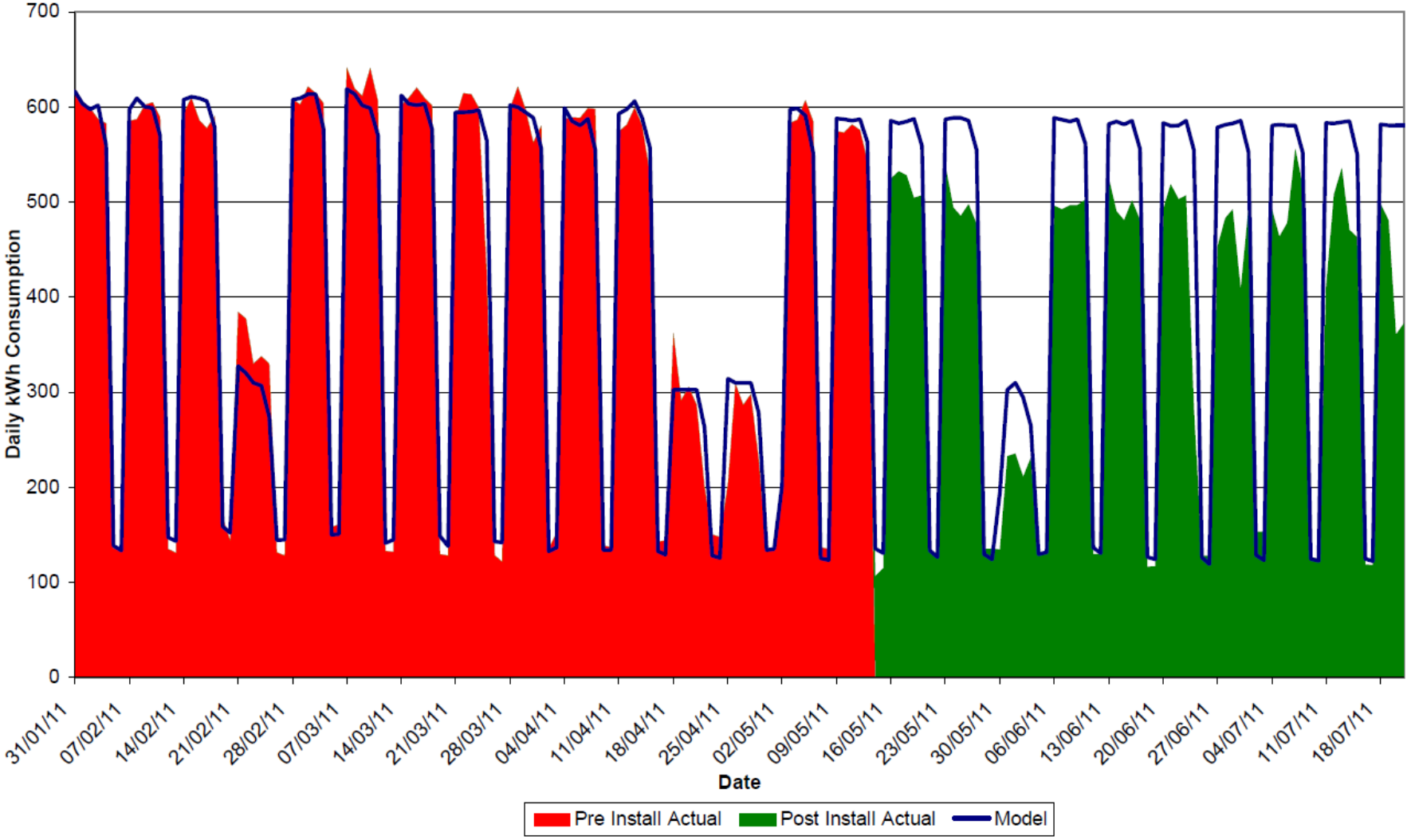


Source: Indices are calculated on end-of-day Spectron forward wholesale prices.

Respond by email if you would prefer to receive these Reports on a daily basis, weekly, monthly or no longer required; or if you would like your auction broker to call you to discuss market prices and to run an auction.

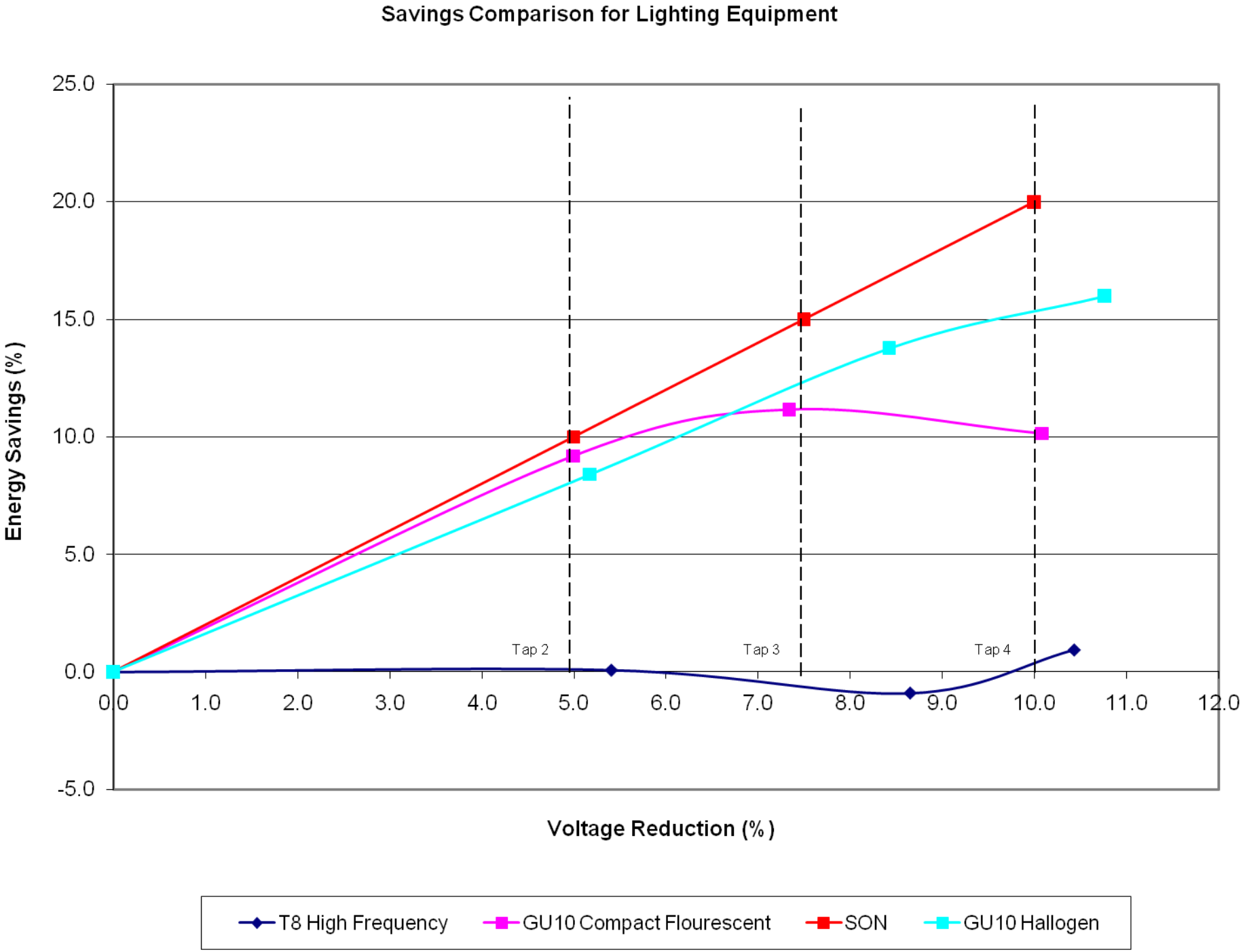
How does Voltage Optimisation help?

