Calor LPG
THE COMPLETE ENERGY SOLUTION

LPG in Commercial and Industrial Applications
Course Content

Unit 1 - LPG Product Knowledge
Unit 2 - Gas Regulations & Standards
Unit 3 - Bulk Tank Installations
Unit 4 - Cylinder Storage
Unit 5 - Pipe Work
Unit 6 - Utilisation
UNIT 1 : LPG PRODUCT KNOWLEDGE

LPG

What is it?
UNIT 1: WHERE DOES LPG COME FROM?

LPG is a naturally occurring by-product of natural gas extraction (60%) and crude oil refining (40%). Therefore we either use it or it is wasted.
UNIT 1: WHAT IS LPG?

LIQUEFIED PETROLEUM GAS AND IT COMES IN TWO FORMS

**COMMERCIAL PROPANE**
- Chemical Makeup: C3 H8
- Boiling Temperature: -42°C
- Storage Conditioners:
  - Bulk Tanks and Red Cylinders

**BUTANE**
- Chemical Makeup: C4 H10
- Boiling Temperature: -2°C
- Storage Conditioners:
  - Yellow Cylinders
UNIT 1: LPG CHARACTERISTICS

1. Under moderate pressure LPG becomes a liquid. Easy to store large quantities in specially constructed vessels and cylinders.

2. Heavier than air and natural gas so therefore will search out and accumulate at the lowest levels. Such as drains, pits, basements – NO LPG appliances in basements.

These 2 key characteristics distinguishes LPG from Natural Gas.
UNIT 1 : LPG HAS A HIGH CALORIFIC VALUE

THE GROSS CALORIFIC VALUE

<table>
<thead>
<tr>
<th>Gas Type</th>
<th>Calorific Value (MJ/m³)</th>
<th>Calorific Value (Btu/ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPANE (LPG)</td>
<td>95.0</td>
<td>2500</td>
</tr>
<tr>
<td>BUTANE (LPG)</td>
<td>121.5</td>
<td>3200</td>
</tr>
<tr>
<td>METHANE (Nat. Gas)</td>
<td>38.0</td>
<td>1040</td>
</tr>
</tbody>
</table>

MEGAJOULES PER CUBIC METRE (MJ/m³) or BRITISH THERMAL UNITS PER CUBIC FOOT (Btu/ft³)
UNIT 1 : HOW IS LPG STORED?

LPG IS STORED AS A LIQUID IN SPECIALLY DESIGNED PRESSURE VESSELS UNDER MODERATE PRESSURE.

STP @ 15°C & 1013.25 millibar

Propane 7 bar (100 psi)
In its natural form LPG is not readily detectable in air so to enable detection by smell a stenching agent is added

**Ethyl Mercaptan or Dimethyl Sulphide**

Detectable at 20% of the Lower Explosive Limit approximately 0.4% in air
UNIT 1 : DETECTION OTHER THAN BY SMELL?

YES!

LPG LIQUID EVAPORATING WILL CREATE A COOLING EFFECT AND CAUSE THE WATER VAPOUR PRESENT IN THE AIR TO ‘FREEZE’

REFRACTORY DIFFERENCES BETWEEN GAS AND AIR WILL CAUSE A LEAK TO ‘SHIMMER’
UNIT 1: HOW IS THE GAS VAPOUR PRODUCED?

The liquid boils similar to water in a kettle except the boiling temperatures are very different when the pressure in the vessel is reduced.

The liquid will boil.

Valve Open

Valve Closed

Valve Closed
UNIT 1: WHAT TEMPERATURE DOES LPG VAPOURISE?

LPG BOILS AT VERY LOW TEMPERATURES

Propane boils at -42°C

Butane boils at -2°C

✓ Propane in Ireland does not have vaporisation issues.
✓ Butane performs well at an ambient temperature of 10°C.
✗ Butane will be affected if the air temperature falls below minus 2°C.
WHERE DOES THE LIQUID DRAW ITS HEAT FROM FOR VAPOURISATION?

UNIT 1: THE VAPOURISATION PROCESS

1. From the Liquid Gas Itself
2. From the Wetted Surface Area
3. From the Ambient Temperature
ARE TANKS OR CYLINDERS COMPLETELY FILLED?

