



ENERGY SAFETY PRACTICES



Nilo J. Geroche
DOE - Mindanao Field Office



Energy Investment Forum and Stakeholders Conference
03 October 2017 | Grand Regal Hotel, Davao City



What is LPG?



What is LPG?

LPG stands for Liquefied Petroleum Gas, either propane or butane or a mixture of both. These gases occur naturally in crude petroleum or natural gas.

In the Philippines, LPG is essentially a mixture of butane and propane.



Sources

1. Field Gas

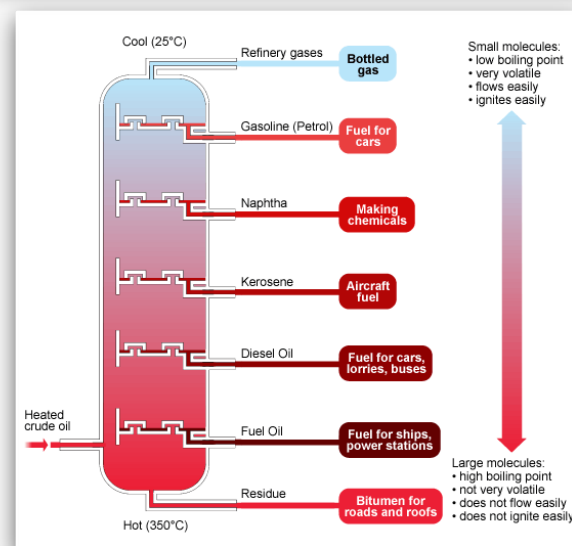
Associated Gas (w/ crude petroleum)

Unassociated Gas (mixed w/ natural gas)

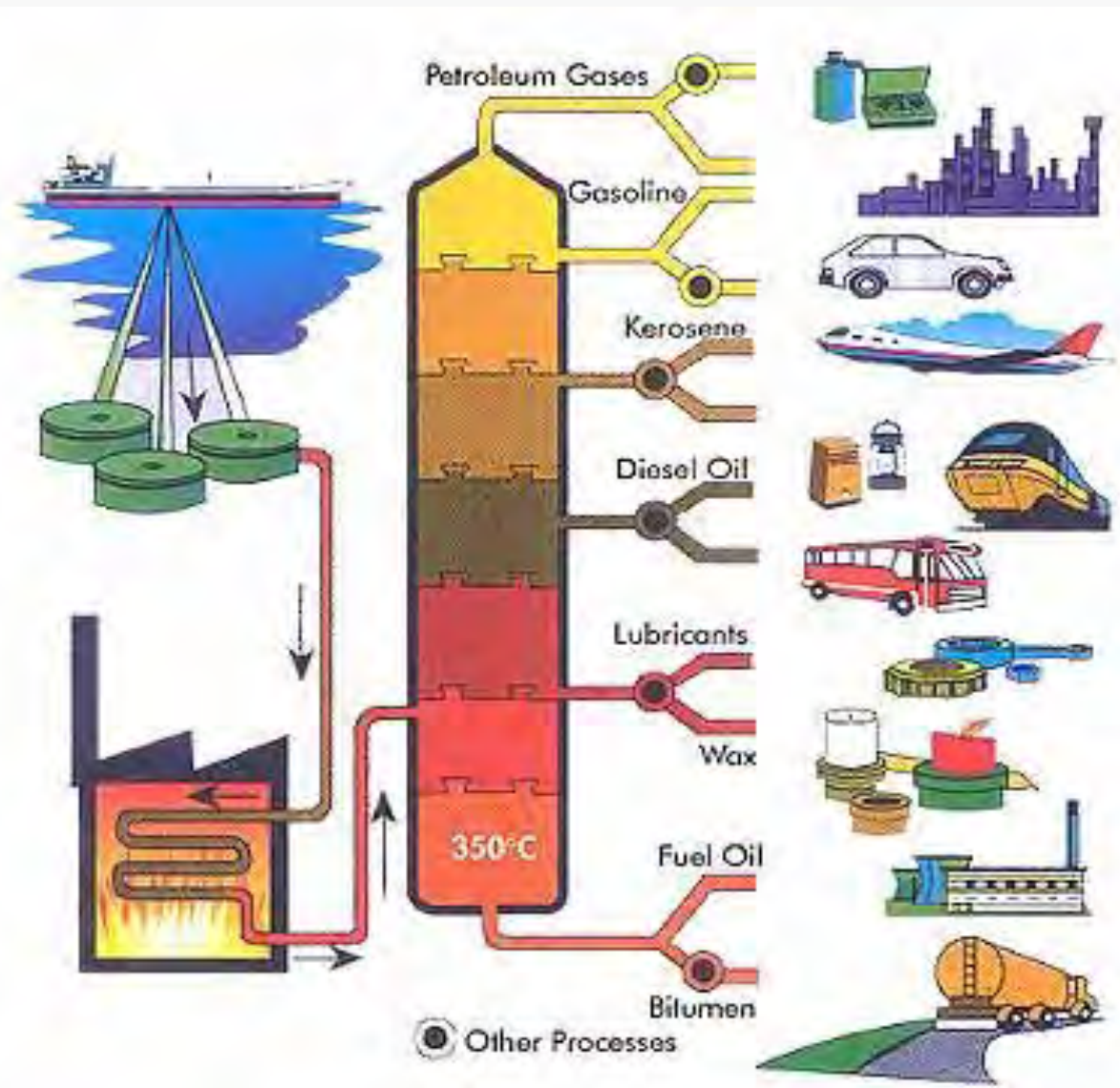


2. Refinery Gas

The result of processing crude oil by distillation, in the same manner that other liquid fuels, such as kerosene, gasoline and diesel, are extracted.

