PROGRAM KHIDMAT NASIHAT PENGELUARAN BERSIH KEPADA PKS KE ARAH INDUSTRI HIJAU

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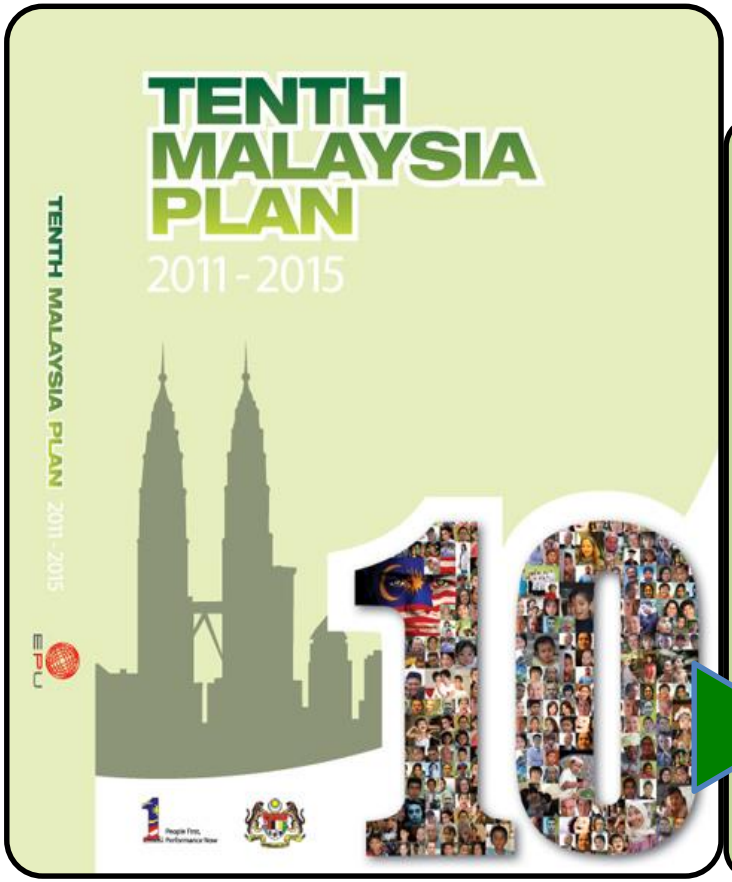
UNIT INDUSTRI HIJAU

