Using an Integrated Energy Strategy (IES) approach to deliver cost and carbon reductions

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Presentation Overview

- What is IES?
- Key Benefits
- Examples
- Discussion

What is Integrated Energy Strategy?

- An integrated energy strategy (IES) is a method of optimising various energy inputs and outputs in such a way as to **minimise the overall thermodynamic loss** that occurs.

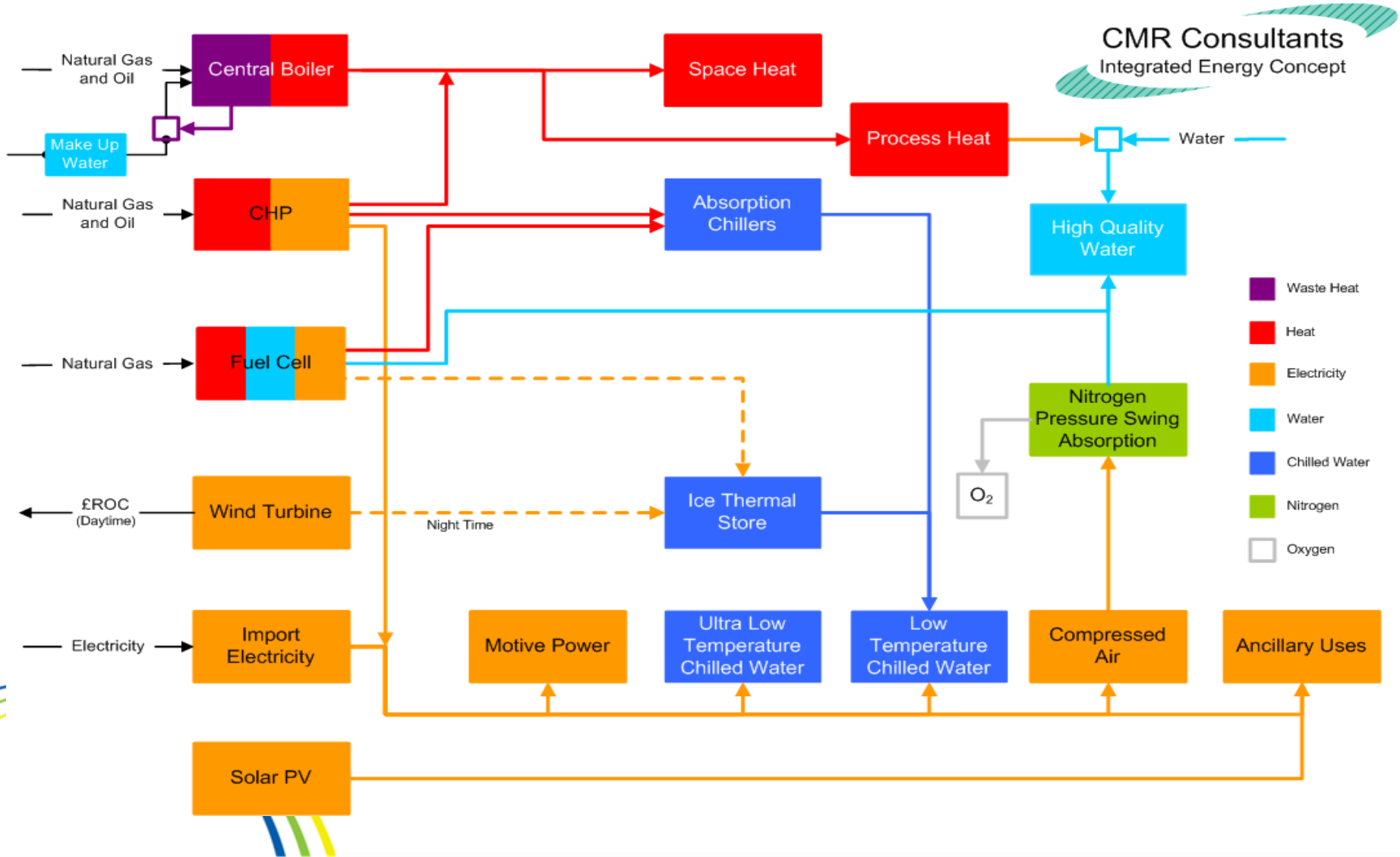
- By reutilising waste heat or surplus power from one source or process and re-used as feedstock for another process minimises the need to import **new** energy or dump **surplus** energy.