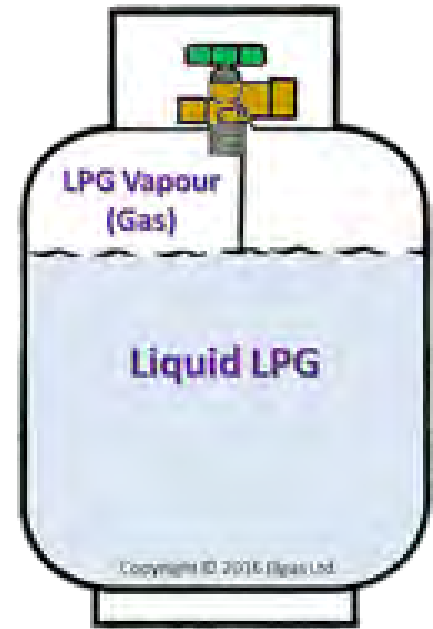


LPG in REFINING PROCESS



Characteristics of LPG

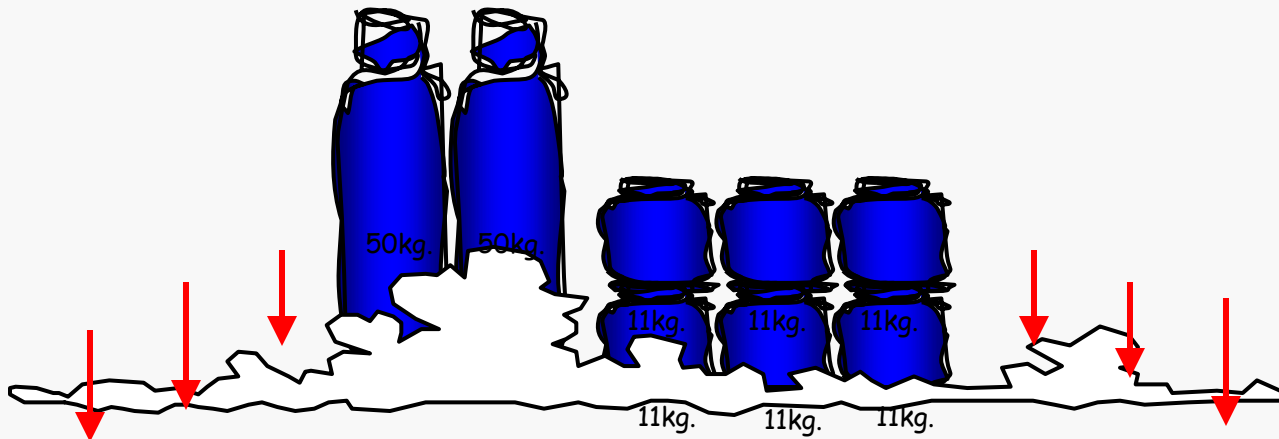
LPG is liquid inside the cylinder, but immediately transforms to a gaseous state when released. It is liquefied so that it can be stored economically and transported easily.



Characteristics of LPG

LPG VAPOR is HEAVIER than AIR

LPG vapor, when released to the atmosphere is heavier than air. LPG vapor will then tend to deposit itself on the lowest portion in the area.



Characteristics of LPG

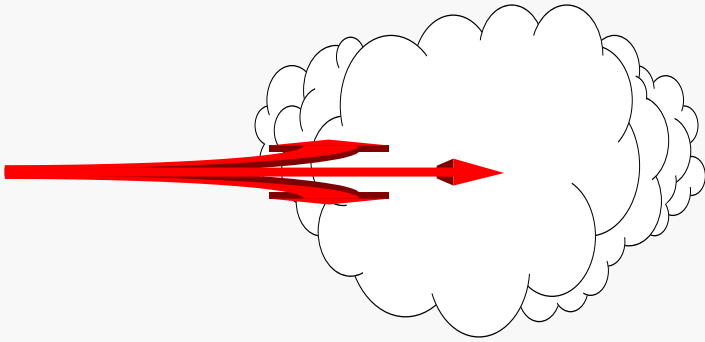
PURE LPG IS COLORLESS AND ODORLESS

LPG is as clear as water in the liquid form. As LPG evaporates, it looks like steam, but quickly becomes invisible.

Pure LPG has no smell. For safety purposes, **ethyl mercapthan** is added so any leaks can be detected by scent.

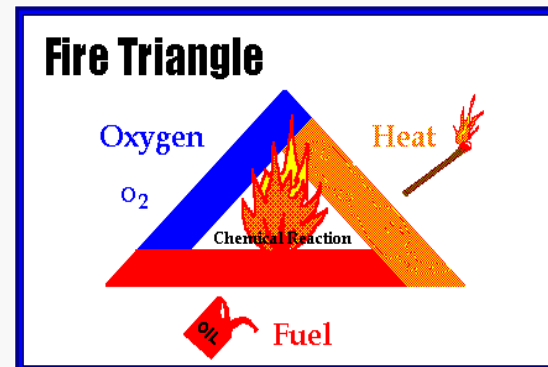


Characteristics of LPG



When LPG is released, it rapidly vaporizes and mixes with the air.

If the released gas is not properly dissipated, it will readily ignite upon contact with sparks, open flame, or any other source of ignition



The fire, however, may not be serious unless the gas is confined; in which cases, an explosion may occur, the intensity of which will depend on the degree of confinement

In the open air, flaming LPG vapors travel at about 15 feet per second, depending on the atmospheric conditions and the concentration of the gas.