JABATAN ALAM SEKITAR MALAYSIA

Pengenalan



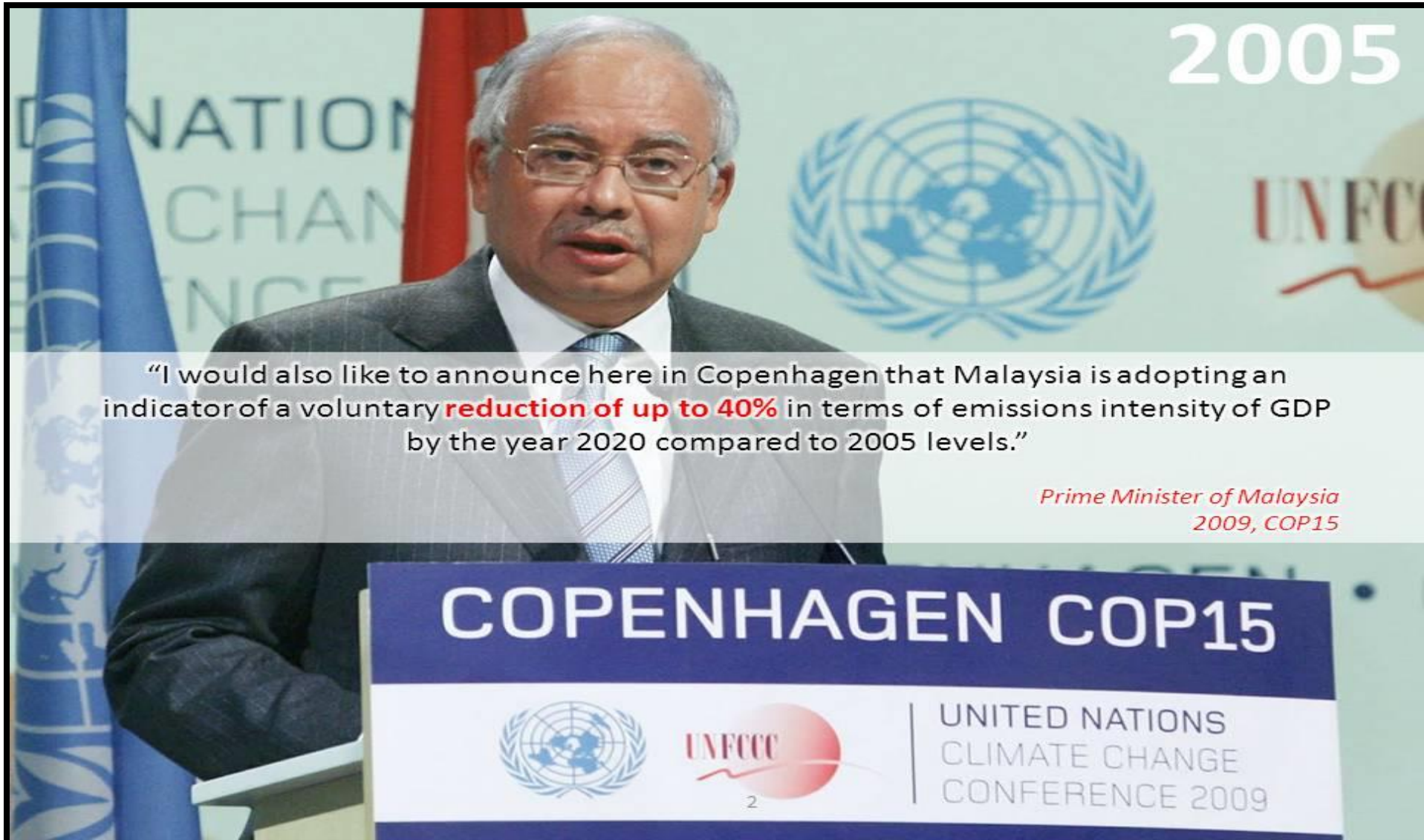
PROJEK PEMBANGUNAN JAS

Meningkatkan keupayaan Perusahaan Kecil dan Sederhana (IKS) dalam pengawalan dan pencegahan pencemaran

PENGELUARAN BERSIH (CP)

Program Latihan Pengeluaran Bersih kepada PKS

Adakah kita serius?



Bagaimana Pencapaian kita?

Malaysia sudah pun mengurangkan intensiti pelepasan karbon dioksida bagi KDNK sehingga lebih 33 peratus dan berada pada landasan yang baik untuk mencapai sasaran 40 peratus menjelang 2020.

PERDANA Menteri, Datuk Seri Najib Razak menyampaikan ucapan pada Persidangan Perubahan Iklim 2014 di ibu pejabat Pertubuhan Bangsa Bersatu (PBB) di New York, Amerika Syarikat, 24 September 2014

INDUSTRI HIJAU

"Pembangunan dan **pengeluaran industri** yang **tidak menyumbang kepada *kemerosotan alam sekitar*** atau **tidak menyebabkan *kesan buruk kepada kesihatan manusia" (UNIDO)***

MATLAMAT

Mengintegrasikan pertimbangan alam sekitar, iklim dan sosial dalam operasi perindustrian.

STRATEGI

Aplikasi berterusan strategi pencegahan alam sekitar bersepadu kepada proses, produk dan perkhidmatan yang bertujuan untuk meningkatkan kecekapan dan mengurangkan risiko kepada manusia dan alam sekitar

Ciri-ciri Industri Hijau

- Penghasilan input-input yang lestari
- Penggunaan bahan mentah asli yang minima
- Proses pengeluaran yang menggunakan air, tenaga (elektrik/manusia) dan bahan buangan yang minima
- Proses pengeluaran yang bebas dari bahan berbahaya
- Guna dan kitar semula sisa pepejal

- Pengurangan ketara dalam pelepasan gas rumah hijau dan efluen yang kurang mengandungi bahan pencemar
- Penghasilan produk-produk yang tahan lama dan lasak

Faedah Industri Hijau

- Mengurangkan kos bahan mentah dan kos modal
- Jaminan bekalan bahan berterusan
- Mengurangkan kos dan risiko pencemaran

- Meningkatkan kerjasama dan kepuasan pekerja
- Meningkatkan imej dan reputasi syarikat

- Meningkatkan daya saing syarikat diperingkat global

Apa itu Pengeluaran Bersih(CP)?

