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KEYNOTE ADDRESS BY

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## **Contribution of the Natural Gas Industry to a Sustainable Energy System**

Conference Theme: "The Global Energy Challenge: Reviewing the Strategies for Natural Gas"

Salutations

Ladies and Gentlemen,

On behalf of PETRONAS, I would like to first of all thank the IGU for giving me the honour and privilege to address this prestigious conference, to share with you some of my thoughts at this pivotal moment in the development of our industry.

We meet at a time when the world economy appears to be stabilising from its worst crisis in more than 70 years. Already, a number of developed economies have reported a return to growth, while in many emerging economies prospects also appear to have improved. The worst may be over, but what the future heralds remains uncertain.

However, even if the most optimistic recovery projections were to materialise, it is probably too late to forestall this year from becoming the first in more than half a century to see a full year contraction<sup>1</sup> in global gas demand or reverse the postponement and cancellation of various gas-related projects, potentially affecting the supply of more than 30 billion cubic metres of gas.<sup>2</sup>

Over the course of the next 12 months, economic policymakers will be faced with the delicate task of gradually withdrawing the massive fiscal and monetary supports that have been in place, without endangering the fragile recovery. Improperly executed, these exit strategies risk sending the world economy tumbling once again, creating further disruptions in energy markets and making efforts to ensure that adequate investments are made to sustain future availability of energy supplies a more complex task.

Ladies and gentlemen, during the last two days, you have been inundated with charts and graphs. My presentation will not contain any but will perhaps be more philosophical towards a sustainable future of our energy system and how the gas industry can play a role.

As we all know, energy plays a central role in sustaining economic development and social progress. Over the course of the last 200 years, humanity has witnessed a 70-fold expansion in economic activity in real terms, resulting in an 11-fold increase in living standards.

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<sup>1</sup> IEA press release during launching of its *Natural Gas Market Review 2009*.

<sup>2</sup> <sup>2</sup> IEA Background Paper for the G8 Energy Ministers' Meeting, "The Impact of the Financial and Economic Crisis on Global Energy Investment" (May 2009) — some 2.3bcf/d of gas capacity has been delayed by at least 18 months, while 1bcf/d of capacity shelved. Units converted into billion cubic metres, in keeping with the IGU's convention.

This is unprecedented in human history – and that this was attained despite a six-fold increase in population, itself unprecedented, thanks to the improved nutritional intake and living conditions that sustained economic development afforded.<sup>3</sup> The degree of mobility to which we have grown accustomed to today, as well as the sheer breadth of choices in consumer goods and services we enjoy, would have been unimaginable to someone living at the dawn of the Industrial Revolution. These accomplishments were founded upon the availability of secure and affordable energy, enabled in turn by a continuous stream of technological innovations that have allowed us to harness the planet's endowment of energy resources.

Today, just one-fifth of humanity, consuming approximately half of the world's annual energy requirements, produces nearly three-fifths of world economic output and in the process attains an average income level of more than 6½-times over the rest. Following closely in their footsteps, a further two-fifths of humanity<sup>4</sup> have only just embarked on their drive towards industrialisation and behind them an equal number may soon follow suit. Over the course of the next two decades, world economic output has been projected to double and energy requirements to increase by one-third, despite a decline of a similar magnitude in the intensity of energy use.

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<sup>3</sup> Angus Maddison (March 2009), *Historical Statistics of the World Economy: 1-2006 AD*

<sup>4</sup> Primarily referring to China and India, which account for 38% of total world population..

By 2030, robust economic growth in the emerging economies at twice the rate of the OECD average will have enabled four-fifths of humanity to double their per capita incomes and in its wake nearly two billion new members of the so-called “global middle class” will have been created.<sup>5</sup>

Yet, staggering as these increases may appear, by 2030, the average per capita income level in the emerging economies will only have reached one-quarter the OECD average, signifying that rapid economic development, and more importantly the increases in energy requirements necessary to sustain it, is set to continue well into the century.