Characteristics of LPG

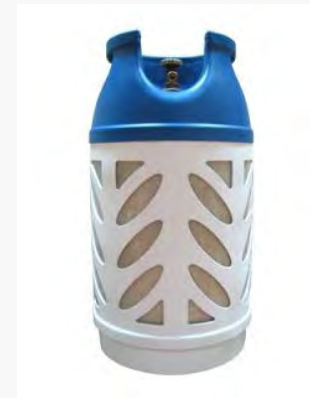


LPG is non-poisonous and environment friendly.

LPG dissolves natural rubber.



The Household LPG Family



CONSUMER TIPS



Consumer Tips

Buy cylinders with proper markings, e.g., brand name, tare weight.



Consumer Tips

- Check if the security seal is intact and firmly affixed to the valve.

LPG Seal



The brand name/logo in the cylinder and the seal must be the same



Consumer Tips

- Check if the security seal is intact and firmly affixed to the valve.



The brand name/logo in the cylinder and the seal must be the same



Consumer Tips

Determine the gross weight of LPG in filled cylinders by adding the Tare Weight (T.W.) and net weight of 11.0 kgs.



$$\begin{array}{r} 12.3 \\ + 11.0 \\ \hline \text{Gross weight } 23.3 \end{array}$$



Consumer Tips

Uncertified and Illegally Manufactured Cylinders

Consumer Tips: Check the DTI-BPS markings (footring/collar plate) and other LPG cylinder Markings (logo / trademarks, Brand name, etc)



required markings and labels

To make sure that your LPG cylinder has passed the required standards, look for the following markings and labels:

- ✓ Brand name or name of trader
- ✓ Product specifications and other data
- ✓ Approval or tested PS mark on the collar plate or footring

sample label on collar plate

Manufactured in accordance with ABC standard under PS 03-2016 Design and maximum WT 15kg TSC 2016/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000

don't forget to look for the PS and ICC marks for safe and reliable products

is it safe?
consumer's guide on product safety

LPG cylinders

dti
Department of Trade and Industry
30 Trade and Technology Center
Meralco, 6000 Alabang, Muntinlupa City
1500 1501 1502
1503 1504 1505
1506 1507 1508
1509 1510 1511
1512 1513 1514
1515 1516 1517
1518 1519 1520
1521 1522 1523
1524 1525 1526
1527 1528 1529
1530 1531 1532
1533 1534 1535
1536 1537 1538
1539 1540 1541
1542 1543 1544
1545 1546 1547
1548 1549 1550
1551 1552 1553
1554 1555 1556
1557 1558 1559
1560 1561 1562
1563 1564 1565
1566 1567 1568
1569 1570 1571
1572 1573 1574
1575 1576 1577
1578 1579 1580
1581 1582 1583
1584 1585 1586
1587 1588 1589
1590 1591 1592
1593 1594 1595
1596 1597 1598
1599 1600 1601
1602 1603 1604
1605 1606 1607
1608 1609 1610
1611 1612 1613
1614 1615 1616
1617 1618 1619
1620 1621 1622
1623 1624 1625
1626 1627 1628
1629 1630 1631
1632 1633 1634
1635 1636 1637
1638 1639 1640
1641 1642 1643
1644 1645 1646
1647 1648 1649
1650 1651 1652
1653 1654 1655
1656 1657 1658
1659 1660 1661
1662 1663 1664
1665 1666 1667
1668 1669 1670
1671 1672 1673
1674 1675 1676
1677 1678 1679
1680 1681 1682
1683 1684 1685
1686 1687 1688
1689 1690 1691
1692 1693 1694
1695 1696 1697
1698 1699 1700
1701 1702 1703
1704 1705 1706
1707 1708 1709
1710 1711 1712
1713 1714 1715
1716 1717 1718
1719 1720 1721
1722 1723 1724
1725 1726 1727
1728 1729 1730
1731 1732 1733
1734 1735 1736
1737 1738 1739
1740 1741 1742
1743 1744 1745
1746 1747 1748
1749 1750 1751
1752 1753 1754
1755 1756 1757
1758 1759 1760
1761 1762 1763
1764 1765 1766
1767 1768 1769
1770 1771 1772
1773 1774 1775
1776 1777 1778
1779 1780 1781
1782 1783 1784
1785 1786 1787
1788 1789 1790
1791 1792 1793
1794 1795 1796
1797 1798 1799
1800 1801 1802
1803 1804 1805
1806 1807 1808
1809 1810 1811
1812 1813 1814
1815 1816 1817
1818 1819 1820
1821 1822 1823
1824 1825 1826
1827 1828 1829
1830 1831 1832
1833 1834 1835
1836 1837 1838
1839 1840 1841
1842 1843 1844
1845 1846 1847
1848 1849 1850
1851 1852 1853
1854 1855 1856
1857 1858 1859
1860 1861 1862
1863 1864 1865
1866 1867 1868
1869 1870 1871
1872 1873 1874
1875 1876 1877
1878 1879 1880
1881 1882 1883
1884 1885 1886
1887 1888 1889
1890 1891 1892
1893 1894 1895
1896 1897 1898
1899 1900 1901
1902 1903 1904
1905 1906 1907
1908 1909 1910
1911 1912 1913
1914 1915 1916
1917 1918 1919
1920 1921 1922
1923 1924 1925
1926 1927 1928
1929 1930 1931
1932 1933 1934
1935 1936 1937
1938 1939 1940
1941 1942 1943
1944 1945 1946
1947 1948 1949
1950 1951 1952
1953 1954 1955
1956 1957 1958
1959 1960 1961
1962 1963 1964
1965 1966 1967
1968 1969 1970
1971 1972 1973
1974 1975 1976
1977 1978 1979
1980 1981 1982
1983 1984 1985
1986 1987 1988
1989 1990 1991
1992 1993 1994
1995 1996 1997
1998 1999 2000



