

Bangchak's Low Carbon Products Y2023

Bangchak was certified to register the Carbon Label Products according to the PCR standard (Product Category Rule: PCR) by the Greenhouse Gas Management Organization (TGO) under collaboration with Thailand National Metal and Materials Technology Center (MTEC) and the National Science and Technology Development Agency (NSTDA)



Gasoline Base



High speed diesel



Fuel Oil

| Products | 2023 sale volume ⁽¹⁾ (Million liters) | Average Emission of Thailand | | Bangchak's Emission | |
|----------|---|---|---------------------------------------|--|---------------------------------------|
| | | Emission factors ⁽³⁾ (kgCO ₂ /L) | GHG emissions (tCO ₂ e) | Emission factors ⁽²⁾ (kgCO ₂ /kg) | GHG emissions (tCO ₂ e) |
| Gasohol | 1,764 | 0.4124 | 545,605 | 0.344 | 455,112 |
| Diesel | 3,598 | 0.3522 | 1,064,461 | 0.237 | 716,290 |
| Fuel oil | 192 | 0.3743 | 69,710 | 0.276 | 51,402 |
| | | Total | 1,679,776 | Total | 1,222,804 |

Bangchak improves refining process management continuously both operational stability and operational efficiency. This **helped to reduce GHG emission 456,972 tCO₂e per year** compared to Average Emission of Thailand with same volumes in 2023

(1) 2023 sale volumes from Bangchak's Annual Report 2023, PDF page 137, <https://investor.bangchak.co.th/en/document/viewer/stream/98191/form-56-1-one-report-2023>

(2) Emission factors for Bangchak's product from carbon label products according to the PCR standard (Product Category Rule: PCR) by the Greenhouse Gas Management Organization (TGO)

(3) Emission factors for normal oil product from IPCC 2006, Vol.2, table 3.2.1, 3.2.2, and the Department of Alternative Energy Development and Efficiency (DEDE)

Avoided emission at 3rd party (Scope 3 emission) Y2023



- Bangchak was the first oil company in Thailand which produced and sold biofuel products at Bangchak gas service stations to customers.
- All oil products of Bangchak are biofuels which helps avoid GHG emissions compared to gasoline and diesel.
- Gasohol oil products are the mixture of bioethanol and gasoline.
- Biodiesel oil products are the mixture of biodiesel (B100) from palm oil and diesel.
- Various gasohol and biodiesel oil products are available for customers at Bangchak service stations.

Total GHG emission from the used of sold products (Scope 3 emission)

| Normal Oil Products | | Bangchak's Oil Products | |
|---------------------|--|-------------------------|--|
| Group of Product | GHG emissions ⁽⁴⁾ (tCO ₂ e) | Group of Product | GHG emissions ⁽³⁾ (tCO ₂ e) |
| Diesel | 8,324,941 | Biodiesel products | 7,741,679 |
| Gasoline | 3,863,206 | Gasohol products | 3,349,663 |
| Total | 12,188,146 | Total | 11,091,342 |

Bangchak's gasohol and biodiesel oil products **helped avoid emissions for third-parties by 1,096,804 tCO₂e** compared to normal oil products with the same volumes in 2023

(3) 2023 scope 3 GHG emissions for the use of sold products through Bangchak service stations was verified as one of scope 3 emissions sources by a third party.

(4) Emission factors for normal oil product from IPCC 2006, Vol.2, table 3.2.1, 3.2.2, and the Department of Alternative Energy Development and Efficiency (DEDE) were used for the calculation.