- The minimisation is **time and volume** dependent and with modern energy modelling techniques an optimum technical and economic solution can be selected.

- A number of technologies “building blocks” or **matching components** are available to meet the requirements of an IES such chp, heat pumps, solar pv, as illustrated next.

- The thermodynamic challenge is how, where and when to combine these building blocks to **achieve an optimum solution**.

IES Concept – illustration only



Key Benefits of IES Approach

- Net energy reduction and cost
- Business protection security of supply
- Adaptation to changing energy technologies
- Built In redundancy & existing plant life extension
- Environmental improvements
- Contribution to Low Carbon footprint

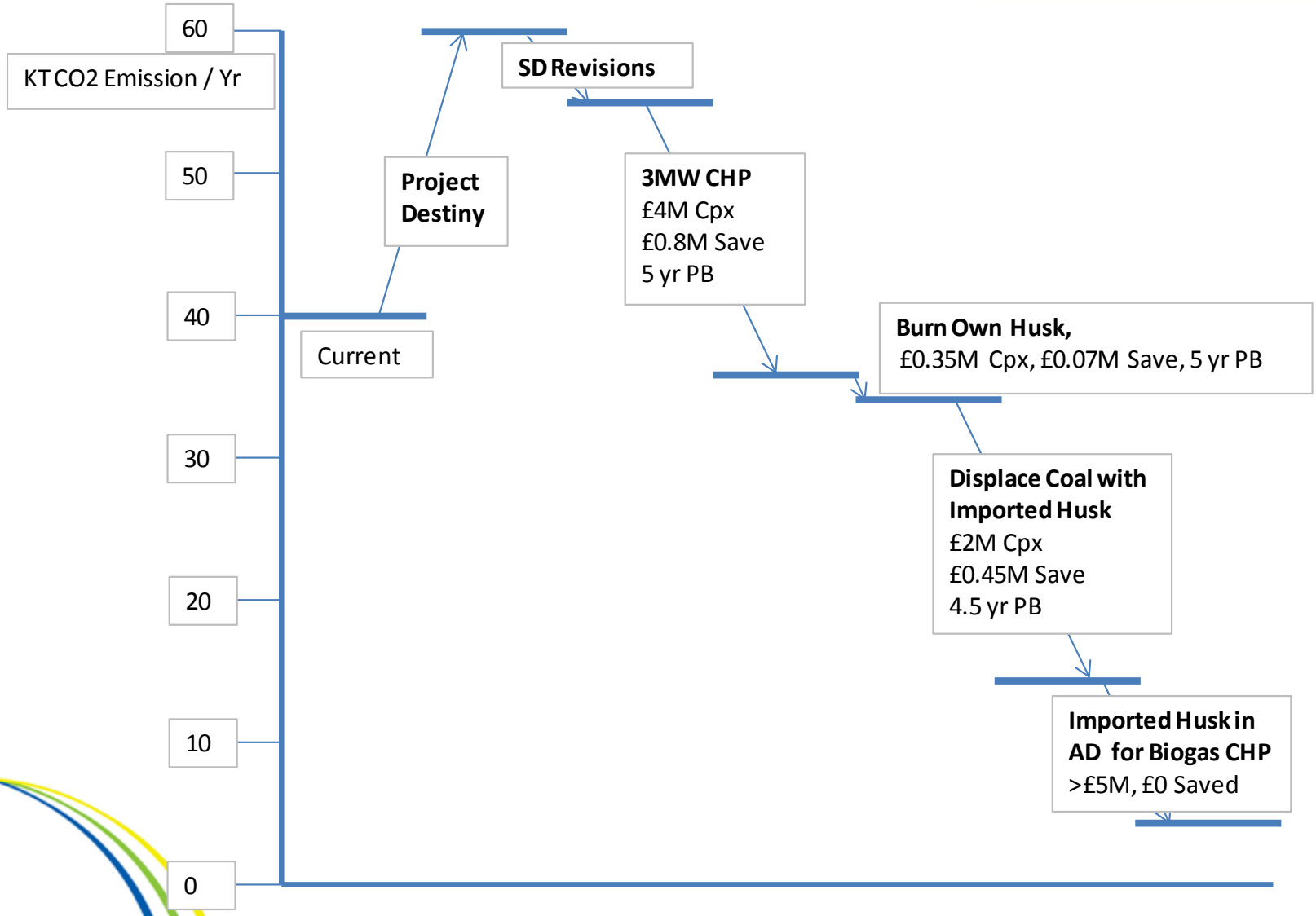
Example 1

- Horlicks Manufacture
  - Feed stock - barley
  - Imported coal, electricity bore hole water
  - Site generation of heat and chilled water
  - Spray dryers low humidity, large vol fresh air
  - Wastes
    - Husks
    - Various grades of heat

Client Objectives

1. Minimise power outages/improve security of supply;
2. Cater for current & future business expansion
3. Deliver energy, CO2 and cost reductions;
4. Capex avoidance
5. Contributes to Company sustainable targets

CO2 Benefits



Cost / Benefit Summary

