

Pengeluaran Bersih

Ke Arah Industri yang Mesra Alam

Cleaner Production

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Projek Integrasi Pengeluaran Bersih PEMBUATAN BATIK

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Apa itu Batik?

Batik berasal dari perkataan Jawa 'amba' yang bermakna menulis, dan 'nitik' yang bermakna membuat titik (sumber: Wikipedia). Batik yang dipercayai berasal dari Indonesia, adalah satu seni reka corak yang berasaskan lilin sebagai bahan halangan untuk menghasilkan corak (Sumber: Malaysian Standard, MS 692:2007).

Bersumberkan kepada Batik Malaysia (Kraftangan) di dalam Malaysian Standard Perkara 3.1 (definisi batik) MS 692:2007 (Jabatan Standard Malaysia), kain batik adalah kain yang diproses dengan melukis, mencetak, mewarna, mencelup fabrik menggunakan bahan halangan fizikal ke atas fabrik seperti lilin, untuk mengelakkan bahagian yang diaplikasikan oleh lilin tersebut daripada diresapi warna dan kemudiannya melupuskan bahan halangan fizikal (lilin) tersebut untuk menampakkan coraknya. Seterusnya, terdapat beberapa jenis batik yang diproses oleh pengusaha-pengusaha batik pada hari ini. Di antaranya adalah Batik Lukis, Batik Terap dan Batik Sutera Saring.

Kebiasaannya reka corak dan motif-motif batik diinspirasi dari alam semula jadi seperti flora dan fauna yang kemudiannya digabung dengan corak-corak geometri atau abstrak. (Kraftangan)

Batik Malaysia

Di Malaysia, batik merupakan seni warisan bangsa yang menjadi kebanggaan negara. Batik mula diperkatakan di Malaysia pada abad ke-17 Kesultanan Melayu. Lagenda bermula apabila Laksamana Hang Nadim menerima titah daripada Sultan Melaka, Sultan Mahmud untuk belayar ke India bagi membeli 140 helai serasah cloth (batik) yang dilakar dengan 40 jenis motif bunga. Namun kerana tidak berjaya menemui batik yang dikehendaki oleh Sultan, beliau menghasilkan kain batiknya sendiri. Dalam perjalanan pulang, kapal beliau karam dan hanya 4 helai batik berjaya di bawa pulang yang menimbulkan kemarahan Sultan. Di Terengganu, pembuatan batik bermula pada tahun 1913 dengan lukisan menggunakan lilin. Manakala di Kelantan, batik



mula dihasilkan di Lorong Gajah Mati, Kota Bharu. Pada zaman penjajahan Jepun, industri batik merudum apabila banyak kilang-kilang terpaksa ditutup. Namun, pada tahun 1957 Malaysia mewujudkan identiti batik kebangsaan dengan menjadikannya pakaian kebangsaan untuk majlis-majlis rasmi.

Batik Malaysia kebanyakannya terdiri daripada motif bunga-bunga besar, ringan dan berwarna terang serta ceria.

Isu Alam Sekitar

Industri batik merupakan salah satu industri tradisional yang turut menyumbang secara signifikan kepada ekonomi negara. Batik keluaran Malaysia mendapat permintaan yang tinggi dari pasaran tempatan dan luar negara kerana keunikannya. Walau bagaimanapun di sebalik keunikan ini, aktiviti pembuatan batik turut menghasilkan air sisa atau yang dikenali sebagai effluen yang menyumbang kepada masalah pencemaran air terutama di Kelantan dan Terengganu memandangkan penghasilan batik melibatkan penggunaan bahan kimia yang banyak. Kajian awal ke atas airsisa yang dihasilkan oleh premis pembuatan batik menunjukkan bahawa effluen yang terhasil dari aktiviti pemrosesan batik mengandungi pepejal terampai, pewarna organik dan bukan organik serta logam berat yang memberi kesan negatif kepada alam sekitar. Selain pencemaran air, aktiviti pembuatan batik yang tidak mesra alam juga menimbulkan masalah pencemaran udara dan penghasilan sisa buangan.

Sisa pepejal- raja kain, bekas-bekas, beg, bahan pembungkusan

Pencemaran air-effluen mengandungi banyak bahan pencemar organik dan terampai

Impak Terhadap Alam Sekitar

Pencemaran udara - sebatian organik meruap (VOC), asap, bau

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Dari Meja Pengarang

Jenis-jenis Batik

BATIK COP



Blok yang diperbuat daripada sebungkah kayu atau logam diukir dengan motif-motif bersesuaian untuk mengecap kain

BATIK CANTING



Lilin cair dilakar menggunakan canting dan diwarna mengikut kesesuaian reka corak Kain digunakan: kapas, rayon, voile, sutera

BATIK SUTERA SARING



Dikenali sebagai batik stensil Teknik lakaran corak dan terapan warna dilakukan di atas skrin yang diperbuat daripada poliester diregang di atas pemedang

Bahan Mentah

BATIK COP

- Blok cop
- Pewarna
- Pemidang
- Lilin
- Bekas kecil
- Kain putih
- Bekas besi besar

BATIK CANTING

- Canting
- Lilin
- Resin
- Minyak masak
- Kain putih
- Pewarna (Remazol dan Premazin)

BATIK SUTERA SARING

- Kain putih
- Pewarna
- Pemidang



Pengeluaran Bersih di Premis DAGANG BATIKRAF

Bagi meneruskan kesinambungan industri batik di Malaysia supaya berdaya saing dan mesra alam, Jabatan Alam Sekitar (JAS) telah mengambil inisiatif melaksanakan Projek Integrasi Pengeluaran Bersih di Premis Pembuatan Batik bermula pada tahun 2011. Projek ini merupakan anjuran JAS dengan kerjasama Unit Perundingan Universiti Malaya (UPUM). Projek ini dilaksanakan melalui dua fasa iaitu Fasa 1 (Tahun 2011) dan Fasa 2 (Tahun 2012). CP merupakan pendekatan yang diambil oleh JAS sebagai satu strategi bagi mematuhi Akta Kualiti Alam Sekeliling 1974 dan di bawah projek ini industri batik telah dipilih sebagai kategori industri yang diberi keutamaan dalam konteks amalan CP. Premis Dagang Batikraf Sdn. Bhd. di Kota Bharu, Kelantan telah dipilih sebagai premis demonstrasi bagi pelaksanaan opsyen-opsyen CP.

Projek ini merupakan usaha ke arah pencegahan pencemaran di peringkat awal proses di premis pembuatan batik dan akan dijadikan contoh pelaksanaannya kepada industri batik yang lain. Secara tidak langsung, ia memberi penekanan kepada elemen-elemen bagi meningkatkan tahap toleransi dan kesedaran pengusaha batik terhadap impak industri batik kepada alam sekitar.

Projek Integrasi CP di Premis Pembuatan Batik pada asasnya dijalankan untuk membuktikan bahawa industri

batik yang rata-rata merupakan industri cottage boleh dijadikan sebagai industri yang bersih dari aspek alam sekitar di samping menjadi industri yang viable dari segi ekonomi. Penjanaan opsyen-opsyen CP yang dikenalpasti di Premis Dagang Batikraf merangkumi aspek tenaga, bahan mentah, sisa pepejal yang berbahaya, sistem rawatan effluen, produktiviti dan keselamatan dan kesihatan.

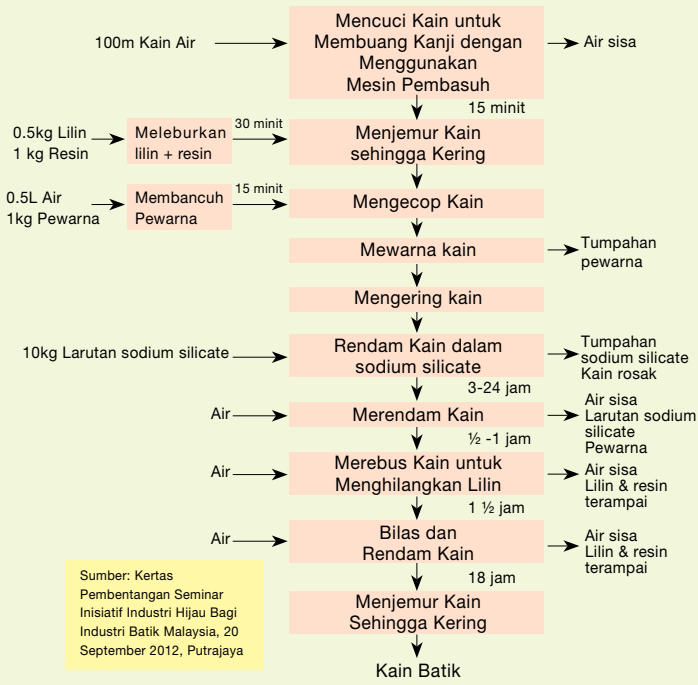
Fasa Pertama (2011)

1. Menjalankan audit CP di sebuah premis pembuatan batik di Kelantan
2. Menjana senarai opsyen-opsyen CP yang praktikal bagi premis tersebut
3. Merekabentuk atau mengubahsuai skema rawatan effluen yang sesuai.

