### Bulk LPG Business in Portugal

Portugal has the largest LPG (Liquefied Petroleum Gas) share of primary energy demand in the EU (about 5%). The bulk LPG market in Portugal is mainly about small and medium business clients and household consumers, in the regions where natural gas is not available.

Excluding cooking and special appliances, the alternative energy with the most competitive price is heating diesel. This substitute energy has a very low price, with small variations, because it has been substituted by government.

Due to the increasing of LPG international cost in the last 4 years, the distance between LPG bulk price and price of substitute energy has raised to expressive values. Because of the high price sensitivity of the consumers, the preference of new consumers for equipment using substitute energy has been increasing.

### Market Dynamics, Pricing Strategies and Value Creation

Some strategic questions about pricing arise from recent evolution in bulk LPG market.

Pricing strategies have to take into consideration some market dynamic effects. Such effects are derived from consumer behaviour regarding his willingness to switch to substitute energy and from the interest of equipment sellers to promote LPG.

What are the best pricing strategies in terms of value creation, considering different scenarios for the future evolution of LPG international cost? For example, in a scenario of cyclic variation, fix price strategy would deteriorate financial results, otherwise a fix margin would cause client resource depletion.

### Simulation Model

A simple system dynamics model was built, combined with Economic Value Added framework, to evaluate some pricing strategies under different scenarios of LPG international cost.

That model provide that policymakers visualize the impacts over time of certain strategies, and with that they have a dynamical understanding of the pricing policies that create more value for the organization.

To build this simulation model, we have used historical data (1998-2003) of LPG market.

The LPG international cost is an exogenous variable, and is used to define the different future scenarios.

To keep the model as simple as possible, we use relative variables and non-linear graphical functions to describe the pricing effect in consumer behaviour.

In the case of LPG consumers changing to substitute energy, the switching rate is dependent upon the relative price between LPG and its substitute energy. That function was calibrated against historical data, assuming one year delay between consumer perception and action.

The acquisition rate of new consumers is also dependent upon the relative price, and that function was calibrated against historical data as well.

It is assumed that agents influence the option in about 60% of new consumers. The medium time to adjust agents perception about LPG competitiveness and consumer preference is two years.

### Financials

- **Non-linear graphical function used for describing new consumer behaviour.** For a given price ratio, the function gives the fraction of new consumers preferring substitute fuel instead LPG.
- **Linear function used for describing change of equipment price.**
- **Logistic function used for describing change of perception about fraction of clients preferring LPG equipment.**

### Scenario Planning and Strategies Evaluation

Using that simulation model in combination with scenario planning method, we can develop and evaluate alternative futures in uncertain environment, and test alternative strategies as well.

For example, considering a scenario with a cyclical variation of LPG international cost, we might be interesting in testing two alternative pricing policies: fix price and fix margin.

Policy 1 – Fix margin. Price is driven by margin.

Policy 2 – Fix price. Margin will vary to absorb LPG cost variations.

Given that scenario for the future international cost, the following graphics show the simulated impacts for those two pricing policies.