(a)

Associazione Italiana
Economisti dell'Energia

World Energy Council

IAI
Istituto Affari
Internazionali

SEMINARIO

ENERGIA E SVILUPPO SOSTENIBILE: QUALI AZIONI?

14 MAGGIO 1997 - ORE 9.15

Palazzo Rondinini
ROMA - Via del Corso, 518

La partecipazione al Seminario è gratuita.
Si prega confermare la presenza per telefono o per fax a:

AIEE - Associazione Italiana Economisti dell'Energia
Via Giorgio Vasari, 4 - 00196 Roma
Tel. (06) 3227367 - Fax (06) 3234921

PRESENTAZIONE

Il World Energy Council (WEC), che raggruppa un centinaio di paesi, è un'organizzazione non governativa e multienergetica. Il WEC studia, analizza e discute i problemi relativi al settore dell'energia al fine di fornire, su scala internazionale, punti di vista, consigli, raccomandazioni ai decisori politici, agli operatori, ai media. L'obiettivo statutario del WEC è "promuovere l'approvvigionamento e l'utilizzazione sostenibili dell'energia per il più grande beneficio di tutti".

Il WEC ha pubblicato recentemente il "WEC Message for 1997" dal titolo "Energy Complacency Threatens Sustainability". Nel Messaggio del WEC si sostiene che anni di disponibilità di energia abbondante ed a prezzi particolarmente convenienti hanno generato a livello mondiale un pericoloso atteggiamento di "autocompiacimento" che mette a rischio la "sostenibilità" e che non è giustificato da una più attenta valutazione della situazione, soprattutto in una prospettiva di lungo periodo.

Con questo Seminario il Comitato Nazionale Italiano del WEC, l'Associazione Italiana degli Economisti dell'Energia e l'Istituto per gli Affari Internazionali intendono dibattere il contenuto del Messaggio del WEC e informare l'opinione pubblica sui problemi del settore dell'energia che — nonostante l'attuale confortevole situazione — richiedono una costante e vigile attenzione.

PROGRAMMA

ore 9.15 Apertura dei lavori
Giuseppe Sfligiotti, Presidente Comitato Italiano WEC e Studies Committee

ore 9.20 **Il Messaggio WEC per il 1997**
Ian Lindsay, Secretary General WEC (*)

ore 9.40 **La disponibilità di energia: quali azioni per uno sviluppo sostenibile?**
Guglielmo Moscato, Presidente ENI

ore 10.00 **Il quadro delle relazioni internazionali: prospettive e proposte**
Stefano Silvestri, Vice Presidente IAI

ore 10.20 **Il ruolo della ricerca scientifica per lo sviluppo sostenibile**
Ugo Farinelli, Direttore Dip. Energia ENEA

ore 10.40 **Il finanziamento degli investimenti energetici**
Intervento di un rappresentante del mondo finanziario italiano

ore 11.00 Intervallo - caffè

ore 11.30 **Il sistema industriale e lo sviluppo sostenibile**
Giuseppe Gatti, Presidente Commissione Energia Confindustria

ore 11.50 **Il cambiamento negli assetti istituzionali e strutturali nell'industria energetica**
Chicco Testa, Presidente ENEL

ore 12.10 **Il ruolo del mercato e della regolamentazione per lo sviluppo sostenibile**
Sergio Garribba, Membro Autorità Energia

ore 12.30 **Le risposte di politica energetica per lo sviluppo sostenibile**
Umberto Carpi, Sottosegretario Industria (*)

ore 12.50 Dibattito

ore 13.20 Chiusura lavori
Edgardo Curcio, Presidente AIEE

(*) da confermare

World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

Comitato Nazionale Italiano del Consiglio Mondiale dell'Energia

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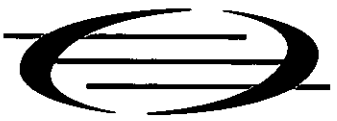

World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

AUTOCOMPIACIMENTO ENERGETICO: UNA MINACCIA PER LA SOSTENIBILITA'

MESSAGGIO WEC 1997

Novembre 1996

AUTOCOMPIACIMENTO ENERGETICO: UNA MINACCIA PER LA SOSTENIBILITA'

1. *La scena energetica mondiale*

Nei paesi industrializzati, sono in molti a credere che le disponibilità energetiche non siano un grosso problema, perchè raramente sono state così ampie. Le riserve di combustibili fossili sono abbondanti e verosimilmente sfruttabili fino a tutto il prossimo secolo, purchè continui il progresso tecnologico e si rendano disponibili i capitali necessari. Questa situazione, che ha ovviamente portato ad un diffuso atteggiamento di compiacimento fra i consumatori, cela tuttavia una serie di rilevanti problematiche. Noi qui vogliamo sottolinearne una in particolare, cioè l'esigenza di coniugare, a più lungo termine, progresso economico e salvaguardia ambientale.

Oggi, nonostante l'apparente abbondanza di combustibili fossili, il 40% della popolazione mondiale - ossia oltre 2 miliardi di persone - la maggior parte delle quali nei paesi in via di sviluppo, non dispone di energia commerciale e non è quindi in grado di soddisfare bisogni essenziali. Per questa parte del mondo, ipotesi di compiacimento sono prive di fondamento o addirittura un affronto, dato che essa non riesce a compiere nemmeno il primo passo verso lo sviluppo economico e si vede costretta ad utilizzare, come fonti di energia, solo legna da ardere e rifiuti.

Poichè, nel prossimo secolo, la popolazione mondiale è destinata a raddoppiarsi e poichè l'incremento demografico sarà concentrato nei paesi in via di sviluppo, le tensioni dovute alla carenza energetica, se non saranno affrontate con decisione, si accresceranno. I problemi che ne derivano dovranno avere soluzioni soddisfacenti, altrimenti il peggioramento della situazione che ne seguirà sul più lungo termine determinerà profonde conseguenze geopolitiche e nefaste ripercussioni sull'ambiente, come la deforestazione e l'erosione del suolo.

Tuttavia, nell'ipotesi che si riesca a rendere commercialmente disponibile l'energia necessaria, gran parte dell'incremento della domanda si registrerà nei paesi che sono attualmente in via di sviluppo, che rappresentano il 35% dei consumi mondiali e molti dei quali già risentono degli effetti dell'inquinamento atmosferico locale. Entro il 2050, questi paesi consumeranno probabilmente oltre il 60% delle risorse energetiche primarie. Oggi, il gruppo dei paesi industrializzati è il maggiore responsabile delle emissioni atmosferiche dovute all'utilizzo dei combustibili fossili; entro il 2020, questo "primato" negativo spetterà ai paesi in via di sviluppo e la relativa quota di emissioni continuerà a crescere, anche se con percentuali di emissioni pro capite inferiori a quelle dei paesi industrializzati.

Nei decenni a venire, nonostante i sostanziali guadagni di efficienza, il mondo consumerà molta più energia. Gli studi del WEC segnalano, nella maggior parte degli

scenari ipotizzati, almeno un raddoppio dei valori attuali al 2050. I costanti progressi tecnologici ed investimenti adeguati potrebbero assicurare disponibilità sufficienti ed accessibili di gas, petrolio e carbone per alimentare gran parte di questo futuro fabbisogno; si potrà anche far ricorso a risorse non convenzionali di petrolio e gas. Di fatto i combustibili fossili continueranno, nel futuro prevedibile, a costituire la parte dominante dei consumi energetici.

Tuttavia, se si vuole conciliare l'aumento della domanda di energia, a sostegno dello sviluppo socio-economico, con la salvaguardia ambientale, occorrono azioni più incisive:

- migliorare la compatibilità ambientale dei combustibili fossili;
- accelerare l'incremento di efficienza nell'approvvigionamento e nell'impiego di tutte le forme di energia;
- intensificare il ricorso a forme di energia non fossile.

2 *Agire immediatamente*

Armonizzare lo sviluppo socio-economico basato sull'incremento della richiesta energetica con la salvaguardia ambientale è definito come il "percorso per uno sviluppo sostenibile". Esso richiede, soprattutto da parte dei paesi industrializzati, azioni incisive di scala planetaria.

Il WEC sollecita quindi le seguenti iniziative:

- Anzitutto, mettere in atto interventi rapidi ed efficaci per elevare l'efficienza energetica. In molti paesi, l'intensità energetica (cioè l'energia necessaria per produrre un'unità di Prodotto Interno Lordo) diminuisce soltanto dell'1% all'anno, un risultato modesto rispetto a quello che sarebbe conseguibile utilizzando in modo più efficiente le tecnologie odierne. Fra gli strumenti per incrementare l'efficienza, ricordiamo:
  - maggiore impegno nel promuovere campagne nazionali di informazione e sensibilizzazione dell'opinione pubblica;
  - incentivi per accrescere l'efficienza dei mezzi di trasporto e nella produzione di energia elettrica;
  - incentivi all'industria ed agli utilizzatori finali, affinchè investano in beni strumentali di tipo innovativo e più efficienti sotto il profilo energetico;

- Ampliare le attività istituzionali per intensificare il trasferimento, fra i paesi, di tecnologie di avanguardia energetiche e di salvaguardia ambientale. Fra le attività di maggiore successo, basta ricordare la recente iniziativa dell'E7 nel settore elettrico ed alcuni aspetti del progetto PHARE dell'Unione Europea;

- Fare in modo che i prezzi al consumo dell'energia siano quelli di mercato. Nei numerosi paesi in cui sarà necessario eliminare gradualmente le sovvenzioni, questo processo potrà richiedere del tempo ma, in fin dei conti, solo i prezzi di mercato sono in grado di

scoraggiare gli sprechi e l'inefficienza e di mobilitare flussi di capitali per finanziare i necessari investimenti nelle infrastrutture;

- Utilizzare in modo più efficace le risorse destinate alla ricerca e sviluppo. Entro il 2050, per soddisfare il proprio fabbisogno, il mondo dovrà utilizzare tutte le forme di energia; occorrono dunque progressi tecnologici costanti in tutti gli impieghi delle diverse forme di energia. Particolare accento va posto sulla ricerca, sullo sviluppo, sui progetti dimostrativi e sul finanziamento delle nuove fonti rinnovabili (solare, eolica, biomasse ecc.) che non hanno ancora raggiunto la maturità commerciale. Con un adeguato sostegno, il contributo delle nuove fonti rinnovabili, attualmente del 2%, potrebbe raggiungere, entro il 2020, il 5-8% del fabisogno energetico mondiale. Tale contributo potrebbe rivelarsi prezioso per molti dei paesi in via di sviluppo;

- Adottare misure precauzionali, ma economicamente valide, per contenere le emissioni atmosferiche. In particolare, bisogna accelerare il miglioramento della compatibilità ambientale dei combustibili fossili, attraverso tecnologie del carbone pulito, benzine e motori diesel meno inquinanti, centrali elettriche più efficienti e migliori sistemi di abbattimento degli inquinanti;

- Estendere il principio "polluter pays" ed avviare con determinazione azioni volte alla definizione di standard comuni per misurare l'impatto ambientale e i relativi costi;

- Creare le condizioni affinchè l'energia nucleare possa dare un maggiore apporto alle disponibilità energetiche. Ciò significa garantire un'elevata sicurezza e buone prassi di esercizio delle centrali e dimostrare che le scorie nucleari possono essere smaltite in piena sicurezza. L'industria nucleare ha la responsabilità di assicurare che questa informazione sia portata a conoscenza dell'opinione pubblica in modo efficace e comprensibile a tutti.

Tutte queste azioni possono costituire la piattaforma per uno sviluppo energetico sostenibile nel futuro.