Fasa Kedua (2012)

1. Melaksanakan opsyen-opsyen CP yang terpilih dan memantau hasil pelaksanaan
2. Membina sistem rawatan effluen mudah yang dapat mengurangkan kandungan bahan pencemar di dalam effluen ke paras pematuhan minimum Standard B.
3. Menerbitkan satu manual pelaksanaan amalan CP bagi pengusaha batik
4. Mengadakan satu bengkel dan dua seminar bagi pengusaha batik dari seluruh Malaysia

Carta Alir Proses Pembuatan Batik



Sumber: Kertas Pembentangan Seminar Inisiatif Industri Hijau Bagi Industri Batik Malaysia, 20 September 2012, Putrajaya

Justifikasi pemilihan Premis Integrasi CP

- Lokasi premis diberikan keutamaan kerana terletak di sekitar Kota Bahru, Kelantan
- Komitmen sepenuhnya dari pemilik dan tenaga kerja premis
- Kebolehan dan kesediaan premis untuk melaksanakan opsyen-opsyen CP
- Kesediaan premis untuk berkongsi pengalaman melaksanakan amalan CP dengan premis lain

Latarbelakang Dagang Batikraf Sdn. Bhd.

- Ditubuhkan pada tahun 1970 dan terletak di Kota Bharu, Kelantan
- Menjalankan perusahaan pembuatan kain batik menggunakan teknik cop.
- Mengambil tempahan pakaian rasmi dari agensi kerajaan dan institusi pengajian tempatan.
- Mempunyai pekerja seramai 10 orang

Aktiviti-aktiviti di premis

- Taklimat dari pemilik premis
- Menjalankan pra-audit dan tinjauan umum
- Mengenal pasti isu secara kualitatif
- Perancangan aktiviti audit
- Pengendalian audit secara terperinci
- Pengukuran dan pengumpulan data
- Penganalisaan data
- Kuantifikasi isu secara terperinci
- Penyediaan laporan kajian

Dapatan Audit

Aktiviti pra-audit telah dijalankan di premis Dagang Batikraf bagi mengenalpasti isu-isu yang dihadapi oleh premis serta membuat pemerhatian mengenai proses dan aktiviti yang dijalankan di premis. Ia merangkumi penggunaan bahan dan utiliti, keadaan persekitaran tempat bekerja, pengurusan sisa, risiko kesihatan dan keselamatan dan pengurusan sumber manusia. Jadual 1 dan 2 di bawah menunjukkan dapatan audit yang diperolehi.

Jadual 1

Penggunaan/Penghasilan	per meter kain	13,000,000 meter kain*
Penggunaan air	18 liter	234,000 m ³
Penghasilan airsisa	15 liter	195,000 m ³
Penghasilan sisa pepejal	12 gram	156 tan
Penggunaan elektrik	0.1 kW.hr	1,300 MW.hr (RM455,000)
Penggunaan bahan api		
- kayu	0.13 kg	1,690 tan (RM169,000)
- gas	0.01 kg	130 tan (RM235,000)

Jadual 2

Penggunaan/Penghasilan	Kadar untuk seluruh Kelantan sehari	Catatan
Penggunaan air	750 m ³	Sumber air bawah tanah
Penghasilan airsisa	625 m ³	COD : 200 – 500 mg/L TSS : 800 – 1,000 mg/L pH : 10 - 12
Penghasilan sisa pepejal	500 kg	- Abu kayu api - Lilin dan resin - Lain-lain
Penggunaan elektrik	RM1,460	-
Penggunaan bahan api	5.5 tan (RM545)	-
- kayu	410 kg (RM755)	-
- gas		

*Anggaran kadar penghasilan kain batik di seluruh negeri Kelantan setahun

Penjanaan Opsyen-opsyen CP

Cleaner Production berkait rapat dengan aktiviti-aktiviti yang dapat mengurangkan penjanaan *Carbon Footprint* atau Kesan Karbon. Secara umumnya, kesemua aktiviti pada akhirnya boleh dikaitkan dengan penjanaan *Carbon Footprint* melalui penggunaan tenaga atau bahan secara langsung atau tidak langsung. Sebanyak 160 opsyen CP telah dijana bagi premis Dagang Batikraf yang memfokus kepada aspek-aspek berikut:

- Carta aliran proses
- Penggunaan bahan mentah
- Penggunaan utiliti (elektrik, air dan bahan api)
- Keadaan tatasusun persekitaran premis
- Tempat penstoran bahan mentah dan produk
- Risiko keselamatan dan kesihatan tempat kerja
- Produktiviti syarikat

Pembahagian opsyen-opsyen mengikut kemudahan pelaksanaan adalah seperti di bawah:

Bil	Kemudahan pelaksanaan	Peratus (%)
1	Dilaksanakan oleh premis tanpa memerlukan bantuan JAS dan kos	53
2	Dilaksanakan oleh premis dengan bantuan JAS tanpa memerlukan kos	15
3	Dilaksanakan oleh JAS dengan kos kurang dari RM 200	26
4	Dilaksanakan oleh JAS dengan kos yang tinggi	5
5	Memerlukan dana tambahan	1
	Jumlah	100

Sebanyak 71 opsyen CP telah disenaraipendek untuk dinilai dengan lebih terperinci dan seterusnya sebanyak 28 opsyen CP utama telah dipilih untuk dilaksanakan di premis Dagang Batikraf. Antara opsyen CP yang telah dilaksanakan ialah seperti berikut:

Pelaksanaan Opsyen-Opsyen Cp Di Premis Integrasi Dagang Batikraf Sdn. Bhd.

Bil.	Opsyen CP	Sebelum	Selepas
1.	Pembinaan lantai bersimen berkeluasan 1200 kaki persegi bagi ruang pemprosesan		
2.	Pembinaan 2 buah kolam takungan air bagi pembilasan kain	Tiada.	
3.	Pemasangan siling plywood di ruang mewarna berkeluasan 32 kaki persegi		
4.	Pembinaan 2 buah kabinet bagi menempatkan bekas simpanan pewarna		
5.	Pembinaan dapur memanaskan lilin beserta kebuk wasap		
6.	Pemasangan rak simpanan blok cop		
7.	Pemasangan meja/bingkai mewarna batik keluli (2 tingkat)		
8.	Pemasangan 4 keping panel bumbung lutsinar.	Tiada	
9.	Pembinaan longkang saliran di ruang mewarna		Tiada 
10.	Kolah takungan rendaman sodium silicate		
11.	Pelabelan bagi keseluruhan ruang pemprosesan dan tong simpanan bahan dan sisa		Tiada 
12.	Pembersihan perimeter premis.		
13.	Peralatan keselamatan (Alat pelindung diri individu dan alat pemadam api)		Tiada 
			Tiada 
15.	Tong simpanan sisa.		
16.	Pemasangan papan tanda premis.		Tiada 

Sistem Rawatan Effluen Batik

Aktiviti pemprosesan batik menggunakan bahan kimia yang banyak dan menghasilkan effluen yang mengandungi bahan pencemar dengan ciri-ciri seperti di Jadual 4.

Effluen yang dihasilkan dari pemprosesan batik mempunyai ciri-ciri seperti beralkali, berwarna dan mempunyai suhu yang tinggi. Bahan kimia yang digunakan di dalam pemprosesan batik ialah lilin, resin, *sodium silicate* dan bahan pewarna (organik

dan bukan organik). Terdapat lebih daripada 100,000 bahan pewarna komersial di pasaran dengan kadar pengeluaran bahan pewarna sebanyak 7×10^5 tan setahun. Berdasarkan kepada struktur kimianya, pewarna mempunyai rintangan terhadap keupatan apabila terdedah kepada cahaya, air dan bahan kimia lain. Struktur yang kompleks pula menyebabkan pewarna sukar untuk nyahwarna dan mereput secara biologi.

Jadual 4

Bil.	Aktiviti	Bahan pencemar	Anggaran kuantiti air sisa (m3)/ bulan	Kesan
1.	Pembasuhan	Kanji	36	Menyumbang kepada TSS
2.	Menstabilkan kain	Sodium silicate	9.5	Menyumbang kepada TSS
3.	Merendam	Sodium silicate dan pewarna	24	Menyumbang kepada COD dan TSS
4.	Merebus	Sodium silicate dan lilin	2.5	Menyumbang kepada TSS
5.	Membilas	Baki lilin dan pewarna	54	Menyumbang kepada TSS dan COD
Jumlah 126 m3 / bulan				

Jadual : Sumber pencemar pemprosesan batik, kuantiti dan kesan kepada kandungan effluen

TSS – Total Suspended Solid atau Jumlah Pepejal Terampai

COD – Chemical Oxygen Demand

Jadual 5 : Ciri-ciri effluen batik di premis Dagang Batikraf Sdn. Bhd.

