

# **Environmental Sustainability Report for Palm Oil Industries** **(Department of Environment (DOE) Perspective)**

## **1.0 Introduction**

Palm oil industry is one of the main industries in Malaysia. Malaysia currently accounts for 39% of world palm oil production and 44% of world exports. In 2017, there were about 5.81 million hectares of palm oil plantations throughout Malaysia. Currently, there are 461 palm oil mills and 50 palm oil refineries in Malaysia. Figure 1 below shows the breakdown of the palm oil mills by states and the production capacity. Palm oil industry products are being used in various applications such as food and dairy products, skincare and haircare products as well as pharmaceuticals products.

Palm oil industry is also a highly regulated and well-managed industry in terms of environmental aspects with the objective of achieving sustainability of palm oil production and use in its entire supply chain. The Malaysian Sustainable Palm Oil (MSPO) Certification Scheme is the national scheme in Malaysia for oil palm plantations, independent and organised smallholdings, and palm oil processing facilities to be certified against the requirements of the MSPO Standards. The MSPO Standards have been developed by committees facilitated by the Malaysian Palm Oil Board (MPOB).

This environmental sustainability report for palm oil industries covers all of the legal requirement, programmes and initiatives under the Department of Environment (DOE) jurisdiction which envisions achieving the highest standards of sustainability of palm oil in Malaysia. This is essential in order to protect one of the most important national resources.

Under the DOE's jurisdiction, palm oil industry in Malaysia is subjected to the environmental compliance through Environmental Quality Act (EQA) 1974 except for Sabah and Sarawak where the environmental compliance for palm oil industry are governed by the the state agencies which are Sabah Environment Protection Department and Natural Resources and Environment Board (NREB) of Sarawak.

DOE had introduced the elements of competent person in handling the pollution control equipment in palm oil mills in order to uplift the technical capabilities of the operators as well as facilitating environmental compliance in palm oil industry.

Plus, DOE had been appointed by the Ministry as the coordinator for the prevention of peatfires to mitigate local haze to ensure the sustainability of palm oil industry which are the Fire Prevention and Peatland Management Programme and to coordinate in the preparation of the greenhouse gas (GHG) emissions report for waste sector. In addition, the development of waste to energy (WtE) facility in palm oil industry is subjected to the submission of Environmental Impact Assessment (EIA) to DOE.

Table 1: Breakdown of palm oil mills by states and the production capacity.

No.	States	No. of Palm Oil Mills	Production Capacity	
			< 40 MT FFB/hr	> 40 MT FFB/hr
1.	JOHOR	64	9	55
2.	KEDAH	6	1	5
3.	KELANTAN	11	3	8
4.	MELAKA	3	1	2
5.	NEGERI SEMBILAN	16	3	13
6.	PAHANG	71	15	56
7.	PULAU PINANG	2	1	1
8.	PERAK	48	13	35
9.	SELANGOR	17	8	9
10.	TERENGGANU	13	2	11
11.	SABAH	130	14	116
12.	SARAWAK	80	3	77
<b>Total</b>		<b>461</b>	<b>73</b>	<b>388</b>

## **2.0 Palm Oil Industries Environmental Compliance Requirement Under Environmental Quality Act (EQA) 1974**

There are several regulations under EQA 1974 in which related to palm oil industries. There are two types of palm oil industries, which are subjected to EQA 1974; the development requirement of palm oil plantations and the environmental compliance from palm oil mills. The regulations under the EQA 1974 which are related to palm oil industries are listed as below :-

1. Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015;
2. Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order 1977;
3. Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977;
4. Environmental Quality (Prescribed Activities) (Open Burning) Order 2003;
5. Environmental Quality (Scheduled Wastes) Regulations 2005; and
6. Environmental Quality (Clean Air) Regulations 2014

### ***2.1 Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015***

The objective of this Order is to ensure that the land development options is under consideration environmentally sound and sustainable and that environmental consequences are recognized and taken into account early in the project design.

The Order depicts that any land development schemes of other agricultural states into palm oil plantation covering an area of 200 hectares and above are subjected to the submission of Preliminary Environmental Impact Assessment (EIA) Report under Schedule 1, Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 to the DOE.