Reduces kWh Consumption

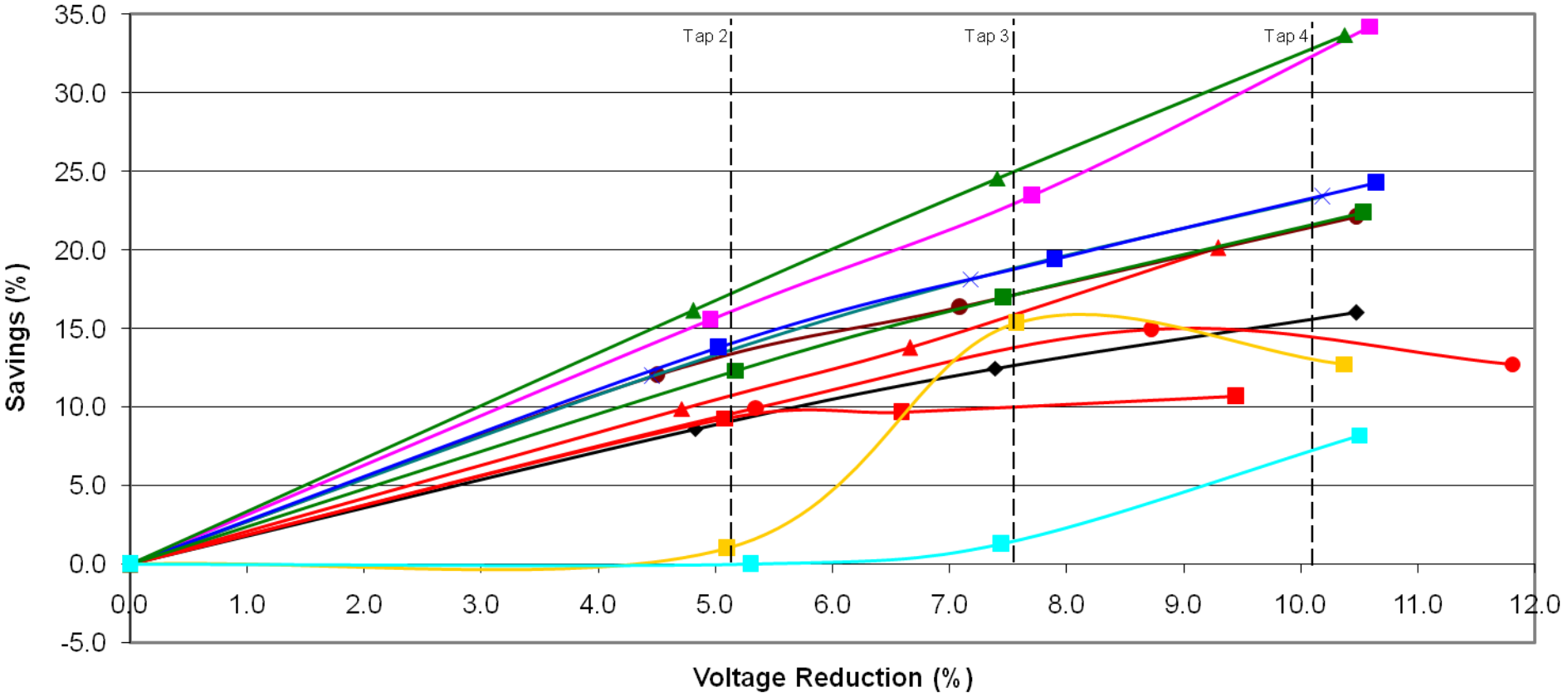


Will everything consume less energy?

- **NO, not everything…**
- Greatest savings come from inductive loads (motors, lighting)
- Some loads will yield less savings (VSDs)
- Some loads will yield zero savings, but will benefit in other ways
- It is important to understand the electrical loading characteristics of your site.
- Remember no two sites are the same

