

# BIOENERGY 2010

warming to wood energy



JOINTLY PRESENTED BY:



Funded by the Forest Service of the Department of Agriculture, Fisheries and Food under the National Development Plan 2007 – 2013.



The Sustainable Energy Authority of Ireland is financed by Ireland's EU Structural Funds Programme co-funded by the Irish Government and the European Union.



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# Wood Energy Solutions for Non-Residential Buildings

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*Bioenergy 2010*  
*17<sup>th</sup> June 2010*

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## CONTENTS

- Introduction to Clearpower
- Clearpower Bioenergy Case Studies
  - 540 kW LTHW Boiler for hotel
  - 1MWe/5MWth ORC CHP for Television Company
  - 3 MW LTHW boiler for London Olympics
- Key Learnings

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# INTRODUCTION TO CLEARPOWER

## BIO-ENERGY PROJECT DEVELOPMENT AND DELIVERY:

- Biomass hot water, steam & CHP
- Design, build, operate, finance and maintain for Commercial and Industrial clients
- Exclusive agencies for leading European equipment manufacturers (KOB, Heizomat, Mawera and Compte)
- Delivering stable, secure fuelling and maintenance contracts, focused on applications in the 100 kW – 9 MW range and higher in series
- 70 installations, 35,000 kW installed capacity to date
- UK and Ireland focus



## BIOMASS FUEL SUPPLY:

- Production and nationwide delivery of processed wood fuels from a nationwide network of depots

## ENVIRONMENTAL:

- Reuse and Recycling of commercial and municipal organic waste products



# CLEARPOWER CLIENTS



KILRONAN CASTLE  
ESTATE AND SPA



monart  
RETURN TO YOUR TRUE NATURE



Clare County Council  
Comhairle Contae an Chláir



RDS



clearPOWER

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## HOTEL BIOENERGY CASE STUDY

- Luxury Hotel including pool/spa
- LPG was energy source – no prospect of pipeline gas
- Clearpower proposed Woodchip based bioenergy solution:
  - 540 kW KOB Pyrot Boiler
  - 4,300L Accumulator
  - Rotary arm fuel feed system
  - Wood chip silo and wood blower
  - Integration with existing mech services
  - Heat meter and remote monitoring capability