Bil.	Perkara	Julat ciri-ciri effluen batik	Piawai B*
1.	pH	11.8	5.5 – 9.0
2.	COD (mg/L)	250 - 300	250
3.	BOD	50 - 80	50
4.	TSS (mg/L)	800 - 1000	100

* Peraturan-Peraturan Kualiti Alam Sekeliling (Effluen Perindustrian) 2009, Akta Kualiti Alam Sekeliling 1974

Sehingga kini, pelbagai kajian telah dijalankan bagi mendapatkan kaedah dan pendekatan terbaik dalam merawat effluen batik. Salah satu pendekatan yang diambil adalah melalui pelaksanaan opsyen-opsyen CP yang menyeluruh dan bersepadu (*comprehensive and integrated*). Bagi aspek penjanaaan effluen pula, pelaksanaan CP dapat mengurangkan kuantiti air sisa yang terjana di mana strategi-strategi CP memfokuskan kepada mengenalpasti sumber-sumber pencemar dan kuantiti penjanaaan, seterusnya melaksanakan konsep pencegahan (*pollution prevention*) bagi mengurangkan kandungan dan kuantiti bahan pencemar tersebut. Paling ketara ialah pengurangan/pengoptimuman penggunaan setiap jenis sumber iaitu air dan bahan kimia.

Namun begitu, industri batik masih juga memerlukan satu sistem yang dapat merawat effluen batik. Pada masa ini, sistem rawatan berpusat adalah tidak sesuai dilaksanakan bagi premis-premis batik di Kelantan. Ini adalah kerana lokasi premis-premis pembuatan batik tersebut adalah bertaburan dan usaha untuk mengumpul semua premis dalam bentuk kluster adalah mustahil. Satu sistem rawatan mini diperlukan kerana industri pembuatan batik adalah industri *cottage* dan kebanyakkan premis dibina di dalam ruang yang terhad. Selain itu, rekabentuk sistem rawatan juga perlu mengambil kira kuantiti dan ciri-ciri air effluen yang terjana bagi sesebuah premis.

Pada masa kini, terdapat pelbagai teknologi rawatan bagi merawat effluen yang terhasil dari aktiviti pembuatan batik seperti berikut:

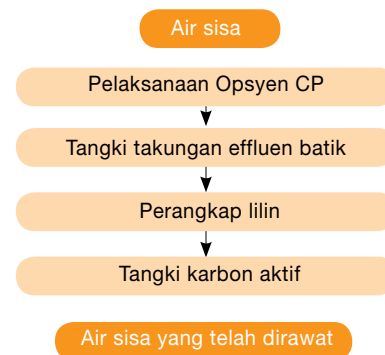
1. Penjerapan pada karbon teraktif (carbon adsorption)
2. Rawatan ozon
3. Proses membran (turasan ultra, mikro,nano,osmosis berbalik)
4. Proses elektrokimia
5. *Coagulation dan Flocculation*

Ciri-Ciri Sistem Rawatan Effluen Bagi Premis Dagang Batikraf Sdn. Bhd.

Rekabentuk sistem rawatan effluen yang dibangunkan di premis Dagang Batikraf mempunyai ciri-ciri seperti di bawah:

1. Memerlukan kos yang murah dan mampu milik iaitu kurang daripada RM10 ribu. Sistem rawatan ini boleh dijadikan model yang boleh dicontohi oleh premis-premis batik yang lain.
2. Sistem tidak memerlukan ruang yang besar. Ruang diperlukan bagi pemasangan empat buah tangki yang dapat menampung 1 hingga 2 m3 air sisa.
3. Kos pengoperasian adalah murah. Rekabentuk sistem melibatkan penjanaaan air sisa sebanyak 5 m³ hingga 10 m³ sehari.
4. Sistem rawatan mudah dikendalikan oleh pekerja sendiri dengan latihan yang diberikan.
5. Rawatan tidak menghasilkan sisa yang lebih berbahaya (enapcemar).
6. Sistem rawatan adalah sesuai bagi kadar aliran air sisa dan kandungan yang berubah-ubah.
7. Sistem rawatan sesuai bagi proses berkelompok di mana operasi pembuatan batik adalah tidak menentu.
8. Penyelenggaraan sistem rawatan yang tidak kompleks. Rekabentuk menyasarkan kos penyelenggaraan 'hampir sifar' dan boleh diaplikasikan oleh premis yang tidak mempunyai kemudahan elektrik.

Sistem rawatan yang dipilih untuk dilaksanakan di premis Dagang Batikraf ialah Penjerapan Karbon Teraktif atau *Carbon Adsorption*. Penjerapan dengan bahan jerap kos rendah merupakan alternatif yang lebih ekonomi (Ramesh et al., 2011). Kaedah ini terbukti sangat efektif dalam membuang pewarna *recalcitrant* (Garg et al., 2004b).



Rajah 3

Cabaran Industri Batik Malaysia

Isu Pemasaran – Memerlukan strategi pemasaran yang sistematik dan efektif

Isu Perniagaan – Memerlukan reputasi kukuh dan penandaaras (benchmarking)

Isu Alam Sekitar – Penggunaan air yang berlebihan di dalam proses pembuatan dan pengeluaran yang menghasilkan effluen dicemari oleh pewarna dan bahan kimia

Halangan utama dalam industri batik antaranya kekurangan modal, permintaan yang tidak menentu, kekurangan pekerja mahir, akses terhad kepada bahan mentah, teknologi tradisional dan infrastruktur yang terhad.



Penilaian Pulangan Pelaksanaan Opsyen-opsyen CP di Premis Dagang Batikraf

Penilaian Pulangan Pelaksanaan Opsyen-opsyen CP

Jadual 6 : Penilaian Pulangan Pelaksanaan Opsyen-opsyen CP

Bil	Opsyen CP / Pulangan diperolehi (Pengurangan penghasilan / Penjimatan penggunaan)	Bahan mentah	Bahan api	Kuantiti air	Kualiti air	Sisa pepejal	Masa operasi	Suhu sekitar	Imej syarikat	Keselamatan dan Kesihatan	Tatasusun premis	Ergonomik
1.	Pembinaan lantai bersimen bagi ruang pemprosesan.									✓	✓	
2.	Pembinaan kolah takungan air bagi pembilasan kain.						✓					
3.	Pemasangan siling plywood di ruang mewarna.									✓		
4.	Pembinaan kabinet bagi menempatkan bekas simpanan pewarna.										✓	
5.	Pembinaan dapur memanaskan lilin dan cerobong wasap.					✓		✓		✓		
6.	Pemasangan rak simpanan blok cop.									✓	✓	
7.	Pemasangan meja/ bingkai mewarna batik keluli (2 tingkat).									✓	✓	✓
8.	Pembinaan sistem saliran paip dan tangki penapis karbon teraktif.				✓							
9.	Pemasangan 4 keping panel bumbung lutsinar.									✓		
10.	Pembinaan longkang saliran di ruang mewarna.										✓	
11.	Kolah takungan rendaman sodium silicate.					✓						
12.	Pelabelan bagi keseluruhan ruang pemprosesan dan tong simpanan bahan dan sisa.									✓	✓	
13.	Pemasangan papan tanda keselamatan.									✓		
14.	Pembersihan perimeter premis.								✓	✓	✓	
15.	Peralatan keselamatan (alat pelindung diri individu dan alat pemadam api).									✓		
16.	Tong simpanan bahan mentah.					✓						
17.	Pencucuh dapur memanaskan automatik.		✓					✓		✓		
18.	Tong simpanan sisa.					✓				✓	✓	
19.	Pemasangan papan tanda premis.								✓			
20.	Penambahbaikan tatasusun premis secara keseluruhan.							✓	✓	✓	✓	
21.	Penggunaan penimbang digital.	✓										

Walau bagaimanapun, isu berkaitan industri batik boleh ditangani dengan mewujudkan prospek yang cerah bagi industri batik, sokongan yang lebih jitu dari agensi kerajaan yang terlibat termasuk bantuan kewangan dan teknikal, melahirkan lebih ramai usahawan muda yang menceburi industri batik serta pembangunan kepakaran untuk menghasilkan pekerja mahir.

Peranan DOE

Jabatan Alam Sekitar mendapati kaedah yang paling sesuai dan berkesan untuk

membawa industri batik khususnya dan Industri Kecil dan Sederhana (IKS) amnya kepada pematuhan Akta Kualiti Alam Sekeliling 1974 ialah dengan strategi yang diguna pakai sekarang iaitu penguatkuasaan beserta khidmat nasihat atau consultation. Strategi ini diharapkan mampu membuka minda dan mengubah cara berfikir pengusaha IKS supaya lebih proaktif dan sentiasa peka terhadap masalah alam sekitar. Pengusaha IKS perlu diberi kesedaran bahawa terdapat amalan pengurusan

alam sekitar yang mampu dilaksanakan tanpa atau dengan melibatkan kos yang minimum. Oleh sebab itu, pihak IKS tidak perlu merasa takut untuk menyertai program yang direka khas untuk mereka seperti Program Bantuan Audit Pengeluaran Bersih bagi Industri Kecil dan Sederhana yang dijalankan oleh Jabatan Alam Sekitar melalui Unit Industri Hijau. Program ini bertujuan membantu IKS untuk mengenal pasti proses atau komponen kilang yang boleh dipertingkatkan melalui opsyen-opsyen CP. Dalam Rancangan Malaysia ke 10, Jabatan Alam Sekitar melalui Unit Industri Hijau akan menggunakan pendekatan memberi khidmat nasihat, kesedaran, bimbingan, galakkan, kepakaran dan demonstrasi projek kepada IKS mengenai konsep dan amalan Cleaner Production bagi menyelesaikan permasalahan yang dihadapi oleh IKS dalam mematuhi undang-undang dan keperluan alam sekitar.