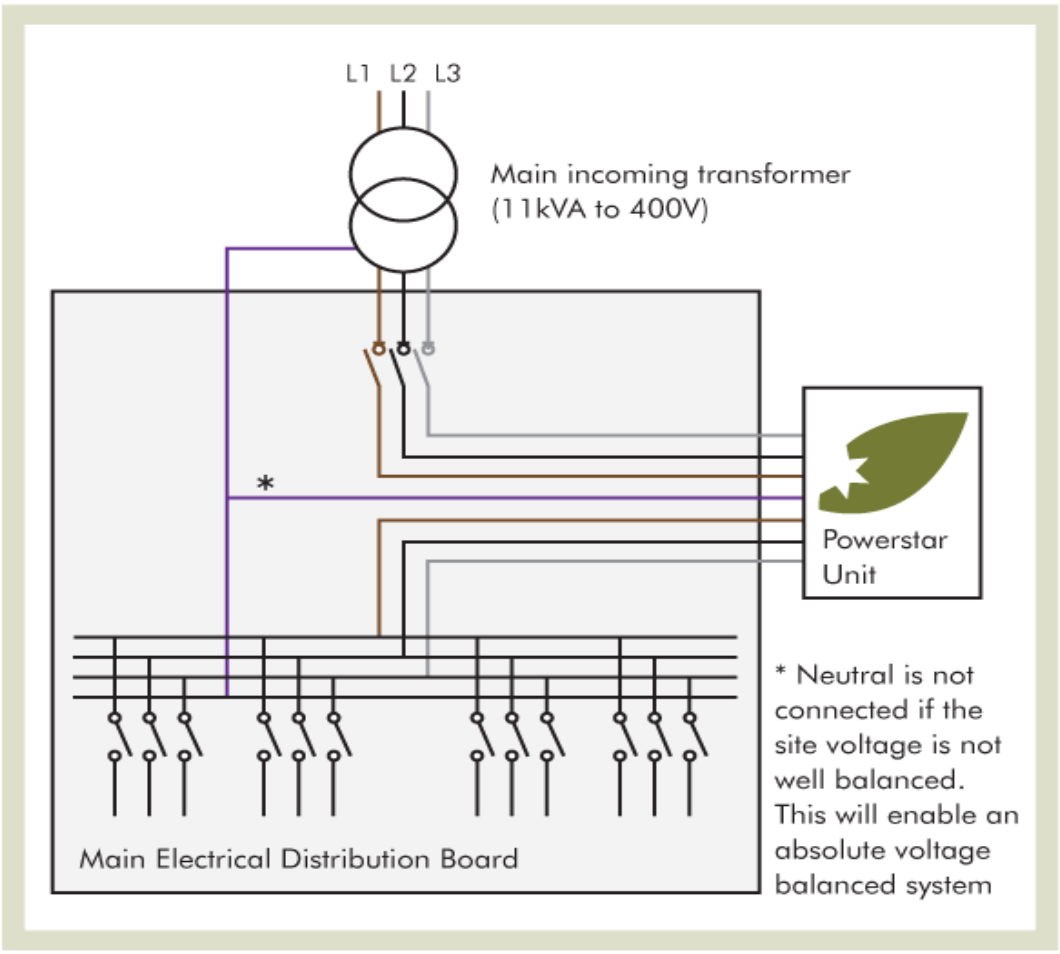

Savings Comparison for Lighting Equipment
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
Energy Savings (%)
Tap 2
Tap 3
Tap 4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
Voltage Reduction (%)
T8 High Frequency
GU10 Compact Flourescent
SON
GU10 Hallogen

Savings Comparison For Motor Equipment



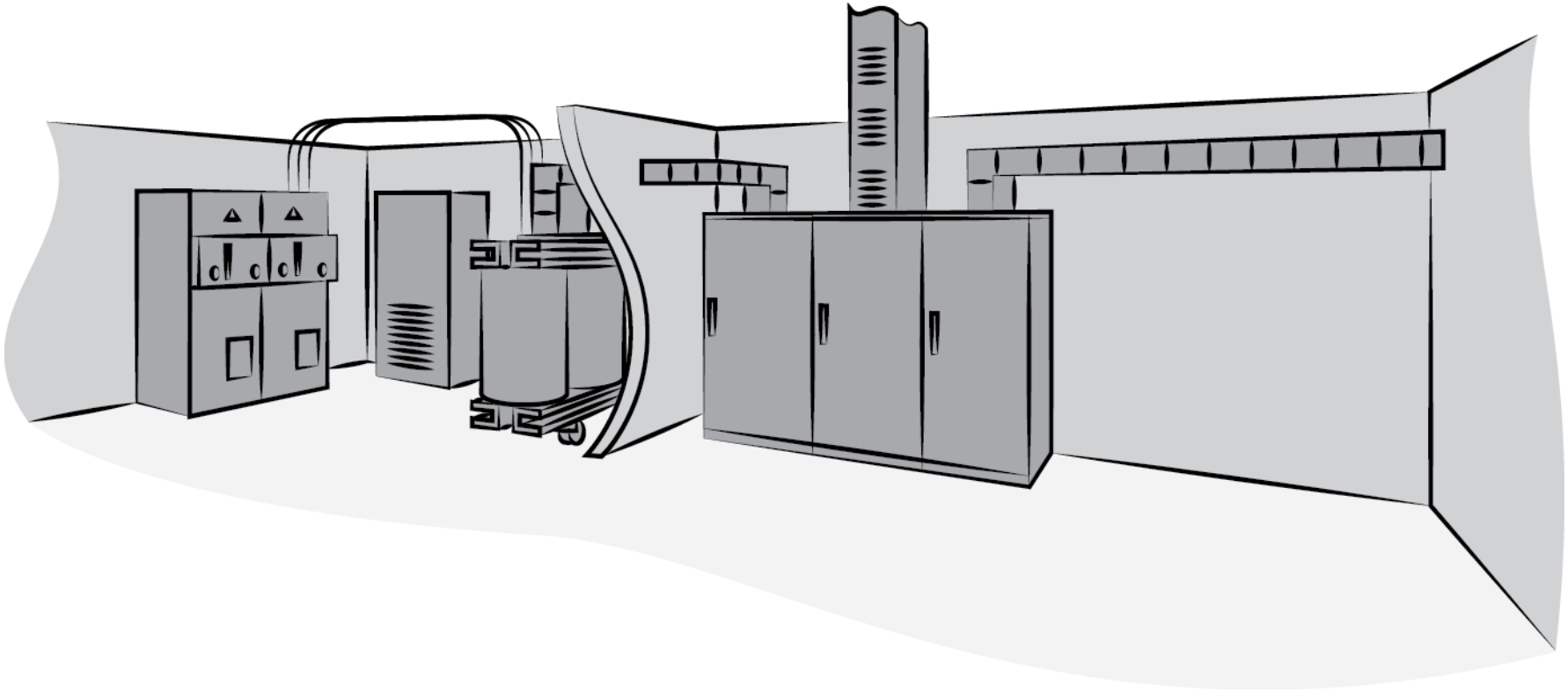
- Air Compressor
- Extractor Fan
- Office Fan Full Power
- Office Fan Half Power
- Office Fan Low Power
- Resistive Heater Fan
- Pillar Drill No Load
- Pillar Drill With Load
- Shredder
- Vacuum Cleaner Full Power
- Vacuum Cleaner Low Power
- Fridge