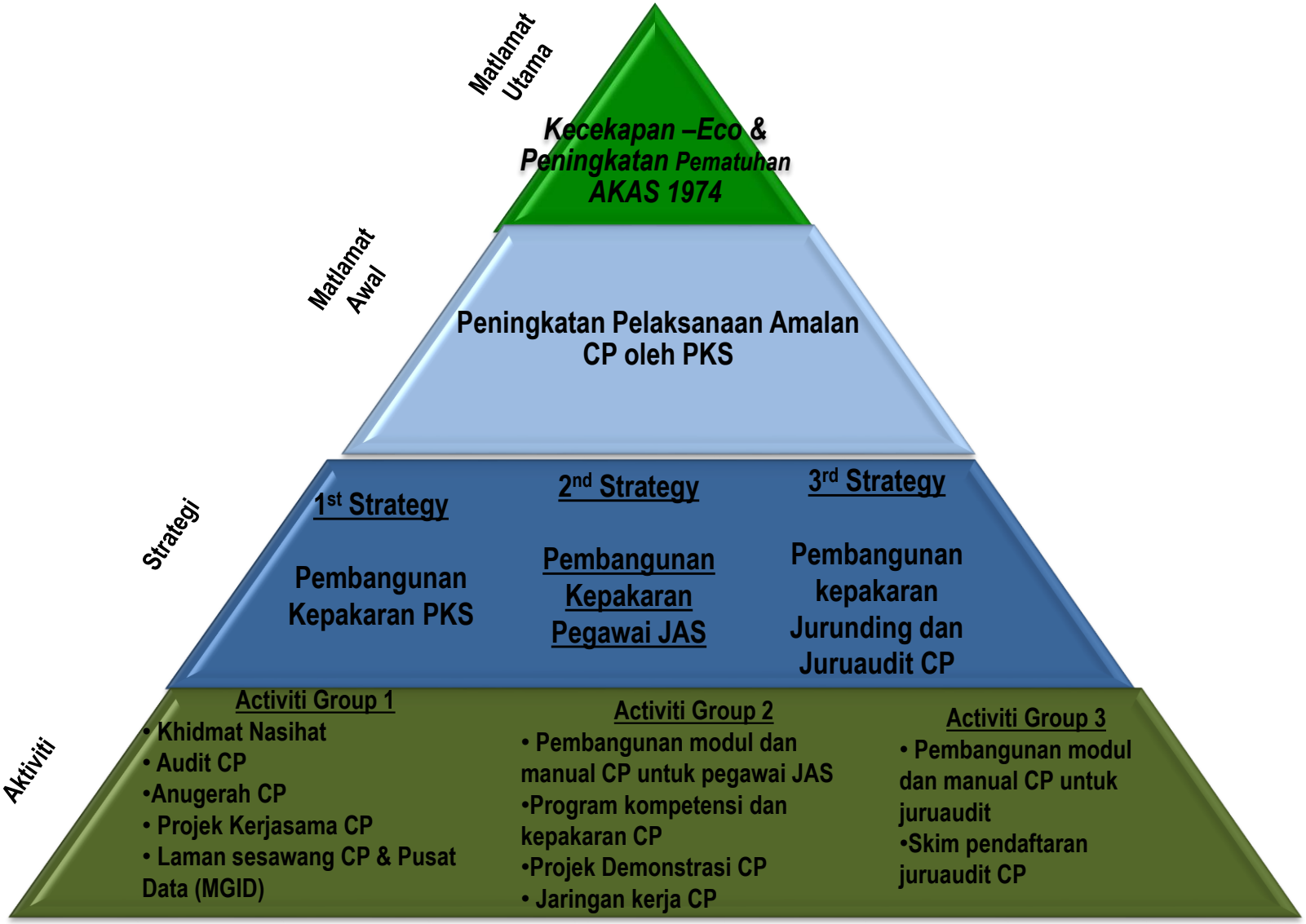
- **UNEP 1991: "CP adalah aplikasi berterusan strategi pencegahan bersepadu untuk proses, produk dan perkhidmatan dalam usaha meningkatkan kecekapan-eko dan mengurangkan risiko kepada manusia dan alam sekitar"**

- **Matlamat CP adalah untuk mencegah pencemaran, pengurangan penggunaan tenaga, air dan bahan serta mengurangkan penjanaan sisa tanpa menjejaskan kapasiti pengeluaran serta menjana keuntungan syarikat.**

Pengeluaran Bersih (Cleaner Production)

Merupakan salah satu inisiatif yang boleh dijalankan oleh Industri (di dalam proses, produk dan perkhidmatan) untuk mencapai status Industri Hijau *(Green Industry)*

Plan Perancangan Program Pengeluaran Bersih JAS



Kenapa Pengeluaran Bersih?