Menyedari betapa pentingnya penerapan konsep CP oleh industri di Malaysia yang menjadi pemacu kepada Industri Hijau, Jabatan Alam Sekitar telah menjadikan Pengeluaran Bersih atau CP ini sebagai salah satu strategi bagi JAS dalam menangani masalah ketidakpatuhan IKS kepada peraturan alam sekitar dan seterusnya menjadikan industri ini berdaya saing dan mesra alam sekitar. Maka adalah menjadi tanggungjawab dan misi Jabatan Alam Sekitar untuk menggalakkan penerapan elemen CP di dalam pengurusan alam sekitar memandangkan pendekatan tersebut mampu mengurangkan impak terhadap alam sekitar.

Melangkah Ke Hadapan

Projek Integrasi CP di Premis Pembuatan Batik yang tercetus dari sesi dialog bersama pengusaha-pengusaha batik dan badan berkepentingan di Negeri Kelantan pada tahun 2010 merupakan usaha transformasi ke arah mewujudkan industri batik yang mesra alam dan berdaya saing di peringkat tempatan dan antarabangsa. Dengan terlaksananya projek ini, JAS yakin bahawa peratus tahap kesedaran pengusaha-pengusaha batik terhadap impak industri batik terhadap alam sekitar akan meningkat serta pelaksanaan CP di kalangan industri ini akan semakin bertambah.

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The GREEN Industry

What is the Green Industry?

The Green Industry, as defined by UNIDO, is industrial production and development that does not come at the expense of the health of natural systems or leads to adverse human health outcomes. The Green Industry is aimed at mainstreaming environmental, climate and social considerations into the operations of enterprises.

The Green Industry promotes sustainable production and consumption patterns, for example, industrial patterns that are resource and energy efficient and products with low carbon and waste emissions that are responsibly produced and managed throughout their life cycle. In another perspective, the Green Industry stimulates technological advances and innovation. Therefore, the Green Industry not only reduces environmental impacts but spurs innovation, creating business opportunities and new jobs.

The Green Industry is viewed as the key to green growth that will result in an obvious shift to Sustainable Production and Consumption (SCP) patterns that will determine how a green economy and sustainable development are realised.

Green Industry Strategies

Strategy 1: Greening of existing industries

Enable and support all industries regardless of their sector and size, to green their operations, processes and products by using resources more efficiently; transforming industrial energy systems towards greater sustainability by expanding renewable energy sources; phasing out toxic substances; and improving occupational health and safety at the industrial level.

Strategy 2: Creating green industries

Establish and expand (new) green industries that deliver environmental goods and services. The Green industry is a rapidly expanding and diverse sector that covers all types of services and technologies that help to reduce negative environmental impacts and resource consumption. These include companies that manufacture renewable energy equipment as well as companies that develop clean technologies for various sectors such as transportation, energy, building and automotive. It also covers service industries, recycling companies, waste treatment equipment companies and includes consulting companies for energy and environment.

The Characteristics of the Green Industry

The attributes of the Green Industry can be categorised in the form of industrial operation, product and waste management. They are:

- Industry that consumes and uses minimal virgin raw materials.
- Products produced from sustainable inputs.
- Products that are built for longevity and durability.
- Production processes that minimise the use of water, energy, and materials.



- Production processes that are free from harmful toxins.
- Application of reuse and recycling of solid waste streams.
- Products and processes that achieve substantial reductions in emissions or effluents of harmful greenhouse gases and pollutants.

Benefits of the Green Industry

Briefly, Green Industry benefits are reflected in three major sectors namely economic, social and environment. The multiple benefits that accrue from pursuing a Green Industry approach are listed below.

- Reduced raw material cost
- Increased security of supply
- Reduced pollution risks and cost
- Lower cost of capital
- Increased employee appeal and engagement
- Increased awareness of emerging smart technologies
- Enhanced innovation capacity and skill
- Improved brand recognition and competitive position in markets

The tools to green our industries are already in place. We just have to make a conscious effort to make them part and parcel of our industrial processes. They are:

- ↓ Eco-efficiency
- ↓ Environmental Labeling
- ↓ ISO 14000/EMAS
- ↓ Environmental Audits
- ↓ Environmental Accounting
- ↓ Codes of Practice
- ↓ Industrial Ecology
- ↓ Environmental Indicators
- ↓ Life Cycle Assessment
- ↓ Environmental Taxes
- ↓ Performance Based Contracting
- ↓ Public Environment Reporting
- ↓ Pollution Prevention
- ↓ Waste Minimisation
- ↓ Green Productivity

Note: Part of the information is extracted from UNIDO .



GREEN INVESTMENT

‘Green is the new black!’ Everyone wants to go green, in keeping with global trends.

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We are now on the threshold of another major and important revolutionary phase - the green economics. But while the world battles the pressures of the global financial crisis, the question posed is ‘can we afford to go green’. If we were to make a case purely on bread-and-butter economics, the answer could well be ‘no’. However, the soaring rate of environmental degradation has had devastating impacts on the the climate which in turn is affecting water resources and resulting in terrifying effects on food security. The ‘Green Economy Initiative’, backed by Germany, Norway and the European Commission arises from the insight that the most pressing problems we face are interrelated. Rising energy and commodity prices have helped create the global food crisis, which fed the financial crisis. Meanwhile global population growth has resulted in shortages of critical resources—fuel, food, clean air and water.

The Need to Grow Green Jobs

We need to understand that growth is vital as new jobs have to be created to combat the rising unemployment in both the developing and developed world. Poverty is an overriding issue. Green Investment will help redirect resources away from the speculative financial engineering at the root of today’s market crisis into more productive, growth-generating and job-creating investments for the future.

Green financing is a basic activity to accomplish green growth. Green financing is targeted financing that induces the flow of sufficient funds into the target through the intervention of public agencies. Autonomic market forces do not provide sufficient funds to green economic activities, hence the term targeted financing.

Soaring energy needs, volatile oil prices and an increased focus on curbing global warming have spurred investments in clean energy, in the last few years which has thus mooted the way for a new market scheme of green financing. The total world market for environmental products and services is currently estimated at around USD1,370 billion, and is set to double by 2020 (UNEP/ILO 2008). In China, green capital investment is expected to grow

from USD170 million in 2005 to more than USD720 million in 2008. Globally, the UN Environment Programme (UNEP) estimates that investment in low-greenhouse energy will reach USD1.9 trillion by 2020.

There has been more than 200% increase in growth in green investment since 2005. The financial crisis slowed this trend in late 2008 and 2009, but capital continued to flow into green ventures despite harder economic times. For instance, in 2010, there was a record breaking USD 243 billion in investments, double the figure in 2006 and nearly five times that of 2004. What The main driver for this rapid growth were China with an investment jump of 30% which is the single largest for any country, European offshore wind and solar projects and an increased focus on research and development (R&D).

The number of countries with some type of policy target or support policy almost doubled in recent years, from 55 in early 2005 to more than 100 by early 2010 (OECD). One of the major contributors will be the growing energy challenge particularly in Asia which will further encourage the ongoing investment on green financing.

In 2009, China replaced the United States to emerge as the leader in clean energy finance and investments for the first time. This is only expected to continue with China leading the way in attracting clean energy investments in the near future. Along with China, India, Japan and South Korea will account for the lion’s share of investments in 2020 with the Americas

and Europe trailing. The United States will lose its leadership position, as it does not maintain the potential to attract USD342 billion in private clean energy investments over the next decade.

Malaysia’s Green Investment Initiatives

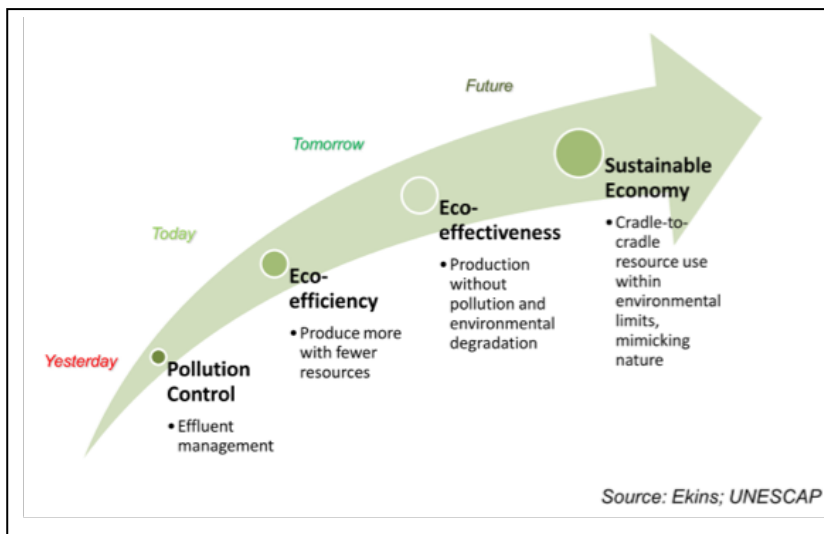
In 2009, a cabinet reshuffle and restructuring was conducted to form the Ministry of Energy, Green Technology and Water (KeTTHA) which was given the green technology portfolio into the water and energy functions. Some of the major milestones include the formulation of Green Technology Policy, Green Technology Financing Scheme and the rebranding exercise of Pusat Tenaga Malaysia (PTM) to Malaysian Green Technology Corporation (GREENTECH).