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# INSTALLATION



**clearPOWER**

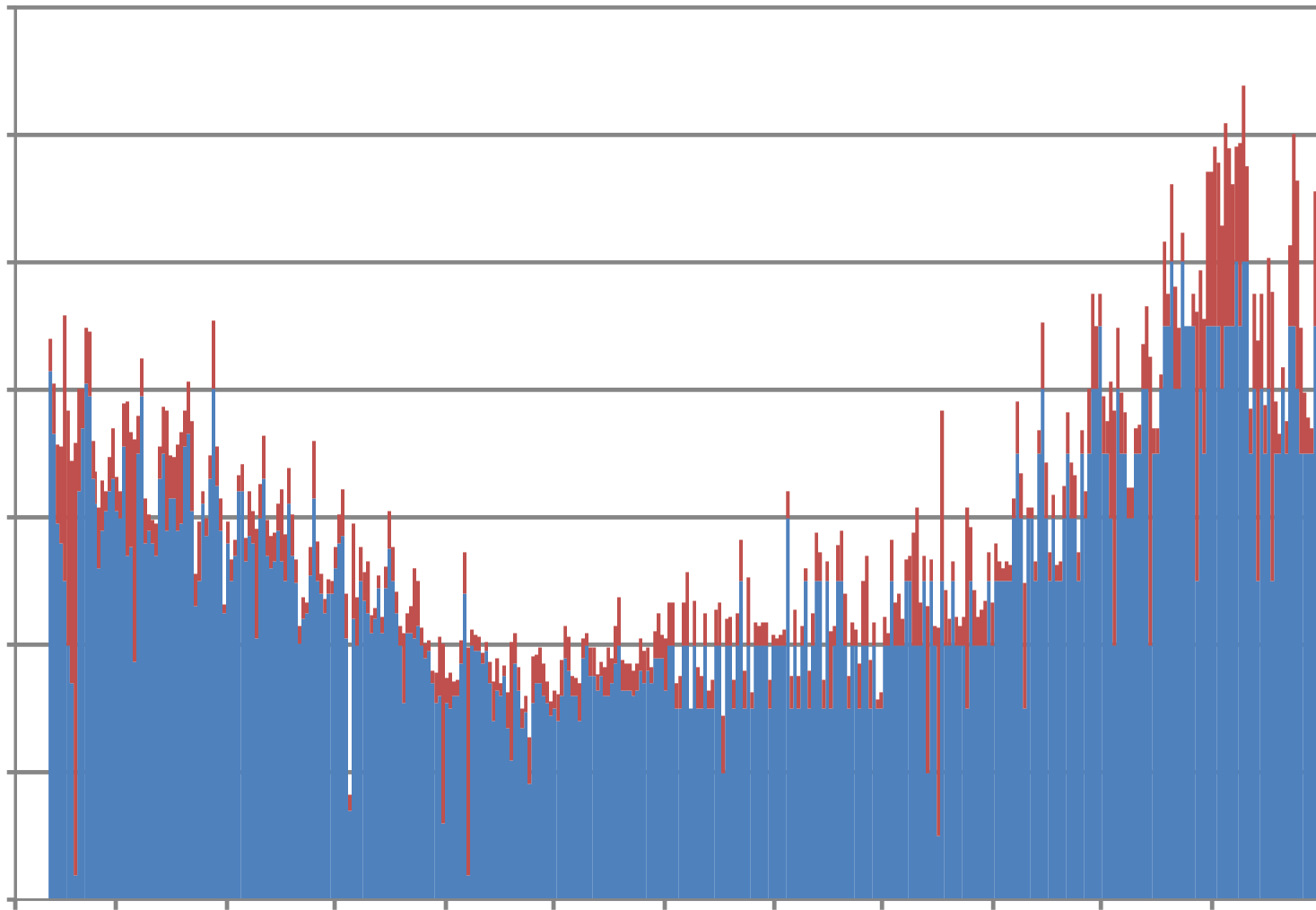
# INSTALLATION



**clearPOWER**

# Daily 2010h output of heat energy (FEB 2009)

Daily Energy Output (MWh)



LPG  
Biomass

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## PROJECT ECONOMICS

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CAPEX	170,000
SEI Grant	<u>60,000</u>
Net CAPEX	110,000

- At the time of installation – there was a projected fuel saving of €50,000/year giving a payback of approx 2 years
- 2009-2010 figures – Biomass is providing 86% of energy needs
- 2009-2010 figures – At 40 c/L, annual energy saving is €31,000/year – 3 year payback
- That includes:
  - Reduced energy usage – approx 70% of initial estimate
  - Reduced energy cost
- Clear project success – Bioenergy creating real savings