3. *E' necessario un impegno su scala planetaria*

In futuro, ingenti risorse saranno necessarie per lo sviluppo tecnologico, il finanziamento dei progetti, la gestione dell'aumento della domanda energetica indotto dall'incremento demografico e dallo sviluppo economico, nonchè per facilitare l'accesso all'energia commerciale per quei 2 miliardi di cittadini del mondo che attualmente non ne dispongono. Date le dimensioni di questi fabbisogni, i cambiamenti dei sistemi energetici non potranno che essere graduali: ci vorranno molti anni per sviluppare le strutture energetiche di domani e ci vorranno decenni perchè i progetti energetici possano raggiungere una massa critica tale da avere un impatto a livello globale. Se non verranno immediatamente attuati interventi tesi ad accelerare questi processi, la futura sostenibilità della produzione e del consumo di energia potrà risultare gravemente compromessa - a scapito di tutti.

World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

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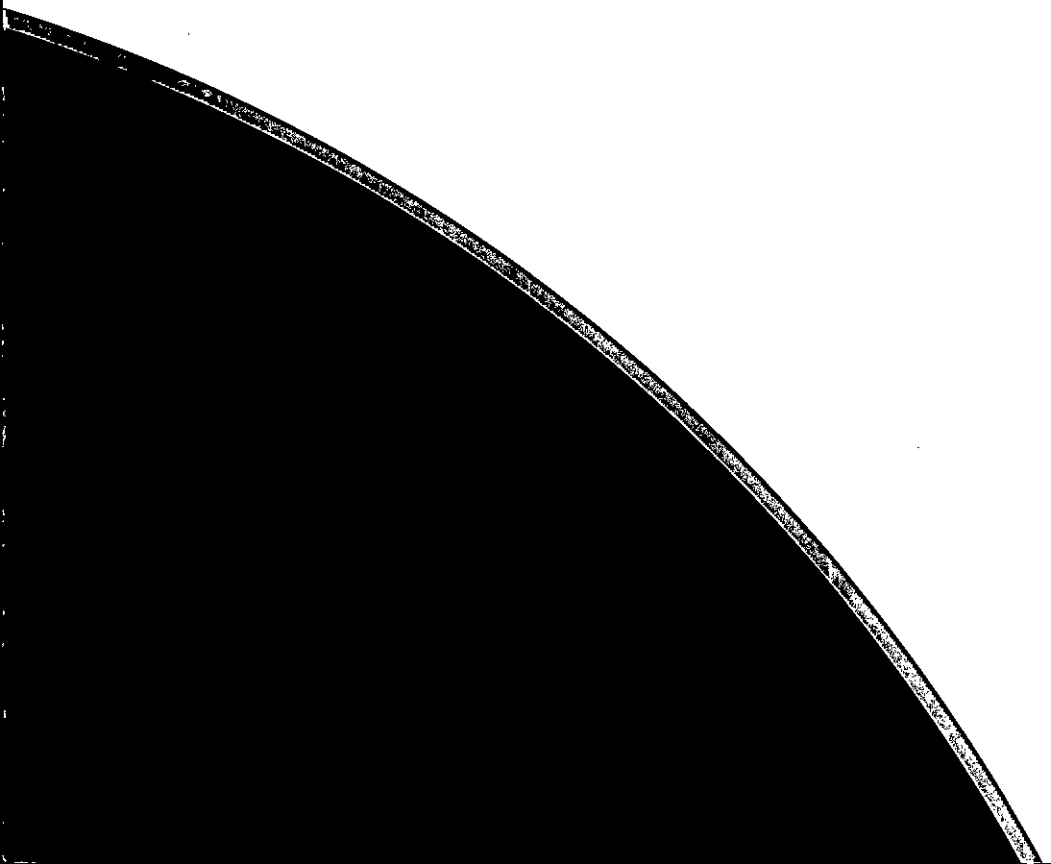
MESSAGGIO WEC 1997

Il World Energy Council è un'organizzazione non governativa che si interessa, con finalità non commerciali, a tutte le forme di energia.
I membri del WEC, appartenenti a circa 100 paesi, rappresentano oltre il 90% dei consumi energetici mondiali.
Con questo Messaggio, indirizzato essenzialmente ai decisori del settore energetico internazionale e dei settori correlati, il WEC richiama l'attenzione su quelle problematiche che, a suo giudizio, meritano una più alta priorità e per le quali sollecita iniziative immediate.



WEC MESSAGE FOR 1997

BRIEFING NOTES

As follows:

A. Energy Reserves

B. 'Global Energy Perspectives to 2050' Scenarios:

1. Overview of the Scenarios
2. Global Primary Demand
3. Composition of Global Primary Demand and Carbon Emissions
4. Global Energy Investment

C Reducing Energy Intensity

D Energy Prices

E Energy Subsidies

F Government Funding on Energy R&D

G Competiveness of New Renewables

A. ENERGY RESERVES

Fossil Fuel & Uranium Reserves at end 1993

	Proven Reserves Gtoe	Resources Gtoe	Resource Base Gtoe	Proven Reserves: Production
Oil				
Conventional	150	145	295	44
Unconventional	193	322	515	-
	343	467	820	-
Natural Gas	141	279	420	65
Coal & Lignite	606	2794	3400	231
Total Fossil Fuel	1090	3550	4640	-
Uranium				
In Thermal Reactors	37	130	167	
In Fast Reactors	1850	6500	8400	

Source: WEC

Proven Reserves are those which can be produced with existing technologies under present market conditions.

Resources are those which with technical progress could become economically attractive to produce over the next 55 years.

Notes

1. Proven reserves of conventional oil, natural gas and coal increased by 62%, 78% and 15% respectively between 1981 and 1993.

2. The scenarios in 'Global Energy Perspectives to 2050 and Beyond' show expected fossil fuel consumption over 1990-2050 to be as follows:

Oil	Natural Gas	Coal	Total Fossil Fuels
323-210 Gtoe	241-179 Gtoe	235-141 Gtoe	799-548 Gtoe

If both Conventional and Unconventional Oil are included, reserves of oil appear sufficient to meet expected consumption up to 2050.

B. 'GLOBAL ENERGY PERSPECTIVES TO 2050' SCENARIOS

1. Overview of the Scenarios

'Global Energy Perspectives to 2050 and Beyond' presents three sets of scenarios, Cases A, B, and C. They are designed to correspond to Cases A, B, and C in 'Energy for Tomorrow's World' (WEC 1993). They examine, in particular, more thoroughly the possiblities beyond 2020. They focus on the period up to 2050, although data are available in 2100.

In brief, Case A presents a future of impressive technological improvements and consequent high economic growth. Case B describes a future with less ambitious, though perhaps more realistic, technological improvements; and policies which reflect internal contradictions and consequently more modest economic growth. Case C presents a "rich and green" future. It includes both substantial technological progress, and unprecedented international co-operation centred explicitly on environmental protection and international equity. Key characteristices of the three Cases are given in the table below.

Summary of 'Global Energy Perspectives to 2050 and Beyond' Cases

	Case A High Growth	Case B Middle Course	Case C Ecologically Driven
World Population 2050 (10^9)	10.1	10.1	10.1
World Economic Growth 1990 - 2050	2.7% p.a.	2.2% p.a.	2.2% p.a.
World energy intensity improvement 1990-2050	medium	low	high
	-1.0% p.a.	-0.7% p.a.	-1.4% p.a
Primary energy demand (Gtoe) 2050	25	20	14
Resource availability			
Fossil	high	medium	low
Non-fossil	high	medium	high
Technology costs			
Fossil	high	medium	medium
Non-fossil	high	medium	high
Technology dynamics			
Fossil	high	medium	medium
Non-fossil	high	medium	high
CO_2 emission constraint	no	no	yes
Carbon emissions (GtC) in 2050	9-15	10	5
Environmental taxes	no	no	yes

Gtoe: Giga tonnes (10^9) of oil equivalent
GtC: Giga tonnes of carbon

2. Global Primary Energy Demand

The Cases show the following projections for primary energy demand:

Gtoe

	1990	2020			2050		
		A	B	C	A	B	C
OECD	4.2	5.7	5.2	3.7	6.7	5.6	3.0
Economies in Transition	1.7	2.3	1.7	1.7	3.7	2.4	1.7
Developing Countries	3.1	7.4	6.7	6.0	14.4	11.8	9.5
Total	9.0	15.4	13.6	11.4	24.8	19.8	14.2

(See Chart 1)

3. Composition of Global Primary Energy Demand and Carbon Emissions

Case A comprises three scenarios:

A1 : high oil
A2 : high coal
A3 : high renewables and gas

The composition of world primary energy demand and carbon emissions in the scenarios is as follows:

Gtoe

	1990	2020			2050		
		A1	A2	A3	A1	A1	A3
Coal	2.2	3.7	4.3	2.9	3.8	7.8	2.2
Oil	3.1	4.7	4.5	4.3	7.9	4.8	4.3
Gas	1.7	3.6	3.4	3.8	4.7	5.5	7.9
Nuclear	0.5	0.9	0.6	1.0	2.9	1.1	2.8
Hydro	0.4	0.7	0.9	0.9	1.0	1.1	1.1
New Renewables	0.2	0.9	0.8	1.6	3.7	3.8	5.7
Traditional Biomass	0.9	0.9	0.9	0.9	0.8	0.7	0.8
Total	9.0	15.4	15.4	15.4	24.8	24.8	24.8
Carbon Emissions (GtC)	6.0	9.5	10.0	8.2	11.7	15.1	9.2

The composition of world primary energy demand and carbon emissions in Case B is:

Gtoe

	1990	2020	2050
Coal	2.2	3.4	4.1
Oil	3.1	3.8	4.0
Gas	1.7	3.2	4.5
Nuclear	0.5	0.9	2.7
Hydro	0.4	0.7	0.9
New Renewables	0.2	0.7	2.8
Traditional Biomass	0.9	0.9	0.8
Total	9.0	13.6	19.8
Carbon Emissions (GtC)	6.0	8.4	10.0

Case C comprises two scenarios:

C1 : low nuclear
C2 : high nuclear

The composition of world primary energy demand and carbon emissions in the Case C scenarios is as follows:

Gtoe

	1990	2020		2050	
		C1	C2	C1	C2
Coal	2.2	2.3	2.3	1.5	1.5
Oil	3.1	3.0	3.0	2.7	2.6
Gas	1.7	3.1	3.0	3.9	3.3
Nuclear	0.5	0.7	0.8	0.5	1.8
Hydro	0.4	0.7	0.7	1.0	1.0
New Renewables	0.2	0.7	0.7	3.8	3.2
Traditional Biomass	0.9	0.9	0.9	0.8	0.8
Total	9.0	11.4	11.4	14.2	14.2
Carbon emissions (GtC)	6.0	6.3	6.3	5.4	5.0

(See Chart 2 for fuel shares in percentages)

4. Global Energy Investment

Cumulative investment needs for energy supply by region for the three Cases are as follows:

US$10^12 (1990)

	CASE A[a]		B		C[b]	
	1990-2020	2020-2050	1990-2020	2020-2050	1990-2020	2020-2050
OECD	8	10	7	10	5	4
Economies in Transition	3	6	2	5	2	3
Developing Countries	9	18	7	15	6	11
World	20	34	16	30	13	18

As share of GDP

Per cent

OECD	1.1	0.8	1.1	0.9	0.7	0.4
Economies in Transition	9.0	4.3	7.9	5.9	7.0	3.9
Developing Countries	3.7	2.3	3.6	2.8	2.9	1.8
World	1.9	1.6	1.8	1.7	1.5	1.1

a: A1 scenario. b: C1 scenario

Current annual investment in global energy supply is estimated to be around US$450 billion.