Plus, the development of waste to energy (WtE) facility in palm oil industry is also subjected to the submission of Environmental Impact Assessment (EIA) to DOE under the provision of this Order.

Penalty : Fine of maximum RM 500,000 or imprisonment not exceeding 5 years or both and additional fine of RM1,000 per day if the project development continues without the approval of EIA report.

From the year of 2015 until now, there are 5 approved EIA report on palm oil plantation development activity with area ranging from 350 to 950 hectares.

## **2.2 Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order 1977**

The objective of this Order is to ensure that all palm oil mills are subjected to be licensed by DOE.

Penalty : Fine of maximum RM 25,000 or imprisonment not exceeding 2 years or both and additional fine of RM1,000 per day if that the offence is continued after a notice by the Director General had been issued.

Currently, there are 461 prescribed premises for palm oil mills in Malaysia.

## **2.3 Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977**

The objective of this Regulation is to ensure that the palm oil mills effluent are in compliance with the specified limit values and standards. This Regulation is crucial in preventing environmental issues that arise from the quality of palm oil mill effluent.

The specified limits for palm oil mill effluent parameters are depicted as below :

i. Limits for palm oil mill effluent parameters to be discharged into a watercourse:

<b>Parameters</b>	<b>Limit</b>
BOD	100 mg/l
Suspended Solids	400 mg/l
Oil and Grease	50 mg/l
Ammoniacal Nitrogen	150 mg/l
Total Nitrogen	200 mg/l
pH	5.0 – 9.0
Temperature	45 °C

ii. Limits for palm oil mill effluent parameters to be discharged onto land :

<b>Parameters</b>	<b>Limit</b>
BOD	5,000 mg/l

Penalty : Fine of maximum RM 25,000 or imprisonment not exceeding 2 years or both and additional fine of RM1,000 per day if that the offence is continued after a notice by the Director General had been issued (non-compliance with license condition).

Currently, DOE had taken the initiative in reviewing the standard and limit values of the palm oil mill effluent in order to suit current technologies and practices to further protect the sustainability of the industry.

#### **2.4 *Environmental Quality (Prescribed Activities) (Open Burning) Order 2003***

The objective of this Order is to ban any open burning to be done on peatsoil. This is crucial in order to prevent the occurrence of local haze due to peatland fire.

Penalty : Compounded offences of maximum RM 2,000 per offence

#### **2.5 *Environmental Quality (Scheduled Wastes) Regulations 2005***

The objective of this Regulation is to ensure that the scheduled waste management which include processing, storage and disposal of the scheduled wastes in palm oil mill is being done properly. It is crucial to prevent the environmental hazards that could arise from the scheduled wastes.

Penalty : Compounded offences of maximum RM 2,000 per offence

#### **2.6 *Environmental Quality (Clean Air) Regulations 2014***

The objective of this Regulation is to ensure that the air emissions from the palm oil mills equipment are in compliance with the specified limit values and standards. This Regulation is crucial in ensuring that the air emission from those equipment does not pose any threat to the environment quality.

There are several specified limit values and technical standards for palm oil mills equipment which are depicted as below :-

i. Opacity limit :

- Not darker than shade No. 1 Ringelmann Chart
- Not greater than 20% opacity (transmissometer)
- Premise emitting more than 2.5kg/hour dust or potentially emitting smoke darker than No. 2 Ringelmann Chart shall install and operate transmissometer (averaging time : 1 minute)

ii. Control of fuel quality for fuel burning equipment and incinerators

Fuel type	Fuel	Fuel quality parameter
Liquid	All	Sulphur content < 500 ppm (per weight)
Solid	Coal	Sulphur content < 1% (per weight)
	Biomass	Wood, agricultural waste, etc.: air dry and in its natural composition (e.g. wood without coating, paint or other treatment)
		Residues from wood-based industries: without wood preservatives