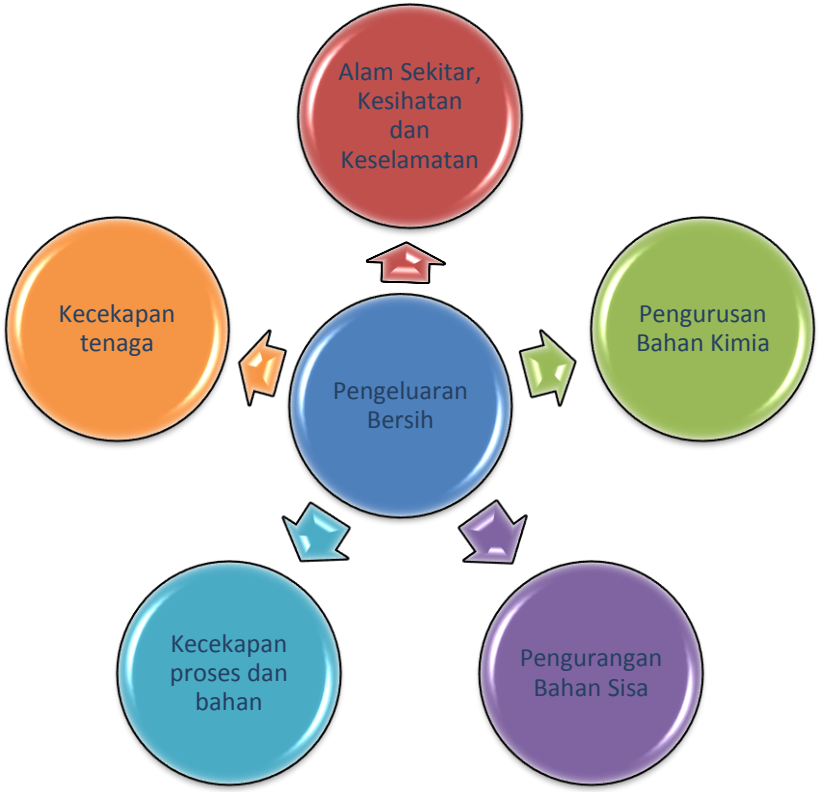
- Pengistiharan Antarabangsa bagi Pengeluaran Bersih telah diterima pakai pada seminar "*Fifth International High-Level Seminar on Cleaner Production, Korea, 1998*" dengan lebih **350 tandatangan.**

- Lebih daripada **100 Pusat Pengeluaran Bersih** telah ditubuhkan diseluruh dunia dan wujudnya rakaian kerja yang beroperasi di **40 buah negara**.

- Diseluruh dunia lebih daripada **1000 projek demonstrasi Pengeluaran bersih** telah di bangunkan sebagai rujukan.

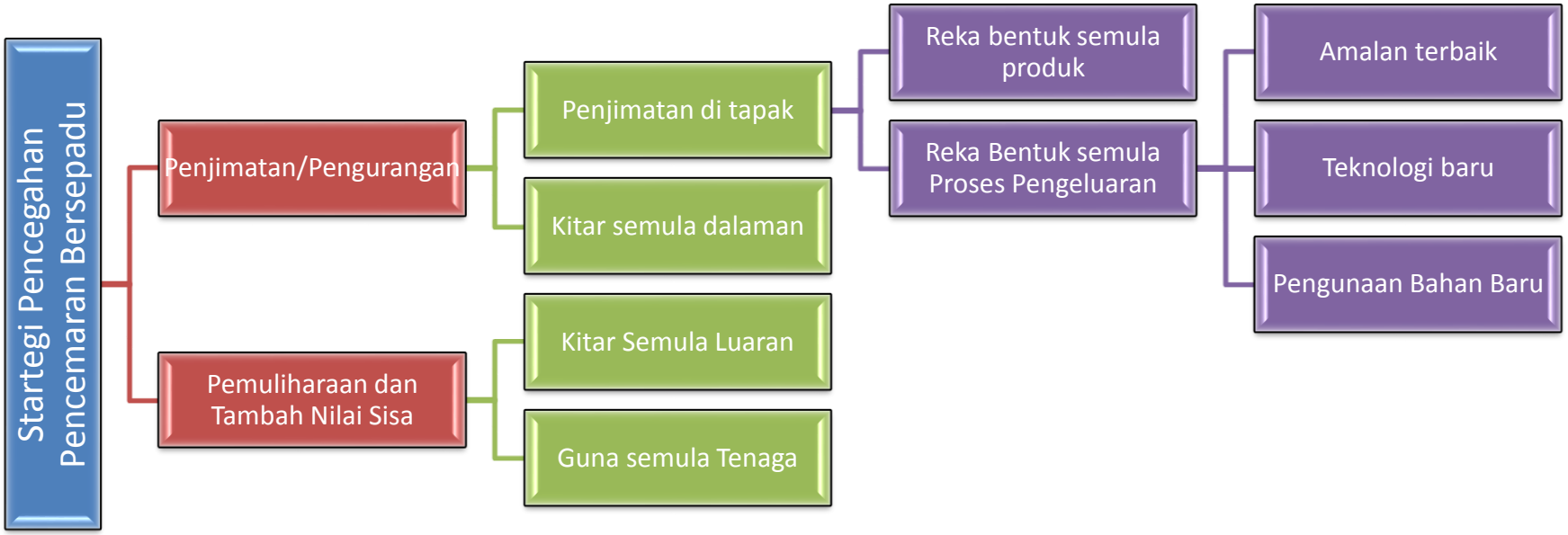
(*sumber Sustainable Consumption and Cleaner Production-Global Status, UNEP*)

