

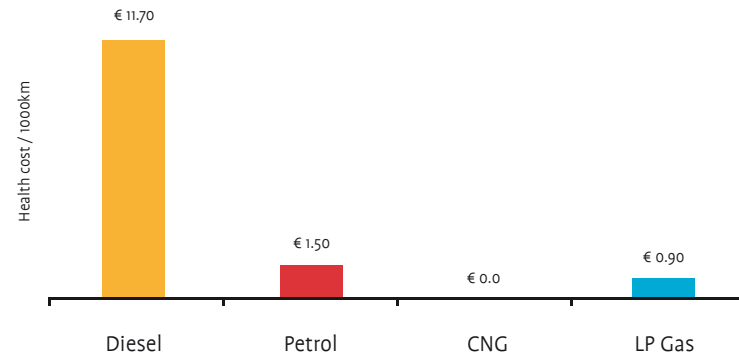
## TRANSPORTATION



Conventional transport fuels diesel and petrol, have been identified as a source of air pollution and ill-health, including incidences of respiratory diseases and cancers, in urban environments. The rapid increase in popularity of diesel powered vehicles, has focused a great deal of attention on the adverse health impacts of fine particulate matter (PM), which is emitted from diesel engines at much higher rates than from petrol or gaseous fuelled engines.

*FACT: Older technology diesel engines have a health cost impact of around €11.70 for every 1000km travelled, compared with €0.90 for a car powered by LP Gas.*

**Health Costs from passenger cars and derivatives  
(with no particle filter on diesel engines)**



As the global voice for LP Gas, the WLPGA promotes the use of the fuel to foster a cleaner, healthier and more prosperous world.

The Association was officially granted Consultative Status with the United Nations Economic and Social Council in 1989 and actively represents the interests of the LP Gas industry in numerous UN processes including the UN Framework Convention on Climate Change (UNFCCC) negotiations.