NO!

THEY MUST NEVER BE FILLED ‘HYDRAULICALLY’

LPG IN ITS LIQUID STATE HAS A HIGH RATE OF THERMAL EXPANSION. IT IS IMPORTANT TO LEAVE A VAPOUR SPACE ABOVE THE LIQUID LEVEL.

TANKS ARE CHARGED BY VOLUME AND FILLED TO 80% - 87%

CYLINDERS ARE CHARGED BY WEIGHT.
UNIT 1: ESCAPE OF LIQUID PROPANE

The liquid will expand over 274 times when vaporised

1 VOLUME OF LIQUID

274 VOLUMES PROPANE VAPOUR
UNIT 1: SPECIFIC GRAVITY OR RELATIVE DENSITY

LPG is Heavier than Air

- Natural Gas = 0.58 s.g.
- Air = 1 s.g.
- Propane = 1.5 s.g.
- Butane = 2.0 s.g.
UNIT 1: IS LPG EASILY IGNITED?

YES: LPG IS EXTREMELY FLAMMABLE AND IS READILY IGNITED

IGNITION TEMPERATURES FOR PROPANE IS 460°C - 580°C

MUST HAVE THE CORRECT MIXTURE OF PROPANE AND AIR

L.E.L. - Lower Explosive Limit
U.E.L. - Upper Explosive Limit

Propane Gas % to Air mix
2% - 11% FLAMMABLE OR EXPLOSIVE
UNIT 1: COMBUSTION AIR REQUIRED FOR PROPANE

1 Volume of Propane

24 Volumes of Air

\[ \text{Complete Combustion} \]
UNIT 1: PRODUCTS OF GOOD COMBUSTION

When LPG is burned completely, the products of combustion are harmless. However, incomplete combustion can result in the production of carbon monoxide (CO) which is harmful.

\[ \text{CO}_2 + \text{H}_2\text{O} \]

Carbon Dioxide + Water Vapour
UNIT 1: CO - CARBON MONOXIDE

WHAT IS IT?

• Highly poisonous gas.
• No smell.
• No colour.
• No taste.

WHAT ARE THE SYMPTOMS?

• When you inhale CO it starves the body of $O_2$
• Symptoms similar to everyday illnesses
  • HEADACHES
  • BREATHLESSNESS
  • COLLAPSE
  • NAUSEA
  • DIZZINESS
  • LOSS OF CONSCIOUSNESS

Even low levels of exposure of CO over a long period of time can cause lasting damage to your health, including permanent brain damage. More serious cases can cause death.

HOW DOES IT OCCUR?

• Poorly installed or maintained appliances
• Oil, Solid Fuel, Wood, Gas

UNIT 1: ENVIRONMENT

Comparison of CO2 emissions*

<table>
<thead>
<tr>
<th>Source – SEAI 15th October 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ emission factors for electricity vary from year to year depending on the fuel mix used in power generation</td>
</tr>
</tbody>
</table>

LPG IS:

- Cleaner Burning
- Reduced CO₂ Emissions
- Convenient
- No Soil or Water Pollution
- LPG is non-toxic
UNIT 2 : GAS REGULATIONS AND STANDARDS

Code of practice — Bulk storage of Liquefied Petroleum Gas (LPG) — (Edition 2)

Domestic Gas Installations (Edition 2) (Consolidated text including amendments No. 1 and No. 2)

Installation pipework on industrial and commercial premises

Bulk LPG Storage at Fixed Installations

Design, Installation and Operation of Vessels Located Above Ground
UNIT 2: NATIONAL STANDARD AUTHORITY

Regulations governing the use of LPG in Republic of Ireland for Storage & Installations

- IS 3216:2010 Code of Practice for the Bulk Storage of LPG
  Part 1 General Requirements
  Amendment No.3 : 2001 –
  Installation of underground vessels
- IS 3213 :1987 Storage of LPG Cylinders and Cartridges
- IS 813 : 2002 Domestic Gas Installations
- IS 820 : 2003 Non-Domestic Gas Installations
- IS 329 : 2003 Gas Distribution Mains
- IS 265 : 2000 Installation of Gas Service Pipes
  Parts 1 & 2 (Fourth Edition)
UNIT 3 : BULK TANK INSTALLATIONS
UNIT 3 : LPG CONVERSION FACTORS