Installation



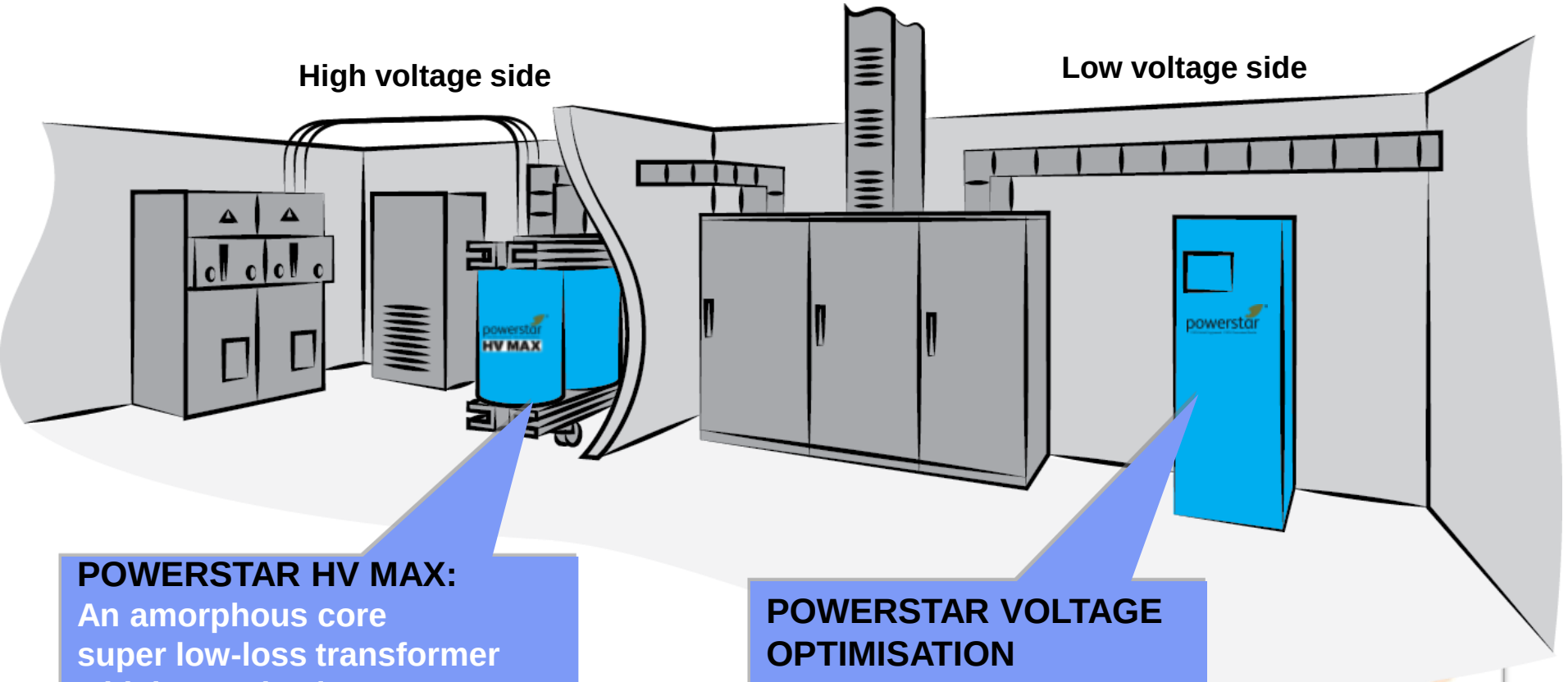
Optimise at HV side or LV side?

The diagram below shows a typical onsite plant room set-up, without any voltage optimisation technologies being utilised



Optimise at HV side or LV side?

The diagram below shows the same typical plant room set up, but highlights where Powerstar voltage optimisation technologies can be installed on either the HV or LV supply



POWERSTAR HV MAX:
An amorphous core super low-loss transformer with integral voltage optimisation and electronic-dynamic regulation

POWERSTAR VOLTAGE OPTIMISATION SYSTEM:
Available in fixed or electronic-dynamic variations

Case studies and testimonials

Guoman Hotels Group Ltd – Thistle Hyde Park

• Total before (kWh) (24 days)	34355.3
• Total after (kWh) (24 days)	25403.8
• Savings (kWh)	8951.5
• % Savings	26.1%
• Annual savings based on 8p/kWh	£10,891

GUOMAN HOTELS

"So far the Powerstar installations in our hotels have achieved as much as an amazing 26.1% saving in total electricity consumption at our Thistle Hyde Park Hotel and elsewhere, never less than an 11.5% saving."

David Hannah, Head of Property, Guoman Hotels Group Ltd

Department for Business Innovation & Skills

Seven Powerstar units were installed into BIS, the results of five of these installations are shown below. Two of the units currently have no data for savings as BIS changed the meter and have not had data since.

BIS
Department for Business Innovation & Skills

Annual energy consumption reduction and cost savings

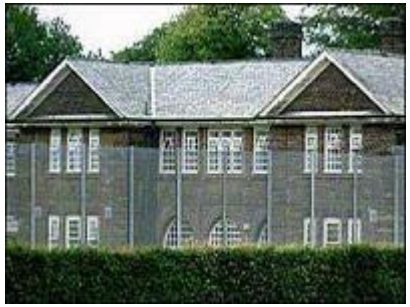
- Unit 1: 24.7% reduction / £8,067 saving
- Unit 2: 11.3% reduction / £3,391 saving
- Unit 3: 13.65% reduction / £4,537 saving
- Unit 4: 8.59% reduction / £6,598 saving
- Unit 5: 6.2% reduction / £8,204 saving

NHS – Ashworth Hospital

The hospital were looking for a reliable system to effectively reduce high energy costs and consumption caused by lighting, plant & IT equipment in the hospital.

Following the installation of four Powerstar units the hospital is benefiting from the following savings:

• Savings (kWh)	458,272
• % Savings	12%
• Annual savings	£51,213
• Payback period	3 years



Derby City Council

Derby City Council is aiming to reduce its carbon emissions by 25% by 2013/14 as part of a ‘Climate Change Strategy’.