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## CONFIDENTIAL CLIENT – BIOMASS CHP TURNKEY PROJECT

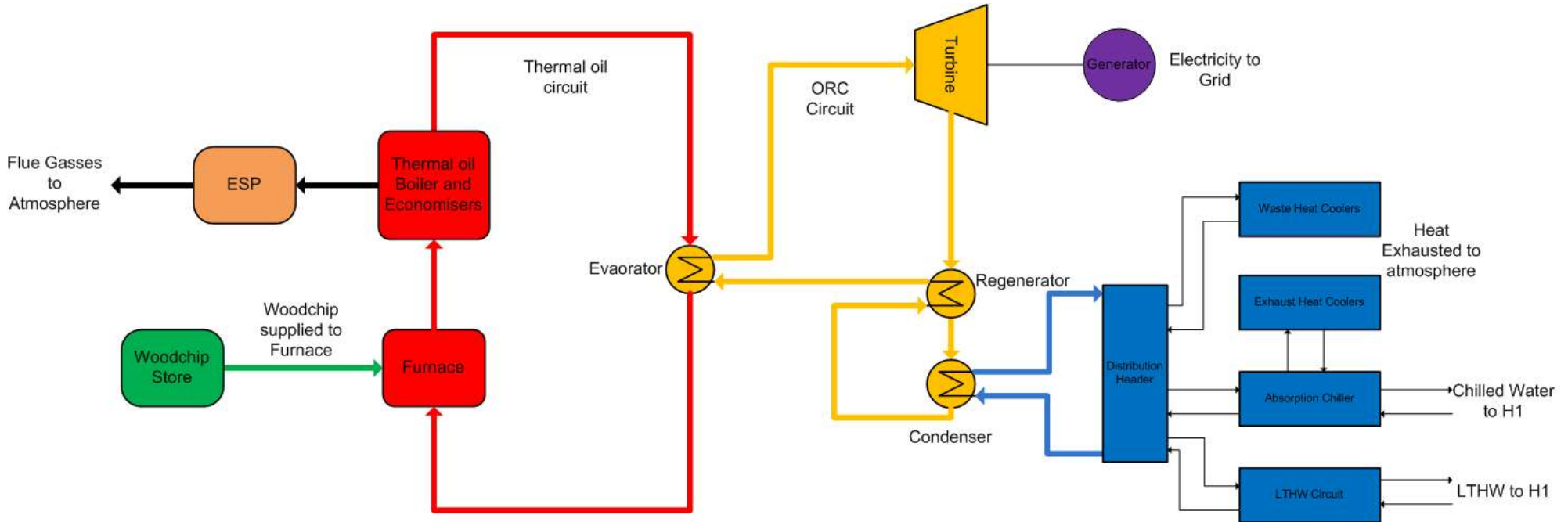
- UK Media Company building new development
- Required significant Carbon Reduction Commitments – Identified Biomass CHP as one element of solution
- Clearpower are Turnkey Contract provider of a 1MWe/5 MW ORC CHP solution:
  - Biomass Crane Delivery System
  - 1 No 5.1MW Biomass Furnace and Thermal Oil Boiler
  - 1 No 1 MWe Organic Rankine Cycle CHP Unit
  - 2 No 1.15 MW Adsorption Chillers
  - Full SCADA control system
  - Mechanical Integration
  - Full Civil Structure
- First Commercial Biomass ORC CHP in UK – leveraged from Irish bioenergy experience

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## BUILDING BEING SERVICED BY CHP