Volume Conversion

1 mTonne = 1000 kg

1 mTonne = 1968.5 litres of LPG

Energy Conversion

1 kWh = 3412 btu’s/hr

1 litre of LPG = 7.09 kWh

1 m³ of LPG = 3.72 litres
Selecting the appropriate size of Tank/s depends on:

1. Customer Requirements (Application, Aesthetics)
2. Safety Considerations & Physical Constraints (Location requirements, Surrounding Area)
3. Required Off-take and/or Minimum Storage Capacity.
4. Access of Tank and Gas Delivery
# UNIT 3: TANK OFF-TAKES

Off-take = amount of vapour a tank can deliver at any point of time by natural vaporisation

<table>
<thead>
<tr>
<th>Tank off-take table*</th>
<th>u/g = underground</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank capacity (kg propane)</td>
<td>Kw</td>
<td>m³/h</td>
<td>Kg/h</td>
</tr>
<tr>
<td>200</td>
<td>60</td>
<td>2.3</td>
<td>4.2</td>
</tr>
<tr>
<td>600</td>
<td>145</td>
<td>5.7</td>
<td>10.5</td>
</tr>
<tr>
<td>1000</td>
<td>187</td>
<td>7.1</td>
<td>13.2</td>
</tr>
<tr>
<td>1000 (u/g)</td>
<td>94</td>
<td>3.5</td>
<td>6.8</td>
</tr>
<tr>
<td>2000</td>
<td>264</td>
<td>10.2</td>
<td>19</td>
</tr>
<tr>
<td>2000 (u/g)</td>
<td>132</td>
<td>5.1</td>
<td>9.5</td>
</tr>
<tr>
<td>3000</td>
<td>347</td>
<td>13.4</td>
<td>25</td>
</tr>
<tr>
<td>4000</td>
<td>513</td>
<td>19.8</td>
<td>36.9</td>
</tr>
<tr>
<td>6500 (u/g)</td>
<td>366</td>
<td>14.2</td>
<td>26.4</td>
</tr>
</tbody>
</table>
UNIT 3 : TANK SITING – ABOVE GROUND

Distance from buildings, boundaries and sources of ignition

<table>
<thead>
<tr>
<th>LPG capacity (kg)</th>
<th>Max no. of tanks in a group (m)</th>
<th>From buildings boundary, property line or fixed source of ignition (m) A</th>
<th>With a fire wall (m) B</th>
<th>Distance between (m) C</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>3</td>
<td>2.5</td>
<td>0.3</td>
<td>1.0</td>
</tr>
<tr>
<td>600</td>
<td>5</td>
<td>3.0</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>1000</td>
<td>3</td>
<td>3.0</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td>7.5</td>
<td>4.0</td>
<td>1.0</td>
</tr>
<tr>
<td>3000</td>
<td>6</td>
<td>7.5</td>
<td>4.0</td>
<td>1.0</td>
</tr>
<tr>
<td>4000</td>
<td>3</td>
<td>7.5</td>
<td>4.0</td>
<td>1.0</td>
</tr>
<tr>
<td>12000</td>
<td>3</td>
<td>15.0</td>
<td>7.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>
UNIT 3: WIDE RANGE OF AG STORAGE OPTIONS

- 6 x 1000kg
- 3 x 200kg ‘vertical’
- 4 x 3100kg
- 6x 1000kg ‘vertical’ tanks
- 3x 4000kg & 3x 3000kg
UNIT 3 : SCREENING DISTANCES

Non flammable ranch type fence

Evergreen shrubs
UNIT 3: UNDERGROUND TANKS

• Safety Distance observed from Tank Lid
• Incorporation of a Gas Dispersion wall results in a reduced Safety Distance requirement
• No vehicular movement permitted on tank area
• Tanks cannot be located in areas prone to flooding
• No underground services permitted within the Tank Excavation Area

More technical info regarding Underground Tanks is available from Calor Gas Customer Engineering
## UNIT 3: UNDERGROUND TANKS SAFETY DISTANCES

**NSAI I.S 3216: 2010 Bulk Storage of Liquefied Petroleum Gas**

<table>
<thead>
<tr>
<th>Tank Size (kg)</th>
<th>To Tank Surface</th>
<th>To Valve Assembly (Man lid)</th>
<th>Distance Between Tanks (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Without gas Dispersion Wall</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>1*</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>4000</td>
<td>1*</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>6500</td>
<td>3</td>
<td>7.5</td>
<td>4</td>
</tr>
</tbody>
</table>

* Recommended to be no less than 2 metres so as to minimise effects on building structure.

