

Low Carbon Manufacturing Programme

A Way Out: How the manufacturing industry can address climate change



Climate change is one of the greatest challenges the human race has ever had to face. If suitable mitigation measures are not developed promptly, phenomena like global warming and the melting of glaciers may well become a reality. These phenomena will irreparably damage the global environment. Regulations now being drafted to address climate change will directly constrain the development, and affect the very survival of the manufacturing industry.

In December, 2011, the UN Framework Convention on Climate Change met in Durban, South Africa. 194 countries agreed to adopt a universal legal agreement on climate change, and are expected to enact more stringent emission standards starting in 2015. Furthermore, 37 industrialised countries, which had agreed to reduce carbon dioxide and other greenhouse gas emissions according to the Kyoto Protocol - which came into force in 2005 - will continue to make binding commitments to emissions reductions (i)(ii). To fulfill these carbon reduction commitments, countries will have to set up regulations and policies. The manufacturing industry - which produces high levels of carbon emissions and various pollutants - will be the first to be affected. As such, it will become a major target of governments' carbon reduction policies. If the manufacturing industry does not find a way forward to make low-carbon manufacturing a reality, future development in the industry will no doubt be affected by these regulations.

Carbon reduction as a major target of China's 12th Five-year plan

At the Durban Climate Change Conference, the 194 countries agreed on a package of decisions and launched the "Green Climate Fund" to assist developing countries with addressing the problem of climate change. While other countries were still debating the issue of how to slow down global climate change, China had already listed climate change, energy saving and carbon reduction as key national policies in its 11th Five-year plan. These same policies later became major targets in its 12th Five-year plan.

In 2009, China announced a binding target of reducing its unit GDP carbon emissions by 40 to 45 percent in 2020, based on 2005 data. As further binding international carbon reduction bills pass, China will carry out proactive, top-down carbon reduction measures, which will allow the whole country to share in the responsibility of reducing emissions. As a high-carbon emission industry, the manufacturing industry will become a target for these carbon reduction measures. Again, if the industry does not implement carbon-reduction measures, manufacturers will face restrictions on their operations.

LCMP - A comprehensive carbon accounting and labeling system

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Carbon reduction as a basic requirement of multinational customers

National and international policies aside, many global retail chains and brands have been paying more attention to environmental issues in recent years. Indeed, they have started dictating carbon emissions requirements to their manufacturers. Take the multinational retailer Wal-Mart as an example: in 2008, Wal-Mart started to require that their largest 200 China suppliers lower their energy consumption by 20 percent (using data from the year 2007 as a baseline). A series of training workshops and on-site assessments, along with data collection and evaluation by Wal-Mart provided the suppliers with the assistance they needed to achieve these targets. Fashion brand Levi's has also made a commitment to carbon neutrality and the use of 100 percent renewable energy in its operation and supply chain. In addition, such multinational corporations as Kingfisher, Fuji-Xerox and Next also provide energy and carbon reduction training to their suppliers; some of these companies have even set up timetables and carbon reduction targets.

In addition, customers' increasing attention to brands' transparency and carbon emission control results is becoming an important factor in terms of brands choosing their suppliers. A trend is being set, whereby non-low-carbon and non-energy-saving producers may gradually be eliminated from the marketplace.

Striving towards carbon reduction best practice

In the course of producing electronics products or Printed Circuit **Board**, processes such as drilling and lamination use a great deal of compressed air. Soldering processes, surface finishing, and hot air levelling also consume a large amount of energy. Although traditional electronics production processes use high amounts of electricity and emit large amounts of carbon by their nature; there is still room for emissions reduction. For example, evaluations and tests can be performed before products are produced; and using the most energy-efficient and optimized production parameters can avoid energy and raw material wastage and reduce carbon emissions. At the same time, taking this approach will save on production costs and enhance production effectiveness. Factories can also achieve energy reduction targets in different ways: by implementing such measures as machine capability analyses, repeatability and efficiency evaluations, regular machine maintenance, process control, energy-saving device installation, heat recovery, parameter enhancement, defect and waste reduction, and avoiding machinery idle and standby time, to name just a few.

Manufacturers can also save energy by enhancing the design, operation and maintenance of various general utilities - including those delivering air-conditioning, electricity, lighting and compressed air. Take a lighting system

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as an example: an energy-saving lighting system can incorporate many different elements, such as natural light, high-efficient illumination and lighting (such as T5 fluorescent tubes), and lighting system control (e.g. occupancy sensor, photocell sensor).