The Malaysian National Green Technology Policy consists of FOUR key pillars, namely ENERGY, ENVIRONMENT, ECONOMY and SOCIAL. As long as the world’s energy needs keep growing at a feverish pace, the future outlook for clean energy investments (green investment) will continue to burn brightly. The Malaysian energy sector is still heavily dependent on non-renewable fuel such as fossil fuels and natural gas as a source of energy and efforts towards clean energy were initiated way back in 1996 during the 7th Malaysian Plan. The table below identifies some of the efforts introduced in the various Malaysian Plans.

One of the main drivers of the unprecedented growth in clean energy investments in 2010 was the direct result of government intervention. Some of the other efforts and commitments of the Malaysian government are listed below:

- National Biofuel Policy; by 2025, at least 5% of the national energy mix must come from biofuel. In 2005, Malaysia

Seventh Malaysia Plan (7 MP) (1996-2000)	Renewable energy was made the fifth fuel in the energy mix together with oil, gas, coal and hydro
Eighth Malaysia Plan (8 MP) (2001-2005)	• In-house biomass-based cogeneration for the production of electricity;
	• Extension of financial and fiscal incentives for biomass, biogas, municipal waste, solar and mini hydro; and
Ninth Malaysia Plan (9 MP) (2006-2010)	• Promotion of co-operation between government agencies and private institutions
	Development of other renewable energy sources such as standalone systems of solar hybrid and Municipal Solid Waste (MSW), especially through the implementation of Clean Development Mechanism (CDM) projects.



utilised less than 1% of its biomass resource potential for renewable energy. Be that as it may, Malaysia is now one of the key biodiesel producers in the world. Current CDM potential in Malaysia is associated with biomass, biogas, hydro, waste management, landfill gas, Municipal Solid Waste (MSW) and Composting. For the future, the transport and agricultural sectors, biofuel, oil and gas, agriculture sector offer vast potential.

- Budget 2008 tabulated that income derived from trading certified green gasses emission reduction will enjoy tax exemptions (2008-2010). Companies providing energy conservation services will also get an additional 10-year pioneer status. Expansion of the qualifying criteria for these tax exemptions would be required towards greater sustainable development.
- Announcements were made in 2010 about incentives provided to businesses developing and investing in green technology, while the Pioneer Status and Investment Tax Allowance for renewable energy and sustainable activities was extended to December 2015.
- In 2010, a soft loan incentive, the Green Technology Financing Scheme, was launched to create a policy environment that will attract innovators and users of green technology followed by the development of green procurement manual, procedures and standards are currently under development.
- The Renewable Energy Act 2011 (Act 725) provides for the establishment and implementation of a special feed-in-tariff system to catalyse the generation of renewable energy in Malaysia. The law is administered by the Sustainable Energy Development Authority (SEDA).
- Other initiatives include Malaysian Green Building Index (MAA /ACEM) and the Malaysian Building Integrated Photovoltaic Technology Application Project (MBIPV).

The Transition to Green Growth

The transition to a greener growth should be facilitated by eco-tax reform, soft energy path, sustainable infrastructure, the greening of business and industries, and sustainable consumption. The 'business as usual' scenario is likely to be constrained and there will be a realignment of market sectors as companies face a growing spectrum of stakeholders who are concerned about the environment

Mainstream economic thinking is that the proposed solutions will contribute to economic recovery, fight against poverty, and promote justice, since greener growth would also ensure that the earth's vast resources are also available to develop the poorest countries and their populations.

Another major impact of green investment will be the growth of job markets. More than two million people in the advanced industrial nations today find work in renewable energy. Brazil's biofuels sector has been creating nearly a million jobs annually. Economists say that India, Nigeria and Venezuela, among many others, could do much the same. In Germany, environmental technology is expected to quadruple over the coming years, reaching 16% of manufacturing output by 2030 and employing more people than the auto industry. Mexico already employs 1.5 million people to plant and manage the nation's forests.

Any new era will have its own challenges, thus green investment has

its own set of challenges other than the global economic crisis. Any investment decision will prompt the investors to undertake a risk analysis of the project in question and of the investment conditions where the investment is being considered. When unabated or not compensated for, these risks present formidable barriers to the investment. Ultimately, investors do not look for a risk free environment, but rather an environment where risks can be understood, managed and anticipated.

The Role of the Public Sector

Public finance is critical to help unlock investments in green infrastructure. For example, the carbon credit (Certified Emission Reduction or CERs) market, which can be simply viewed as a proxy for the price of a tonne of carbon emissions, has tumbled over the last 8-10 months as a result of the Eurozone crisis. These facts and examples cause uncertainties and scepticism within the business and investment world. The future of the carbon market and its susceptibility to global economics underscores the uncertainty of CDM / CER projects.

Policy can play a crucial role to address investment risks and market barriers and create stronger enabling environments for business and industry to respond to opportunities and challenges presented by climate change, but there will remain a need for public finance and innovative financing mechanisms. However, the notion that "in today's crisis lies tomorrow's opportunity" is forecasted as an economic opportunity, measured in jobs and growth. This is also the reason that global companies like General Electric or Siemens are betting their future on green and this is the most appropriate footstep to be followed by government and industries in Malaysia and around the world.

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THE GREEN BUILDING INDEX

Greening the Construction Industry

Background

Ever since the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) entered into force in 2005, Malaysia in general and the local construction industry in particular have sought to enhance the sustainability of the domestic economy by the introduction of a range of eco-friendly initiatives. Given that internationally, the construction and running of buildings accounts for an extremely large percentage of greenhouse gas emissions (in 2009 – 40% of global energy use and one third of global greenhouse gas emissions)¹, much attention has been focused on the construction industry as a pathfinder to responsible long-term development. In Malaysia this has seen the rise of the increasingly popular ‘Green Building Index’, which was launched in May 2009.

About the GBI

The Green Building Index (GBI) is an environmental rating system jointly developed by Persatuan Arkitek Malaysia (PAM - Malaysian Institute of Architects) and the Association of Consulting Engineers Malaysia (ACEM). It is Malaysia’s first comprehensive rating system for evaluating the environmental design and performance of buildings, and was developed specifically for Malaysia’s tropical climate.² In a nutshell, its purpose is to assist the construction industry reach the goal of sustainable development. It is an important part of Malaysia’s stated commitment under COP 15 (Conference of Parties – annual follow-up meetings under the UNFCCC umbrella) held in Copenhagen, Denmark in 2009 to reduce greenhouse gas emissions by 40% from 2005 levels by 2020.³

Designed to be user-friendly for professionals within the industry, the index is managed by GreenbuildingIndex Sdn. Bhd., a wholly-owned subsidiary of PAM and ACEM which was incorporated in February 2009.⁴

The GBI is a rating matrix applicable either to individual buildings or entire

townships. The individual building GBI is based on six main criteria :

1. Energy efficiency
2. Indoor Environmental Quality
3. Sustainable Site Planning and Management
4. Materials & Resources
5. Water Efficiency
6. Innovation

These 6 criteria are then used to rate the following categories of buildings:

1. Non-residential new construction (with a sub-category for buildings described as ‘data centres’)
2. Residential new construction
3. Industrial new construction

4. Non-residential existing buildings
5. Industrial existing buildings

For townships, developments are rated via a different matrix of six criteria comprising Climate, Energy & Water; Environmental & Ecology; Community Planning & Design; Transportation & Connectivity; Building & Resources and finally Business & Innovation.⁵

Projects are categorised according to type and then scored based on additions of the marks for the 6 GBI criteria (each carrying a percentage weightage, with the six categories adding up to 100%, which each percent then translating into a ‘GBI point’). Buildings or townships are then rated accordingly:



GBI CLASSIFICATION	
POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

A total of 86+ points achieves a Platinum GBI rating; 76-85 achieves Gold; 66-75 achieves Silver whilst 50-65 is the minimum to be considered certified. (Note : the relative importance of the six criteria in the GBI rating matrix differs according to the category of the building being rated, but the total of the six criteria

¹Buildings and Climate Change, United Nations Environment Programme (UNEP DTIE), Paris, 2009

²Green Tax Initiatives for a sustainable Malaysia, PwC Alert Issue No. 86 October 2010

³Ibid

⁴Greenbuildingindex.org

⁵Ibid

always adds up to 100 points.)

Far from being a mere marketing and publicity ploy (as suggested by some detractors), the GBI rating system is supported by a range of tax incentives, whereby investments in energy saving capital expenditure enjoy a 100% tax rebate in addition to accelerated tax depreciation for assets classified as such, where applicable. Additional fiscal incentives tied to the GBI include the Stamp Duty (Exemption) Order 2009, which excludes property purchases made between 24 October 2009 and 31 December 2014 by first time buyers from Stamp duty if the property in question is GBI certified.

Rather than being a copy of the widespread penalty-based rating systems gaining ground in Europe (where approval of projects is often based on the ability to prove a low to zero carbon footprint), Malaysia's GBI is a voluntary, incentive-based system that manages to encourage development whilst at the same time safeguarding the environment by increasing the demand for eco-friendly products and procedures throughout every stage of the local industry's supply chain.

