

Welcome to the inaugural edition of **Energy & Carbon Solutions**. This newsletter explores the latest trends and opportunities in energy and carbon management. We encourage you to contact us with feedback and to make suggestions for future issues.

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What is CDM?

The Clean Development Mechanism (CDM) proposed under Article 12 of the Kyoto Protocol is an instrument to promote foreign investment in greenhouse gas (GHG) emission reduction options while simultaneously encouraging sustainable development in developing countries.

About Earth Systems

Earth Systems is an environmental consulting firm that provides specialist services to the environmental and energy sectors. Formed in Melbourne in 1993, the company has successfully completed over 300 projects in Australia, Asia, Africa, South America North America and the Pacific. Earth Systems has built its reputation on high quality, objective and value-adding service that reflects the environmental and energy expectations of the present and anticipates those of the future. The company has extensive experience in energy efficiency, carbon credit services, environmental and social impact assessment, auditing and due diligence, environmental planning and management, waste management and water quality management.

Turning Challenges into Opportunities: Investment in Sustainable and Efficient Energy

Climate change, fluctuating energy prices and the global financial meltdown are creating new and complex challenges for businesses. Whilst fears of a recession may limit investment and block action against climate change, the current situation can be viewed as a catalyst to re-think our economy and assess the opportunities that change will create.

Energy drives the economy. Investment in energy efficiency and alternative energy sources offers a significant advantage over conventional fuels in meeting global energy demands. Through diversifying the energy portfolio, the risk associated with a dependence on fossil fuels and future energy cost uncertainties is reduced, while simultaneously stimulating the economy through the creation of growth opportunities.



Renewable energy and energy efficiency technologies represent a fast and growing industry. Tremendous advances have been made in the last few decades and these technologies have experienced substantial improvements in cost, performance and reliability, making them competitive in a range of applications. The momentum for investment and market growth in this area is being driven by supportive policy and regulatory frameworks, energy security issues and environmental and climate change concerns. The Obama administration has approved the allocation of over \$100 billion in direct spending to environmental projects, including clean energy and energy efficiency programs. The Rudd government has announced the use of \$3.8 billion over four years for household energy efficiency.

CDM leading the way. The recent emergence of the carbon market and the Clean Development Mechanism (CDM), has also offered a new revenue stream to boost the financial viability of renewable energy and energy efficiency projects. Proposed under Article 12 of the Kyoto Protocol (1997), the CDM allows emission reduction projects in developing countries to earn Certified Emission Reduction (CER) credits, each equivalent to one tonne of CO₂ reduced. These CERs can be traded and sold to businesses in industrialised countries, providing cost effective methods of complying with their emission reduction targets, while simultaneously promoting investment opportunities and sustainable development in developing countries.

Since the entry into force of the Kyoto Protocol in 2005, the CDM has already registered more than 1,500 projects and is anticipated to produce CERs amounting to more than 2.9 billion tonnes of CO₂ equivalent in the first commitment period of the Kyoto Protocol, 2008–2012. Over 150 approved methodologies for quantifying emission reductions exist, making it possible to generate carbon credits in a wide range of sectors and industries including renewable energy industries, manufacturing, construction and chemical industries, transport, energy supply and distribution, mining, mineral and metal production, agriculture and afforestation / reforestation. Through

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Ten Tips For Getting Started on Energy Efficiency

- (1) Right-size your equipment - don't oversize motors, fans, compressors and chillers.
- (2) Optimise grinding circuit(s) - grinding is one of the most energy intensive parts of the process.
- (3) Keep reticulated services well maintained (steam, coolant, compressed air, hot water, gas) – service leaks are money burned.
- (4) Consider power factor correction if you have a lot of inductive loads.
- (5) Maintain haul trucks engines in tip-top form.
- (6) Educate and provide incentives for truck drivers to drive fuel-efficiently.
- (7) Apply voltage optimisation on electric motors where appropriate.
- (8) Replace old, inefficient high intensity discharge (HID) lighting with intelligent fluorescents.
- (9) Recover heat and cooling wherever possible.
- (10) Ensure all pumps are in good working condition.

Did You Know?