** Subject to excavation design. Minimum 1 metre.

### ILLUSTRATION OF A 1000KG (1TONNE) UNDERGROUND TANK
UNIT 3: EFFECTIVE USE OF A 0.5m DISPERSION WALL

500 mm
UNIT 3: VARIOUS UNDERGROUND INSTALLATIONS
UNIT 3: SAFETY DISTANCE FROM ELECTRICAL CABLES

Separation distances from overhead power cables.
UNIT 3: TANK TELEMETRY

1. Telemetry gauge activates when LPG in your tank reaches certain level
2. Remote Telemetry Monitoring Centre
   - Our monitoring centre is alerted that there is a need for your tank to be refilled
3. Calor Gas delivery tanker is dispatched from local depot
4. Tanker arrives at your home to fill tank in plenty of time - guaranteeing you never run out*
UNIT3: LPG DELIVERY TANKER ACCESS

TANKER DETAILS
- Minimum width of entrance 4 Metres
- Minimum height clearance of entrance 4 Metres
- Minimum turning circle 12 Metres
- 8 tonne tanker gross weight 20 tonnes
- 9 tonne tanker gross weight 23 tonnes
- Maximum hose length 30 Metres
UNIT 4: CYLINDER INSTALLATIONS

(IS 3213)
UNIT 4: LEISURE & DOMESTIC CYLINDERS

**Propane**
- Cooking
- Gas Fire
- Catering
- BBQ
- Camping
- Patio Heater

Available in: 9kg Lightweight, 11kg, 19kg, 34kg & 47kg

**Butane**
- Cooking
- BBQ
- Space Heating
- Burning Ring
- Patio Heater

Available in: 5kg & 11.34kg

**Patio**
- BBQ
- Patio Heater
- Caravan

Available in: 6kg Lightweight & 11kg Patio
UNIT 4: COMMERCIAL/INDUSTRIAL CYLINDERS

Butane
Available in: 5kg & 11.34kg

Propane - Fork Lift Truck
Available in: 12kg & 18kg

Propane
Available in: 9kg Lightweight, 11kg, 19kg, 34kg & 47kg
UNIT 4: MULTI CYLINDER INSTALLATIONS

- Ideal for buildings with limited space
- Up to 132kW demand
- 4, 6 or 8 cylinders in interconnected pairs
- Un-interrupted supply
UNIT 4: SIZING CYLINDERS

Sizing Gas Cylinder’s: 3 Key Questions

1. What is the maximum gas rate of the appliances?

2. Is there more than one appliance?

3. What is the pattern of use?

<table>
<thead>
<tr>
<th>Cylinder Size (Propane kg)</th>
<th>Maximum Continuous propane Off-take</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kW</td>
</tr>
<tr>
<td>34</td>
<td>24</td>
</tr>
<tr>
<td>47</td>
<td>34</td>
</tr>
</tbody>
</table>
UNIT 4: LPG CYLINDERS SAFETY DISTANCES

Safety distances of LPG cylinders from buildings and other potential sources of ignition. LPG Gas Association COP 24 Parts 1 to 6
UNIT 5: PIPEWORK

PIPE WORK LOCATION

PIPEWORK SIZING

PIPEWORK INSTALLATION

(IS 329 Gas Distribution Mains)
(IS 265 Installation of Gas Service Pipes)
(IS 813 Domestic Gas Installations)
(IS 820 Non-Domestic Gas Installations)
UNIT 5: PIPEWORK MATERIALS

Above Ground Pipework Material
– Steel
– Copper

Under ground Pipework Material
– Polyethylene Plastic SDR11 (PE)
UNIT 5: THE INSTALLATION PIPEWORK
UNIT 5: PIPE SIZING

- LPG has a much larger Calorific Value than Natural Gas, therefore pipe sizes for LPG can be much smaller.
- Contact Calor for assistance with Pipe Sizing
- Tables available in the Installation Guide.