The use of carbon reduction tools achieves significant results

The electronics manufacturing process is complicated. In order to start reducing emissions, manufacturers need to begin by collecting data and building up a greenhouse gas emissions database. By inputting data into carbon accounting software, manufacturers can search for potential ways to reduce their carbon emissions. Carbon accounting is important, but setting up energy conservation measures is crucial to reducing emissions. To this end, **WWF-Hong Kong launched their Low Carbon Manufacturing Programme (or LCMP) in 2010** (iii). Apart from providing carbon accounting software to manufacturers in Pearl River Delta Region, the LCMP also provides clear guidelines for manufacturers and equips them with three sets of best practice: “Greenhouse gas management”, “Factory general utilities” and “Manufacturing process”. “Manufacturing process” provides best practice advice on enhancing the manufacturing equipment in ten specific industries.

According to the LCMP pilot study, conducted in 2008, the measures below save energy effectively, and their cost is low. The average return on investment period is only 1.2 years (iv).

	Annual Energy Cost Saving (RMB)	Investment (RMB)	Payback (Year)
Diesel and Solar System			
● Conduct proper maintenance	60,000-70,000	< 10,000	Immediate
Compressed Air System			
● Raise awareness of all system users on the proper use of compressed air	40,000-50,000	< 10,000	Immediate
● Implement a leakage reporting and repair program	N/A	< 10,000	Immediate
● Use of high-efficiency motors instead of normal motors	30,000-40,000	10,000-99,999	1.0
● Install Variable Speed Drive (VSD) control	30,000-40,000	10,000-99,999	1.0

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● Optimize the control of multiple compressors	30,000-40,000	10,000-99,999	1.0
● Install heat recovery measures where appropriate	100,000-120,000	> 200,000	1.7
Lighting System			
● Use natural light to reduce the need for lighting	70,000-80,000	< 10,000	Immediate
● Implement good management policy of lighting systems	30,000-40,000	< 10,000	Immediate
● Redesign the lighting system	30,000-40,000	10,000-99,999	0.5
● Use high-efficiency lighting equipment	120,000-130,000	> 200,000	2.6
HVAC System			
● Increase temperature setting of HVAC system by 1-2°C	50,000-60,000	< 10,000	Immediate
● Ensure refrigerant pipes are properly insulated	15,000-20,000	< 10,000	Immediate
● Clean filters	10,000-20,000	< 10,000	Immediate
● Use scale control for condensing water	90,000-110,000	10,000-99,999	0.1
● Use solar shading devices	190,000-200,000	100,000-199,999	0.8
● Retrofit chiller plant	90,000-100,000	100,000-199,999	2.0
Production Machines			
● Reduce idle and standby time	225,000-235,000	< 10,000	Immediate
● Install VSD control on motors	735,000-745,000	> 200,000	1.0
● Replace standard motors with energy efficient motors	440,000-450,000	> 200,000	3.2

The crisis of climate change is imminent, and carbon emissions regulations are coming into effect around the world. If manufacturers implement carbon reduction measures before it is too late, they will not only reduce their costs and prepare for a low-carbon future; they will also display leadership, show their corporate vision to their suppliers and customers and, above all; their brand will stand head and shoulders above others in the competitive global marketplace.

Some factories in the Pearl River Delta Region have already implemented energy saving and carbon-reduction measures, and have achieved excellent results:

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Reflectors are used to increase brightness, and lighting has been installed with independent switches near users.



Energy consumption should be monitored using individual meters, so as to target potential energy saving 'hotspots'.



Use steam or compressed air leakage-proofing devices.



Use of solar energy.



High-efficiency chillers can reduce energy consumption by 20 to 30 percent.



Use of natural light.



Efficient ventilation systems can reduce the energy consumption of air conditioning units.

Remarks

- (i) <http://www.un.org/apps/news/story.asp?NewsID=40695&Cr=climate+change&Cr1>
- (ii) http://unfccc.int/files/press/press_releases_advisories/application/pdf/pr2011112cop17final.pdf
- (iii) LCMP is a WWF initiative which uses verification by third parties.
- (iv) Data is approximate, and for reference only.

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