- Compact fluorescent lamps** use about ¼ of the energy of normal incandescent light bulbs, and pay for themselves after about 500 hours of use.
- Ordinary fossil fuel power plants** convert between 36% and 48% of the fuel's energy into electricity, with the remainder being lost as waste heat.

Want more information?

For more on the available options for energy efficiency contact Dr John Sanderson at Earth Systems.

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providing financial incentives for emission reduction initiatives, the CDM encourages economic efficiency while creating a framework for the implementation of global climate change mitigation efforts.

CDM Case Study: The Xeset 2 Hydropower Project

Earth Systems is currently engaged by Electricite du Laos to register the Xeset 2 Hydropower Project as Lao PDR's first CDM project in the hydropower sector. The project will contribute to sustainable development in the region by promoting economic and social advancement through rural electrification and foreign exchange earned from electricity exports. The carbon credit income will not only increase the viability of the project, but will also support the implementation of socio-economic initiatives that benefit the local community.

Project developer	Electricite du Laos
Installed capacity	76 MW
Clean energy production	329,000 MWh
Location	Saravan Province, Lao PDR
GHG emission reductions	181,525 tonnes of CO ₂ equivalent per annum

The Energy Efficiency Endgame

The **mining and mineral industry** is an extremely energy intensive industry, contributing 46.3 million tonnes of CO₂ equivalent to Australia's national GHG emissions in 2005¹. Energy use represents at least 15 – 20% of mine operating cost².

Energy use compromises a significant cost for businesses. Given this, the potential for tapping into energy savings across different processes and operations are high. Below are some tips and suggestions for successful and efficient site energy management.

The bottom line is the bottom line. A business's energy use costs money. Whilst there will undoubtedly be GHG emission reduction benefits, for example through additional financial benefits achieved through the carbon market, the key point is that every dollar saved in energy efficiency is a dollar straight to the bottom line. The only question asked should be "How many dollars can be saved and will it be worth it?"

You can't manage what you don't measure. Energy-intensive operations need careful ongoing measurements and indicators to quantify the effectiveness of any energy-savings measures that are implemented. Intermittent energy audits or efficiency drives without ongoing monitoring do not tend to result in long-term savings or the development of an energy-saving culture in the workplace. This is one of the reasons why Australian Government mandatory schemes such as EEO (Energy Efficiency Opportunities), EREP (Environment and Resource Efficiency Plans) and others require large energy users to evaluate their energy usage on a regular basis.

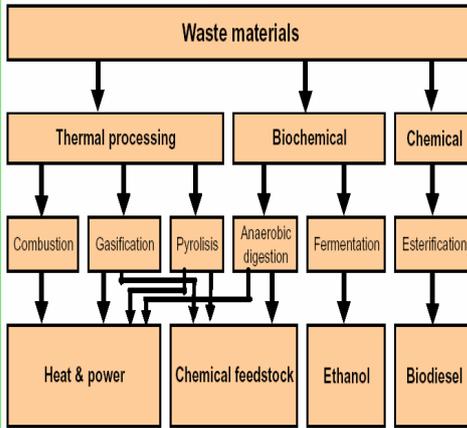
Champions within the ranks. A socially healthy workplace where employees are encouraged to save energy and rewarded for suggesting or championing energy efficiency improvements is the most important part of any energy efficiency strategy. Do employees know where and how different processes in the company's operations could save energy? Is there an incentive to address this? A successful site energy management plan is driven by the people that generate the ideas and implement the plan, and the feedback and recognition they receive along the way.

¹ AGO (2007)

² DRET (2002)

Waste-to-Energy Technologies

The diagram below illustrates the variety of pathways through which waste sources can be converted to energy and energy related products.



Development of a Rice Husk Biomass CDM Project with one of Sri Lanka's largest rice producers

Through the recycling of rice husk waste for energy production, sufficient electricity is generated for the operation of the rice mill, thus reducing operating costs and avoiding imports from the fossil fuel based national grid.



Waste-to-Energy projects provide multiple environmental and economic benefits:

- ❑ Revenue from electricity sales and avoided costs from electricity purchases.
- ❑ Increased financial viability through carbon credit income under the CDM and other schemes.
- ❑ GHG emission reductions through the displacement of fossil fuel based power generation.
- ❑ Sustainable waste management solutions.
- ❑ Reduced waste transportation and disposal costs.