The Council’s Eagle Centre market, Environmental Services parks management depot and the Market Hall have had Powerstars installed.

• Savings (kWh)	128.972
• % Savings	14.6%
• Annual savings	£10,000
• Emission Reductions	69.2 tonnes

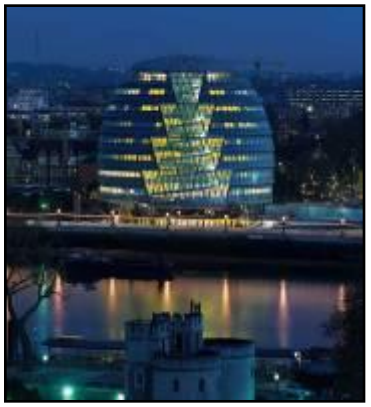
University of Surrey

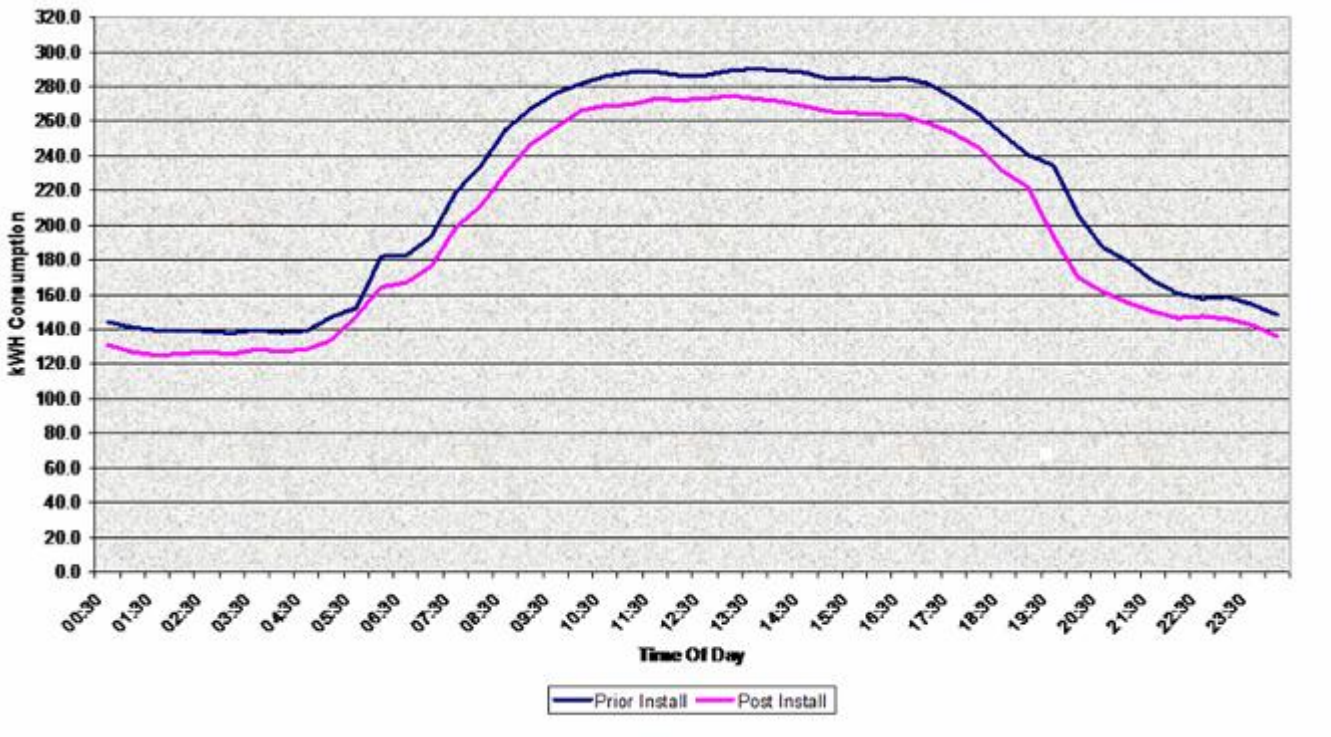
The University of Surrey has held sustainability at the heart of its CSR agenda for over a decade. The campus is home to 17,900 students and 2,597 staff and views investing in sustainable technology as a critical component.

• Savings (kWh)	189,474
• % Savings	8.1%
• Annual savings	£13,911
• Payback period	3 years

London City Hall

Home of the Greater London Authority accommodates the Mayor of London, the London Assembly and 600 or so permanent GLA employees..





% Savings: 13.6%

Can we help?

YES, we can…

If you are not sure what to do to reduce your energy consumption, contact us and we can organise a free no-obligation proposal.

Call us on +44 (0)1142 576 200 or
e-mail us at powerstar@ems-uk.org

Sustainable Business Breakfast

Chichester, 21st March 2013

Sustainable Business Network

Sustainable Business Network Presentation

March 2013

Agenda

- Introductions
- Energy Partnership
- Major 5 year target
- The Green Toolkit
- Smart Meter Roll Out
- New Technology
- Colleague Involvement
- Renewable Sources in Convenience ?
- Questions Please

Business Introduction

The Southern Cooperative

- Independently owned regional Cooperative Society
- Celebrating our 140th anniversary in 2013
- Around 170 community stores and 41 funeral homes across the South of England (Avon, Berkshire, Devon, Dorset, Hampshire, Isle of Wight, Somerset, Surrey, Sussex, Wiltshire)
- At the heart of our local community - support environmental and community owned organisations and work with local food producers

Presenter Background

Gemma Lacey – Head of Sustainability

- Responsible for developing and implementing TSC's Ethical Operating Plan
- Head of CSR, John Lewis Partnership (5 years)
- Consultant, KPMG Sustainability Advisory Services (6 years)
- Ethical Audit Co-ordinator, The Body Shop (2 years)
- BSc Biology, Portsmouth University

Presenter Background

Glenn Waters Bsc MBIFM – Group Facilities Manager

- National Power Electrical Engineer 14 years
- National Services Manager Pirelli Energy Cables 9 UK sites
- Chairman of Environmental Committees/Energy Group
- Group Facilities Manager The Southern Cooperative
- Energy Speaker at the UK Cooperative Congress
- Energy Speaker at the Future Solent Business Event - Portsmouth University

The Southern Co-operative are working with an energy partner:-

eco-monitor

energy efficiency for business

5 year goal.....