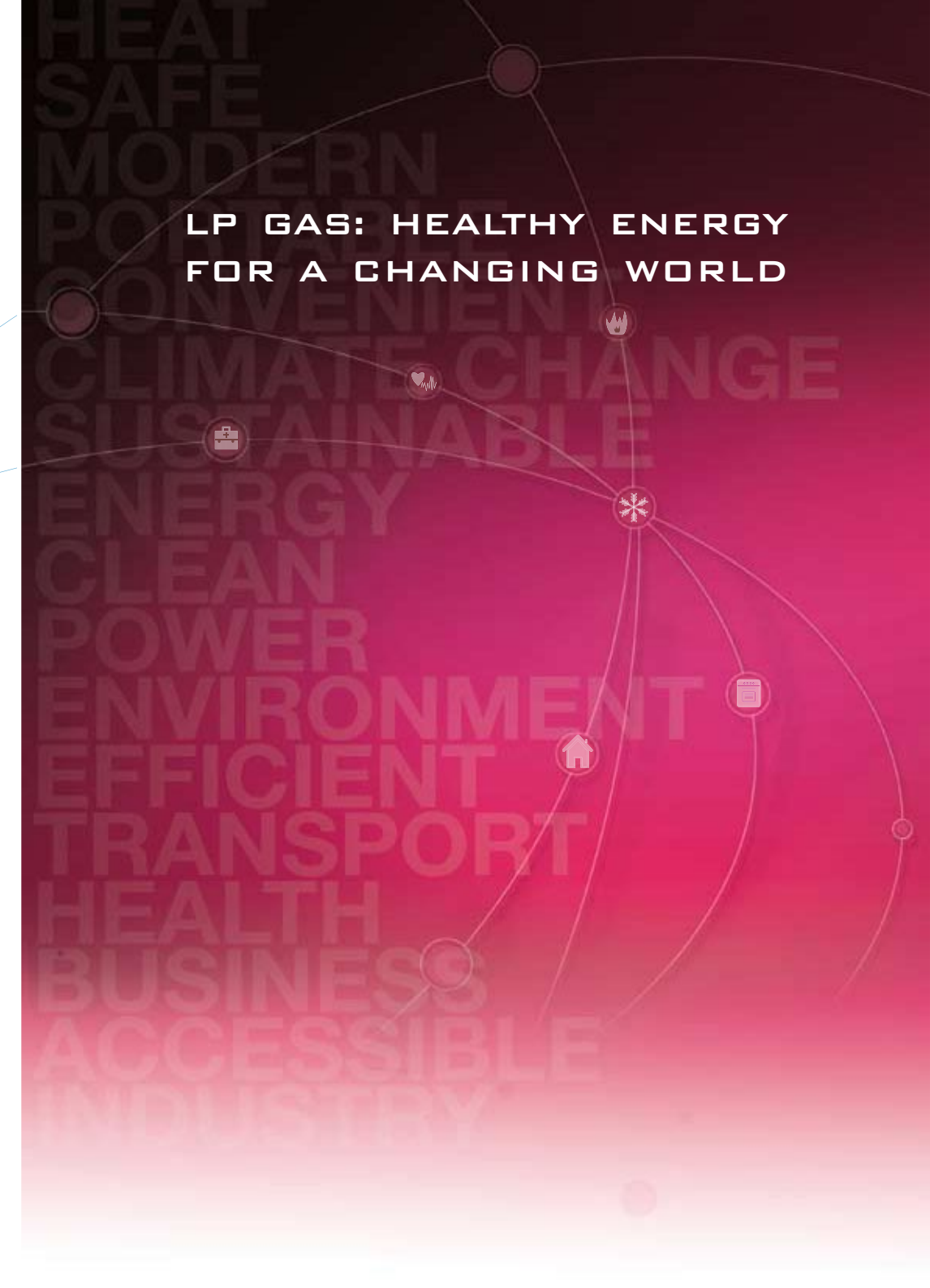


**WORLD LP GAS ASSOCIATION**  
9, rue Anatole de la Forge, 75017 Paris, France  
Tel. +33(0)1 58 05 28 00 Fax +33(0)1 58 05 20 01  
Email : [association@worldlpgas.com](mailto:association@worldlpgas.com) Web: [www.worldlpgas.com](http://www.worldlpgas.com)



**WORLD LP GAS ASSOCIATION**  
[WWW.WORLDPGAS.COM](http://WWW.WORLDPGAS.COM)

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## STUDY RESULTS AT A GLANCE



### LP GAS AND HUMAN HEALTH

Energy is essential to meet humanities most basic needs, from cooking to heating to boiling water to providing transportation. Therefore, switching to clean energy sources has the potential to directly impact the lives of millions and advance the wellbeing of whole communities. Improvements in public health flowing from the use of cleaner fuels not only reduces the cost of providing health care and social services, but also contributes to the broader economy by helping to avoid the impacts of diminished productivity.

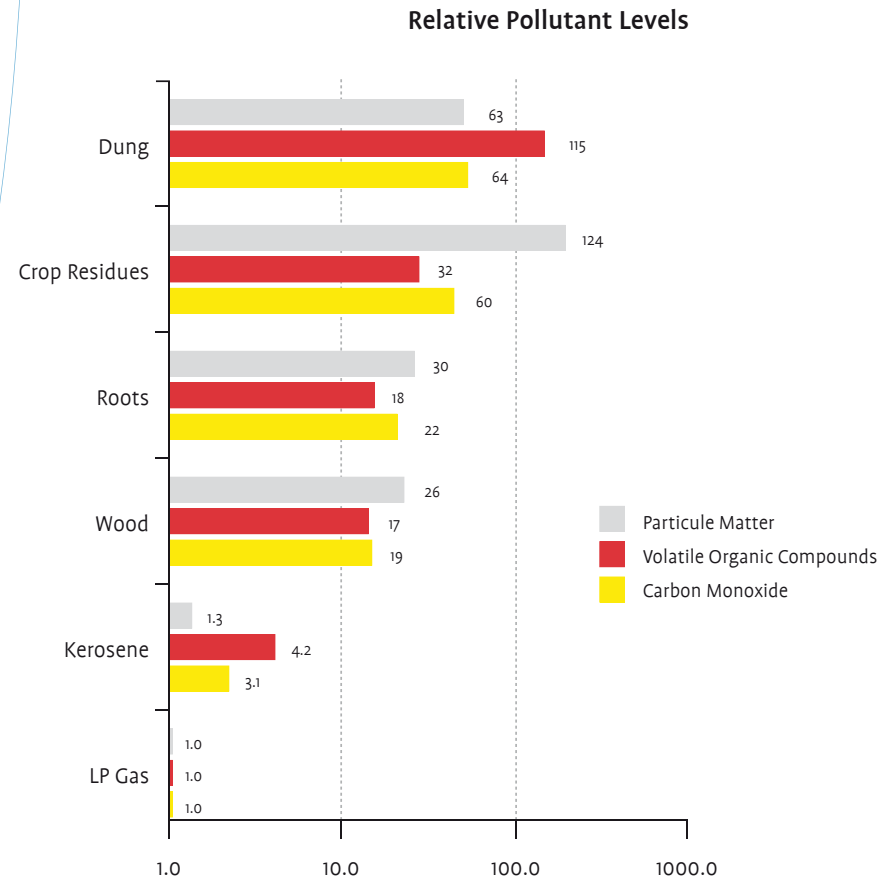
The study by the World LP Gas Association (WLPGA) entitled “LP Gas: Healthy Energy for a Changing World” explores and compares the health impacts on society caused by pollutants emitted by a range of commonly used fuels both in indoor domestic applications and in outdoor applications. Where possible, estimates are also made of the direct and indirect economic costs associated with these health effects. The study’s results clearly demonstrate that whether used in the home for cooking or heating, or outdoors as a transport fuel or for distributed generation, LP Gas, with its intrinsically clean burning characteristics, offers a practical avenue towards cleaning the air we breathe and improving our health.