iii. Combustion emissions from fuel burning equipment and incinerators

Fuel type	Pollutant	Limit value	Monitoring
Liquid	Total particulate matter (PM) Where dust load emitted : a) > 0.33 < 1.0 kg/h b) ≥ 1.0 kg/h	50 mg/m <sup>3</sup>	Once/year 2 times/year
Solid	Total particulate matter (PM) Where dust load emitted : a) > 0.44 < 1.0 kg/h b) ≥ 1.0 < 1.5 kg/h c) ≥ 1.5 < 2.0 kg/h d) ≥ 2.0 < 2.5 kg/h e) ≥ 2.5 kg/h	150 mg/m <sup>3</sup>	Once/year 2 times/year 3 times/year 4 times/year Continuous*
	Carbon monoxide (CO)	1000 mg/m <sup>3</sup>	Periodic

iv. Heat and power generation : A1. Boilers

*O<sub>2</sub> reference content 6% solid and 3% for others*

Fuel Type	Pollutant	Capacity	Limit Value	Monitoring
Gaseous Fuels	Sum of NO and NO <sub>2</sub> expressed as NO <sub>2</sub>	> 10 MW	350 mg/m <sup>3</sup>	Continuous
	Carbon Monoxide (CO)	> 10 MW	50 mg/m <sup>3</sup>	Continuous
	Total PM	> 10 MW	5 mg/m <sup>3</sup>	Periodic

v. A2. Combustion Turbines

*O<sub>2</sub> reference content 15%*

<b>Fuel Type</b>	<b>Pollutant</b>	<b>Capacity</b>	<b>Limit Value</b>	<b>Monitoring</b>
Gaseous Fuels	Sum of NO and NO <sub>2</sub> expressed as NO <sub>2</sub>	> 10 MW	150 mg/m <sup>3</sup>	Continuous
	Carbon Monoxide (CO)	> 10 MW	100 mg/m <sup>3</sup>	Continuous

vi. A3. Generator Sets for Combined Heat & Power Production with a Total Thermal Output ≥ 3 MW

*O<sub>2</sub> reference content 5%*

<b>Fuel Type</b>	<b>Pollutant</b>	<b>Capacity</b>	<b>Limit Value</b>	<b>Monitoring</b>
Liquid or Gaseous Fuels	Sum of NO and NO <sub>2</sub> expressed as NO <sub>2</sub>	≥ 3 MW	600 mg/m <sup>3</sup>	Periodic
	Carbon Monoxide (CO)	≥ 3 MW	650 mg/m <sup>3</sup>	Periodic
	Total PM	≥ 3 MW	80 mg/m <sup>3</sup>	Periodic

## K. Waste Incinerator in all sizes

*O<sub>2</sub> reference content 11%*

<b>Pollutant</b>	<b>Limit value</b>	<b>Monitoring</b>
Total PM	100 mg/m <sup>3</sup>	Continuous*
NMVOG as total organic carbon	10 mg/m <sup>3</sup>	Continuous*
Hydrogen chloride (HCl)	40 mg/m <sup>3</sup>	Continuous*
Hydrogen fluoride (HF)	1 mg/m <sup>3</sup>	Continuous*
Sum of SO <sub>2</sub> and SO <sub>3</sub> , expressed as SO <sub>2</sub>	50 mg/m <sup>3</sup>	Continuous*
Sum of NO and NO <sub>2</sub> expressed as NO <sub>2</sub>	200 mg/m <sup>3</sup>	Continuous*
Carbon monoxide (CO)	50 mg/m <sup>3</sup>	Continuous*
Cadmium and its compounds, expressed as cadmium (Cd)	Total	Periodic
Thallium and its compounds, expressed as thallium (Tl)	0.05 mg/m <sup>3</sup>	Periodic
Mercury and its compounds, expressed as mercury (Hg)	0.05 mg/m <sup>3</sup>	Periodic
Antimony (Sb), Arsenic (As), Lead (Pb), Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni), Vanadium (V), and their compounds expressed as the element	Total 0.5 mg/m <sup>3</sup>	Periodic
PCDD/PCDF	0.1 ng TEQ/m <sup>3</sup>	Periodic

Penalty : Fine of maximum RM 100,000 or imprisonment not exceeding 2 years or both.