PROJECT	CAPITAL COSTS		BENEFITS				
Avoided Capex	£	INR (lac)	kWh/pa	£ / pa	INR (lac) / pa	Simple payback	CO2 (te) / pa
Oil Boiler Conversion	0	0	TBA	TBA	TBA	TBA	TBA
2 x 1MW Chiller	400,000	328					
Ice Store to Displace Dairy -2deg C Chiller	TBA	TBA					
Electrical Infrastructure	TBA	TBA					
Total	400,000	328					
Implementation Capex							
Dehumidification Improvements	1,000	1	298,851	26,000	21	0.04	353
Dehumidification System	600,000	492	3,711,053	248,295	204	2.42	4,379
COP Improvements to Chillers	200,000	164	1,122,000	97,614	80	2.05	1,324
SD Inlet Air Modifications	50,000	41	316,800	27,562	23	1.81	373.82
3MW Nat Gas CHP	4,010,000	3288	-34,486,000	806,000	661	4.98	20,407
Burn Own Husk	350,000	287	0	70,000	57	5.00	2,420
Displace Coal with Import Husks	2,000,000	1640	0	450,000	369	4.44	18,708
20 day production loss avoided	0	0	TBA	TBA	TBA	TBA	
Gross Capex/Savings	7,211,000	5,913	-29,037,296	1,725,470	1,415		47,964
Gross Simple Payback (yrs)	4.18					4.18	
Incremental Capex/Savings	6,811,000	5,585	-29,037,296	1,725,470	1,415		
Incremental Simple Payback (yrs)	3.95					3.95	

Example 1

- Pharmaceutical
  - 60% of energy used for close control air conditioning
  - Imported natural gas and power
  - Large water usage
  - Wastes suitable for AD
  - Land available for solar pv
  - Production doubled by 2016