Consumer Tips

How to Detect Underfilling

Tare Weight



Net Weight

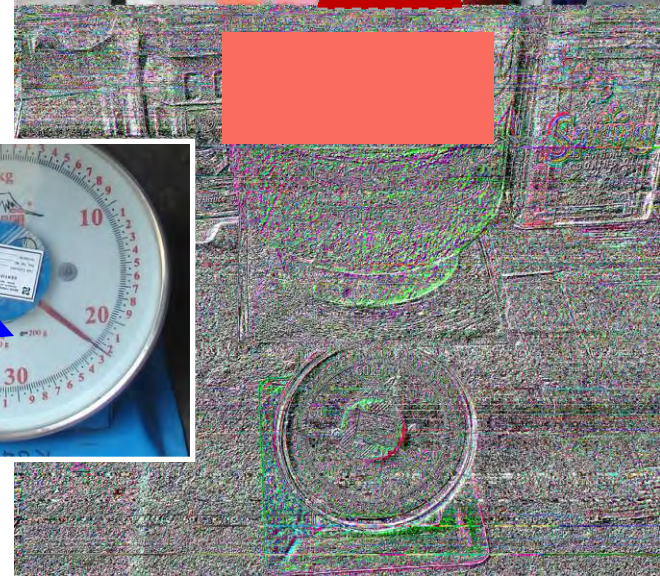
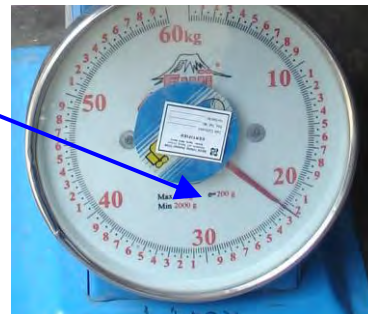
+ 11.0 kg.



Gross Weight **23.0 kg.**

22.4 kg.

-0.6 kg.



Consumer Tips

Each time you buy an LPG, look for a weighing scale



Check if scale is sealed and calibrated.



Consumer Tips

In purchasing LPG, be sure that the cylinder is in good condition



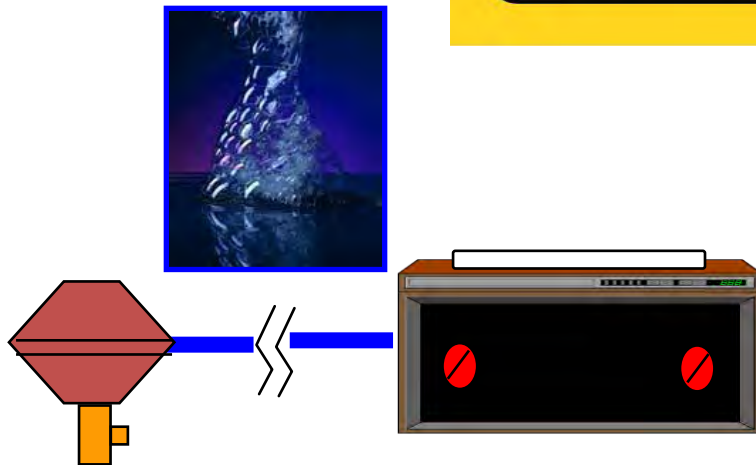


E-SAFETY MO!



Safety Tips

- Do not invert the LPG cylinder or let it lie horizontally on the floor.

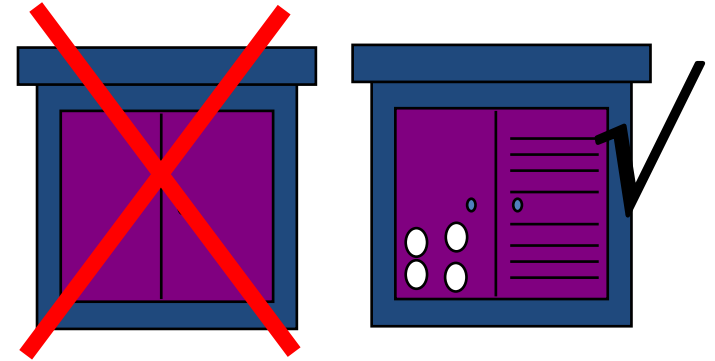


- Use only LPG resistant rubber hoses with clamps and regularly check for wear, cracks and leaks using soapy and water.

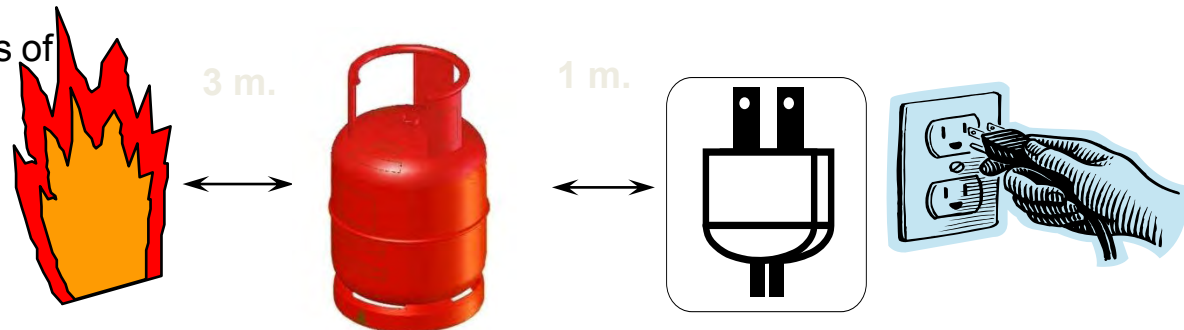


Safety Tips

- Do not store LPG cylinders in enclosed kitchen cabinets.