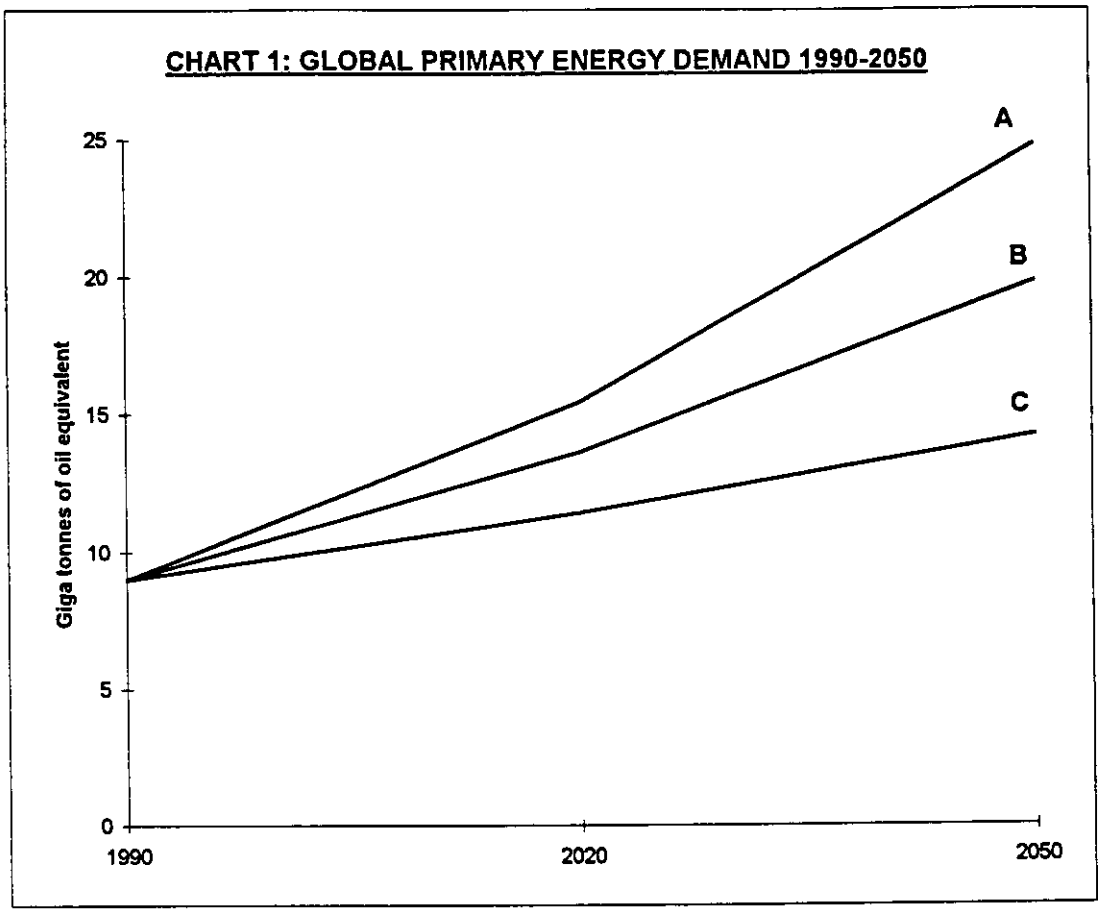
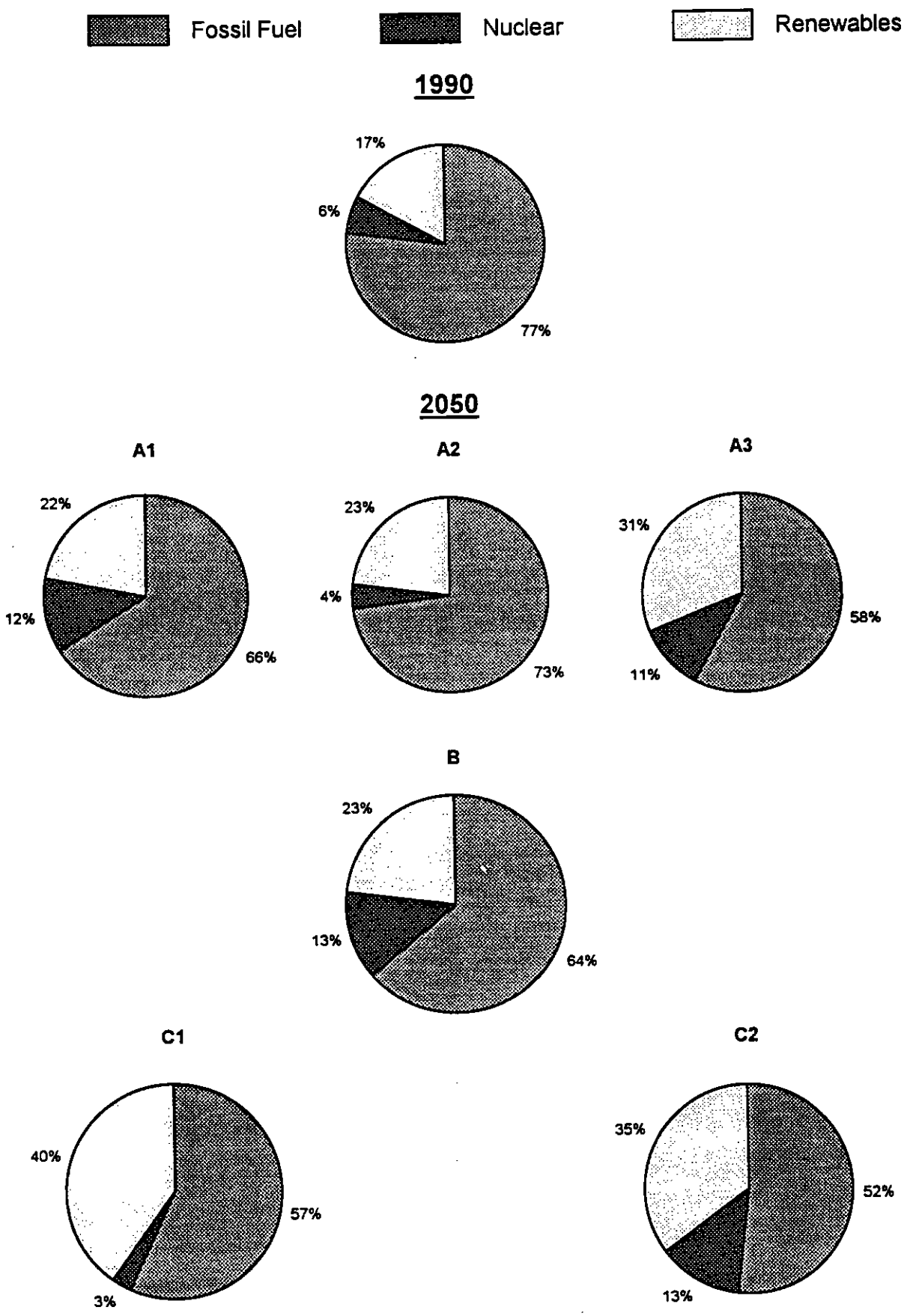


CHART 1: GLOBAL PRIMARY ENERGY DEMAND 1990-2050
Giga tonnes of oil equivalent
25
20
15
10
5
0
1990
2020
2050
A
B
C

CHART 2: GLOBAL FUEL SHARES



C. REDUCING ENERGY INTENSITY

Change in Global Energy Intensities 1975 - 90

	1975-80 % p.a.	1980-85 % p.a.	1985-90 % p.a.
OECD	-1.5	-2.1	-1.6
Economies in Transition	0.9	-0.2	-0.5
Developing Countries	0.4	0.2	0.1
World	-0.9	-0.7	-1.1

Source: WEC

The long run trend rate of decline in energy intensity for the US and the UK has been about 1% for more than 100 years. France and Germany show a similar rate of decline from the 1920s, and Japan after 1950.

Expected Reduction in Global Energy Intensities 1990-2050

	% p.a.
OECD	-2.0 to -1.1
Economies in Transition	-2.2 to -1.7
Developing Countries	-1.9 to -1.6
World	-1.4 to -0.8

Source: WEC / IIASA

Taking account of all the theoretically possible improvements in efficiency in conversion and use of energy to provide the service required (exergy), it has been calculated that end use efficiency for the USA as a whole is 2.5%, for Western Europe and Japan 4.5%, and for the world as a whole no greater than 3 to 3.5%.

D. ENERGY PRICES

1. OECD - Indices of Real Energy Prices for End-Users

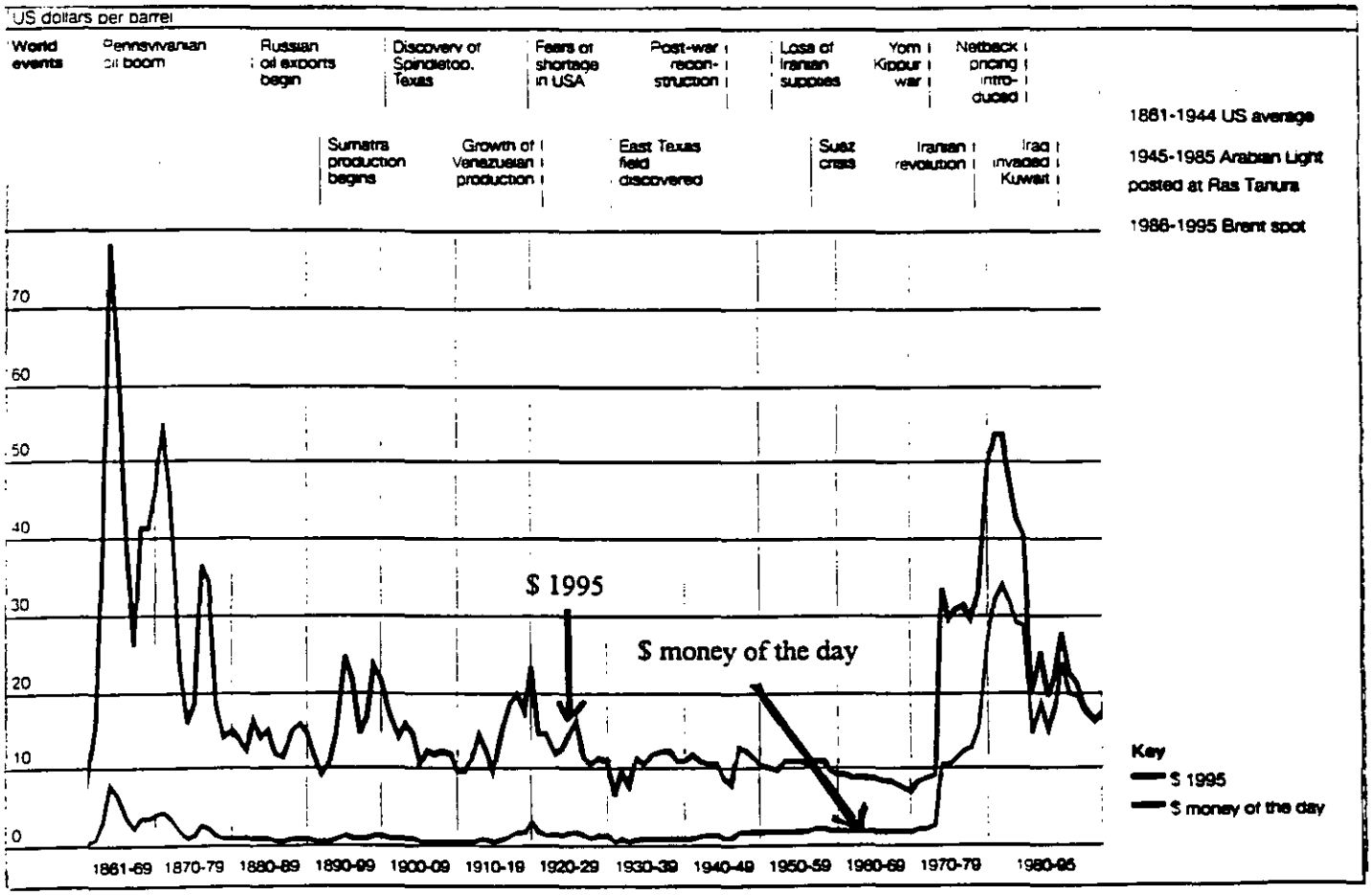
Total Energy

	Industrial	Households	Total Energy
1978	120.6	104.4	113.4
1982	164.8	141.0	154.3
1995	93.2	92.5	92.8

1990 = 100

Source: IEA

2. Crude Oil Prices since 1861



Source: BP Statisical Review of World Energy 1996.