### Effective capacity of STEEL pipe for LPG

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Heat input (kW)</th>
<th>8mm</th>
<th>15mm</th>
<th>20mm</th>
<th>25mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>5.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>4.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Effective capacity of COPPER tube for LPG

| Length (m) | Heat input (kW) | 6mm | 10mm | 15mm | 22mm | 28mm | 25mm |
|------------|-----------------|-----|------|------|------|------|
| 3          | 2.20            |     |      |      |      |      |
| 6          | 1.54            |     |      |      |      |      |
| 9          | 1.32            |     |      |      |      |      |
| 12         | 1.10            |     |      |      |      |      |
| 15         | 0.88            |     |      |      |      |      |
| 18         | 0.88            |     |      |      |      |      |
| 21         | 0.66            |     |      |      |      |      |
| 24         | 0.66            |     |      |      |      |      |

### Effective capacity of POLYETHYLENE PIPE (PE) for LPG

<table>
<thead>
<tr>
<th>Heat Input (kW)</th>
<th>Maximum length (25mm OD) (m)</th>
<th>Maximum length (32mm OD) (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.6</td>
<td>1.104</td>
<td>72</td>
</tr>
<tr>
<td>30.8</td>
<td>1.189</td>
<td>62</td>
</tr>
<tr>
<td>33.0</td>
<td>1.274</td>
<td>54</td>
</tr>
<tr>
<td>35.2</td>
<td>1.358</td>
<td>47</td>
</tr>
<tr>
<td>37.4</td>
<td>1.443</td>
<td>42</td>
</tr>
<tr>
<td>39.6</td>
<td>1.528</td>
<td>37</td>
</tr>
<tr>
<td>41.8</td>
<td>1.613</td>
<td>33</td>
</tr>
<tr>
<td>44.0</td>
<td>1.698</td>
<td>30</td>
</tr>
</tbody>
</table>

**NOTE:** The heat maximum pressure drop over the length of the pipe.

Source: IS 3216:2002 – Irish Standard for Domestic Gas Installations
A gas safe registered installer (in Northern Ireland) is responsible for the installation of all gas pipework and appliances and for making the connection to outlet pipework at vessel. An RGII registered installer in the Republic of Ireland is responsible for domestic gas works for LPG installations.

A written GAS SAFE or RGII certificate is required before the gas can be turned on.

The gas supply may only be turned on by Calor approved personnel.
UNIT 6: UTILISATION OF LPG

- Commercial
- Industrial
- Domestic and Metered
1. Simple, non-complex flue arrangement

2. Ventilation in accordance with Building Regulations
   *(TGD J) Combustion air and water vapour*

3. Consider room sealed appliances where available.
UNIT 5: COMMERCIAL APPLICATIONS

Sectors
• Commercial
• Hospitality & Leisure
• Catering
• Education
• Healthcare
• Government Buildings
• Industrial Processing/Manufacturing
• Agricultural

Applications
• Space Heating
  — Radiators
  — Warm Air
  — Radiant
• Hot Water
  — Stored
  — Instantaneous
• Catering
• Laundry
• Air-Conditioning
• CHP
• Gas Heat Pump
UNIT 5: COMMERCIAL SPACE APPLICATIONS

Radiant Heating

- High Levels of High Efficiency
- Deliver heat precisely and exactly where required
- Rapid Heat up & Cool down time
- Highly controllable
- Easy to Install, manage and maintain
- Factories, Workshops, Warehouses, Sports & Community Halls, Churches
UNIT 5: COMMERCIAL SPACE APPLICATIONS

Warm Air Heating

- Direct or Indirect Fired
- Fast response
- Highly Controllable
- Effective Warm Air Distribution
- Can also be used for Cooling
- Easy to Install, manage and maintain
- 90% efficient
- Offices, Retail Units, Warehouses, Leisure centres
UNIT 5: COMMERCIAL HYBRID SYSTEM

• Combines benefits of cost effective Air to Water Heat pumps with extremely efficient modulation of gas boilers
• Most economic balance of Heat Source is Supplied
• 50% savings compared to Oil System