**DATA ON EQA 1974 COMPLIANCE STATUS FOR PALM OIL MILLS (EFFLUENT, CLEAN AIR, SCHEDULED WASTES) BY STATES (FROM 1<sup>st</sup> January – 31<sup>st</sup> May 2018)**

Table 1: EQA 1974 Compliance Status for palm oil mill effluent by States (From 1<sup>st</sup> January – 31<sup>st</sup> May 2018)

No.	State	No. of Palm Oil Mill	No. of Investigation	No. of Compliance	Non Compliance	Effluent Compliance (%)
1	JOHOR	64	211	186	24	89%
2	KEDAH	6	11	11	0	100%
3	KELANTAN	11	18	18	0	100%
4	MELAKA	3	4	4	0	100%
5	NEGERI SEMBILAN	16	26	25	1	96%
6	PAHANG	71	165	159	4	98%
7	PULAU PINANG	2	0	0	0	0%
8	PERAK	47	43	38	5	88%
9	PERLIS	0	0	0	0	0%
10	SELANGOR	17	6	6	0	100%
11	TERENGGANU	13	13	12	1	92%
12	SABAH	131	86	82	3	96%
13	SARAWAK	80	106	94	11	90%
14	WPKL	0	0	0	0	0%
15	W.P LABUAN	0	0	0	0	0%
16	W.P PUTRAJAYA	0	0	0	0	0%
Total		461	689	635	49	
Average Compliance %						<b>93%</b>

Table 2: EQA 1974 Compliance Status for clean air emission by States (From 1<sup>st</sup> January – 31<sup>st</sup> May 2018)

No.	State	No. of Palm Oil Mill	No. of Investigation	No. of Compliance	Non Compliance	Clean Air Compliance (%)
1	JOHOR	64	211	181	30	86%
2	KEDAH	6	11	11	0	100%
3	KELANTAN	11	18	18	0	100%
4	MELAKA	3	4	4	0	100%
5	NEGERI SEMBILAN	16	26	25	1	96%
6	PAHANG	71	165	152	12	93%
7	PULAU PINANG	2	0	0	0	0%
8	PERAK	47	43	38	5	88%
9	PERLIS	0	0	0	0	0%
10	SELANGOR	17	6	6	0	100%
11	TERENGGANU	13	13	13	0	100%
12	SABAH	131	86	83	3	97%
13	SARAWAK	80	106	95	11	90%
14	WPKL	0	0	0	0	0%
15	W.P LABUAN	0	0	0	0	0%
16	W.P PUTRAJAYA	0	0	0	0	0%
Total		461	689	626	62	
Average Compliance %						<b>91%</b>

Table 3: EQA 1974 Compliance Status for scheduled wastes management by States (From 1<sup>st</sup> January – 31<sup>st</sup> May 2018)

No.	State	No. of Palm Oil Mill	No. of Investigation	No. of Compliance	Non Compliance	Scheduled Wastes Management Compliance (%)
1	JOHOR	64	211	193	18	91%
2	KEDAH	6	11	11	0	100%
3	KELANTAN	11	18	18	0	100%
4	MELAKA	3	4	4	0	100%
5	NEGERI SEMBILAN	16	26	25	1	96%
6	PAHANG	71	165	161	4	98%
7	PULAU PINANG	2	0	0	0	0%
8	PERAK	47	43	42	1	98%
9	PERLIS	0	0	0	0	0%
10	SELANGOR	17	6	6	0	100%
11	TERENGGANU	13	13	13	0	100%
12	SABAH	131	86	84	2	98%
13	SARAWAK	80	106	95	11	90%
14	WPKL	0	0	0	0	0%
15	W.P LABUAN	0	0	0	0	0%
16	W.P PUTRAJAYA	0	0	0	0	0%
Total		461	689	652	37	
Average Compliance %						<b>95%</b>

### **3.0 Competent Person in Palm Oil Mills**

Another requirement under the EQA 1974 for palm oil mill to operate is that there should be competent person handling the pollution control equipment to be on duty at all times. This requirement is essential in ensuring that the person handling the pollution control equipment has the technical capabilities and understanding in operating the equipment. This requirement would also helps to facilitate the industry in achieving full compliance to the DOE requirements.