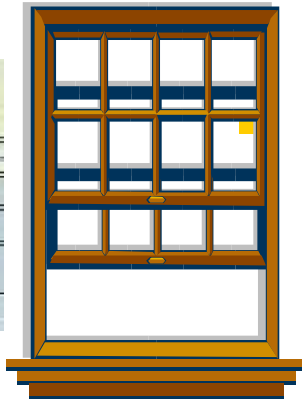


- Keep LPG cylinders away from electrical points and other sources of fire/ ignition.



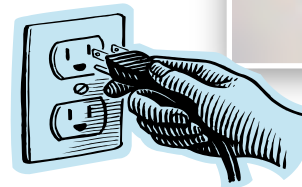
Important Reminder

IF YOU SMELL GAS IN YOUR KITCHEN:



Open all doors and windows to improve ventilation.

- Do not switch on/off electrical switches or connect/disconnect electrical plugs.



Important Reminder

- If leak is on cylinder, move cylinder out to open and ventilated place.

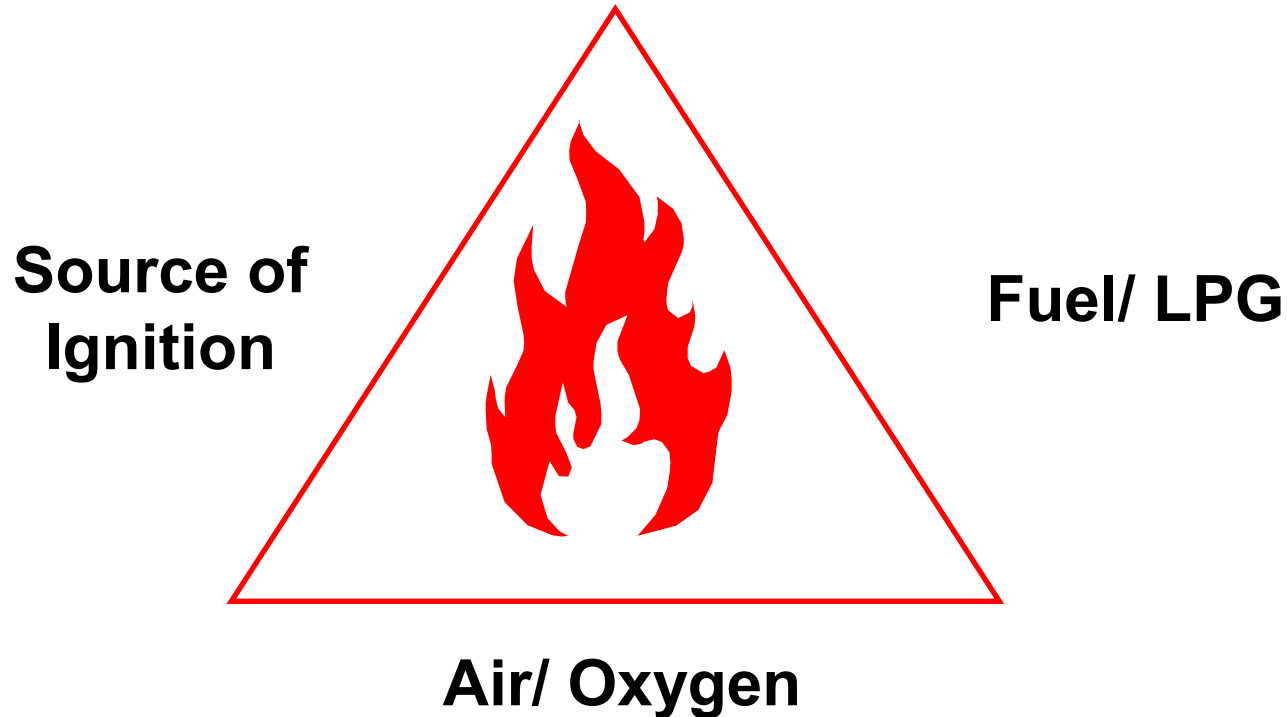


- Seek help from retail outlet where LPG was purchased or call the proper authorities.