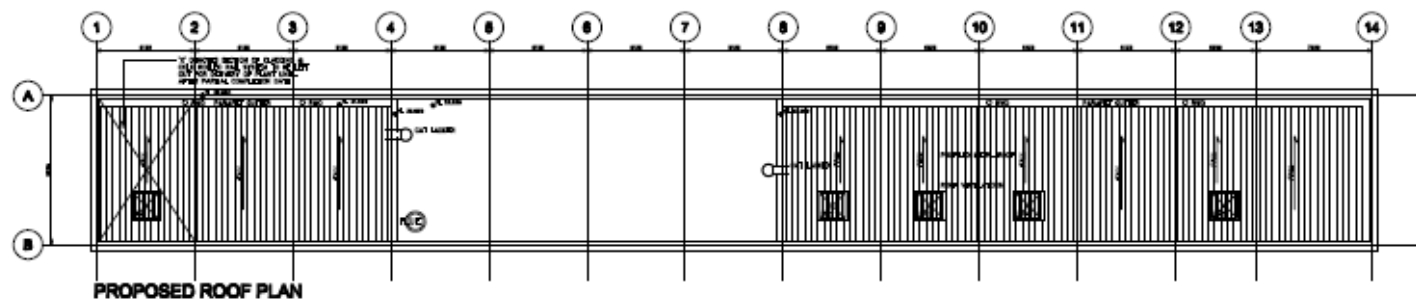
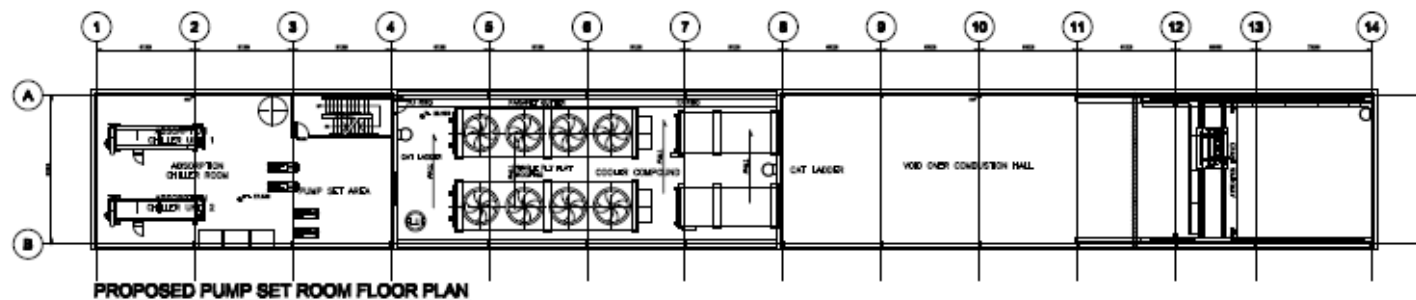
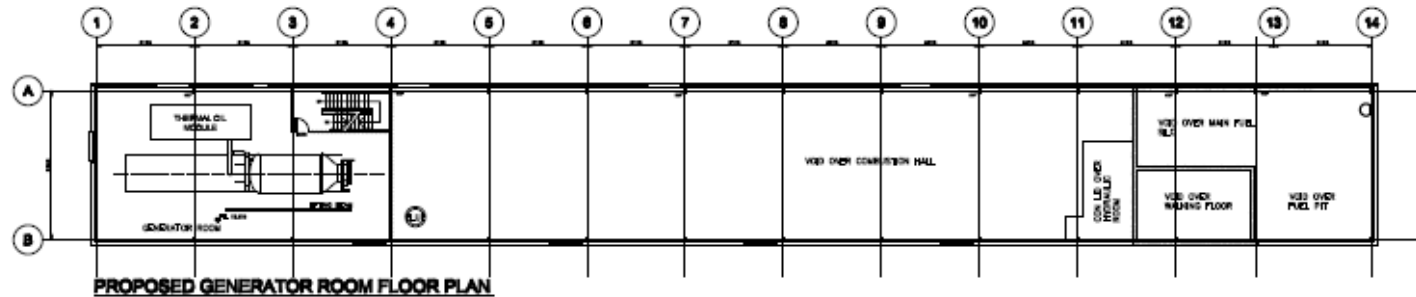
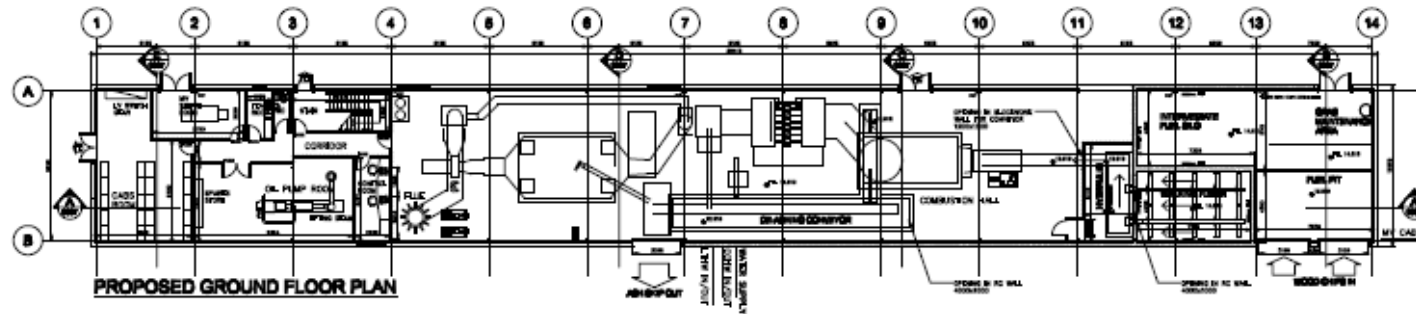