Kenapa Pengeluaran Bersih



Pengeluaran Bersih adalah berdasarkan kepada strategi menang-menang (**'win-win' strategy**). Disamping melindungi **alam sekitar**, **pengguna dan pekerja** ia juga **meningkatkan kecekapan proses** pengeluaran, **keuntungan dan daya saing** syarikat.

Strategi pengeluaran Bersih



Bagaimana menjana keuntungan dari CP

Pengeluaran bersih tidak merencatkan pembangunan tetapi menekankan kepentingan **pembangunan yang lestari** bukan sahaja untuk **alam sekitar** tetapi juga **ekonomi**.

Program Latihan dan khidmat Nasihat Pengeluran Bersih

PERINGKAT	KAEDAH	MATLAMAT
Penilaian	•Perjumpaan dan mesyuarat dengan pihak atasan syarikat. •Penerangan konsep CP •Lawatan tapak/premis •Pemeriksaan ringkas (Walkthrough) •Pengumpulan data	•Membentuk hubungan kerjasama pihak swasta dan awam •Pengenalan program CP •Mendapatkan komittmen pihak atasan syarikat • Membentuk pasukan CP •Mengetengahkan istilah dan konsep CP •Memahami keperluan PKS •Mengenalpasti peluang pelaksanaan CP
Khidmat Nasihat CP dan Pelaksanaan	•Komunikasi atas talian •Mesyuarat dan perbincangan •Lawatan tapak/premis •Penerangan lanjut dan latihan “hands-on” •Tunjuk ajar dan nasihat	•Pembentangan hasil penilaian dan cadangan opsyen CP •Pemilihan opsyen CP •Khidmat nasihat pelaksanaan opsyen CP
Penilaian akhir dan penyerahan sijil	•Lawatan tapak •Mesyuarat dan perbincangan •Khidmat nasihat	•Mengenal pasti halagan pelaksanaan opsyen CP •Khidmat nasihat lanju jika perlu •Penutup

Faedah Program CP

PKS

- Menjimatkan kos pengeluaran
- Meningkatkan produktivit
- Membuka peluang perniagaan hijau
- Menigkatkan daya saing syarikat
- Meningkatkan pematuhan Peraturan Alam Sekitar
- Penganugerahan sijil penyertaan

Pengguna

- Peningkatkan kesihatan dan keselamatan
- Mendapat produk/perkhidmatan yang selamat dan lebih baik
- Peluang pekerjaan

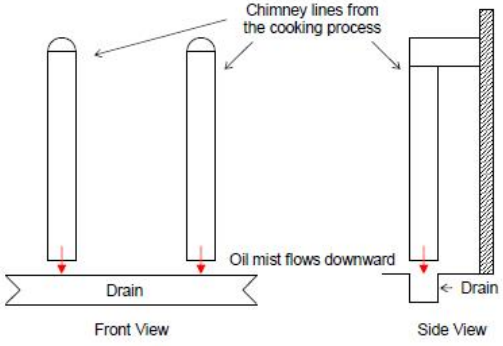
Alam Sekitar

- Peningkatan kualiti alam sekitar yang berterusan
- Penggunaan bahan mentah secara mampan
- Menangani isu pemanasan global

Contoh Opsyen CP:
Peningkatan Kualiti Alam Sekitar

Existing System

Cooking Area
Arrows show the smoke hood



Sketch Diagram of the chimney outside of the factory

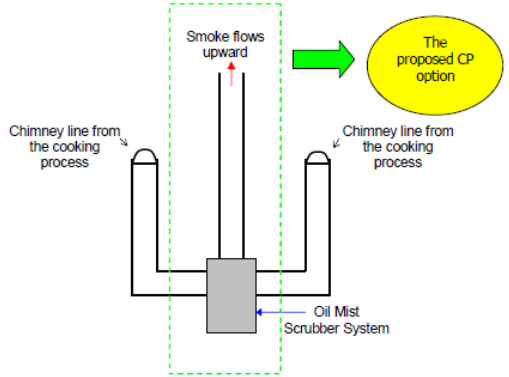
Suggestion:

Option 1

To avoid the accumulation of oil contents in the effluent, it is recommended to switch the position of the chimney by reinstalling it from facing downward to the upward. The height of the chimney should be in accordance with the Department of Environment's (DOE) requirements. The company should get the relevant advice from DOE on all the conditions required for installing the smoke chimney.