Saving energy doesn't always mean spending big. Energy efficiency improvements are often achieved without a large capital commitment, but rather through a change in procedures or a different maintenance regime for particular plant and equipment.

Changing Perceptions: Waste as an Energy Resource



A shift to the perception of waste as a resource and not a problem, coupled with innovation in the search for alternative energy supply, is required to address energy security, protect against fluctuating energy costs and address concerns associated with over-strained landfills. The generation of renewable energy from waste based sources is fast becoming an economically attractive, as well as an environmentally sustainable, form of power generation.

Harnessing energy from waste. Due to the diverse physical and chemical properties of different waste streams, appropriate energy conversion technology must be selected to effectively utilise waste as an energy resource. Waste materials range from dry agricultural residues through to wet wastes and various mixed urban wastes. The settings, scale of plants and energy conversion technologies depend on the waste type utilised. Consequently, the economic considerations and viability parameters of each project will differ.



The process of converting waste to energy involves primary energy conversion processes, producing energy carriers (e.g. steam, producer gas and biogas) that are then converted to a usable form of energy such as electricity or process heat through secondary energy conversion. Primary energy conversion of waste materials of high calorific value occurs via combustion, gasification or pyrolysis. These are thermochemical processes, with the essential difference being the amount of atmospheric oxygen used in the process. This is more suitable for drier forms of waste, while the primary conversion of wetter waste or mixed waste streams occurs through the biochemical pathways of fermentation and anaerobic digestion.

Don't waste the opportunity. Major new commercial opportunities for waste-to-energy projects are emerging out of GHG emission reduction measures, which provide financial support to these projects through initiatives such as carbon credit income. Most waste-to-energy technologies and applications are well established and well proven, with further emerging technologies being developed to maximise waste stream utilisation. Opportunities for waste-to-energy exist in numerous industries with agricultural residues, animal waste, sugarcane waste, forestry residues, industrial and municipal wastes, sewerage and black liquor from pulp and paper mills all being potential resources for clean energy production. In Australia, more than 97 waste-to-energy plants are either operating or under construction with a combined electricity generation capacity of 772.51 MW¹. In the developing world, investment in waste-to-energy projects have become viable through the Clean Development Mechanism. With increasing energy demands and waste generation worldwide, the opportunity for harnessing clean energy while encouraging effective waste management solutions, should not be wasted.

¹ ABCSE (2005)

Earth Systems Energy and Carbon Services

- CDM Project Development
- Carbon Trading Services
- Sustainable Energy Solutions
- GHG Emissions Auditing
- Energy Auditing
- Feasibility Studies
- NGER Compliance Services
- Climate Risk Assessment and Management
- Climate Change Information Services

Important Dates

- 20 May 2009**—Seminar: Energy Savings Through Increased Efficiency and Carbon Credits, presented by PT Carsurin in association with Earth Systems, Jakarta, Indonesia.
- May 2009** — Upcoming workshops for the Energy Efficiency Opportunities (EEO) Program, Australian Government, Department of Resources, Energy and Tourism.
- 31 August 2009** —Registrations due for the 2008—2009 reporting period of the National Greenhouse and Energy Reporting Act.
- 31 October 2009**—Reports due for the 2008—2009 reporting period of the NGER Act.

Useful Web Links

- Clean Development Mechanism: <http://cdm.unfccc.int/index.html>
- National Greenhouse and Energy Reporting: www.climatechange.gov.au/reporting/index.html, www.ngermanagement.com.au
- Waste-to-Energy technologies: www.bcse.org.au
- Energy efficiency: www.energyefficiencyopportunities.gov.au

Want to find out more ?

Please tick as appropriate and Fax back to Earth Systems:

- | | |
|--|---|
| <input type="checkbox"/> Contact me on CDM and carbon trading | <input type="checkbox"/> Contact me on sustainable energy solutions |
| <input type="checkbox"/> Contact me on greenhouse gas and energy auditing services | <input type="checkbox"/> Contact me on water, energy and waste efficiency |
| <input type="checkbox"/> Contact me on NGER compliance | |

Comments / Suggestions:

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