The GBI achieves this by targeting its 'score-card' across the six categories which represent the different value-added components of the construction industry's supply chain, avoiding the more simplistic (and easier) route of merely

targeting CO2 emissions via energy efficiency only. These categories are then broken down into sub-categories which allow for clear methods of compliance (for example, 'sustainable site planning and management' is further separated into areas such as 'Site Selection', 'Brownfield Redevelopment', 'Workers' Site Amenities' and the like so that stakeholders look at the entire process and economics of development in a more sustainable way. Some categories such as 'Water Efficiency' have recently been reflected in some local council guidelines (such as at Kuala Lumpur City Hall (DBKL), where rainwater harvesting is now mandatory in a wide range of building types).

Stages, Statistics and Mechanisms

The GBI also divides the certification process into three stages in order to engage as many stakeholders as possible:

1. **Application and registration** : typically done at the beginning of the project's life-cycle, with primary emphasis on the building developer / owner.
2. **Design assessment** : typically done when the project drawings are completed but before construction begins, with primary emphasis on the architect(s) and consultant

engineer(s). (Leading to the issue of a provisional GBI certificate)

3. **Completion and verification assessment** : typically done within 12 months following completion of the building, or when the building reaches 50% occupancy, whichever is earlier.⁶ (Leading to the issue of a full GBI certificate)

This 3-stage process ensures that all stakeholders are made aware of the project's requirements from as early as possible, with clear and achievable targets being set and commitments given (for example to purchasers buying residential units 'off-plan') to target a high degree of compliance to the Index's targets. In addition, GBI ratings awarded require re-assessment every three years to ensure long-term sustainability of structures, as well as to ensure that lack of maintenance and/or latent defects do not contribute to the degradation of otherwise promisingly designed buildings.

Any push towards sustainable development in an industry as diverse as construction in Malaysia (where there are over 60,000 contractors registered with the Construction Industry Development Board (CIDB)(although many of these are little more than shell companies) has to be a long-term agenda. As of September 2012, only 3 buildings are listed on the Greenbuildingindex.org website as

Continued on page 13



⁶Persatuan Arkitek Malaysia (PAM) data, 2012

Environmental Performance Evaluation Your Cleaner Production Tool

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How do you know whether your cleaner production practices are paying off – whether in economic terms (savings in \$) and/or in terms of impact on your surrounding environment?

Cleaner Production not only addresses environmental aspects of an organisation’s activities, products and services, but at the same time has to meet the ever-increasing expectations of stakeholders for continued profits and improved environmental performance. So how can the results be assessed?

Yes, a tool is needed to help measure and evaluate your environmental performance. One such tool is known as Environmental Performance Evaluation (EPE).

What is EPE?

EPE is an internal management process that provides information to facilitate management decisions regarding an organisation’s environmental performance. It actually goes together with any environmental management system.

In the ISO 14001 Environmental Management System, section 4.4.1 specifically calls for an organisation to record information to track its environmental performance. Thus ISO 14031 is the standard developed for the application of evaluating environmental performance.

How does EPE benefit an organisation?

An EPE programme will help a company to

- Better understand its impact on the environment
- Establish the baseline for benchmarking the company’s overall performance, not just environmental but also management and operational performances
- Identify opportunities for increased efficiency of energy and resource use
- Improve on proper allocation of resources
- Increase employee awareness
- Confirm regulatory compliance
- Provide information and data for sustainability reporting
- Improve relations with authorities, community, and customers

Indicators for EPE

As with the evaluation of any form of performance, the establishment of sets of criteria or indicators are necessary to obtain both qualitative and quantitative measurements. The tangible and intangible results will help the organisation to plan and decide on its management direction, strategies, programs and activities in line with the organisation’s policies.

For EPE there are two general categories of indicators: Environmental Performance Indicators (EPIs) and Environmental Condition Indicators (ECIs).

EPIs include two indicators

- management performance indicators (MPIs) such as policy; people; planning activities; practices; procedures; decisions; and actions at all levels of the organisation
- operation performance indicators (OPI) such as inputs(materials, energy and services); supply of inputs into ops; design, installation, operation and maintenance of the physical facilities and equipment of the organisation, outputs (products, services, wastes, emissions from operations); delivery of outputs from operations

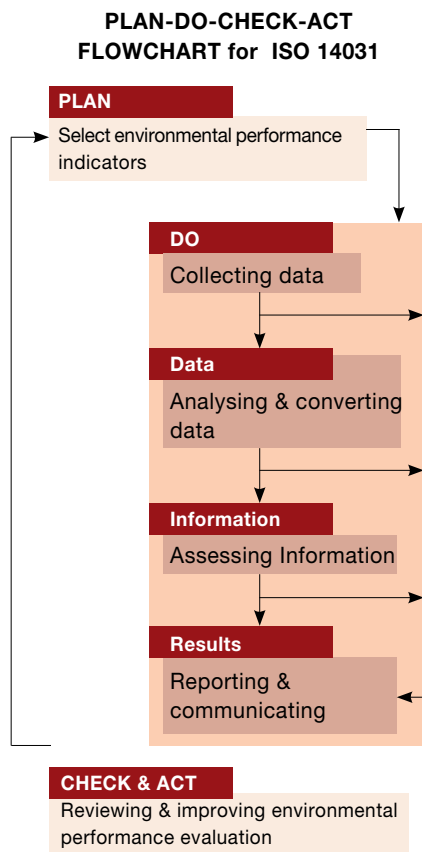
ECIs

They provide information on local regional, national or global condition of the environment. The minimum EPIs that an organisation could opt for (and among the easiest to maintain) would be the operation performance indicators since these can be easily measured at regular intervals by internal staff and/or outsourced to external contractors. Often some of these indicators may already be required to be submitted on a regular basis to regulatory agencies such as the Department of Environment. Examples of these could include exhaust air emissions, industrial effluents, hazardous wastes generated, raw materials used, and so on.

How to Conduct an EPE

Since EPE is a tool for monitoring performance, a description on how to conduct an EPE is provided under ISO 14031. The figure below illustrates the

process flow in the form of Plan-Do-Check-Action cycle, similar to any of the basic ISO management systems frameworks.



For EPE, the first step, i.e. ‘PLAN’, requires an organisation to first decide and choose appropriate environmental performance indicators. The organisation needs to list all possible indicators (the EPIs and ECIs) that it deems relevant, prioritise them, and then select those indicators that are most impactful on the organisation and the environment (including for regulatory requirements) and/or where data is obtainable - examples are air emission levels from the exhausts and/or industrial effluent discharges and/or energy consumption and/or raw materials usage.

When the decision is made, then arrangements can be made for data gathering at regular intervals (daily, weekly, monthly, quarterly and so on) or on ad-hoc basis, depending on the indicators



Measuring quality of air emissions from exhaust stack
(Source: Thantawan Industry Plc)



Sampling industrial wastewater
(Source: Greenpeace International)

selected. This is the start of the 'DO' stage. Typically, data gathering may be out-sourced, (e.g. stack monitoring for air emissions and industrial effluents monitoring – refer to pictures below) if an organisation has the funds. Otherwise it is possible to also conduct in-house data gathering, e.g. weighing/measuring volumes of wastes, recording energy consumption, etc. and other qualitative information.

Once the data has been obtained, the team responsible for the EPE needs to analyse the data, perhaps comparing against its own benchmark, or against the industry's benchmark and thereby assessing its performance accordingly – whether consistent/inconsistent, improved or deteriorated, and if so why. Of course the objective should be to remain consistently good or better. The data and related information and recommendations from the team is then reported to management to be communicated internally within the organisation,

or externally (to vendors, customers, authorities), or to both. Some companies incorporate selected data and information into annual environmental reports, or their annual sustainability reports.

Regardless of whether or not the data and information are released such data and information should still be reviewed by the management, most likely in conjunction with the annual review of an organisation's environmental management system. These are the CHECK & ACT stages of EPE. Decisions are made by management, most likely based on the recommendations of the EPE team, on the need for further improvements to the organisation's management and/or operations, or need for further data gathering, indicators, and so on. The decisions made would then be taken up in planning strategies for the next cycle.

In conclusion, the PDCA loop thereby will continue for the organisation's continuous improvement and for cleaner production.

From page 11

having obtained 'full' certification, with another 60+ developments attaining 'provisional certification, a reflection of the long lead time in construction being measured against an Index which was only introduced in 2009. However, as some of the provisionally certified developments come under the township criteria, the actual amount of 'certified floor space' has now breached the 26 million square foot mark, representing a huge leap forward in a comparatively short period of time.

Keen to ensure that the GBI becomes a permanent and influential part of the building industry scene in Malaysia, GreenbuildingIndex Sdn. Bhd. has ensured that the GBI's "Innovation Category" is specifically divided into 2 further sub-categories, namely "Innovation in Design and Environmental Design Initiatives" and "Green Building Index Accredited Facilitator".