Web connected control system which can be accessed remotely
UNIT 5: Boilers

Retrofitting

• Change the burners
• Older boilers not designed to condense, doing so can damage
• No improvement in efficiency, fuel switch only
• Less expensive option (in the short term)
• Consider boiler condition/in test (steam boilers)

New Boilers

• Opportunity to greatly improve efficiency
• Modulating to match the load requirement
• Important to review operation of the entire system (lower the temperatures if possible)
• Higher capital but payback can be achieved
UNIT 5: Typical Example

Large Hotel

• 2 x 800kW Boilers (for heating)
• Consuming 300,000 Litres of oil per year
• Assume existing system efficiency of 70%, reasonable assumption, given age, condition and technical set-up
• Replaced with high efficiency modulating LPG boilers, typical rating of 89%
• >20% Primary Energy Saving
• >30% Carbon Savings (263 Tonnes/year)
• Estimated €50k Savings/Year
Indirect Water Heating

- Boiler system heating a coil in a calorifier
- More losses – pumping, heat loss, thermal efficiency of boiler, coil etc..
- Difficult to achieve condensing at low demand
- Storing hot water » Legionella considerations
- Re-heat times of the storage vessel a consideration
  - Increase in boiler size » Capital Cost
- Boilers required all year round
- Traditional system in Ireland
- Plate Heat Exchangers also an option but expensive and require a lot of control
UNIT 5: Water Heating

Continuous Flow

• High efficiency, modulating flame
• Low or zero standing losses
• Good for intermittent use
• Capital cost, reasonable if sized correctly
• Storage/buffer can be incorporated
• Easy incorporation of new technologies

Dairy Farm example – no storage

Multiple heaters, combined with buffer
UNIT 5: COMMERCIAL CATERING

Substantial savings by using LPG compared to electricity.

Hotels
Nursing Homes
Restaurants
Fast Food Outlets
Factory Canteens
Schools + Colleges
UNIT 5: INDUSTRIAL APPLICATIONS

Any Industrial Process requiring Heat

Incineration

Air handling

Steam Boilers

Industrial Water Heating

Food Processing

Paint Drying

Laundry
UNIT 5: FORK LIFT TRUCKS (FLT’S)

Efficient
Lower Emissions
No Battery to recharge
Used Indoor & Outdoor
Reduced engine noise.
On site LPG storage.
UNIT 5: DOMESTIC CENTRAL HEATING

Bulk Tank or Cylinder Storage

Standard Central heating plus the complete energy package

Automatic top-up throughout the year. Telemetry as standard, budget plan available
UNIT 5: METERED DEVELOPMENTS
COMMERCIAL AND DOMESTIC

Communal LPG storage to serve a number of dwellings or business units.

Each network is designed, installed and maintained by experienced and qualified engineers.

An individual meter box is installed outside each customer dwelling or business unit for billing.
UNIT 5: TYPICAL HOUSING ESTATE LAYOUT

- Bulk Tanks are normally located in the communal green area.
- Designed and Installed Gas Distribution Infrastructure
- Tank Telemetry installed on all sites
UNIT 5: LPG PARTNERS WITH RENEWABLES

Solar Panels
- Condensing, fully Modulating and Weather Compensated Gas Boiler (90+% efficient)
- Solar Panel System with Solar Station Control for Water Heating
- Heat Recovery Mechanical Ventilation System
- Three Zone System Control
- Increased Cavity Wall & Attic Insulation

Air Source Heat Pump
- Integrated Unit comprising of an Electric Heat Pump, a Condensing Boiler and a Hybrid System Manager.
- System manager, selects the most cost effective heat source for the current conditions.
- Works best at temperatures of 45°C.
Calor is a wholly-owned subsidiary of SHV Gas based in the Netherlands.

SHV is the largest distributor of LPG in the world

Market Leader: Calor has 50% Market Share in the Irish LPG market.
SUMMARY

Unit 1 - LPG Product Knowledge
Unit 2 - Gas Regulations & Standards
Unit 3 - Bulk Tank Installations
Unit 4 - Cylinder Storage
Unit 5 - Pipe Work
Unit 6 - Utilisation
LPG is a competitive alternative to Oil

Thought you couldn’t have Gas?
Now You Can
Questions

Everything is Possible

Thank you