Faced with the prospects of increases in energy requirements of such a magnitude, unless concerted efforts are made to shift our energy systems into a less resource-intensive mode, the implications for the climate and the intolerable stresses they would create on the planet’s resources would be almost too frightening to even contemplate. Short of stopping economic development in its tracks or denying billions a chance at prosperity, humanity therefore faces the challenge of evolving a sustainable energy system that while making available the necessary energy to sustain economic growth, will also preserve the integrity of essential natural systems and avoid intensifying the security risks or geopolitical tensions that may result from increasing competition for unevenly distributed energy resources.

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<sup>5</sup> APEC & the Global Middle Class, published by the Department Of Foreign Affairs And Trade of the Government of Australia (June 2007). The global middle class is defined as “those who have scope for discretionary expenditure over and above the basic necessities of life such as food, clothing and shelter; but who, at the same time, face some constraint on that expenditure”. This would typically include those with annual incomes of between US\$4,000 and US\$17,000.

It is hence within this context of humanity's need to evolve such a system that one can ask, "What role does, and should, natural gas play?"

Not too long ago, it could more or less be taken for granted that the world was moving into the Gas Era. Just as oil replaced coal around the early-20<sup>th</sup> century, so too was it thought that we were at a similar stage of transition away from oil. Natural gas would thus sustain much of humanity's energy requirements until such time when technological improvements rendered renewable energy cost-competitive. Natural gas, therefore, being the least carbon-intensive fossil fuel, was largely perceived as being the natural candidate to bridge our current fossil energy-dominated system with non-fossil energy of the future.

While I believe that this view largely still has its merits, it is also equally important for us to recognise that it can no longer be taken for granted. Nuclear is no longer the taboo it was ten years ago and in fact, in many parts of the developing world – particularly in Emerging Asia and increasingly also in the Middle East – nuclear energy is fast becoming the preferred energy source for power generation. Beyond 2020, more countries are likely to be exploring this energy option. In similar vein, international collaborative efforts are today hard at work to develop the technologies that will make coal an integral part of the solution, rather than a major contributor to the problem.

While natural gas may clearly be today's forerunner in an emergent sustainable energy system, concerted efforts on our part are still required to ensure that it remains safe, reliable and above all affordable.

Ladies and gentlemen,

As we are all aware, the gas business requires huge long-term commitments of capital and rests largely upon stable, mutually-beneficial relationships. Billions of dollars will need to be sunk into immovable physical infrastructures requiring decades of safe operations within an environment of stable regulatory regimes and predictable – even if varying – market conditions, before this initial investment can be recouped.

Absent of any one of these factors, it is difficult to imagine how any rational investor would be willing to invest their money. No investments will then be forthcoming and it would be impossible for the natural gas industry to expand. Environmental concerns and the recent credit crunch have resulted in many projects being deferred or shelved.

In playing its part in any sustainable energy system, natural gas is confronted with a number of challenges. Proven reserves are both geographically and geologically concentrated and are often to be found at great distances from major demand centres, necessitating that lengthy – and in fact, lengthening – supply chains be developed to bring those resources to market. In so doing, we are confronted with numerous technical as well as cost challenges, and in addition, a whole host of complex questions concerning the security of supply and security of demand that needs addressing and managing over long periods of time.

In recent years, the growing attractiveness of unconventional gas reserves as an alternative supply source have unleashed internal industry dynamics whose implications we are perhaps only just beginning to grapple with, let alone fully understand. Above all, geopolitics will determine the “where” and “when” resources are developed.

As was the case in the past, technological innovations as well as improvements are likely to provide us with many of the solutions to these challenges, whether it be in terms of improving access to resources, or to markets. Gas exploration, as you all know, is not yet at the equivalent stage of maturity compared to oil and many areas have yet to be fully or specifically explored for gas. Efforts to discover new resources will be essential not only to ensure adequate supplies to meet rising demand, but also to open up a more diverse array of supply options, to the extent that they exist closer to market, can be marketed more affordably and contribute towards overall energy security objectives. Such efforts will undoubtedly require increasing reliance on technology – current and prospective – particularly as we push into deeper sedimentary basins and further out into new frontier areas.