3. 6 November, 1996 Brent Spot: US$ 21.88 per barrel.

E. ENERGY SUBSIDIES

It is believed that for all Developing Countries total energy subsidies could approach U.S.$150 billion annually; and for Transitional Economies could approach U.S.$250 billion annually. The industrialised countries of the OECD also heavily subsidise fossil fuel provision and use in many instances. The global total of subsidies is therefore likely to exceed U.S.$600 billion per annum.

World Bank staff (B. Larsen and A. Shah) on the basis of an examination of subsidies in 28 non-OECD countries estimated that in 1990/1991 annual subsidies to the fossil fuel sector totalled up to U.S.$330 billion for all non-OECD countries. Coal accounted for some U.S.$50 billion; oil U.S.$125 billion; gas U.S.$70 billion; and electricity U.S.$85 billion. The present developing countries included in the survey accounted for some U.S.$65 billion and the Former Soviet Union for U.S.$175 billion. U.S.$90 billion was not specifically attributed to either group of countries. These figures are widely believed to understate the actual level of subsidies in the countries concerned.

F. GOVERNMENT FUNDING ON ENERGY R&D

OECD Countries - US$ million at 1995 prices and exchange rates.

	1984	%	1995	%
Conservation	753.2	5.9	1023.5	10.2
Energy Systems Analysis/Other*	750.4	6.0	1492.0	14.9
Electricity	297.3	2.3	205.6	2.2
Renewables	1098.2	8.6	896.8	9.0
Nuclear Fusion	1523.8	12.0	1105.1	11.0
Nuclear Breeders	2166.5	17.1	473.8	4.7
Conventional Nuclear	4395.3	34.6	3675.9	36.7
Coal	1179.5	9.3	578.4	5.7
Oil & Gas	536.4	4.2	560.8	5.6
Total	12700.3	100	10011.9	100.0

Source: OECD/IEA

Notes: 1) Between 1984 & 1995 government funding for energy R&D fell by 21% in real terms. However, over the period funding was at its lowest level in 1992 at US$ 9076 millions.

2) Between 1984 & 1995 only three categories showed increases: Conservation, Energy Systems Analysis/Other, and Oil & Gas. The most marked decline over the period was for Nuclear Breeders where funding fell 78%. Overall funding for the three nuclear categories fell by 35%.

3) *Other covers funding for fundamental science, mainly in the USA.

Reliable OECD data for the breakdown of spending on renewables are only available to 1994 and are as follows:

Government Funding on Renewables R&D

OECD Countries - US$ million at 1994 prices & exchange rates.

	1984	%	1994	%
Solar Heating	109.0	10.7	51.0	7.3
Solar Photo Electric	332.5	32.5	409.1	58.2
Solar Thermal Electric	85.3	8.3	14.4	2.0
Wind	122.7	12.0	65.9	9.4
Ocean	16.5	1.6	3.1	0.4
Biomass	187.8	18.4	81.0	11.5
Geothermal	169.0	16.5	69.6	9.9
Large Hydro	-	-	7.6	1.1
Small Hydro	-	-	1.1	0.2
Total	1022.8	100.0	703.0	100.0

Source: OECD/IEA

Note: Spending on Solar Photo Electric increased by 23% to US$ 409.1 million between 1984 and 1994 and was the only category to record an increase.

G. COMPETITIVENESS OF NEW RENEWABLES

Electricity generated from up to date conventional hydrocarbon sources is supplied to grids on average at around 5 US cents/kWh.

The Intergovernmental Panel on Climate Change's Second Assessment Report (1996) gives the following costs for the principal new renewables:

Biomass

At biomass cost of US $2/GJ electricity can be produced at 10-15 US cents/kWh.

Wind

Lowest current electricity price is US 6 cents/kWh. The stock average is 10 US cents/kWh. Future costs could be as low as 3.2 US cents/kWh in favourable locations.

Solar

Currently photovoltaic solar delivers electricity at 23-33 US cents/kWh, but costs are coming down rapidly and could fall to as low as 2.2-4.4 US cents/kWh in the medium term depending on the level of insolation.

Solar thermal is anticipated to come down to 8-9 US cents/kWh in the medium term. In the longer term this could come down to 4-6 US cents/kWh using power towers.

Geothermal

Current electricity generation costs are around 4 US cents/kWh, and current heat generation only costs are around 2 US cents/kWh.

H. NUCLEAR GENERATING CAPACITY

Reactors Operating & Under Construction: End 1995

	Operating		Under Construction	
	Number	GWe net	Number	GWe net
Argentina	2	0.9	1	0.7
Belgium	7	5.6	-	-
Brazil	1	0.6	1	1.2
Bulgaria	6	3.5	-	-
Canada	21	15.4	-	-
China	3	2.1	2	1.2
Czech Republic	4	1.6	2	1.8
Finland	4	2.3	-	-
France	56	57.1	4	5.8
Germany	19	21.0	-	-
Hungary	4	1.7	-	-
India	9	1.8	4	1.8
Iran	-	-	2	1.2
Japan	50	39.5	2	2.4
Korea (Republic of)	11	8.2	5	3.9
Lithuania	2	2.5	-	-
Mexico	2	1.3	-	-
Netherlands	2	0.5	-	-
Pakistan	1	0.1	1	0.3
Romania	-	-	1	0.6
Russian Federation	29	19.2	3	2.9
Rep. of Slovakia	4	1.6	2	0.8
Slovenia	1	0.6	-	-
South Africa	2	1.8	-	-
Spain	9	7.1	-	-
Sweden	12	9.9	-	-
Switzerland	5	3.1	-	-
Taiwan, China	6	4.8	-	-
Ukraine	15	13.1	2	1.9
UK	35	13.0	-	-
USA	108	98.9	-	-
World Total	**430**	**338.8**	**32**	**26.5**

Source: Uranium Institute

In addition to the 32 reactors under construction there are some 60 at the planning stage, mainly in China, Republic of Korea and Japan.

Taking into account the likely retirement of reactors when they reach the end of their operating lives, the possible effect on capacity of standard costs in the USA and the likelihood of plans for new reactors being realised, the Uranium Institute has prepared three scenarios for nuclear generating capacity up to 2015. These are given in the following table:

World-wide nuclear electricity production in gigawatts (September 1996)

	1995 Actual	2000 Predicted	2010 Predicted	2015 Predicted
Lower	339 GWe	357 GWe	358 GWe	333 GWe
Reference	339 GWe	362 GWe	401 GWe	411 GWe
Upper	339 GWe	367 GWe	414 GWe	473 GWe

The Reference Scenario is in line with post-Cherbonyl increases in capacity to date. Only the Upper Scenario suggests nuclear power could become more fashionable than at present.

World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

Comitato Nazionale Italiano del Consiglio Mondiale dell'Energia

COMUNICATO STAMPA

AUTO COMPIACIMENTO ENERGETICO: UNA MINACCIA PER LA SOSTENIBILITA'

Nel suo Messaggio 1997, intitolato "Energy Complacency threatens Sustainability" (autocompiacimento energetico: una minaccia per la sostenibilità), il World Energy Council (WEC) sollecita i paesi industrializzati ad intraprendere incisive azioni su scala planetaria al fine di conciliare l'aumento della domanda di energia, indotto dallo sviluppo socio-economico con la salvaguardia ambientale e intraprendere così la "via dello sviluppo sostenibile". Per realizzare questo obbiettivo, il WEC insiste sulla necessità di avviare immediatamente le seguenti iniziative:

- accelerare l'incremento dell'efficienza energetica nel mondo;
- migliorare il trasferimento tecnologico fra i paesi;
- avvicinare i prezzi energetici a quelli di mercato;
- dare nuovo impulso ai programmi per le energie rinnovabili;
- accrescere la fiducia nell'energia nucleare;
- utilizzare in modo più efficace le risorse finanziarie destinate alle attività di ricerca e sviluppo, con particolare attenzione alle nuove energie rinnovabili;
- adottare misure economicamente valide di contenimento delle emissioni;
- estendere il principio "polluter pays".

Il Messaggio WEC 1997 punta l'indice sull'atteggiamento di autocompiacimento dei consumatori dei paesi industrializzati di fronte ai problemi dello sviluppo energetico sostenibile: la piaga rappresentata da quel 40% della popolazione mondiale che non dispone di servizi energetici commerciali e che quindi non riesce nemmeno a compiere il primo passo verso lo sviluppo economico; il probabile raddoppio dei consumi energetici entro la metà del prossimo secolo; il probabile raddoppio della popolazione mondiale entro la fine del 2000; l'aumento della quota di consumi energetici dei paesi in via di sviluppo, la quale potrebbe passare dall'attuale 35% ad oltre il 60%.

Il Messaggio WEC 1997 si conclude così:

In futuro, ingenti risorse saranno necessarie per lo sviluppo tecnologico, il finanziamento dei progetti, la gestione dell'aumento della richiesta energetica indotto dall'incremento demografico e dallo sviluppo economico, nonchè per facilitare l'accesso all'energia commerciale per quei 2 miliardi di cittadini del mondo che attualmente non ne dispongono. Date le dimensioni di questi fabbisogni, i cambiamenti dei sistemi energetici non potranno che essere graduali: ci vorranno molti anni per sviluppare le strutture energetiche di domani e ci vorranno decenni perchè i progetti energetici possano raggiungere una massa critica tale da avere un impatto a livello globale. Se non verranno immediatamente attuati interventi tesi ad accelerare questi processi, la futura sostenibilità della produzione e del consumo di energia potrà risultare gravemente compromessa - a scapito di tutti.

14 Maggio 1997

Presidenza e Tesoreria: c/o AGIP SpA - Via del Serafico 89-91 - 00142 Roma - Tel. 06/5988.3420 - Fax 06/5988.3250
Segreteria: c/o ENEL SpA-DPS - Via G.B. Martini 3 - 00198 Roma - Tel. 06/8509.5821 - Fax 06/8509.2162

(2)

The World Energy Scene

by
Ian Lindsay
WEC Secretary General

Introduction

The WEC was founded in 1923 and has over the years become the world's leading non-governmental energy policy forum. It exists to analyse global and regional energy issues, and to advise the energy community and decision-makers world-wide of its findings and recommendations. Its objective is to promote the sustainable supply and use of energy for the greatest benefit of all. It has Member Committees in 100 countries covering some 92% of the world's energy consumption. This gives it three unique characteristics.

1. It has the spread of viewpoint and experience to be authoritative;

2. It has the ability to work "bottom up" from local experience of energy-related issues around the world, which gives credibility to its work; and

3. by blending industrial experience with the perceptions of government officials, academics, and consumers, the WEC achieves a degree of practical balance rarely achieved elsewhere.

For many years the WEC was a reactive organisation. Today we are largely proactive and have increasingly taken on the role of "facilitator" to assist in "getting things done". We have taken the initiative in a number of World Regions to raise understanding and promote change. So much of what is perceived by the world about energy is today usually either unduly complacent or unduly negative. We live in an era of low prices and abundance of energy for many. Simultaneously, two billion people cannot access commercial energy services to meet their basic needs. Large numbers of people cannot afford the commercial energy even where infrastructural investments have brought power to their doorsteps. Those who use energy do so with great inefficiency and much waste. Yet a growing number of people can and do use commercial energy services, efficiency in use is gradually improving, the energy resource base is widening, steps are being taken to curb emissions. The problem is simply that the process is advancing at much too slow a pace given the scale of present needs and future challenges.

I will present the WEC's views on the World Energy Scene in three parts:

1. the Context;

2. the main Issues; and

3. our Conclusions and Recommendations for future action.