Important Reminder

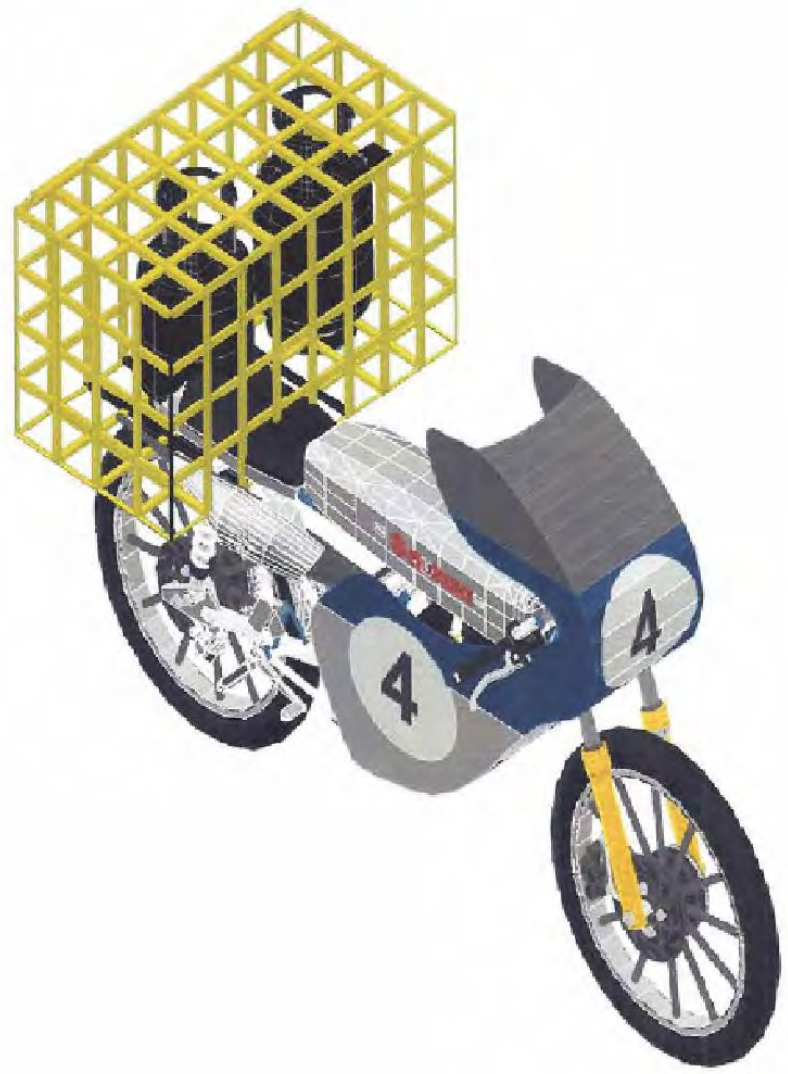
Triangle of Fire



***LPG will burn either in the liquid or vapor phase.
Combustion will require the three elements
represented by each side.***



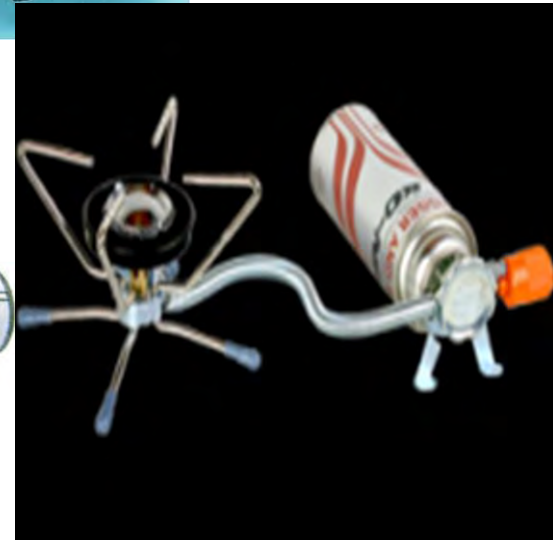
LPG Transport Standards DC 2013-09-0022



LPG Refilled Canisters



Portable Butane Camping Stove



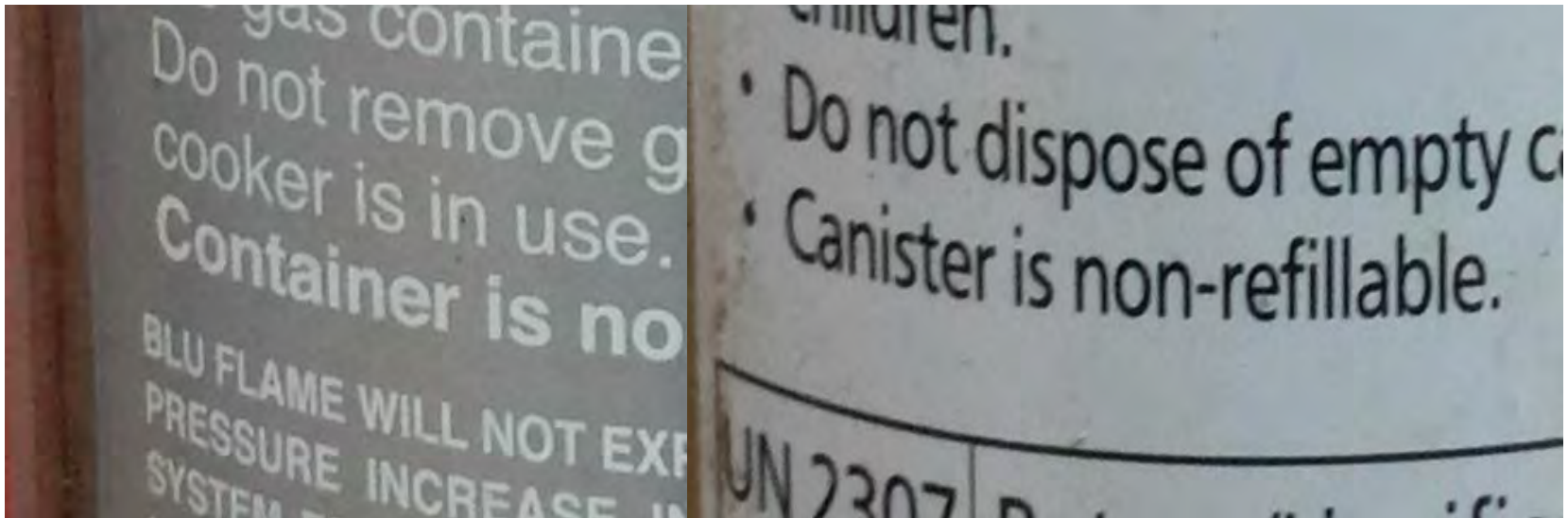
LPG Refilled Canisters

Available in the Market

- Cassette type
- mostly made of tin material
- Joints are soldered or bent
- One-time use (disposable)
- Designed to contain butane gas