The competency required by DOE from palm oil mill operators is the :-

- Certified Environmental Professional in the Treatment of Palm Oil Mill Effluent (CePPOME)
  - The main purpose of the training course is to introduce the participants with the concept and practice of performance monitoring as a means to monitor and control effluent treatment process efficiency and to ensure that the treatment system is operating optimally and in compliance with the environmental regulations
  - Currently, there are 713 people who attended the CePPOME course with 80 people acquired the full competency certification

The competent person also helps to ensure that the palm oil mills to implement the environmental mainstreaming tools (EMT) at the premises. The EMT covers 7 elements which involve environmental policy (EP), environmental budgeting (EB), environmental monitoring committee (EMC), environmental facility (EF), environmental competency (EC), environmental reporting and communication (ERC) and environmental transparency (ET). This would help to institutionalise the environmental aspects in the operations of the premises on daily basis. Currently, there are 129 palm oil mills that practice all of the seven (7) EMTs at their premises.

#### **4.0 Fire Prevention and Peatland Management Programme**

Peatlands burning occur when they are indiscriminately drained due to human activity such as logging or for agricultural purposes. A highly drained peatland lowers ground water level and lets surface water drain away. Due to the high organic content of peatland, any peatlands burning would require huge resources (i.e financial, time, manpower) for the fire to be put out.

Thus, the Fire Prevention and Peatland Management Programme had been initiated in 2009 and continued under the Tenth Malaysia Plan (10MP). The objective of this programme is to prevent, monitor and mitigate peatland fires that could contribute to local haze pollution.

DOE had been appointed as the lead agency to coordinate the implementation of this programme. The main priority of this programme is to dampen the peatland and to provide water source for fire fighting purposes during the peatland fire. This programme includes the building of infrastructures which is handled by different expert agencies such as :-

i. Check Dam

The objective of check dam is to prevent excess peat water discharge and sustain water level in peatland.

The building of check dam is under the purview of Department of Irrigation and Drainage (JPS).

ii. Tube Well

The objective of tube well is to provide alternative water resource to increase the peat humidity and to put out peatfires. Tube well also helps to reduce the resources required to put out the peatfires as it reduces the time required to put out the peatfires from 7 days to 2 days.

The building of tube well is under the purview of Department of Mineral and Geoscience (JMG).

iii. Watch Tower

The objective of watch tower is to provide a platform to monitor peatfires outbreak and act as an early detection of peatfires.

The building of watch tower is under the purview of Forestry Department Peninsular Malaysia (JPSPM).

Currently, there are a total of 314 check dams, 85 tube wells and 5 watch towers in Malaysia. The programme has contributed positive outcome with the reduction number of peatfires throughout the countries and strengthen the collaboration between the relevant agencies in mitigating local land and forest fire, and haze

**Number of Infrastructures Built Under the Fire Prevention and Peatland Management Programme**

STATES	NUMBER OF CHECK DAMS										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Johor	49	0	5	0	0	23	0	0	3	0	80
Pahang	9	9	2	12	5	12	8	6	7	13	83
Sarawak	0	14	2	3	4	7	4	2	1	0	37
Selangor	2	1	2	0	3	15	0	0	0	0	23
Kelantan	0	0	4	0	9	0	10	0	5	7	35
Sabah	0	3	0	1	0	1	0	0	5	2	12
Terengganu	0	0	0	0	0	10	10	7	9	8	44
<b>TOTAL</b>	<b>60</b>	<b>27</b>	<b>15</b>	<b>16</b>	<b>21</b>	<b>68</b>	<b>32</b>	<b>15</b>	<b>30</b>	<b>30</b>	<b>314</b>

STATES	NUMBER OF TUBE WELL										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Johor	-	2	-	2	2	4	1	1	1	1	14
Pahang	2	2	2	2	2	2	1	-	1	1	15
Sarawak	-	5	1	3	1	-	2	2	1	-	15
Selangor	2	-	-	2	-	3	2	-	2	2	13
Kelantan	-	2	-	1	2	2	1	2	1	2	13
Sabah	-	2	-	1	2	-	2	-	2	-	9
Terengganu	-	-	-	-	-	-	-	2	2	2	6
<b>TOTAL</b>	<b>4</b>	<b>13</b>	<b>3</b>	<b>11</b>	<b>9</b>	<b>11</b>	<b>9</b>	<b>7</b>	<b>10</b>	<b>8</b>	<b>85</b>