1. **Context**

First, let us remind ourselves of the basic analysis derived from the WEC Commission report "Energy for Tomorrow's World", 1993. Global population by 2020 will have risen from today's 5.8 billion people to about 8 billion, with annual global economic development growth likely to run at between 1.6% and 2.4%. These and the other main assumptions contained in the Commission's four global scenarios were tested by nine regional groups covering the world, and combined to indicate huge increases in energy consumption between 1990 and 2020. Our recent work in "Global Energy Perspectives to 2050 and Beyond"; 1995 has been based upon the three families of scenarios developed by the WEC's Commission. We have held to our earlier views about the growing level of global energy consumption and unless there is a major shift of current trajectory to anticipate this consumption to rise between 55% and over 70% in the period 1990-2020. This is not the maximum consumption increase conceivable. Other organisations have indicated the possibility of even greater growth. However, we see a range of economic, technological and environmental challenges which will be all the more difficult to overcome if energy consumption is larger.

What could this huge energy consumption growth mean? It will mean that by 2020 more than 90m barrels of oil a day will be consumed, an increase of some 27m b/d, or more than the whole of today's OPEC production.

It will mean that coal output will double to nearly 7 billion (10^9) tonnes per annum, more than twice the UK's or Canada's known total reserves. Such a prospect not only raises question marks over consequential greenhouse gas emissions, but also the need for effective sulphur abatement measures to safeguard air quality and crops, and the need to curb particulate emissions, for more local reasons.

It will mean that annual gas demand will more than double to reach some 4 trillion (10^{12}) cubic metres, almost as much as the total current US gas reserves.

It probably means that more electricity generating capacity will be built over the next 25 years than in the previous century, and that global electricity consumption in 2020 could be double the 1990 level. From what energy resources this electricity is to be generated, and what additional investments will be required, will pose considerable challenges.

And our analysis suggests that 75% of this energy growth will take place in the currently defined developing countries, particularly in Asia and in Latin America.

It means that the developing countries, which today consume 35% of the world's total energy, will probably consume 50% by 2020 and 70% by 2100.

2. **The Issues**

Against this contextual background, today's general global scene is already one of considerable aggregate consumption growth, currently met by more than adequate energy supplies, at relatively low prices. But this masks the fact that nearly two people in every five in the world today have no access to commercial energy supplies at all. I say low prices because oil, for example, sells currently at approximately 40% of its price in real terms 15years ago. But such prices in many developing countries often mean that over 50% of their Gross Domestic Product is required to pay for energy imports, thus inhibiting growth and economic development.

In the mature markets of the industrialised countries in North America, Japan and Western Europe, demand growth is relatively low, but recent change has been profound. Profound for three reasons:

- ✦ liberalisation in varying forms has been, and is being, applied to many markets, often inducing great change - both positive and negative;

- ✦ considerable energy substitution is occurring, particularly from coal and oil to gas for power generation;

- ✦ technology advances have made great strides. In the oil industry, drilling and production costs have been reduced, and the production life of fields has been significantly extended. Huge additional reserves of natural gas have been identified. Some significant advances are occurring in renewable energy technologies, but the take-up rate remains too slow for comfort.

In E. Europe and the CIS the development of more liberal energy markets has inevitably been erratic. This has been particularly so in the Russian Federation where, for example, oil consumption - reflecting economic recession - declined from 1993 to 1994 by some 20%, and where today there is a surplus of 30% in electricity generating capacity. These markets are taking much longer to adapt and are having much greater difficulty in attracting inward capital investments than was hoped when their political systems began to change so radically seven years ago.

In some developing countries' regions, however, consumption increase has been phenomenal, and prospects remain buoyant. Of the world's energy consumption growth between 1990 and 2020 attributable to the developing countries, 50% will occur in just six: China, India, Indonesia, Brazil, Pakistan and in the Thailand/Malaysia Peninsula.

China and India, with some 10% of today's global electricity demand, are planning to build new plants which by 2020 could account for 25% of the world's then much greater world generating capacity. But it should not be forgotten that China in 2020, for example, will only have a per capita generating capacity equal to 30% of that of the USA today.

Such development inevitably brings huge problems in its train. To take one example, by 2020 it has been estimated that the currently defined developing countries will emit CO_2 from fossil fuel burning equivalent to the total 1990 CO_2 emissions from fuel used by the industrialised countries. This is the context for the potentially important third Conference of the Parties to the UN Climate Convention in Kyoto, Japan, in December, 1997. The industrialised countries alone will then be required to set targets to reduce their energy related CO_2 emissions beyond the year 2000. This makes no sense in a world which requires global action to meet a global challenge. And this is true notwithstanding the fact that most industrialised countries will fail to meet even their current aim (of returning their emissions to their 1990 level by 2000), and the targets they are currently proposing are unrealistic given present public attitudes and policies. All countries must be brought more closely into this process, but they must also be offered real incentives to do so.

Lack of finance, inability to mobilise the often very high local savings rates, the need to develop management, restructure institutions, improve energy intensities, liberalise and persuade some governments to abandon their all-pervasive notion of national patrimony, particularly in the day-today management of energy operations - all reduce the smooth and progressive development of energy in many developing regions.

Foreign investment rates, having soared from the early 1990s in such countries as China, Malaysia, Philippines, India and Argentina, have now begun to slow down. And over this whole scene is cast the shadow of the 1980s debt crisis. About 30% of the money then lent to Third World governments was allocated to large power projects. Today's investors are more prudent than yesterday's, but it is still necessary in many instances for the World Bank and other agencies to provide general political cover by themselves taking small stakes in projects. However viewed, the risk of exchange rate depreciation coupled with continuing subsidies and the inability to change tariffs, all negate development. In Sub-Saharan Africa today, external debt represent almost 80% of the Region's Gross National Product. How can development occur in such circumstances?

Oil, with 44 years of reserves, gas with 70, and coal with some 250 years of reserves, at present rates of consumption, give the impression of plenty. Geological resources of these fuels are far greater - assuming the economic, technological and environmental challenges their exploitation pose can be overcome. But these statistics mask the fact that supply lines are lengthening and becoming more vulnerable, both technically and due to political pressures.

Uranium supplies are plentiful, but in the domain of the new renewable forms of energy - particularly modern biomass, solar and wind - current energy costs and lack of government support have combined to slow their development and installation. This is especially the case in the developing countries where they are most needed. Total new renewable energy supplies (which exclude major hydro and traditional biomass) currently only represent 2% of world energy consumption. By our estimates their share is unlikely to rise greatly by 2020, because of the much increased world energy consumption by then, unless they receive concerted and sustained support.

There is considerable complacency today in the industrialised world among both governments and consumers alike about the current availability of energy and the way it is used. This sits ill alongside the fact that:

- ✦ over 2 billion people of the world's total population approaching 6 billion have no access to commercial energy at all, and are trapped in poverty. In using fuelwood they add to deforestation and soil erosion, as well as contributing substantially to undesirable emissions.

- ✦ urban poverty is rising faster than rural poverty, as urbanised population increases more rapidly than population as a whole, and large numbers of the urban poor cannot access energy even when the power infrastructure is available.

- ✦ the world's population is expected to double during the next century, and this together with estimated global economic development will combine to more than double the world's consumption of energy (it could rise 5-fold), with all the consequences that this implies.

This huge requirement for new energy supplies cannot - in the interests of sustainability - be allowed to occur only by relying on fossil fuels, even though these are likely to dominate the energy mix for decades to come.

A sustainable route to improved living standards is required so that tomorrow's generations can satisfy their own requirements for economic, social and environmental well-being. Energy systems can only be changed gradually, and energy projects have

notoriously long lead time. So global action for the evolution of energy systems appears to us to be today's core energy issue. The WEC believes that action for change should initially be directed at:

- ✦ raising the efficiency with which energy is provided and used;
- ✦ improving environmental performance of fossil fuel use;
- ✦ developing publicly acceptable nuclear capacity and storage for spent fuel; and
- ✦ developing and installing new renewable forms of energy where these are economic and not environmentally intrusive.

Why do we place energy efficiency first? Partly because it makes little sense to develop additional fossil fuel, nuclear or renewable energy supplies if these are going to be wasted on a large scale.

Although progress towards energy efficiency has been made with such developments as improved gas turbines, and there have been some improvements in end-use efficiency, there is in general far too little government incentive to obtain what is vitally required. This era of low prices does not help. There is too often a reversion to subsidies which encourage waste, or to taxes which tax mobility and other essential services rather than emissions per se, and do little to promote higher efficiency. There is reluctance to introduce tough and tightening standards and labelling requirements.

Governments and industry must realise the benefits, on a cost/benefit basis, of putting into practice real energy efficiency and conservation policies. The current overall energy intensity decline of about 1% per annum in many countries is too slow, and it is as much in the interests of the developing countries as of the industrialised countries to achieve far greater and more meaningful energy efficiency. It is noteworthy, taking 1990 as a typical year, that global primary energy consumption was 9 Gtoe. Final energy consumption was 6.5 Gtoe. The difference, 2.5 Gtoe or 27% of all primary energy produced, was used or wasted in the conversion process to secondary energy. Furthermore, only 3.3. Gtoe of the total is estimated to result in useful energy for providing the services people desire. This is 37% of the primary energy which first entered the chain. Surely much more can and should be done to improve conversion efficiency and reduce waste?

Given the generally complacent current global energy situation, there is a strong temptation for governments and others to delay or avoid taking major energy decisions. The WEC urges its Member Committees to draw the attention of leaders to the need to start the process of change for energy systems for the longer term. The world needs imagination, sound vision, and the seizing of opportunities. But if we are to move together and without further delay along the path of acceptable development, then the world's energy consumers and policy-makers will have to understand and accept what is at stake - and what is needed to rise to the various challenges.

3. Conclusions and Recommendations for future action

Let me list just five specific recommendations:

(i) We believe that energy subsidies should be phased out in order for suppliers and consumers alike to understand the implications of energy's real costs. It is recognised

that in many areas, notably in rural areas and among the urban poor of the lesser developed countries, this process will take many years to achieve. Over 60% of all energy consumed in the world today is subsidised in one form or another, and these subsidies matched total annual energy supply project investments world-wide (of about US$450 billion) in the early 1990s.

More must be done to raise the level of general awareness about energy and the fundamental services it provides. Many publicly held perceptions are inaccurate and there is a general need for education about the realities of energy.

(ii) Extending this reasoning further, we believe that many of the facts about the energy sector which today are available to end-use consumers are wrong. They are wrong because the signals about supply availability, costs and prices, existing degrees of local environmental damage, and the state of current institutions which handle such matters, are themselves inconsistent and confused. Institutional changes in a number of key areas, of which finance is one, are needed. We believe the world will require some US$30 trillion (x 10^{12}) in 1992 money over the next 25 years if it is to develop energy projects in an environmentally acceptable manner to meet the demand required. This equates to 50% more than the entire 1990 world GDP. If this financing is to become available, many radical changes will be needed to secure it, particularly by building up local capital markets in countries which today do not have them.

(iii) Greater regional and transfrontier co-operation and interdependence are necessary. This applies both to developing counties' Regions and Europe.

(iv) Energy Research and Development budget declines in America, Europe and (at least until recently) Japan cause widespread concern, and we have called for the reversal of this trend. Responsibility resides with governments and industry to increase and refocus their R&D efforts, particularly to energy efficiency and procurement measures, and to the development of new renewable sources of energy.

(v) Finally, there is an overwhelming need for new government, industry and consumer dialogue based on realism and real costs. But such initiatives must - if they are to be worth pursuing - produce early, real action and benefits for the millions who are still deprived.

In conclusion, and above all, action is required now to re-orientate our energy systems for the needs of the next century. The results of today's decisions will be discernible in the global energy sector only round about 2010. We must begin to build to that point now.