LPG Refilled Canisters



Refilled with LPG



Retailed in the Local Market



...previously refilling are done in facilities like this



...previously refilling are done in facilities like this



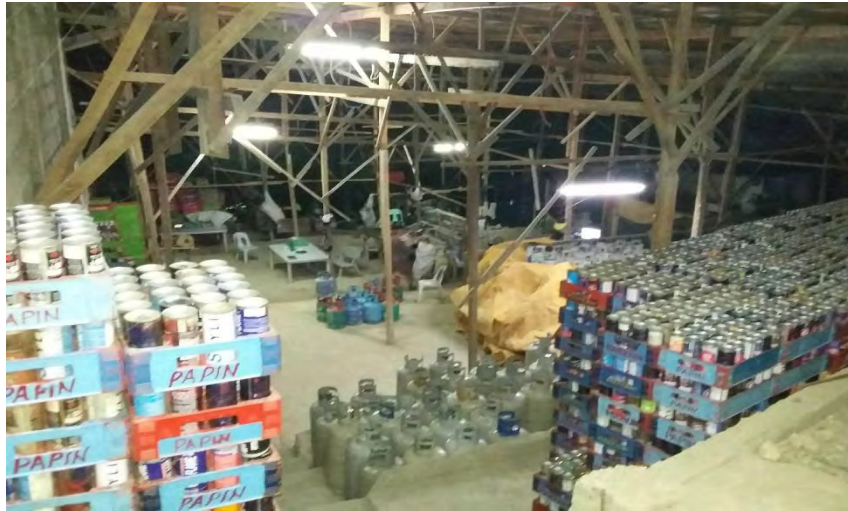
...and it became modernized...



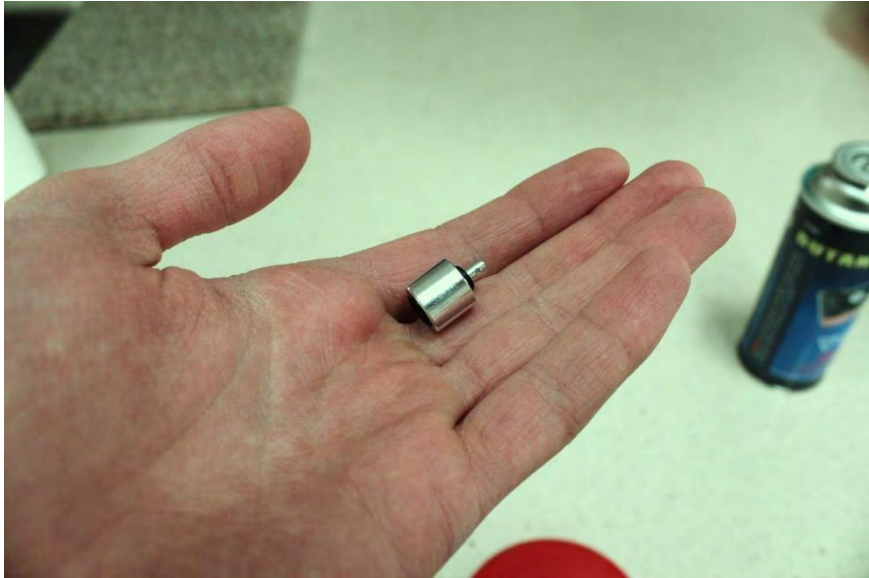
...modernized refilling facilities



...modernized refilling facilities



Household refilling by decanting LPG from cylinder to canister



Canister valve vs. LPG Cylinder valve



Butane Canister valves

Quality of valve material and its composition is designed for 1 time use. Does not have **Pressure Relief Valve**

LPG Cylinder Valves



Snap-on Valve

Made of steel with **Pressure Relief Valves** w/c automatically open to release gas during increase of pressure.



POL Valve



Butane Canister's valve is made partly of plastic material designed for 1 time use



Butane is not the same as Household LPG

LPG in the Philippines is composed of a mixture of 70% propane and 30% butane; and

LPG has a higher pressure (480 – 1050 kPa) than pure butane (485 kPa max)



Butane is not the same as Household LPG



mostly soldered joint

welded joint



A container fabricated from prescribed steel plates consisting of a cylindrical shell and two forged ends or pressed ends which are welded on to the shell or drawn halves circumferentially welded together.

- PNS 03-1992



Exploded Stove



Injuries Suffered From Tin Canister Explosion



Accidents/Incidents Reported

- At least five (5) fire incidents were reported in Mindanao caused by “explosion” of LPG-refilled canisters. Though no lives were lost, millions of pesos worth of properties were destroyed and injuries suffered;
- Due to its popularity in low-income households, future fire incidents are expected



Reported Fire Incidents Caused By LPG in Butane Tin Canisters (Reg. XI)

SOURCE: (BFP) SFO1 Ramil Ellado, Fire Investigator, BFP, Davao City

Fire Incident No. 1

Date of occurrence : 23 December 2013
Location : House of Ms. Adriana Lim,
Blk 78,riverbed, 21-C, Blvd.,
Davao City
Damaged : 1 house
Cost of Damaged : P 1,000.00
Cause/s : Leaking LPG in tin canister caught by fire while cooking