The first of these sub-categories directly engages universities housing schools of the built environment and all those involved in providing continuing professional development programmes

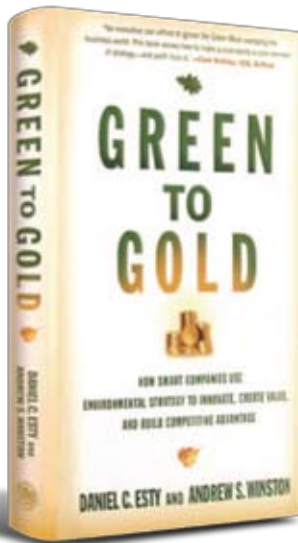
for professionals in the construction industry to train the existing and next generation of designers to understand and apply innovative techniques in all aspects of the buildings and building systems they design. PAM maintains fifteen different committees dealing with every aspect of the architectural profession in Malaysia, and via its Education Committee, is committed to preparing future architects, especially student/graduate members of PAM for professional practice, a role which increasingly requires knowledge of the GBI. For existing professionals within the industry, two income-generating formal roles exist under the GBI umbrella, both subject to undergoing GBI courses and passing examinations :

1. The "Green Building Index Accredited Facilitator" is a role that can be undertaken by qualified members of the construction industry to provide services (such as advice, guidance and consultancy) to enable building projects to achieve GBI accreditation.
2. GBI certifiers (who must be Professional Architects or Engineers

with seven years relevant working experience) perform the detailed assessment and accreditation of building projects submitted to the GBI accreditation panel for GBI certification. They have the final say in whether or not a submitted building gets certified, although a clear mechanism for appeal of decisions also exists.

Conclusion

Malaysia's Green Building Index is by no means a panacea that will transform overnight a huge industry saddled with at times conflicting economic, environmental and regulatory goals into a paragon of renewable and sustainable management. However, the ultimate goal of the GBI and global guidelines of a similar nature is to shrink the huge carbon footprint produced by buildings worldwide to match more closely the industry's reduced importance in most developed economies. Like any system, it is a work in progress, but one which is deserving of support, emulation and praise.



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Green to Gold

Bagaimana Syarikat Yang Bijak Menggunakan Strategi Alam Sekitar untuk Menginovasi, Membentuk Nilai, dan Membina Daya Saing

Daniel C. Esty and Andrew S. Winston, 2006
Yale University Press

Buku ini menjelaskan bagaimana peranan warga organisasi sesuatu syarikat untuk menghadapi dan menguruskan cabaran

alam sekitar yang melanda masyarakat dan perniagaan. Berdasarkan pengalaman penulis dan beratus-ratus temuramah bersama pemimpin-pemimpin korporat di seluruh dunia, penulis berjaya mengenalpasti bagaimana syarikat menghasilkan nilai perniagaan yang berpanjangan seperti mengurangkan kos, meminimakan risiko, meningkatkan keuntungan dan melahirkan jenama yang kukuh iaitu dengan mengintegrasikan pemikiran alam sekitar di dalam strategi perniagaan mereka.

Penulis juga memberikan panduan serta nasihat berpandukan contoh sebenar kejayaan syarikat Toyota dan IKEA yang berjaya menyeimbangkan perniagaan dan alam sekitar dan menunjukkan bagaimana syarikat-syarikat cutting-edge ini mewujudkan Eco-Advantage di pasaran global sebagai elemen tradisi serta keunikan yang membolehkan mereka berdaya saing dengan syarikat lain. Buku ini bukan sahaja memaparkan strategi-strategi ke arah kejayaan tetapi juga menerangkan mengapa kadangkala inisiatif alam sekitar gagal walaupun mempunyai best intentions.

Eksekutif dan pemimpin syarikat akan didedahkan kepada dunia baru yang kompleks yang berhadapan dengan kemerosotan sumber, peraturan alam sekitar yang ketat dan tekanan yang besar daripada pengguna dan pihak berkepentingan ke arah kelestarian.

Eco-Advantage

Lee Scott, CEO Wal-Mart sebuah syarikat terbesar dan ternama di dunia menyatakan bahawa ciri-ciri kepimpinan abad ke-21 ialah komitmen untuk meningkatkan prestasi alam sekitar. Wal-Mart bertekad untuk mengurangkan penggunaan tenaga sebanyak 30%, bermatlamat untuk menggunakan 100% tenaga boleh diperbaharui (dari sumber seperti kincir angin dan panel solar) serta melipatgandakan kecekapan bahan api di dalam sektor perkapalannya. Syarikat ini akan membelanjakan sebanyak USD500 juta setahun bagi program tenaga ini. Mengapa syarikat yang dikenali dengan hanya mementingkan keuntungan ini bercakap mengenai alam sekitar pada masa ini? Jawapannya kerana mereka perlu mematuhi keperluan alam sekitar yang semakin mendesak bagi memastikan kesinambungan perniagaan mereka. Ini kerana industri tidak dapat mengelak dari menghadapi fenomena baru Green Wave yang wujud serta menjadi daya saing di antara industri yang lain.

Buku ini menyenaraikan 10 masalah alam sekitar utama yang dihadapi oleh masyarakat global:

- Perubahan iklim
- Penggunaan tenaga yang tidak cekap
- Akses terhad kepada air (Limited access to water)
- Kemerosotan biodiversiti
- Bahan kimia dan logam berat
- Pencemaran udara
- Pengurusan sisa pepejal dan berbahaya
- Penipisan lapisan ozon
- Pengurusan sumber lautan yang tidak lestari
- Deforestation

Mengapa inisiatif alam sekitar gagal?

- Seeing the Trees But Not the Forest – syarikat sepatutnya mengkaji terlebih dahulu environmental footprint atau jejak alam sekitar dan produk mereka dengan mendalam sebelum menjana sesuatu inisiatif alam sekitar
- Tidak memahami pasaran – Produk Eko menjanjikan penguasaan pasaran tetapi proses untuk memilih sama ada inisiatif hijau memberi nilai kepada perniagaan haruslah sama bagi produk baru yang lain.
- Menjangka harga premium - Green premiums adalah sukar untuk dilonjakkan. Jangan hanya memandang ciri-ciri alam sekitar yang ada pada produk.
- Tidak memahami pengguna – Berwaspada kerana inisiatif alam sekitar bergantung kepada kelakuan pengguna. Kadangkala, sekiranya perubahan tidak menjimatkan masa dan wang, mereka tidak akan mengendahkan kepentingan memelihara alam sekitar.
- Silo Thinking – 'Sekiranya pencemaran adalah kanser kepada alam sekitar, rawatan kimoterapi adalah penawarnya'. Konsep ini adalah bercanggah dengan pencegahan pencemaran. Design for the Environment (DfE) ialah umpama berhenti merokok dan mengamalkan diet seimbang dan merupakan penawar bagi masalah alam sekitar

Ramai yang tergolong di dalam sektor perniagaan berpendapat badan korporat memainkan peranan besar dalam menyelesaikan masalah alam sekitar dunia. Perniagaan merupakan mekanisma yang paling berkuasa untuk membentuk masyarakat yang mesra alam dan menyediakan produk dan perkhidmatan hijau. Badan korporat boleh menjadi contoh yang baik dalam meningkatkan keuntungan syarikat di samping memelihara alam sekitar dengan mempunyai pemikiran yang benar dan strategi yang berkesan. Akhir sekali, Eco-Advantage adalah cara baru seseorang yang berinspirasi – eksekutif, pengurus dan pekerja sokongan untuk membina syarikat dan industri yang bukan sahaja inovatif tetapi juga berkuasa dan hebat serta mempunyai nilai-nilai alam sekitar yang baik.

Program Bantuan Khidmat Nasihat

Pengeluaran Bersih (CP) Kepada Industri Kecil Dan Sederhana (IKS)

Program Bantuan Khidmat Nasihat Pengeluaran Bersih atau Cleaner Production Advisory Assistance Program adalah salah satu program Jabatan Alam Sekitar di bawah Rancangan Malaysia Kesepuluh (RMK10). Dimulakan pada tahun 2009, program ini dilaksanakan dengan kerjasama perunding dari Pusat Penyelidikan Tenaga Diperbaharui, SIRIM Malaysia Berhad.

Program ini adalah salah satu pendekatan pihak Kerajaan dalam usaha



mendapatkan komitmen IKS bagi mencegah dan mengawal pencemaran alam sekitar di samping pematuhan terhadap Akta Kualiti Alam Sekeliling (AKAS) 1974. Justeru itu, bagi menarik minat pihak IKS terhadap program ini bantuan khidmat nasihat yang diberikan adalah percuma. Program ini diharap dapat meningkatkan pengetahuan semua pihak berkepentingan tentang konsep Pengeluaran Bersih yang sangat penting dalam pembangunan ekonomi negara dan persekitaran lestari.

Objektif program ini adalah merentasi pelbagai sektor seperti proses dan teknologi, alam sekitar, keselamatan dan kesihatan. Secara khususnya, ia meliputi:

- Peningkatan pelaksanaan amalan Pengeluaran Bersih di dalam aktiviti IKS.
- Peningkatan produktiviti dan pengurangan kos operasi.
- Pengurangan penggunaan tenaga dan sumber bahan mentah.
- Pengurangan penghasilan sisa buangan.
- Mengatasi/Pengurangan risiko pencemaran alam sekitar.
- Pengurangan kesan karbon.
- Menangani isu perubahan iklim dan pemanasan global.