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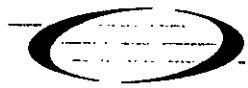
SPECIAL REPORT



World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

GLOBAL ENERGY

JOHN BAKER
CHAIRMAN OF THE EXECUTIVE ASSEMBLY OF THE WEC
CHAIRMAN OF NATIONAL POWER PLC

IAN LINDSAY
SECRETARY GENERAL OF THE WEC

MICHAEL JEFFERSON
DEPUTY SECRETARY GENERAL OF THE WEC

NEBOJSA NAKICENOVIC
PROJECT LEADER AT IIASA

KEN LAY
CHAIRMAN OF ENRON DEVELOPMENT CORPORATION

HON. DOUG KIDD
MINISTER OF ENERGY IN NEW ZEALAND

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GLOBAL ENERGY

A SPECIAL REPORT FOR INTERNATIONAL DECISION MAKERS
PRODUCED IN COLLABORATION WITH THE WEC

The World Energy Council has collaborated with FIRST magazine in the production of this Global Energy Report to ensure that it provides a realistic assesment of the challenges facing the global energy sector, and gives examples of how business and governments are responding to them and the lessons that can be learnt from them. The report also describes the work of the WEC and outlines its concerns regarding the sustainability of energy development.

In the context of the long term energy outlook as portrayed in the scenarios which have been developed by the WEC and the International Institute of Applied Systems Analysis, the Report highlights the environmental, investment, technological, and institutional challenges facing business, and the need for action to start now to ensure that sustainability is not compromised.

The Report then looks at the need for market reform to encourage foreign investment in national energy markets, the experience of energy market liberalisation over the last ten years in New Zealand, the conditions for successful energy related foreign investment in developing countries from their point of view, the importance of partnering with local interests in overseas energy projects, and the conditions for success as a contractor in the international power generation market. ■

World Energy Council
CONSEIL MONDIAL DE L'ENERGIE

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World Energy Council, 34 St James's Street, London, SW1A 1HD Tel: +44 171 930 3966 Fax:+ 44 171 925 0452

Towards 2050

By JOHN BAKER
CHAIRMAN; EXECUTIVE ASSEMBLY, WORLD ENERGY COUNCIL, AND CHAIRMAN OF NATIONAL POWER PLC

With global energy demand forecast to double in less than 60 years, it is vital to take action now to ensure production becomes more sustainable

JOHN BAKER *is the chairman of the Executive Assembly of the World Energy Council, and of National Power PLC. He has had a career in both public and private sectors. An Arts graduate from Oxford University, he spent ten years each dealing with transport policy and finance, and then with urban regeneration and social housing. He moved into the energy sector in 1979 as Company Secretary to the Central Electricity Generating Board. Appointed to that Board in 1980, he became Corporate Managing Director, responsible for commercial matters, and then led the management of the privatisation programme. He was chief executive of National Power from 1990 when the company was established, becoming chairman in April 1995.*

I AM VERY PLEASED THAT THE WORLD Energy Council has been able to co-operate with FIRST magazine in the production of this report on Global Energy. Future energy use will generally be driven by a combination of population and economic growth, tempered by efficiency improvements. With development likely to be greatest in the present developing countries and the former centrally planned economies, a modest average world economic growth rate of 2 per cent p.a. holds out some prospect of significantly reducing mass poverty by 2050. The challenge to the energy community is to take the necessary measures now to provide the greatly increased energy resources and infrastructure that will enable the economic growth to occur in a sustainable way.

WEC-IIASA work, featured in this report, shows that on the basis of world growth at 2 per cent p.a. and a steady improvement in energy efficiency, global energy demand in 2050 would be more then double today's level. Providing that this demand is met through a significant contribution from renewable energy and increased production of nuclear power as well as the more efficient use of fossil fuels, some limited progress would be made towards sustainability and curbing CO_2 emissions. A highly focused worldwide effort to raise the efficiency of energy provision and use could constrain global energy demand in 2050 to about 50 per cent above the current level. This would lighten the load on non-fossil fuel sources in meeting the increment, permit greater confidence in achieving sustainability, and bring global annual CO_2 emission onto a declining trajectory by 2050. However, this more attractive scenario (which we describe in the WEC as Ecologically Driven) may be at the limits of what is realistically available. At the least it presents governments and the global energy industry with huge challenges under four headings.

Environment

On a day-to-day basis energy sustainability means that environmental responsibilities must be recognised in investment programmes and operations, and that efficient regulatory frameworks and mechanisms are in place. For the longer term, sustainability means ensuring that the supply and use of energy becomes less environmentally damaging, and renewable energies account for a growing proportion of total energy supply.

In terms of energy pricing sustainability means that customers must be prepared to pay prices that recover not only the full economic costs of the energy provision but all related environmental costs where they can be identified. Governments must phase out energy subsidies despite their prevalence today. This will ensure that both the 'polluter pays', and that consumer decisions reflect the true cost of energy. It is, after all, ultimately the energy user who pollutes.

In many countries affected by deforestation, soil erosion, and local air pollution, concerns for local and regional pollution are currently greater than for global environmental issues. However, the WEC believes that the threat of possible climate change requires action to be taken now through minimum regrets measures, which both mitigate local pollution and help sustainable global development. This is one aspect of the fundamental challenge of bringing commercial energy to the more than 2 billion people today who have no access to it but are still forced to rely on wood, and animal dung for fuel.

Investment

The investment in new projects needed to provide the world's energy in 2050 has been estimated at some $30-45 trillion (1990 prices) between now and then, with at least two thirds in the developing countries and former centrally planned economies. With the withdrawal of state funding in many countries, domestic savings and retained profits will have to provide the bulk of the finance required. This means that new mechanisms will be needed to mobilise domestic savings.

The ability of aid agencies, like the World Bank and the regional development banks, to provide more finance is not expected to improve. International financing will be encouraged by many governments pulling down the barriers against foreign private

energy investment where they exist, and providing the security of reliable legal and commercial frameworks within their countries. To generate sufficient private sector investment, governments will need to ensure stable investment conditions, with respect to taxation and pricing in particular, and that prospective long run returns provide adequate incentive.

Many more energy companies are likely to invest on an international basis. To do this effectively they will have to transform themselves into truly global companies and develop the necessary skills. Thus international commercial co-operation and global corporate operation, so long a feature of the oil industry, will have to become more and more a feature of the energy sector as a whole.

Technology

New technology will be crucial in: improving energy efficiency; increasing the production of traditional fossil fuels and making their conversion and use cleaner; improving the acceptability of nuclear powe; and accelerating the commercial development of new renewable energies. Cross border investment should facilitate technology transfer between nations and industries, and this will be essential if the fast growing needs of developing countries are to be met in the most efficient and least damaging – that is the most sustainable – way.

The lead times involved in commercialising energy technologies, the often short term view of markets, and the need to take precautionary measures in response to the risk of possible climate change, all make a strong case for increasing government support (without picking winners) for research, development, and demonstration in promising fields of energy technology. New co-operative partnerships between governments, companies, and research institutions should be encouraged as a way of bringing expertise into the technology development and diffusion process. Temporary subsidies should be used to encourage innovation and the early stages of diffusion.

As far as nuclear power is concerned, even greater efforts by governments and the nuclear industry are required to secure levels of public acceptability for the whole nuclear fuel cycle sufficient to ensure that the opportunities offered by nuclear power for a more sustainable future are sought by the public, and therefore do not have to be ignored.

Institutional

Market liberalisation and reform mean that the benefits of competition have become more widely available in the energy sector. They provide an institutional structure which is better equipped to deliver the investment needed for energy development, and to satisfy consumers, than the previous era of state domination could ever do. But free markets are not necessarily a panacea for raising efficiency, achieving the most rapid pace of new technology diffusion, or tackling environmental threats. A judicious mixture of regulation, tightening performance standards and support of pricing mechanisms which reflect environmental impacts can be used to complement the known effectiveness of markets.

With the growing reliance on markets and the private sector comes the concern that long term energy requirements may be subordinated to the need for short term returns. To avoid this danger governments and the energy industry must come together and develop a shared vision of sustainable energy development which can guide and support their decisions.

Governments, the private sector, and end-consumers will all be involved in the changes needed to move towards sustainability in energy development. This calls for a new partnership between them to facilitate the process.

Action now

The apparent calm in the present world energy scene should not be allowed to breed complacency, or be used as an excuse for inaction by any of us. Because of the long lead times and risks involved, action must begin now to ensure that global energy systems become more sustainable, and thereby make their contribution to the improvement of living standards to tolerable levels across all the nations of the world. ■

Governments, the private sector, and end-consumers will all be involved in the changes needed to move towards sustainability in energy development

Promoting sustainable energy

By IAN LINDSAY
SECRETARY GENERAL OF THE WORLD ENERGY COUNCIL (WEC)

The WEC advocates action today to ensure that the systems to be developed for 2050 can provide the expected level of energy services

IAN LINDSAY *is the secretary general of the World Energy Council. Since his appointment in 1987, he has pursued an expansionist policy to raise the membership, profile and authority of the organisation. He is an Oxford graduate, holding a Masters degree in law and economic geography. From 1959 to 1986 he held various positions with the British Petroleum Company, completing his career in the oil industry as managing director of BP's worldwide step-out investment in the consumer goods business.*

FOUNDED BY THE BRITISH VISIONARY, Daniel Dunlop, in 1923, the World Energy Council was originally to have a short life limited to its 1924 London Congress which, by recognising the need for an international, non-governmental electricity forum, brought together engineers, financiers and economists to assist with the reconstruction of the still shattered European power industry following the Great War of 1914–18.

However, unlike a great many other organisations, the WEC had no transitory existence. Quite the opposite. In 1968 it widened its work and scope to cover all forms of energy, and now in 1996 it has become the undisputed leader among non-governmental and non-commercial multi-energy organisations. Its work ranges over the services which energy provides from the primary fossil sources of oil, gas and coal, through nuclear and renewable forms (hydro, solar, wind, biomass, etc.), to the secondary energy of electric power.

The WEC today has nearly one hundred country member committees. Its membership represents over 90 per cent of the world's energy consumption. These member committees finance the organisation's small London central office and themselves supply information, opinion and data for the WEC's work programme. Such input therefore comes from the industrialised world, the economies in transition and from countries at various stages of development in the Third World.

The WEC mission statement is simple. "To promote the sustainable supply and use of energy for the greatest benefit of all." Such an objective may appear to some to represent a mere motherhood statement, but the truth is very different. Because of its unique nature embodied in its broad representational membership, and because it is able to call upon the views of governments (which are often members of its member committees), industry and consumer alike, the WEC today can produce more balanced and probably better synthesised work, particularly related to energy's longer term strategic development, than any other parallel organisation. From being primarily an energy suppliers' organisation, it has become a balanced energy supply and demand side organisation, covering a wide range of energy related issues, and speaking for senior energy operatives internationally. It builds its views and data uniquely from the "bottom up", so that its recommendations relate to local situations, and it has as its primary objective to influence global decision-making both in the energy and energy-related sectors. Recently it has advanced its role to become a facilitator behind the scenes in order to help "get things done". An example was the organisation of the first African Energy Ministers' meeting in 1995 devoted to breaking down the outmoded psychology of national boundaries in order to move Africa's energy development forward on a more constructive and interdependent basis.

The WEC works to triennial programmes of international study projects, regional and national events and publications, ending with a congress. WEC congresses attract 5,000 – 6,000 delegates and accompanying persons, and are held in different centres around the world. Among the delegates are normally some 60 or 70 energy and other ministers, and the main congress sessions have now become the focal points for the expression of industry–government views as the global energy sector moves into the 21st century.

In 1993 the WEC published its definitive work on energy development to 2020 entitled "Energy for Tomorrow's World". This has become the accepted authoritative work of reference on global energy. Based on a number of well documented future scenarios, "Energy for Tomorrow's World" reports on the realities of the developing energy and energy-related perspectives. Its conclusions point to the massive growth of energy demand from a 1990 baseline, of between +50 per cent and +90 per cent by the year 2020.

If the latter figure is explained in clear terms, what will it mean for the world in which our children and our children's children exist? It will mean very simply, with the world's population likely to increase by then from 5.8 billion to over 8.0 billion people (UN medium population projection), and with global economic growth of between 1.6 per cent and 2.4 per cent annually, that the dimensions of energy

growth will be staggering.

Oil production will increase by upto 27 million b/d, or more than the entire OPEC production of today; annual gas production of some 4 trillion cubic metres, will be the equivalent to the entire natural gas reserves of the US; coal output could double to 1 billion tonnes a year, more than twice the known UK coal reserves. More electricity generating capacity will be built over the next 25 years than in the whole of the previous century.