STATES	NUMBER OF WATCH TOWER										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Pahang	1	-	-	-	-	-	-	-	-	-	1
Sarawak	-	1	-	-	-	-	-	-	-	-	1
Selangor	1	-	-	-	-	-	-	-	1	-	2
Sabah	-	-	-	-	-	-	1	-	-	-	1
<b>TOTAL</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>5</b>

## 5.0 Greenhouse Gas (GHG) Emissions From Palm Oil Industry (Waste Sector)

Greenhouse gas (GHG) emissions from palm oil industry arise from the palm oil plantation and the palm oil mills. The GHG emissions are calculated and documented in the national GHG inventory.

The national focal point of the GHG inventory development is the Environmental Management and Climate Change Division (BPASPI) under the Ministry. There are five (5) sectors which are covered under the GHG emissions inventory that include Energy sector, Industrial Processes sector, Land Use, Land-Use Change and Forestry (LULUCF) sector, Agriculture sector and Waste sector.

DOE had been appointed as the lead agency to coordinate the development of GHG inventory from Waste sector. Based on the preparation of Third National Communication (TNC) to the UNFCCC, the emission from wastewater handling in palm oil industries in Waste sector in 2014 is 628.55 Gg CH<sub>4</sub> which is equivalent to 15,713.75 Gg CO<sub>2eq</sub>. Figure 2 below shows the net methane emission from palm oil mills for the time-series (1990-2014).

Below is the amount of net methane emissions from palm oil mill by year based on the preparation of TNC :-

**Table 4: Net Methane Emissions from Palm Oil Mill by Year (1990 to 2014)**

Year	POME Methane Emission (Gg CH <sub>4</sub> )	POME Methane recovery (Gg CH <sub>4</sub> )	Net Methane Emission (Gg CH <sub>4</sub> )	Net Methane Emission (GgCO <sub>2eq</sub> )
1990	221.67		221.67	5,541.75
1991	223.37		223.37	5,584.25
1992	231.81		231.81	5,795.25
1993	269.27		269.27	6,731.75
1994	262.62		262.62	6,565.50
1995	284.08		284.08	7,102.00
1996	305.01		305.01	7,625.25
1997	329.84		329.84	8,246.00
1998	302.60		302.60	7,565.00
1999	383.86		383.86	9,596.50
2000	394.34		394.34	9,858.50
2001	429.32		429.32	10,733.00
2002	433.16		433.16	10,829.00