Fire Incident No. 2

Date of occurrence : 20 June 2014
Location : Purok 2, Brgy 23-c, Mini Forest, Blvd.. Davao City
Damaged : 19 houses totally razed/damaged 8 houses partially damaged
Cost of Damage : P 1 Million (more or less)
Cause/s : Exploded LPG in Butane) tin canister while cooking



Reported Fire Incidents Caused By LPG in Butane Tin Canisters (Reg. XI)

SOURCE: (BFP) FO2 Joey A. Pugosa, Fire and Arson Investigator, Bucana
S.I.R. Station

Fire Incident No. 3

Date of occurrence : 06 Oct., 2014
Location : Purok 12, St John, Brgy. Bucana, Davao City
Damaged : 9 establishments (res.)
Injured : 5 persons
Cost of Damage : P 1 Million (more or less)
Cause/s : Due to flammable substance like (Butane), started at the
residence of Mr. Jover Aguilon



Reported Fire Incidents Caused By LPG in Butane Tin Canisters (Reg. XI)

SOURCE: (BFP) CENRO, Panabo City

Fire Incident No. 4

Date of occurrence : 13 Oct. 2014 (7PM)

Location : Crystal Plain, Cagahongan, Panabo City

Damaged : None

Injured : 1 person (Mr. Michael Olmillo, CENRO Employee, Panabo City)
suffered 2nd degree burn on his arms and face

Cost of Damage :

Cause/s : Mr. Olmillo was cooking his dinner using portable butane stove with three (3) LPG butane canisters beside the stove and one (1) of them suddenly exploded (leakage) that cause the surge of the boiling oil and fire to his body

SOURCE: BFP, Davao City

Fire Incident No. 5

Date of occurrence : 22 January 2016 (0732H)

Location : San Juan Vill, Bangkal, Dvo. City

Damaged : 2 Res. Units (totally/partial)

Injured : None

Cost of Damage : About P 800,000.00

Cause/s : Un-attended cooking using Butane.



Fires Caused By Exploded / Leaking LPG-refilled Canisters



Fires Caused By Exploded / Leaking LPG-refilled Canisters



Fires Caused By Exploded / Leaking LPG-refilled Canisters



LAPU-LAPU BLAZE

BUTANE FANS FIRE

DOE orders probe on use of refilled butane canisters

by Victor Anthony V. Silva and Norman V. Mendoza

The danger of using refilled butane canister came to the fore anew following a six-hour fire that hit a densely populat-

ed community in Sitio Arca, Barangay Pusok, Lapu-Lapu City on Monday.

Department of Energy in Central Visayas (DOE-7) Director Antonio Labios yesterday said he would be sending personnel to investigate the incident even as he awaited the official reports from the police and Bureau of

Fire Protection (BFP).

The fire on Monday, which displaced 857 individuals and burned down 130 houses, was caused by an unattended candle, but exploding butane canisters filled with Liquefied Petroleum Gas (LPG) used by many residents in the area caused the fire to spread quickly.

BUTANE | 31 ©

NEWS The Freeman

Cities push for ordinance vs refilled butane cans

The Talisay City vice mayor has proposed an ordinance regulating the sale and transportation of refilled butane canisters within the city.

In Cebu City, Councilor David Tamalak also re-filed an ordinance prohibiting the manufacture, sale and distribution of refilled butane canisters within the city's jurisdiction.

This came following last Wednesday's incident at the South Coastal Road in San Isidro, Talisay City when butane canisters being carried by a truck exploded after the





WARNING TO THE PUBLIC on the use of butane canister filled with LPG.

The Department of Trade and Industry (DTI) warns the public of the rampant unsafe practice of the use of butane canisters as containers for household liquefied petroleum gas (LPG).

The DTI cautions that these canisters are not intended and designed for LPG and therefore may pose danger to users and households. Based on the Philippine National Standard (PNS) 03-01:2000, only welded steel cylinders with a water capacity of 1 liter to 150 liters are intended for storage and transport of LPG.

Butane canisters are not compliant with quality and safety requirements for LPG refill. As such it may leak and emit hazardous gas and cause explosion and fire, thus posing danger.

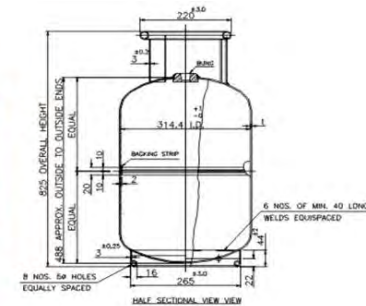
The DTI urges the public to report any information on the said unsafe practice **DTI Direct** 751.3330 or at the nearest DTI Regional/Provincial Office.



PNS Allowed LPG Containers

- **PNS 03:2014**

- Transportable and Refillable Welded Steel Cylinders for Liquefied Petroleum Gas (LPG)



- **PNS ISO 11119-3:2014**

- Refillable Composite Gas Cylinders and Tubes



Canister Transport



Important Reminder

LPG Anti-leak Device



Important Reminder

The **so-called LPG anti-leak device** is actually a mechanically operated gadget technically termed **“excess flow limiter”**.

A steel ball automatically blocks off the passage of gas when there is a sudden surge thru the regulator, about 40% to 50% of the normal flow. It does not activate in the presence of pinholes and small cracks on your LPG hose.

The use of this device on household installation can even result in complete disregard for the most basic and simplest safety practices.



***“A well- informed and vigilant
consumer is the best-protected
consumer.”***

DAGHANG SALAMAT!





(+682) 221-0778



nilo.geroche@doe.gov.ph



www.doe.gov.ph



//doe.gov.ph



@doe_ph