Since oil mist is heavier than the air, the smoke emit from the chimney must be treated by installing a pollution control device to minimize or to eliminate the amount of oil mist. The company can consider installing an oil mist scrubber system along the chimney lines to trap and to collect the oil before emitting to the surrounding. The proposed system is shown as below diagram.

Proposed System



Contoh Opsyen CP:
Peningkatan Kualiti Alam Sekitar

Option 2

It is recommended to install an oil trap collector at the smoke hood which acts as the pre-screening process before flowing through the oil mist scrubber system and finally to the surrounding. The benefits of installing the oil trap collector are as follow:

a) Reduce the amount of oil mist to the scrubber system
b) Less maintenance will be required for the scrubber system
c) Increase the life span of the scrubber system

Photo below shows the location of the proposed oil trap collector.

Contoh Opsyen CP:
Peningkatan kecekapan proses

v) **To attach aluminium plates surrounding the deep fryers to avoid oil spillage to the floor**

Observation/findings:

Cooking process is the main process which consumes a lot of cooking oil. It was observed that some amount of the cooking oil droplets was flowing through the side surface of the deep fryer. It then spilled into the floor which will be cleaned up with soap and water at the end of the daily operation. This current practice will increase the amount of oil contents in the effluent.

CP option
Install an aluminium plate surrounding the Deep Fryer

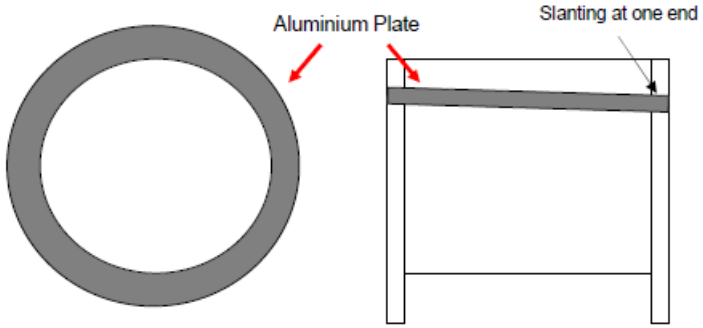
Suggestion:

The company should consider installing an aluminium plate surrounding the side surface of each deep fryer to control the oil spillage to the floor. It is suggested to install the plate at the upper part of the deep fryer's side surface with one end a bit slanting for easy maintenance and collection of the oil droplets.

The benefits of introducing this simple option are as below:

a) Reduce oil content to the drainage system
b) Less maintenance of the deep fryers
c) Avoid slippery floor at the working area

Diagram below shows the sketch of the proposed option.



Aerial and Side views of the proposed aluminium plate surrounding the side surface of the deep fryer

Contoh Opsyen CP:
Peningkatan kecekapan proses

Manual method for egg shell peeling process

Suggestion(s):

It is recommended for the company to invest in using an automatic egg shell peeling machine for the process. There will be a few direct and indirect benefits to the company if using the machine to replace the manual operation. Some of the benefits are as follow:

a) Increase in Numbers of eggs processed daily.
b) Increase in workers productivity.
c) Easily cope with the demand during production peak season.
d) Beneficial for future business expansion.

Examples of the automatic egg peeling machines are shown below.

Contoh opsyen CP:
Peningkatan kecekapan proses

Assume after introducing the new machine which needs only one (1) manpower to handle it,

No. of worker = 1 staff

Total expenses = (RM800/month) x (12 months/year)

= **RM9,600/year** **(b)**

Total Savings = (a) – (b)

= (RM38,400 – RM9,600)/year

= RM28,800/year

<u>Investment Cost</u>

Assume cost of new machine,

Machine Cost = RM80,000

Pay back period = (RM80,000) / (RM28,800)

= 2.7 years

Contoh Opsyen CP: Penjimatan tenaga

To install Inverter control or Variable speed Drives (VSD) at chiller motor

Findings and Observations:

The electricity consumption at was tabulated below. consumed 502,620 kWh per month and their maximum demand is around 1254.5kW. The company was consumed high energy and it reflect to the utilities cost. With the uncertainty on energy scenario the utility cost seems to be increase rapidly. The management should seriously look into potentially in minimize or reduce their electricity cost in their factory by doing proper maintenance on the machinery or electrical equipment or implement energy saving devices.