And where will all this growth occur? Mainly in the developing world, which the WEC believes will account for over 90 per cent of this huge incremental energy demand. In particular, it is in such countries as China and India, Indonesia and the other ASEAN countries where the growth rates will be highest. But Latin America, with its expanding energy demand in Brazil and elsewhere, will also need considerably more energy than before. Ultimately East/Central Europe and the CIS will also increase their energy demands from today's depressed levels.

It is a comfort to note that the WEC membership believes that there will be no discernible problems over the supply of all this new energy. Technology and financing will be there for those markets which adapt to attract them. The requisite energy supplies will follow.

Of less comfort is the fact that unless changes occur rapidly, both in the market place and with the development of the institutions needed to put such energy supplies in place, there will still be many lesser developed countries which may not be able to obtain the energy they need. Economic regression and instability may result.

Of equal worry is the fact that the developing countries are likely, by 2020, to emit more CO_2 from fossil fuel combustion than the industrialised world did in 1990 unless action is taken rapidly to reduce the world's growing dependence on fossil fuels.

Overall, the world faces two fundamental energy-related problems. One is that globally ever increasing amounts of fossil fuels are being used to support economic development. This contributes to the fear that sustainability may not be achieved and that tomorrow's generations may be denied the opportunity to satisfy their own requirements for economic and environmental well-being. With its long project development lead times, the global energy sector must now give serious support to the use of new renewable forms of energy with which to complement fossil fuels; and once its whole fuel cycle is acceptable in safety terms, it is to be hoped that nuclear energy can again be developed widely. Energy efficiency must also play its part in achieving sustainability.

The second fundamental problem is that 40 per cent of the world population or over 2 billion people today have no access to commercial energy and cannot escape the poverty trap. They are obliged to continue using fuelwood and wastes, and these contribute massively to environmental degradation. It is not only the humanitarian aspect of this situation which demands change for the better, it is in the global interest that such degradation should be reduced.

The WEC advocates action for change now, so that the energy systems to be developed for 2050 can provide the services demanded of energy and contribute to world sustainability. It is in this context that the WEC's 1995-98 work programme has been based. It covers "Energy Perspectives to 2050 and Beyond" (continuation of the work featured in this report); "Energy Financing"; "Global Transport and Energy Development"; "The Benefits and Deficiencies of Energy Sector Liberalisation"; and "Rural Energy Development in Developing Countries". All should contribute to the better understanding and ultimate action needed to orientate the world's energy sector towards its objectives for the 21st century.

The 17th WEC Congress will be held in Houston from 13-18 September 1998, with the theme: "Energy and Technology: Sustaining World Development Into The Next Millennium". Why not be there to listen and contribute to its conclusions and recommendations, which will have a measurable impact on energy decision-making as we reach the end of the 20th century and step over the threshold into the 21st?

Scenarios for the future

By MICHAEL JEFFERSON AND NEBOJSA NAKICENOVIC
DEPUTY SECRETARY GENERAL OF THE WEC PROJECT LEADER AT IIASA

As the desire for convenient and clean energy grows, corporations will have to shift their focus and structure

MICHAEL JEFFERSON *has been the deputy secretary general of the World Energy Council since 1990. Previously he spent 7 years managing an economic consultancy before joining Royal Dutch/Shell Group in 1973 as group chief economist. He subsequently held various senior oil supply and planning posts until joining the WEC.*

NEBOJSA NAKICENOVIC *has been the leader of the Environmentally Compatible Energy Strategies Project at IIASA since its establishment in 1991. He joined the institute in 1973, previously working in the field of nuclear materials accountability.*

THE WORLD ENERGY COUNCIL has an enviable reputation for producing comprehensive and informed assessments of future energy prospects (such as "Energy for Tomorrow's World", published in 1993). A few months ago the results of its latest work, conducted jointly with the International Institute of Applied Systems Analysis based in Laxenburg, Austria, were published as "Global Energy Perspectives to 2050 and Beyond". This long-term work continues, and the results of the next stage will be presented at the WEC's 1998 congress in Houston, USA.

We do not know, of course, how world energy supply and demand will develop over the next century with any precision. We therefore use alternative scenarios, by which we seek to portray internally consistent alternative possibilities, each of which is realistic – though different people may find the various scenarios more and less attractive.

We can be fairly sure that energy use will expand because of the demand for the services which energy provides. With world population likely to double over the next century from its present 5.8 billion total, with the drive to satisfy basic needs of the 2 billion plus people currently without commercial forms of energy, and with the wide-ranging pressures for social and economic development, world primary energy demand could rise by at least 2-fold to 5-fold by 2100. In Fig.1 we show population growth and in Fig.2 three alternative cases for energy demand (High Growth A, Middle Course B, Environmentally Driven C) to 2100.

Any low energy demand projection, if based on what are now regarded as realistic world population and economic development projections, needs to be based upon substantial improvements in energy efficiency, real efforts to encourage energy conservation, and the expansion of appropriate technology innovation and diffusion.

We should not be overly pessimistic about the pace of energy efficiency improvement, as indicated by the measure of reducing energy intensity of economic activity. In the US and UK the annual rate of improvement has been about 1 per cent for at least 150 years. A similar pattern can be seen in other industrial countries over the past 50–75 years. In a number of developing countries significant efficiency gains can be seen occurring in recent decades provided one looks at total energy consumption (consideration of commercial energy only generally shows it rising faster than the pace of economic activity). Energy use must then be compared with total economic activity in a country (in less advanced economies much activity is not included in the official statistics – Gross Domestic Product at market exchange rates). Provided these steps are taken the performance of many (but by no means all) developing countries is moderately encouraging if Gross Domestic Product is calculated using the broad measure of purchasing power parity.

Nevertheless, the rate of improvement needs to be accelerated, in order that resources are used more efficiently and environmental impacts reduced. The focus of research effort and technological innovation and diffusion will need to be shifted so that these goals will be achieved earlier and more effectively. There are huge institutional, technological and financial challenges to be overcome – not least the large energy subsidies which tend to encourage waste and inefficiency, inertia and lack of information, and weaknesses in capital markets.

We estimate that on the energy supply side alone the world may need to find more than $20 trillion (at constant 1990 prices) in the period 1990–2020, in order to meet middle-range energy demands. At present investment in the world's energy sector is running around $700bn annually. If the required institutions do not exist, if domestic savings cannot be successfully harnessed, if investments are hampered by inertia, and uncertainty persists over the security and level of returns, then investible funds of the level we have indicated as required will not be forthcoming. The more impoverished and unstable societies are likely to suffer most.

By comparison, available energy resources in a technical sense do not impose anything like the same challenge. In geological

resource terms – if not in technological, financial, or environmental ones – there would appear to be sufficient fossil fuel resources available to satisfy global primary energy demand under most scenarios to 2100. But that projection takes an optimistic view of various challenges – not least those arising from increased import dependency and lengthening supply lines for the fossil fuels.

The world additionally needs to accelerate the development of economic and (in the local sense) environmentally acceptable renewable energy availability, and enhance the public acceptability of nuclear power generation – as well as encourage efficiency and conservation. By 2100 we believe, if challenging conditions were met, that the various forms of renewable energy could provide 40 per cent or 50 per cent of global primary energy supply, and nuclear perhaps up to 20 per cent more under favourable conditions. Modern biomass energy and the various direct forms of solar power are expected to contribute the major part of the contribution by renewables.

Unless we move in that direction the world is likely to be confronted with the physical consequences of (eventually) using up its finite fossil fuel resources, and may have burdened itself with severe local, regional and global environmental problems. Fossil fuel combustion, particularly coal, creates a variety of emissions – some of them clearly harmful in large volumes. Sulphur emissions, for instance, may adversely affect local air quality and cause acid deposition on ecosystems. Sulphur and nitrogen emissions are of major concern now but – we believe – the impacts of sulphur emissions on local air quality and of acid deposition on major food bearing crops will encourage sulphur abatement measures sooner rather than later. Nitrogen (and other) emissions from road vehicles may be a much more formidable challenge unless technical breakthroughs can be achieved – and even then this may do little for traffic congestion and related infrastructural demands.

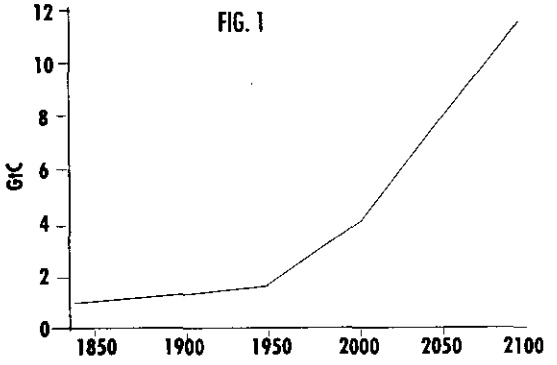
Another enormous potential challenge – in the event that activities (such as fossil fuel use, cement and nylon manufacture, rice growing, and cattle and sheep rearing) are finally and firmly concluded to be causing global climate change – is how far and how fast can global greenhouse gas emissions be brought down? Fig.3 provides our projections arising from the six scenarios (the two C scenarios having much the same outcome). These are all lower outcomes than provided by comparable scenarios of the Intergovernmental Panel on Climate Change, which published its Second Assessment Report in June, 1996. But the lower the targets for global primary energy demand and greenhouse gas emissions, the greater the need for energy efficiency improvements, conservation, and non-fossil fuel development. As Fig.3 indicates, realistic global projections suggest a successful turn-around will be a very long and hard task.

In the next few decades these challenges and the business opportunities provided by them will offer enormous scope for companies willing and able to adapt and to innovate. The pressures for greater consumer orientation and the provision of energy-related services are expected to intensify. The desire for convenient and clean energy will grow. Business corporations will need to shift their focus and structure. There is likely to be a continuing shift in the world's geopolitical balance in favour of "the South". One of the bigger questions is whether institutional change will manage to march in step with these challenges and developments – to facilitate them, rather than hinder them.

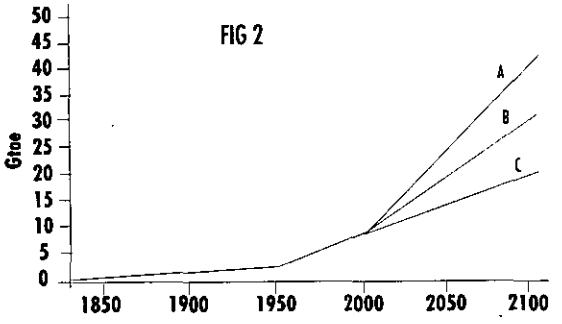
The world needs to ensure that desirable options do not get blocked off or made much more costly to achieve. Fundamental changes cannot be achieved within 25 years. Nevertheless, the essential start can be made to ensure the transition to a more sustainable path of development for the long term. This is why "Global Energy Perspectives to 2050 and Beyond" is strongly supportive of the WEC's call to governments, business decision-makers, and energy consumers to start taking action now to adapt to the needs of our longer term future.