Technology likewise will also influence the threshold field size that can be commercialised with much the same positive effects for the attractiveness of natural gas. In this regard, we are already seeing a decisive push to commercialise floating LNG (FLNG) technologies, which although not yet commercially proven, holds out much promise.

At the other end of the spectrum, expanding conversion and end-user technologies will also help sustain the attractiveness of gas. Combined cycle gas turbine (CCGT) technologies with their superior conversion efficiencies have gone a long way towards enhancing the attractiveness of natural gas as a fuel of choice for power generation and ongoing efforts to push these efficiencies to even higher levels will undoubtedly perpetuate its competitive edge.<sup>6</sup> Other technological advancements could also downscale the size of combined heat and power (CHP) applications<sup>7</sup>, bringing the benefits of gas co-generation to millions of households and perhaps much further into the future. Technology may also enable us to offer hybrid clean energy solutions in combination with renewable energy.

Of course, technology, being embodied in capital investments, will not be able to work its marvels without a stable regulatory regime that provides the conducive environment to flourish. We have seen how the social and political pressures created by higher energy prices have led some governments to resort to populist measures. Retrospective changes in regulations, coming in the face of sunk investment costs, may often force investors into compliance, but this is likely to lead them to demand higher hurdle rates of return on future expansion opportunities — thereby, adversely affecting the sustainable expansion of the natural gas industry and ultimately working against the long-term interests of the host country itself.

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<sup>6</sup> The US Department of Energy's Vision 21 program is aiming for a goal of over 70 – 75% thermal efficiency for CCGT power plants in 21st century.

<sup>7</sup> Micro CHP (mCHP)

We have also seen measures to limit natural gas exports being enforced and the establishment of price ceilings in domestic markets. In order to realise the attractiveness of natural gas as a sustainable energy resource, we will therefore be challenged to work with host governments to convince them that it is neither in the interests of the industry nor ultimately of their public welfare that such measures be perpetuated, particularly if compensating adjustments are left till too late and at the point when the resources have been fully exhausted.

Adequate pricing mechanisms to facilitate the true economic value of the natural gas resource are an important element of sustaining the healthy development of the natural gas industry as well as in achieving efficient resource allocation. However, in doing so, we must avoid the temptation to prescribe a “one-size-fits-all” solution. Gas prices across regional markets today have diverged markedly, reflecting different sets of supply and demand fundamentals.

Under these circumstances, it would be difficult to envisage the suitability of a common reference price even if it was that of a dominant market. Where price discovery cannot be achieved through an actively tradable market, the best mechanism may still be the netback market value approach with gas priced in relation to competing fuels within the framework of long-term contracts. Without these mechanisms to facilitate discovery of a “fair value” long-term price of gas, it is unlikely that we will see timely capacity addition anywhere on a scale necessary to support the sustainable development of natural gas.

Another key element I would like to mention is the human capital dimension. The shortage of suitably qualified technical talent has affected large parts of our industry value-chain and potentially risking its safe operations and reliability is increasingly being recognised as a major area of concern. I believe there have been insufficient collaborative attempts to address this issue. I am convinced this is one area where more thought and effort needs to be put into, so that moving forward we would be able to forge a sound collective position to advocate effective solutions that address both short-term imbalances and lay the foundations for the industry's long-term sustainability.

Ladies and gentlemen,

The realities of gas markets in emerging economies entail their own set of unique challenges that must be surmounted for natural gas to be a part of their sustainable energy futures.

Emerging gas markets are often characterised by small or even a total absence of demand, insufficiently-developed infrastructures – making every stage of expansion comparatively more costly and certainly extremely risky – and gas prices that are highly regulated and frequently set without sufficient regard for their true economic cost. In some cases, particularly where gas has to be transported over large distances, small markets may be unable to support the full potential of natural gas, requiring collaborative region-wide approaches that forge a fully-functioning integrated gas market, backed by a programme of inter-governmental co-operation and mutually coherent energy policies, to generate the necessary economies of scale.