Month	Power Consumption			
	Peak (kWh)	Off Peak (kWh)	Total (kWh)	MD (kW)
Dec 08	322,460	136,530	458,990	1,170
Jan 09	334,720	138,090	472,810	1,190
Feb 09	338,720	134,950	473,670	1,200
Mar 09	355,010	146,640	501,650	1,280
Apr 09	359,050	147,730	506,780	1,250
May 09	384,400	157,500	541,900	1,310
June 09	374,890	152,450	527,340	1,270
July 09	387,870	149,510	537,380	1,260
Aug 09	365,820	147,600	513,420	1,280
Sept 09	327,930	140,490	468,420	1,310
Oct 09	381,480	144,980	526,460	1,280
	Average		502,620	1254.6

Table 1.0: Electricity consumption bill

The team suggests installing inverter control system for the chiller as it is expected to reduce the electricity consumption up to 30%. However, detail study needs to carry out to ensure the percentage of reduction on electricity consumption because it depends on the load. If by installing inverter into the system it can save 5% in electricity consumption from the total bill, the company can save RM7, 500 per month or RM90, 000 per year. Assuming costs of installing inverter are RM40, 000, the payback period of the option is 6 month.

Based on the operation at Chiller section is a main section that using high electricity consumption. The section that has been using chillers is aero freezer operate during operation hour and cold room operate 24 hours. Currently the aero freezer consumed 27,061.6kWh per day and Cold room consumed 11,675.1kWh per day. Below are the pattern or electricity profiles for both of the cooling section.

Case Study – Textile (India)

CLEANER PRODUCTION OPTIONS IDENTIFIED (1)

CP technique used :

> Good House Keeping

> Operational Practices

> Process Optimization

> Raw Material Substitution

> New Technology

> New Product Design

> Onsite Recycle & Reuse

> Equipment Modification

Case Study – Textile (India)

RESULTS OF THE CP OPTION IMPLEMENTATION

Investment	204.000 US$
Net annual savings	196.300 US$
Payback period	11 months
Reduction in GHG emissions	1300 Tons per year

Case Study - Pulp and Paper (India)

RESULTS OF THE CP OPTION IMPLEMENTATION

Investment	10,32 million US$
Net annual savings	4 million US$
Payback period	2,15 years
Results	- Reduction in AOX emissions. - Improved brightness quality

Contoh Kejayaan Program CP

Fuyang Chemical, China

ID#	Description	CP Measures	Objective	Cost Category
1	Air emissions from mother liquor tanks	Collect air emissions; direct to wet scrubber	• Reduce air emissions • Improve occupational health • Recover ammonia	Low
2	Air emission from bagging operation	Ventilation, air collection and scrubbing of air at wet scrubber	• Reduce air emissions • Improve occupational health • Recover ammonia	Low
3	Scrubbing liquor from ammonia scrubber	Recovery and recycling at new CP equipment	• Prevent discharge to sewer and to atmosphere • Recover ammonia	(see item 6)
4	Bleed from integrative tower	Recovery and recycling at new CP equipment	• Prevent discharge to sewer and atmosphere • Recover ammonia	(see item 6)
5	Tail gas from CO/CO, trace removal	Recycling at other process unit	• Reduce air emission of NH_3 • Recover ammonia	(see item 6)
6	Bleed from isobaric absorber	New CP equipment for the concentration, recovery and reuse of ammonia from items 3, 4, 6 and 9	• Prevent discharge to sewer • Reduce losses of ammonia to atmosphere via cooling tower • Recover ammonia • Reduce raw material • Generate revenue	Medium
7	Supernatant from sulphur wastes at gas de-sulphurisation area	New equipment for recovering sulphur, extracting and recycling diluted ammonia	• Convert sulphur wastes into saleable products • Reduce losses of ammonia to the air • Prevent discharge of ammonia to the sewer	Medium
8	Ammonia condensate from the collection of contaminated air in bagging area	Manual collection of condensate before it reaches sewers, return to recovery	• Prevent discharge to the sewer • Recover and reuse ammonia	Zero
9	Excess dilute ammonia solution from CO/CO_2 trace removal	Recovery and reuse at new CP equipment	• Reduce discharge to servers and to air • Recover ammonia	(see item 6)
10	Recovery and reuse of spent lube oil	Collect waste lube oils in the plant and implement new equipment for purifying waste oils	• reduce discharge of waste oils to sewers • reduce purchasing of fresh oil	Medium

No and low cost ammonia measures (initiated late 1997)

Reduction in losses of ammonia	1,400 tonnes/year
Recovery of hydrogen in equivalent NH_3	1,400 tonnes/year
Net revenues generated	1.8 million RMB*/year
Increase in production	+3% per year