# HOW BIOMASS ORC CHP WORKS



# Plant Design

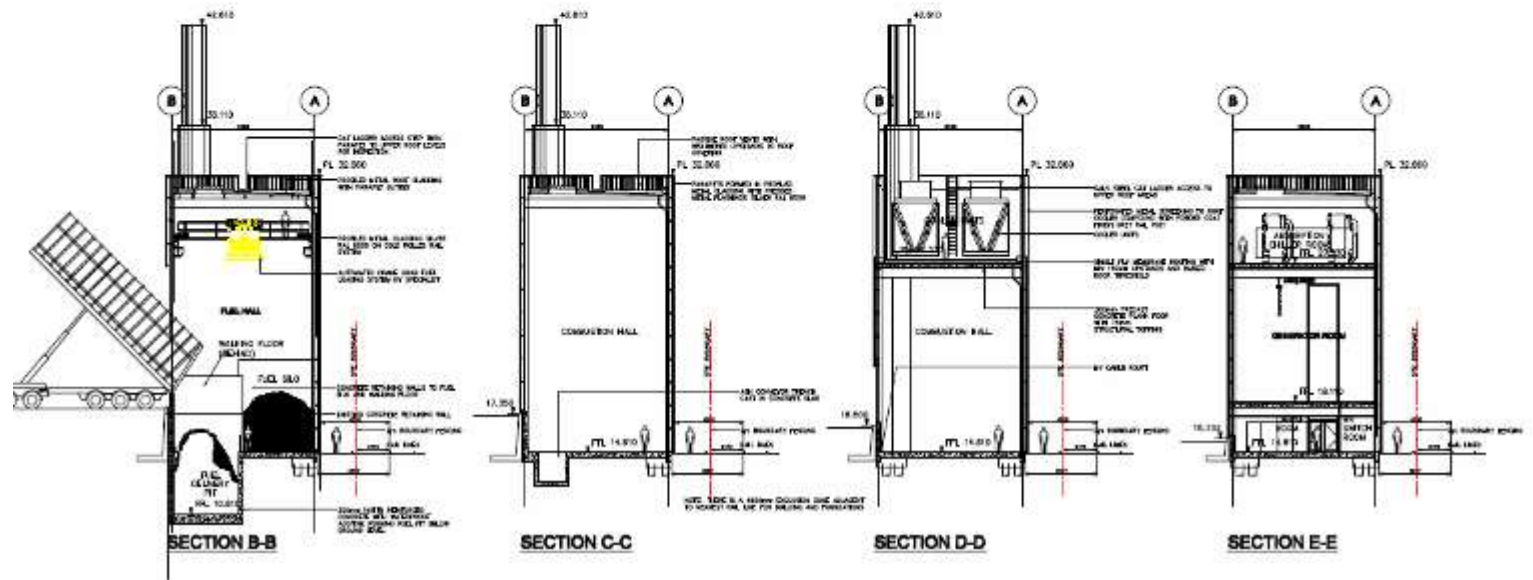
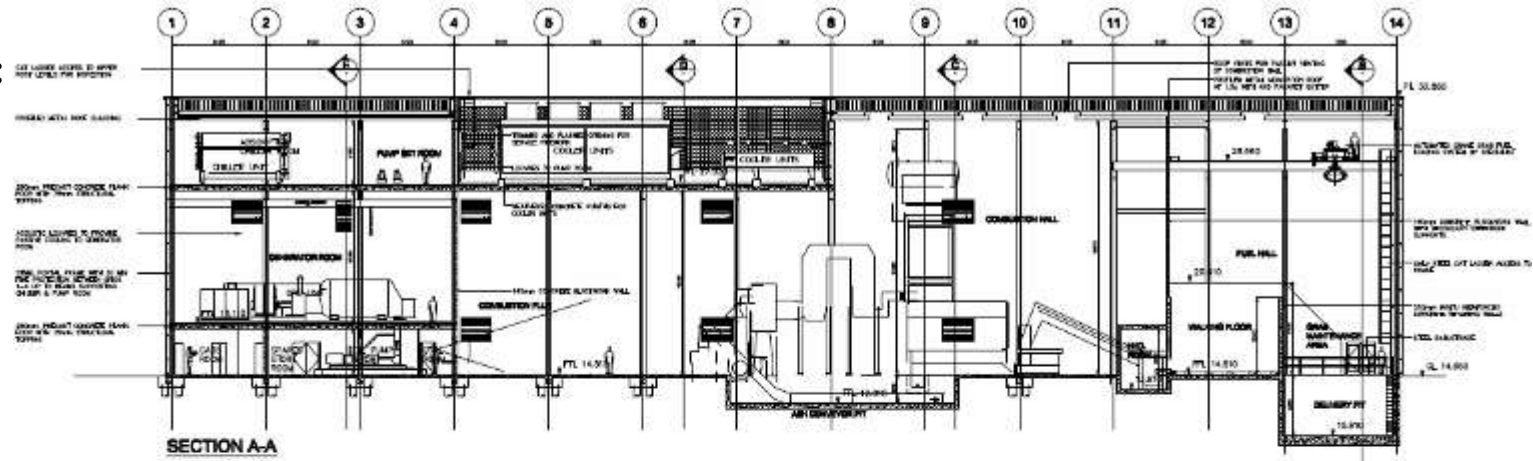
Plan View:





# Plant Design

## Cross Section View:



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## PLANT ECONOMICS

- CAPEX: Confidential - Multi-million £ project
- Strong Economic Case competing against gas:
  - Projected Payback Approx 5 years
  - Projected Project IRR: 16%
  - Annual carbon saving: 4500 tonnes/year > 20 % reduction
- Revenue Model includes revenue from electricity in addition to heat/cooling saving
  - Includes ROCs benefit
  - Includes RHI benefit
- Significant potential for reputational enhancement

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## London Olympics - 3 MW Boiler

- London Olympics - installing large DH energy centre
- Clearpower providing a turnkey 3 MW biomass boiler installation to main contractor – option on second 3MW boiler
- CAPEX: In excess of €1 million
- Allowing for RHI's – project offers competitive payback v's gas
- Clear Carbon Reduction Commitments driving project

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## LONDON OLYMPICS – KINGS YARD ENERGY CENTRE



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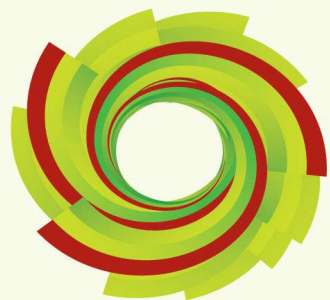
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## KEY LEARNINGS

- Off Gas-grid businesses in Ireland – still potential for projects with 2-3 year paybacks
  - SEI Grant very helpful in giving good economics
  - “Heat ESCo” Option offers good mix of plant ownership and risk minimisation
  - Any increase in Fuel prices will dramatically reduce paybacks
- Biomass CHP is viable and can offer opportunities in Ireland
  - Heat demand is key
  - Project economics more dependent upon elec/heat subsidy than grants
  - UK subsidies stronger than Ireland
  - Irish companies have the expertise to execute projects
- Investing in bioenergy is a sensible economical decision
  - Projects driven by realisable savings/economics
  - Reduces exposure to fossil fuel volatility
  - Additional Carbon Reduction Benefits – of reputational and economic benefit

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THANK YOU



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