### COOKING



Over half of the world’s population still relies on wood, crop waste, or even dried dung to provide the energy for cooking. Overexposure to the pollutants released by these fuels is the direct cause of premature death for more than 1.5 million people worldwide every year. Providing the means to cook with LP Gas greatly reduces exposure to the pollutants emitted by these energy sources, often by a factor of 100 or more, delivering enormous community health benefits.

*FACT: The World Health Organization (WHO) estimates that providing people with access to LP Gas would bring a payback of US \$ 91 billion per year on an investment of US \$ 13 billion to halve the number of people cooking with solid fuels worldwide.*



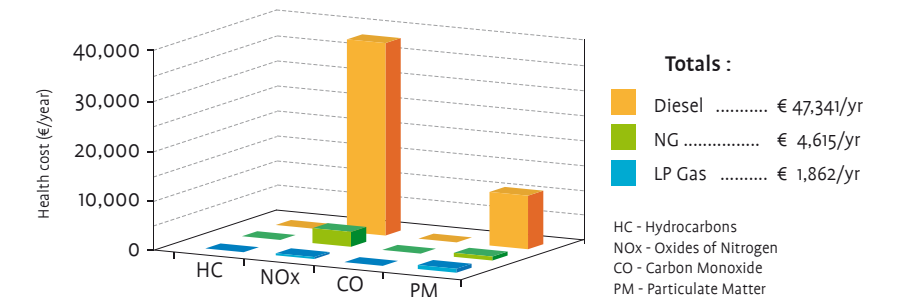
### DISTRIBUTED POWER GENERATION



Unless fitted with sophisticated emission control technologies, diesel and petrol generator sets can produce very high levels of pollutants, in particular elevated amounts of particulate matter (PM) and oxides of nitrogen (NOx) emissions, with commensurably high health impacts.

*FACT: Small 4-stroke petrol powered generators have a health impact cost around 1.5 times higher than LP Gas, and for a similar 2-stroke version the relative health impact factor rises to over 4.5.*

#### Medium Non-Road Engine Annual Health Costs based on 80kW Average power, 12hrs/day



### RESIDENTIAL SPACE AND WATER HEATING



Without adequate ventilation, or if heating appliances and associated flues or chimneys are faulty, the concentration of some pollutants can build up to levels which may be harmful to human health.

*FACT: Measurements of total pollutant emissions produced by burning wood and coal show that these fuels produce around 150 times more carbon monoxide (CO) per gigajoule of energy produced than LP Gas. Liquid fuels, such as kerosene, produce levels around 50% higher.*

**Emissions g/Gj**

Fuel	NO <sub>2</sub>	VOC	PM	CO	
Residential Combustion Heater	Gaseous (LPG)	57.0	10.5	0.5	31.0
	Liquid	68.0	15.5	3.7	46.0
	Wood	74.5	925.0	695.0	5300.0
	Coal	109.0	484.0	404.0	4602.0
50 kW Household Boiler	Gaseous (LPG)	70.0	10.0	0.5	30.0
	Liquid	70.0	15.0	3.0	40.0
	Wood	120.0	400.0	475.0	4000.0
	Coal	130.0	300.0	38.0	4000.0
	Briquettes	200.0	200.0	100.0	3000.0

NO<sub>2</sub> - Nitrogen Dioxide; VOC - Volatile Organic Compounds; PM - Particulate Matter; CO - Carbon Monoxide