To reduce like for like energy consumption and carbon emissions by

32%

by 2016

The Green Toolkit

The Green Toolkit

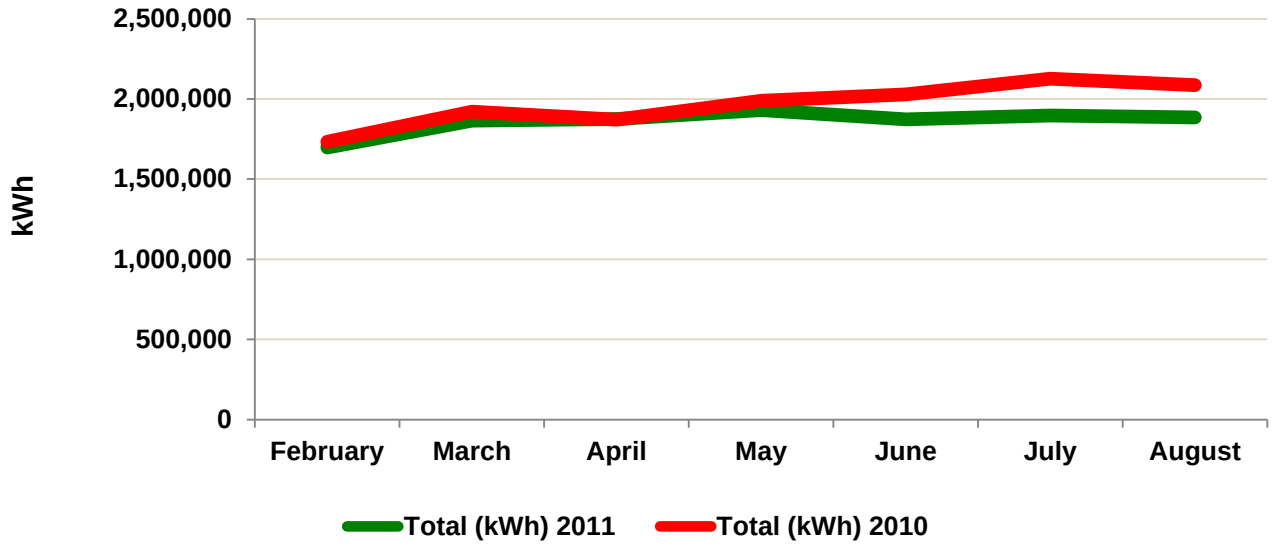
100% of all stores and EOL premises have one.....

SMART METER

UPL/ISTA

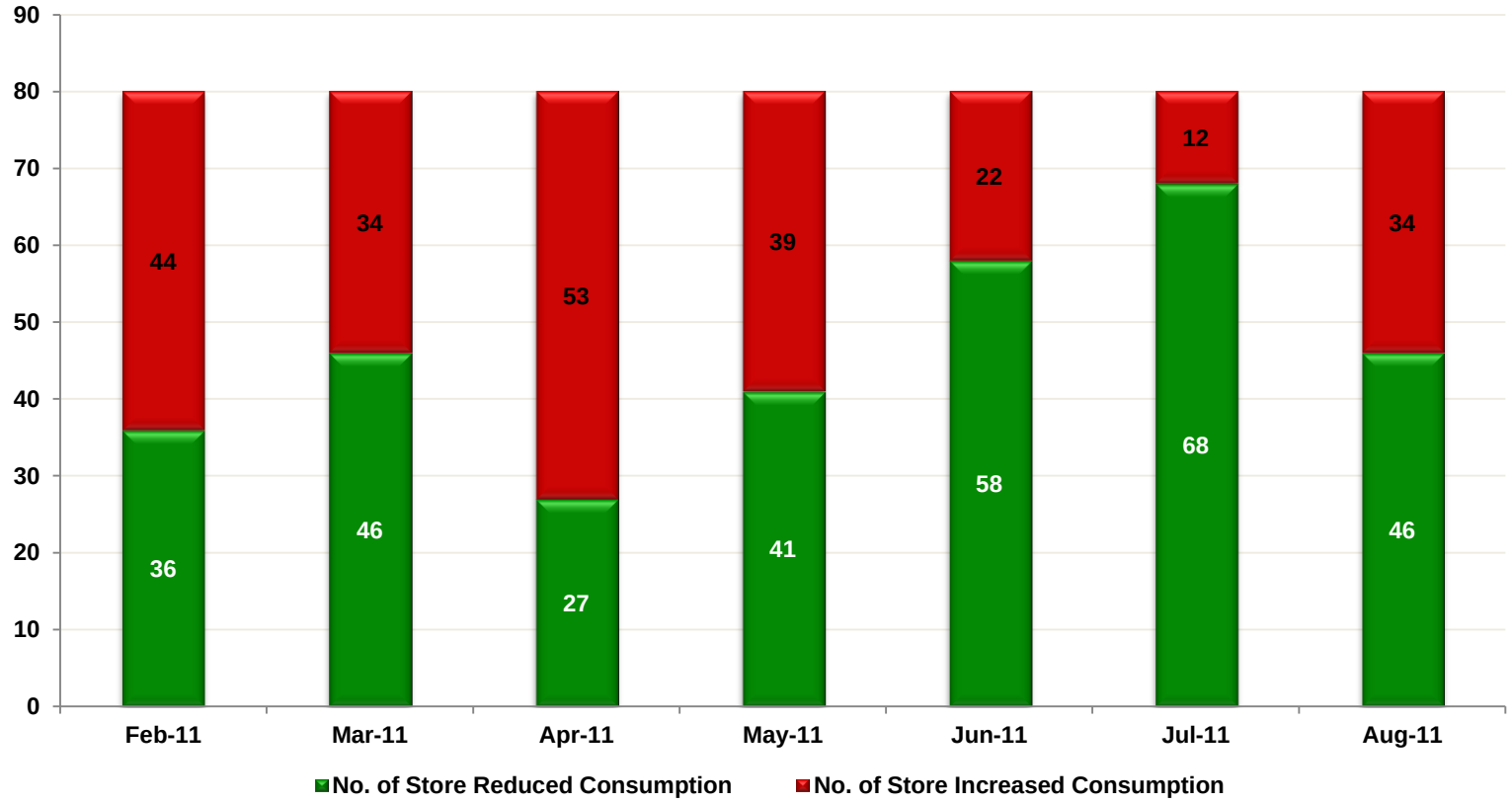
..... Monitoring starts here

All Store performance comparison



Store Name	Store Size (sq ft)	Cluster (sq ft)	February	March	April	May	June	July	August	YTD Consumption (Feb - Aug) (kWh)
80 Stores	217,043	Total (kWh) 2011	1,697,289	1,865,939	1,874,799	1,930,626	1,873,997	1,897,942	1,884,517	13,025,110
80 Stores		Total (kWh) 2010	1,733,670	1,921,714	1,872,118	1,988,651	2,029,486	2,126,587	2,087,262	13,759,488
		% Variance	-2%	-3%	0.1%	-3%	-8%	-11%	-10%	-5%