Melalui pelaksanaan dan amalan Pengeluaran Bersih di dalam premis, pihak IKS akan memperoleh faedah-faedah berikut:

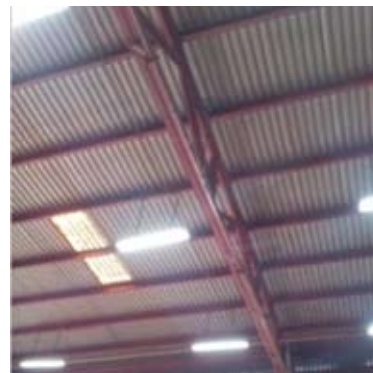
- Meningkatkan daya pengeluaran syarikat.
- Meningkatkan ekonomi dan pendapatan syarikat.
- Meningkatkan imej syarikat.
- Melahirkan IKS yang berdaya saing.
- Menghasilkan produk yang lebih berkualiti dan selamat.
- Mengurangkan risiko kemalangan di tempat kerja.

Sehingga tahun 2012, lebih daripada 150 buah premis IKS telah diberi Bantuan Khidmat Nasihat Pengeluaran Bersih dan dari jumlah tersebut 30 buah premis dipilih untuk Bantuan Khidmat Nasihat Pengeluaran Bersih Secara Terperinci. Pada masa hadapan program ini dicadangkan untuk dikembangkan kepada semua sektor industri.

Premis IKS Yang Telah Diberi Bantuan Khidmat Nasihat Terperinci Pengeluaran Bersih Bagi Tahun 2009/2010

Bil	Premis
1	Azhar Food Manufacturing Sdn. Bhd.
2	F&B Nutrition Sdn. Bhd.
3	Fairy Food Industries Sdn. Bhd.
4	Hlrb Processing Sdn. Bhd.
5	Jeng Yuan Reclaimed Rubber Sdn. Bhd.
6	Kampar Food Industry
7	Keropok Mat Husin
8	Kilang Membuat Mee Hock Sin Sdn. Bhd.
9	Kitapanel Wood Product Sdn. Bhd.
10	Laksamana Usaha Noodle Products Sdn. Bhd.
11	Lee Fah Mee Sdn. Bhd.
12	Pertima Trengganu Sdn. Bhd.
13	Perusahaan Saudee Sdn. Bhd.
14	Scf Food Industries Sdn. Bhd.
15	Syarikat Heera Enterprise

Langkah penjimatan sumber air, elektrik dan bahan serta pengurangan sisa buangan akan dikenal pasti melalui penjaanaan opsyen.





Aktiviti Semasa Cleaner Production



Seminar “Ke Arah Pembuatan Batik Yang Mesra Alam

20 September 2012; 115 peserta

Unit Industri Hijau, Jabatan Alam Sekitar Putrajaya dengan kerjasama Unit Perundingan Universiti Malaya (UPUM) telah Berjaya menganjurkan seminar inisiatif Industri Hijau bagi Industri Batik Malaysia yang bertemakan “Ke Arah Pembuatan Batik Yang Mesra Alam” Seminar ini telah dirasmikan oleh YBhg. Dr. Zulkifli Abdul Rahman, Timbalan Ketua Pengarah, (Operasi) Jabatan Alam Sekitar Malaysia. Para peserta terdiri daripada pengusaha batik, Pihak Berkuasa Tempatan, agensi Kerajaan, ahli akademik dan NGOs dari seluruh Malaysia.

Seminar ini telah diadakan dengan tujuan untuk mencapai objektif berikut;

- Meningkatkan kesedaran semua stakeholders dalam Industri Batik terutama pengusaha batik di kalangan Industri Kecil & Sederhana (IKS) mengenai pelaksanaan inisiatif hijau di premis berkenaan;
- Memberi panduan dan pendekatan mengenai konsep Cleaner Production / Cleaner Technology sebagai preventive tool atau strategi dalam pengurusan alam sekitar; dan
- Membantu industri batik menjadi perusahaan mesra alam sekitar dan berdaya saing.

Sebanyak lima kertas kerja telah dibentangkan di dalam seminar ini seperti berikut:

1. Senario Semasa Industri Batik di Malaysia & Sasaran Industri Batik ke arah Industri Hijau;
2. Peranan Stakeholders Ke Arah Industri Batik Yang Mesra Alam dan Berdaya Saing Secara Global;
3. Pelaksanaan Opsyen-Opsyen CP di Premis Batik dan Hasil Pulangan;
4. Pengenal kepada Projek Integrasi CP
5. Pelaksanaan Sistem Rawatan Air Sisa Industri Batik.

Unit Industri Hijau juga telah merancang mengadakan Seminar Bil 2/2012 pada 16 Oktober 2012 bertempat di Kota Bharu Kelantan khusus kepada pengusaha batik yang terletak di pantai timur terdiri dari pada negeri Kelantan, Terengganu dan Pahang.

Pada awal tahun 2012, Unit Industri Hijau telah merangka program tambahan untuk pegawai JAS yang sedang mengikuti Program Kompetensi Audit Pengeluaran Bersih bagi meningkatkan lagi pengetahuan yang khusus dalam bidang Pengeluaran Bersih. Bengkel yang dinamakan Bengkel Suplimen ini turut menggunakan khidmat tenaga pakar dalam bidang Pengeluaran Bersih daripada syarikat swasta sebagai penceramah. Bengkel Suplimen berikut telah dijalankan sepanjang tahun 2012. Dengan adanya bengkel suplimen ini, para peserta diharap akan dapat meningkatkan pengetahuan dan berkeupayaan untuk menjalankan program audit dengan lebih sistematik dan berkesan di lapangan.

Bengkel Imbangan Jisim dan Asas Imbangan Tenaga

11-12 Julai, 2012, Kajang: 31 peserta

Objektif bengkel adalah seperti berikut: (1) memberi pendedahan berkaitan penggunaan teknik-teknik imbangan bagi membuat anggaran dan mengkuantifikasi entiti-entiti lazim yang diaudit di premis secara sistematik; (2) menambah dan meningkatkan pengetahuan bagi kemahiran untuk menjalankan imbangan jisim, pengiraan mengenai aliran masuk, aliran keluar, penjanaaan dan kehilangan bahan-bahan bagi sesuatu proses yang diaudit; dan (3) pengetahuan dan berkebolehan untuk mengira dan menganggarkan penggunaan dan kehilangan tenaga bagi sesuatu proses yang di audit.

Kandungan Pengisian

Topik 1	Asas kepada Unit-Unit Jisim
Topik 2	Asas Kepada Unit-Unit Tenaga
Topik 3	Teknik-Teknik Penukaran Unit dan Analisa Dimensi
Topik 4	Asas Gambarajah Blik
Topik 5	Teknik Imbangan Jisim Mudah
Topik 6	Teknik Imbangan Jisim Mengikut Komponen Tanpa Tindakbalas Kimia
Topik 7	Teknik Imbangan Jisim Mengikut Komponen Dengan Tindakbalas Kimia
Topik 8	Teknik Imbangan Tenaga Mudah
Topik 9	Penggunaan dan Aplikasi Imbangan Jisim dan Tenaga Secara Kombinasi

Bengkel Tips Pengeluaran Bersih

5-6 September 2012, Seremban: 33 peserta

Objektif bengkel adalah seperti berikut: (1) memberi kemahiran untuk menjana opsyen-opsyen yang berkaitan secara komprehensif dan sistematik; (2) menggunakan pendekatan yang sistematik untuk menjana opsyen-opsyen mudah pengeluaran bersih; dan (3) menggunakan beberapa CP Tool untuk melaksanakan konsep Pengeluaran Bersih.

Kandungan Pengisian

Topik 1	Cara Penggunaan buku “CP Tips for Small and Medium Industries” terbitan Unit Industri Hijau, Jabatan Alam Sekitar Malaysia
Topik 2	Keperluan Penjanaaan Opsyen-Opsyen CP
Topik 3	Kategori-Kategori Opsyen CP
Topik 4	Kaedah-Kaedah Penilaian Opsyen CP
Topik 5	Fokus Penjanaaan Opsyen CP
Topik 6	Kaedah Pelaksanaan Opsyen CP
Topik 7	Prinsip-prinsip Penjanaaan CP

Bengkel Kemahiran Penilaian Opsyen Pengeluaran Bersih

10-11 Oktober 2012, Petaling Jaya: 33 peserta

Objektif bengkel adalah seperti berikut: (1) untuk menilai dan membuat pengutamaan (ranking) bagi opsyen-opsyen yang dijana; (2) membantu untuk menilai opsyen-opsyen berdasarkan kriteria-kriteria yang ditetapkan; dan (3) membantu kaedah-kaedah pengiraan pulangan pelaburan, cara-cara mengenalpasti impak dan kaedah penganggaran sumbangan terhadap carbon footprint dengan teknik yang betul.

Kandungan Pengisian

Topik 1	Pengkelasan Opsyen-Opsyen
Topik 2	Pengenal Kepada Analisa Ekonomi
Topik 3	Penanda Aras (Benchmarking)
Topik 4	Konsep Carbon Footprint
Topik 5	Pengiraan Carbon Footprint
Topik 6	Faktor-faktor yang mempengaruhi kebolehlaksanaan
Topik 7	Cara-Cara Menggunakan Borang Penilaian Opsyen CP

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