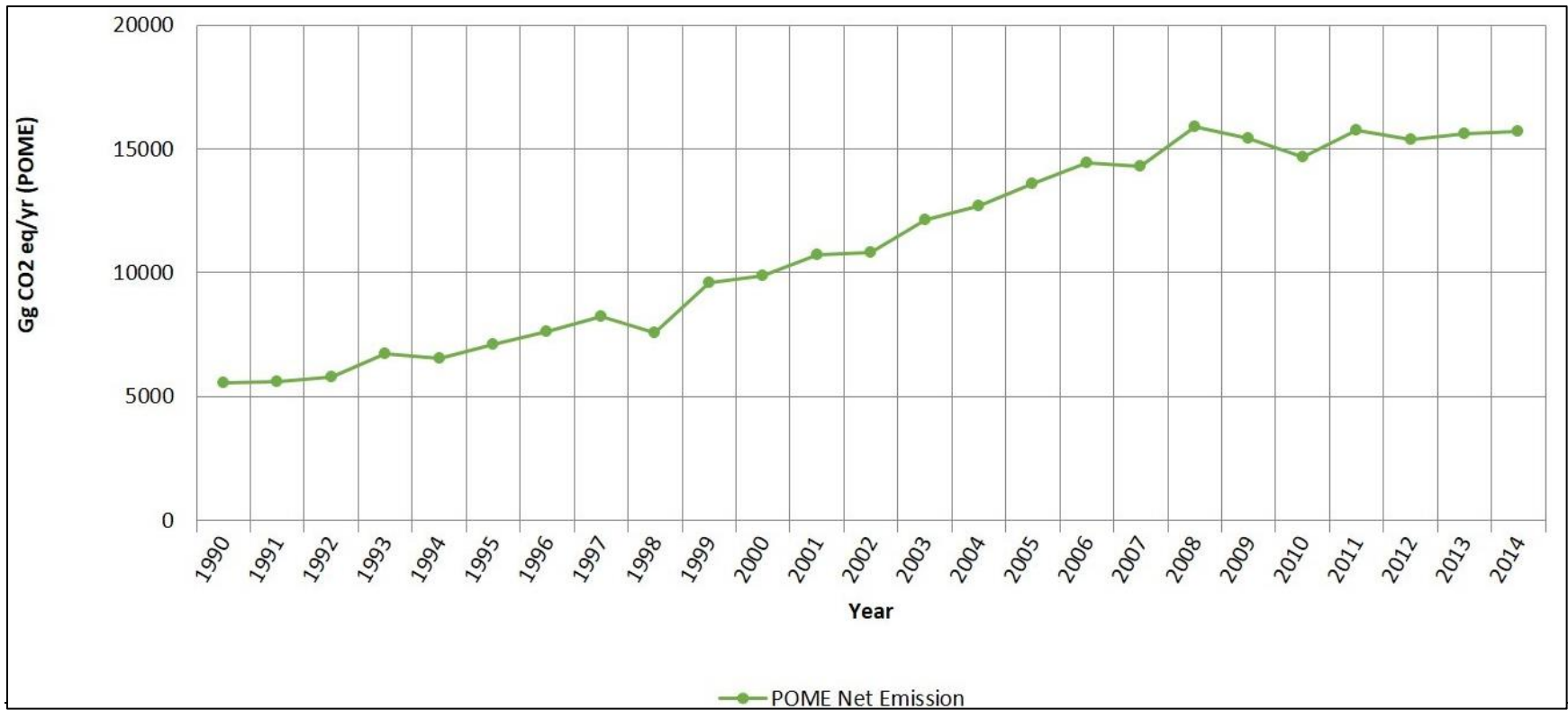
2003	485.73		485.73	12,143.00
2004	508.33		508.33	12,708.00
2005	544.17		544.17	13,604.00
2006	577.60		577.60	14,440.00
2007	575.53	3.20	572.33	14,308.00
2008	645.02	9.51	635.51	15,888.00
2009	638.86	21.04	617.82	15,446.00
2010	618.08	31.05	587.03	14,676.00
2011	687.88	58.54	629.34	15,734.00
2012	683.24	68.08	615.16	15,379.00
2013	698.93	74.88	624.05	15,601.00
2014	715.31	86.76	628.55	15,713.75

## 6.0 Conclusion

In conclusion, there are several activities, programmes and initiatives that had been taken by the Department of Environment (DOE) in order to achieve sustainability in palm oil industries in Malaysia.

These initiatives include the legal requirement by palm oil industry under the Environmental Quality Act (EQA) 1974, the introduction of the element of competency for the operators in palm oil mills who are responsible to implement the environmental mainstreaming tools (EMT) at the premises, the implementation of Fire Prevention and Peatland Management Programme to mitigate the peatland fire and the development of greenhouse gas (GHG) emission inventory that helps to document the GHG emission from palm oil mill.

It can be concluded that DOE plays a role in ensuring the sustainability of palm oil industry in Malaysia due to the initiatives taken by the Department. This is supported by the high percentage of palm oil mills (i.e more than 90%) which are compliant to the legal requirement by EQA 1974, the number of competent person (i.e 713 people who attended the CePPOME course with 80 people acquired the full competency certification) operating the equipments in palm oil mills, the number of premises that implement all of the 7 elements of EMT (i.e 129 premises), the number of infrastructures built (i.e 314 check dams, 85 tube wells and 5 watch towers) in order to prevent peatfires and the recorded GHG emission from palm oil mills for reporting and reference purposes.



**Figure 2: Net Methane Emission from Palm Oil Mills for the Time-series (1990-2014)**