Stores with better / worse consumption than last year



Clustering of individual store performance

Cluster performance – 0 – 1,499 sq ft

Store Name	Store size (sq ft)	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	YTD (Feb 11 - Aug 11) (kWh)	LYTD (Feb 10 - Aug 10) (kWh)	YTD % Var
Bishopstoke	1,184	10,474	11,602	11,231	11,068	10,878	11,224	11,250	77,727	107,419	-28%
Francis	1,453	24,648	28,391	30,150	31,295	28,165	13,282	13,806	169,737	210,998	-20%
Widley	1,238	12,821	13,459	12,739	12,415	12,718	12,523	13,210	89,885	109,665	-18%
Felpham	1,335	11,436	12,457	11,572	11,445	11,318	12,124	12,062	82,414	90,136	-9%
Catherington	1,475	10,905	12,017	13,147	13,506	13,210	14,015	14,505	91,306	94,863	-4%
Moggs Mead	1,302	9,168	10,276	10,440	10,873	10,745	11,874	11,083	74,458	77,145	-3%
Falkland Court	1,324	19,500	20,498	22,443	22,474	22,641	23,156	24,599	155,311	160,433	-3%
Milford On	1,216	12,267	13,091	12,067	12,607	13,147	13,148	13,242	89,568	91,548	-2%
Warren	1,475	13,863	14,362	13,288	14,181	13,800	14,980	15,196	99,670	98,845	1%
Kelsey	980	10,254	11,480	12,676	13,869	13,720	15,643	15,626	93,267	91,770	2%
Tregaron	1,474	11,431	12,996	13,713	13,938	13,736	14,943	14,933	95,689	94,117	2%
Buckskin	1,410	11,475	12,550	12,988	13,429	13,510	13,089	13,838	90,878	89,108	2%
Palmerston	1,335	15,719	18,336	21,113	23,582	24,169	24,319	22,409	149,647	146,058	2%
Winton	1,464	15,590	17,470	19,634	20,690	21,121	23,314	23,175	140,994	137,023	3%
Sandown P	1,389	24,837	26,804	27,051	28,947	29,584	30,837	29,808	197,869	186,145	6%
Hawthorn	1,066	12,025	13,201	12,089	12,662	12,557	12,997	12,989	88,520	81,993	8%
Titchfield	1,249	11,494	12,456	12,397	12,929	12,720	13,228	13,112	88,336	79,872	11%
17 Stores	22,369	237,906	261,445	268,739	279,908	277,738	274,697	274,844	1,875,276	1,947,138	-4%

Cluster performance – 1,500 – 1,999 sq ft

Store Name	Store size (sq ft)	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	YTD (Feb 11 - Aug 11) (kWh)	LYTD (Feb 10 - Aug 10) (kWh)	YTD % Var
Twyford Ave	1,572	16,940	20,062	24,695	24,749	15,151	9,780	9,818	121,196	173,021	-30%
Tangier Rd	1,927	15,125	16,925	14,850	15,084	14,914	15,399	15,416	107,714	139,729	-23%
Crookhorn	1,841	21,459	24,014	26,182	27,453	27,904	24,371	12,651	164,034	198,130	-17%
Sultan Rd	1,916	28,175	31,738	34,179	30,491	30,256	32,635	32,399	219,873	261,482	-16%
Southbourne	1,841	23,505	26,858	30,592	32,092	31,064	18,610	12,151	174,872	204,449	-14%
Bedford Place	1,615	17,957	20,358	19,437	19,837	20,075	19,709	20,105	137,478	148,596	-7%
Rose Green	1,733	13,466	14,364	13,753	13,486	13,050	13,744	14,543	96,406	100,310	-4%
Yapton	1,755	23,893	26,471	30,036	30,905	30,127	31,985	32,056	205,474	210,233	-2%
The Hard	1,938	13,383	14,899	18,189	19,713	18,619	20,261	20,893	125,957	128,613	-2%
Prospect	1,733	19,140	20,919	21,938	21,624	22,143	24,309	24,907	154,981	156,790	-1%
Alderholt	1,615	16,879	18,598	18,797	16,907	18,246	18,890	18,710	127,026	127,747	-1%
Westbourne	1,970	18,304	19,344	18,022	17,696	16,876	18,150	18,299	126,691	126,841	0%
Milton Road	1,679	21,953	23,691	26,811	28,329	30,022	31,214	32,173	194,194	191,872	1%
Somerset Rd	1,625	13,871	15,766	17,054	17,239	16,908	16,758	18,874	116,470	114,570	2%
Colden	1,787	13,751	14,059	14,661	15,180	14,299	14,756	14,613	101,320	95,445	6%
Bishops	1,916	17,105	20,521	17,618	17,407	17,228	18,507	18,480	126,865	118,646	7%
West Leigh	1,905	13,620	14,660	15,421	15,537	15,502	16,707	19,072	110,520	102,206	8%
17 Stores	30,368	308,527	343,245	362,236	363,730	352,386	345,785	335,160	2,411,069	2,598,680	-7%

The Green Toolkit

Total commitment to investment into energy efficient equipment.....