In developing its gas market, Malaysia was confronted with many of these challenges and is still in the process of evolving towards a more mature market structure today. We are the world's second-largest exporter of LNG<sup>8</sup> and have successfully built a fully-integrated domestic gas value-chain supporting an annual domestic gas consumption of around 31 billion cubic metres, which meets more than two-fifths of our primary energy requirements, and which sustains a vibrant petrochemicals industry. We have also played a lead role in the conceptualisation of the Trans-ASEAN Gas Pipeline (TAGP) project aimed at creating and integrating national gas grids in Southeast Asia. We were bold enough in 1994 to suggest the development of the Trans Asia Pipeline network to bring gas from West Asia to East Asia. Sceptics dubbed it 'PETRONAS Pipedream'. The soon to be completed pipeline from Turkmenistan to China will bring this dream to reality.

Let me briefly share with you our Malaysian experience. In 1980, Malaysia, quite simply, had no gas industry. Associated gas was simply flared while abundant non-associated gas left in the ground. We set our sights on developing and adding value to our gas resources, but possessed neither the technical and commercial know-how nor the expertise to undertake the task. However, to prolong the life of our oil reserves, we had no choice but to monetise our gas reserves.

To jump-start the development of our gas industry, we adopted a two-pronged strategy.

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<sup>8</sup> As at 2008.

The key in both cases was to find anchor customers against whose critical mass of demand the substantial upfront investments could be justified, and to plan explicitly for the key developmental elements of the industry. Within this context, it was decided that we would, on the one hand, leverage on our geographical advantage to the North Asian markets to provide a monetisation route for our gas reserves in East Malaysia in the form of LNG.

In this regard, the involvement of IOCs was an important element to ensure the sustainability of our ventures. They were carefully selected not only for their financial and technical capabilities, but also for their ability to add value to our resources in terms of technology applications and transfer technology and skills to Malaysians. In this manner, we were able to gradually build long-term partnerships based on trust and mutual respect for each other's interests and evolve a relationship that went beyond the typical regulatory or adversarial relationship.

The other element of our gas utilisation strategy entailed leveraging on the fuel requirements of the country's then rapidly-growing electricity demand to provide a monetisation route for our reserves offshore Peninsula Malaysia. This objective was expressed through the establishment of the "Four Fuel Policy" in 1981 that envisaged increasing the use of natural gas for power generation and establishing the power sector as the anchor customer against which the development of an onshore cross-country pipeline transmission network – the Peninsular Gas Utilisation (PGU) system – could be undertaken and later expanded for the benefit of other sectors of the economy.

Where power sector demand once accounted almost exclusively for domestic gas demand, about 30 percent of the gas flowing through the network now serves non-power users and the export market.

In spurring gas utilisation within the context of developing gas markets, therefore, I believe our experiences underscore the values of careful and co-ordinated planning, that credible partnerships between NOCs and IOCs can be made to work successfully and the importance of coherent policies in ensuring adequate and timely investments in both physical infrastructure and human capital, as well as to encourage the steady application of technology to constantly add value to gas resources. All these are precisely the elements needed to sustain and enhance the contribution of natural gas in a sustainable energy system.

Ladies and gentlemen,

I begun by noting the considerable challenge arising from the spread of economic development and industrialisation to encompass the larger, rapidly-growing segment of humanity. I have noted how the energy requirements this would entail, coming over and above those necessary to sustain living standards already achieved by today's advanced industrialised economies, would place unimaginable stresses on the planet's natural systems and resources, unless they could be met through more sustainable means. In this regard, I am certain that while natural gas is well-placed to play a vital role in any emergent sustainable energy system, it needs to be sustained in its availability through innovation, technology, credible partnerships amongst all stakeholders, and underpinned by the adequate availability of skilled talent.

Finally, please allow me to take this opportunity to pay tribute to the Argentine Presidency for the relentless efforts they have made over the course of the Triennium in raising many pertinent issues affecting our industry. I am honoured that Malaysia, leveraging on our own unique experiences, will be privileged to lead the IGU at this critical juncture in the development of our industry. To this end, I would like to invite all of you to work with us during the 2009-2012 Triennium to steer our industry to realise its potential to become a vital element in creating an energy future that sustains the prosperity and well-being of future generations of humanity. I look forward to host you at the WGC 2012.

Thank you.