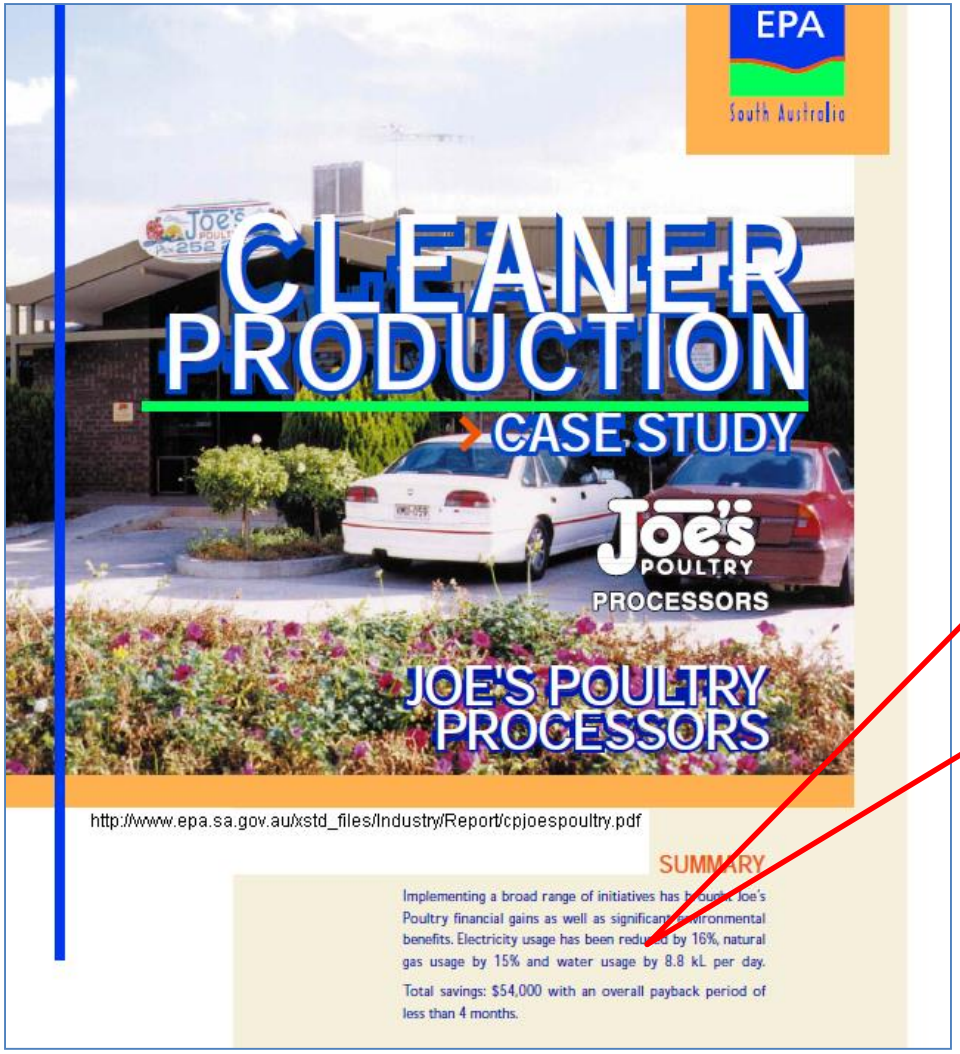
Medium cost measures (initiated late 1999)

Ammonia Recovery Unit	
Ammonia recovered	4,400 tonnes/year
Reduction in water consumption	8,400 tonnes/year
Money saved (net)	3.1 million RMB*/year
Sulphur Recovery Unit	
Ammonia recovery	270 tonnes/year
Sulphur recovered	550 tonnes/year
Reduction in water consumption	29,000 tonnes/year
Money saved (net)	0.34 million RMB*/year
Oil Recovery Unit	
Oil recovered	120 tonnes/year
Money saved	0.20 million RMB*/year
Cost of "medium cost" measures	approximately 1.666 million RMB* for three CP solutions
Time to recover cost:	less than 1 year

* RMB = Renminbi = 0.18 Canadian dollars

Contoh kejayaan program CP

JOE'S Poultry, Australia



Reduced:
1.Electricity =16%,
2.Natural Gas =15% 3.
Water = 88000 liter/day.

Total saving $54,000
payback period
4 month

Bagaimana?

Anda berminat untuk menyertai Program Khidmat Nasihat CP JAS?

Sila Hubungi Kami

http://cp.doe.gov.my/givc/

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Sekian

Terima kasih