....all new and reformatted stores have 100% LED lighting
- @14% total store consumption savings
- 60% lighting saving

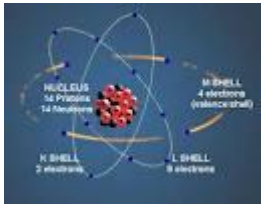
....all new and reformatted stores are fitted with remote pack refrigeration using variable speed drives + LED case lighting

Other saving initiatives – Equipment Energy…

....new CO_2 plant to be installed in Eco store shortly

....Chilled Refrigeration Doors

....Current optimisation



....BMS Profiling

....Voltage optimisation

The Green Toolkit

What part will Colleagues play?

Colleagues are a vital cog in our wheel
– but need information, assistance & recognition

TSC will motivate and involve Colleagues by:

Understanding store energy consumption, communicating and giving guidance on where to reduce it

Appointing Energy Champions within each store

Raising awareness of energy with new colleagues, through the Induction Programmes.

The launching of an 'Energy Efficiency Suggestion Scheme'

The launching of an energy E – Learning module

The Green Toolkit

Policies and Documentation

- ***Build "Energy" into all existing Policies***
- ***Monitoring to be used to highlight areas where new Policy may be required - : eliminating poor practice***
- ***All Policy changes to be agreed by Energy Forum***
- ***Document new procedures and processes and ensure they are understood – Clear simple messaging***

The Green Toolkit

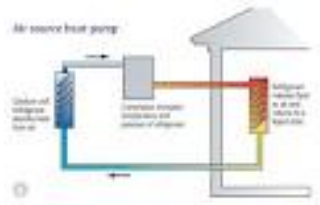
Renewable Sources ..... ?

Wind

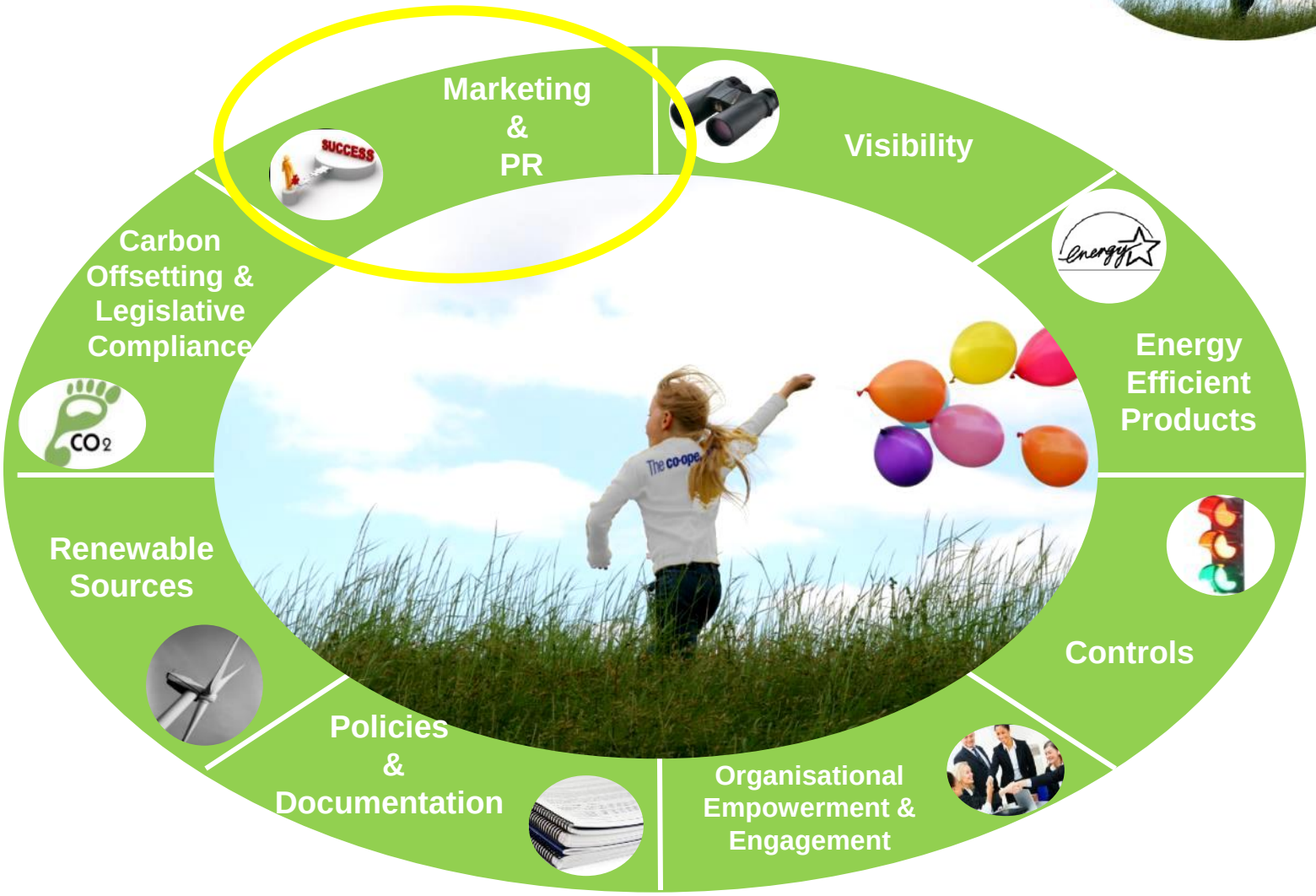
Photo Voltaic

Ground Source Heat Pumps

Air Source Heat Pumps



The Green Toolkit



Marketing and PR…

- ***Develop internal communication tools to promote energy and environmental messages to all colleagues***
- ***Develop external communication tools to promote energy and environmental messages to all colleagues and the General Public***
- ***Maximise internal awareness through an environmental "logo" inclusion on all energy related projects and communication***


Thank you for Listening
All very easy questions can now be taken

Round-the-Tables

Business intros…

Sustainable
Business
Network

Eco Technology Show

(14th & 15th June, Brighton)

Special offer for network members*

Exhibition space in our SBN area

Early bird rate £250 + VAT

www.sustainablebusiness.org.uk/network/eco-technology-show

Sustainable Business Network

RE: Start Local

Fully funded programme for construction, renewables, energy efficiency SMEs

Meet the Buyers – access ***real*** business opportunities

Free support to improve your tenders, implement an EMS and win Green Deal / ECO delivery contracts

Contact: jo@sustainablebsuiness.org.uk

Sustainable Business Network

Thank you for coming

For details of future events and to enter your business in our online directory visit: www.sustainablebusiness.org.uk

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