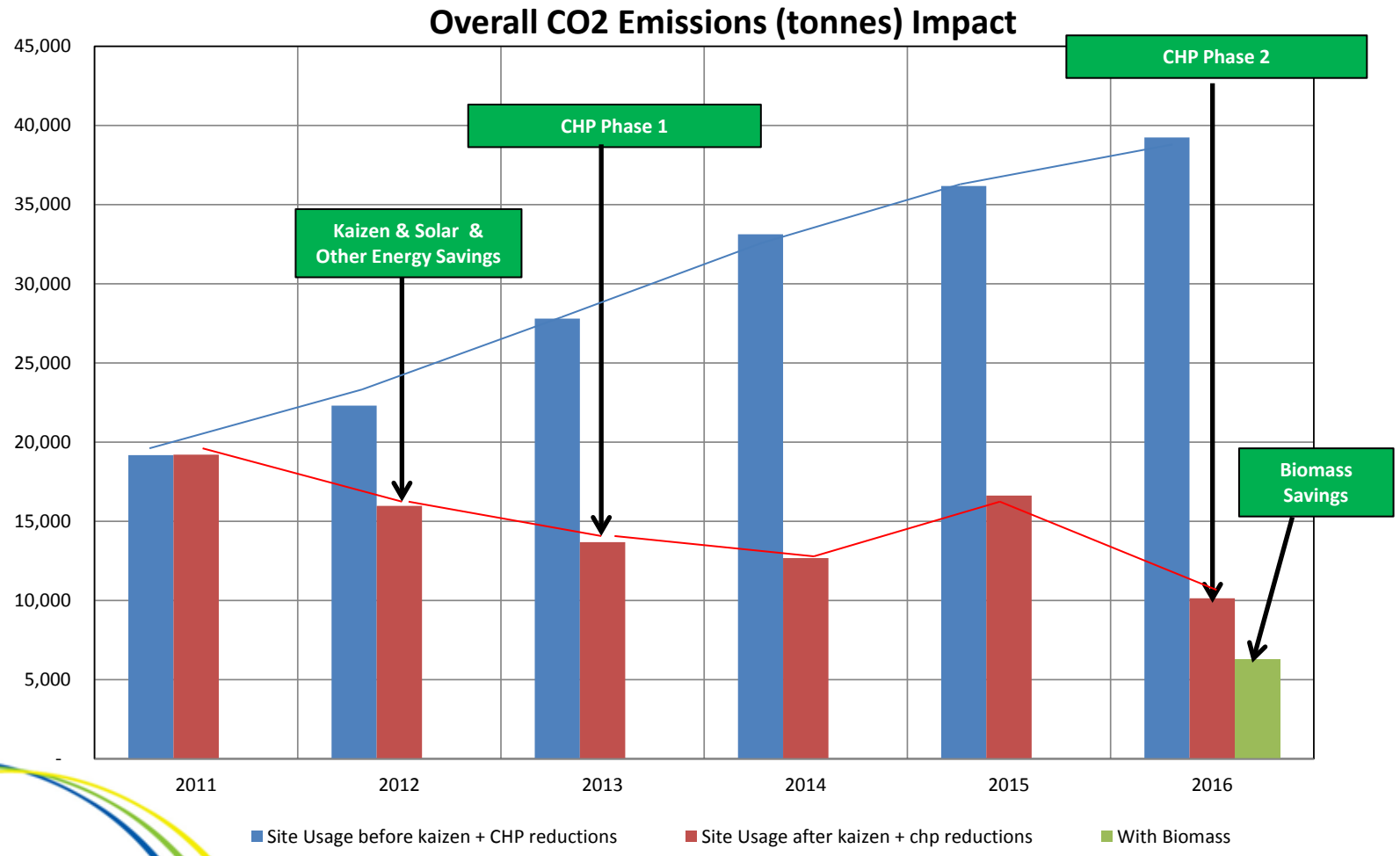
Client Objectives

1. Minimise overall energy needs;
2. Cater for rapid future business expansion
3. Deliver energy, CO2 and cost reductions;
4. Contributes to Company sustainable targets

Summary

Energy Usage (GWh)	2011	2016
Site Projected Energy Usage	62	141
Kaizen & Other Savings	0	-28
CHP + Renewables	0	22
Biomass	0	-21
Total Net Usage	**62**	**134**
CO2 Emissions (tonnes)	**2011**	**2016**
Site Projected CO2 emissions	19,180	39,244
Kaizen & Other Savings	31	-10,146
CHP + Renewables	0	-18,958
Biomass	0	-3,864
Total Net Usage	**19,211**	**6,276**

CO2 (tonnes) Profile



In Summary

IES is a **powerful technique** for systematically evaluating various technological solutions that can deliver a site's energy requirements at the highest efficiency and thus minimising imported fossil based energy sources.

Examples illustrated how the methodology has been applied and the solutions proposed **to achieve significant energy, cost and carbon savings.**

Thank You

End of Presentation