We need to ensure that desirable options are not blocked

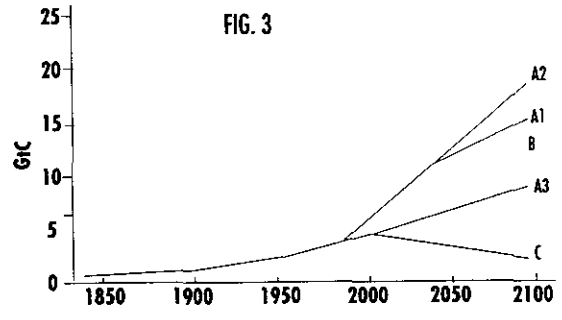
GLOBAL POPULATION GROWTH
1850 TO PRESENT, AND THE PROJECTION TO 2100 IN BILLIONS



GLOBAL PRIMARY ENERGY USE
1850 TO PRESENT AND THE 3 CASES TO 2100 IN GTOE



GLOBAL ENERGY RELATED CARBON EMISSIONS
1850-1990 AND FOR 3 SCENARIO FAMILIES TO 2100 IN GtC



Market reforms hold the key

By KEN LAY
CHAIRMAN OF ENRON DEVELOPMENT CORPORATION

The successful development of an international power industry rests on accommodating the commercial requirements of the developers

KEN LAY *is chairman and chief executive officer of Enron Corp., one of the largest energy companies in the world, engaging in oil and gas exploration and production and actively developing power plants, natural gas pipelines and liquid fuel facilitates throughout the world. Headquartered in Houston, Texas, the company had revenues of more than $9.1bn in 1995 and total assets of more than $14bn.*

WHEN WE LOOK BACK ON THE LATE 20th century, we will recognise an inexorable shift in relations between the industrialised nations and the emerging market economies, and the commercial interests between them. We'll see that a pattern of lingering colonialism was finally broken, and that countries began to stand on equal footing and as partners in a global economy. Today economic disparities still exist, but many governments are working to accelerate their industrial development. They're committed to establishing adequate infrastructure facilities to support their populations and industries, working in partnership with international developers. We're seeing that these public-private partnerships do work, and that they have made it possible to develop, finance and operate billions of dollars of energy facilities in emerging markets.

In essence, there are only two real criteria for the successful development of power projects. The first is the need for power – and that need is measurable and genuine. More than two billion people in this world are denied access to electricity, according to the World Bank, which estimates it would take an investment of $100bn a year to meet this demand. That's an ambitious task for governments to take on alone, which is why many have invited private developers in to help. The second criterion is the political will to legislate the market reform needed to accommodate the commercial requirements of these projects. For this, governments must implement important market reforms if they want to attract private developers, even though those reforms may run counter to popular political beliefs and customs.

Why do we need market reforms? All power projects involve a great deal of risk, and international projects even more so. The developer is responsible for managing much of that risk. It must secure long-term financing, arrange secure and plentiful fuel supplies, and assume responsibility for the construction and operation risk. Developers depend on a comercial framework to support these arrangements and the smooth operation of the facility once it is built. Specifically, there are five areas that governments must address to create an hospitable environment for private energy development:

- Sanctity of contracts. Private developers and their lenders must have the assurance that the contracts they sign will remain in force and be honoured even if the government changes hands or the political and economic situation shifts. If contract disputes arise, the legal system must be capable of resolving civil law disputes.
- Creditworthiness of power purchasers. The ability to finance large capitalisation power plants depends on a project's anticipated cash flow from a creditworthy power purchaser, which is often the state electricity authority. Developers seek state and national government guarantees that they will pay if the state utility is unable to do so.
- Transforming electricity markets. Many state electricity companies base business decisions on political considerations, not economic ones. Countries cannot hope to attract private international developers unless they can make a profit by charging a fair but not excessive price for electricity and employing people they need to run their plants safely and efficiently.
- Assuming foreign-exchange risk. International developers finance most of their projects in their home currency. But it is the obligation of the host government to assume remaining foreign-exchange risk so that loan repayment to international lenders is never jeopardised.
- Remove bureaucratic barriers. In the interest of protecting its domestic economy, many emergng market nations create unintentional barriers to foreign developers. Excessive tariffs, customs and duties on importing state-of-the-art equipment to run today's efficient and clean power plants can add millions to a project's final cost.

Our company has developed or is assembling new projects in 33 countries, at various stages of market reform. As more private power projects begin to operate all over the globe, nations will see for themselves what market reform can accomplish and how it can accelerate their own development. ■

Transforming the sector

By HON DOUG L KIDD
MINISTER OF ENERGY IN NEW ZEALAND

New Zealand's innovative approach to energy sector deregulation has attracted international interest and investment

IN LITTLE MORE THAN TEN YEARS, THE NEW Zealand energy sector has been transformed. Fundamental changes in energy policy have created opportunities for private sector investment, and opened wholesale and retail markets to competition in a sector once characterised by central planning, heavy government investment and state ownership.

Energy sector reform occurred in the context of a broad programme of microeconomic reforms made throughout the economy to improve New Zealand's international competitiveness and overall economic performance. A strategy of reducing and removing barriers to the development of competitive markets began in the early 1980s.

At that time, the government was the largest player in the electricity, gas and coal industries, through major investments in production, transportation and processing. Local electricity and gas distribution and retail were similarly dominated by regional government, and operated within exclusive geographical franchise areas. Government involvement in petroleum processing and distribution was limited to a share of the country's oil refinery, but the industry was tightly bound in regulation – most notably, price control.

In a short space of time, the government restructured its assets. The state has now withdrawn from gas and petroleum markets. In electricity, the government retains ownership of key generation and transmission businesses, but they are kept at arm's length, and run along business lines, under the transparent terms of the State-Owned Enterprises Act 1986. The major coal producer is run on similar lines. Special legislation was also introduced requiring local governments to restructure their energy businesses as standalone companies. Shares in many of these are now publicly traded. At the same time, all franchise restrictions were removed.

A wholesale electricity market becomes fully operational from 1 October 1996, bringing with it a new and exciting phase of competitive pricing. In the lead-up to the new market, the dominant generation company was split into two, and both of the major generators and private consortia have committed to new generation projects, expanding the scope for wholesale competition to develop.

Companies at the distribution and retail level have pursued productivity improvements through restructuring and amalgamation. Given that there are still about 40 electricity companies serving a national population of 3.5 million, amalgamation activity at that level is expected to continue.

The revitalised energy sector is attracting significant foreign investment from Australia and North America, and experienced international operators are bringing their experience to the market.

New Zealand has adopted a unique light-handed approach to the regulation of natural monopolies. The Commerce Act 1986, which applies to all markets, contains provisions making it illegal for a dominant firm to restrict competition. In addition, price control can be introduced under the Act in markets where competition is limited. In the electricity and gas industries, where transmission and distribution line businesses have strong natural monopoly characteristics, the Act is supported by extensive information disclosure. Disclosure makes transparent the performance of businesses with market dominance, encouraging self-regulation and facilitating recourse to the Commerce Act.

The government has an important role to ensure that New Zealand's unique environment does not suffer in the pursuit of competition. That has involved setting and enforcing clear standards for environmental practices, and promoting energy efficiency and innovation. New Zealand's first windfarm has been commissioned, without government subsidies, and interest in this and other renewable resources is high.

New Zealand has come a long way in a little over 10 years. The objective of market reforms has been to establish properly functioning markets, in which energy businesses can deliver efficient and effective services. Our innovative approach to energy sector deregulation has attracted international interest and investment. The foundations have been laid for a sustainable, efficient and dynamic energy sector. ■

HON DOUG L KIDD *studied law at Victoria University and practised as a solicitor until 1979, a year after he entered Parliament as a member for Marlborough. Since the National Party's return to government in 1990, he has held a number of cabinet posts. He has business involvement in forestry and maintains a lifelong interest in military and defence matters. He is currently minister of fisheries, energy, labour and for accident rehabilitation and compensation.*

The local multinational

By TIM STATTON
PRESIDENT OF BECHTEL POWER COMPANY

Research and background knowledge are among the secrets of success in gaining access to overseas markets

TIM STATTON *is the president of Bechtel Power Company, with global responsibility for all fossil and nuclear activities, and a senior vice-president of Bechtel Corporation. He joined Bechtel in 1972 as an assistant cost and trend engineer. His progressively responsible assignments have included manager of several turnkey power plant projects, managing director of Bechtel Enterprises and manager of Bechtel Power's US business development activities. He has held his present post since January 1996.*

How does a company – even an established multinational – succeed in gaining entry to new overseas markets?

Two points. First, do your homework. Easier said than done, but unless you invest in learning your markets and your customers — and what they value — you can't win in this game.

Second, become local. A venerable US politician once said: "All politics is local." Our international work, especially in the power sector, is inherently local. That's why Bechtel uses the expression 'global reach, local touch.' Customers value our worldwide capabilities and resources, but when it comes to selecting a builder, they want assurance that we have a profound knowledge of local commercial practices, prospective partners, labour relations, sources of finance and materials, and politics.

Let's talk about politics. How do you generate support for these big jobs?

After you recognise that you're working back and forth between economics and politics, it leads you right back to being local. Use your project's economic benefits to create local "stakeholders" – local investors, partners, merchants, labourers, technicians, people who want job training, and citizens from every walk of life. Give them a stake in the outcome and they will root for your project.

You obviously need partners on these billion-dollar-plus jobs. How do you evaluate prospective partners?

Ethics. Experience. They should be well-known and well respected; capable of matching us quality for quality. At the end of the day, Bechtel wants a project we're proud to hang our name on.

What is the cardinal sin of trying to penetrate new markets?

Pride. Believing you can parachute in to a new country, make your profit, and go home. That may have worked once, but no longer. Now, you need to demonstrate to your hosts that you're in for the long haul, and can make a tangible contribution to the quality of life. Pride usually takes the form of: "We've done this before, we know best, stand back and we'll show you how it's done." That's a big mistake.

If electricity is a commodity, how do you differentiate yourselves from the competition?

The product – electricity – is indeed a commodity. But customers will always recognise value and superior quality. We can and do price our work to generate kilowatts at commodity prices, but we also offer what no other builder can – project development and finance, an innovative product that we call PowerLine™, worldwide resources, local capability, and a Bechtel guarantee that has stood up for 98 years.

What is PowerLine?

PowerLine is a family of standard, optimised designs for power plants that incorporate the most advanced technologies and best practices from our worldwide portfolio. Before PowerLine, designing and building power plants was a fully customised, one-of-a-kind business. That's needlessly expensive.

What are Bechtel's most notable projects?

In the power industry, we've developed, financed, designed, built – and now own or operate – more megawatt capacity than any builder in the world. So that's a tough question.

But across the board, we've been involved in some of the biggest and most complex infrastructure jobs in history, from development of Hong Kong's new international airport, to the Channel Tunnel between France and England, to restoration of postwar Kuwait's oil production facilities. Those represent quite a leap from a company that had its origins using mules to grade railroad beds in the US Oklahoma Territory at the turn of the century. F

Partners and partnering

By ROBERT C. HART
PRESIDENT OF COASTAL POWER COMPANY

The partnering process is complex and time consuming, but the benefits of a successful union far outweigh the time and effort invested

COASTAL POWER COMPANY HAS BEEN active in international power development since the middle of 1994. In these two years, we have looked at more than a hundred opportunities, made serious runs at about 15 projects or acquisitions, and reached financial closing on seven projects, now under construction or in operation. In every one of these projects, including those where we were not successful, we learned essential lessons about the partnering process.

Everyone can recall stories about how easy it is to take advantage of out of town visitors interested in buying real estate. The fool on vacation is the answer to a real estate broker's prayers.

Now consider going half-way around the world to a different country, with different customs and culture, different language and lifestyle, and just as many savvy local players anxious to take advantage of the outsider. It is simply foolhardy to attempt to do business without a local partner.

My second point has two parts: first, the partnering process is complex and time consuming, and, second, once a decision is made to form a partnership, the benefits of partnering far outweigh the time and effort invested.

The analogy of courtship and marriage is unavoidable. Finding partners and forming partnerships in the power business have more in common with courtship and marriage than any of us would like to admit.

In order to determine whether a potential partner can satisfy our needs, we have to be very clear about those needs. Many partnerships (and marriages) fail because the partners were not clear about their own needs and expectations. When considering a partnership, make a list of your needs. Devise a scoring system and rank every potential partner with respect to the list.

What we are looking for is compatibility. How do we feel about voting rights, board membership, day-to-day management, and big decisions like new investments, borrowing, and termination? How do we feel about yield on investment, distribution of cash, provision of services, and sharing of development or bidding costs? Once we are clear about our own feelings, we look for someone who shares those feelings.

Don't hurry the courting process. Take time for different levels of management to meet and for those meetings to occur in different circumstances and settings. Communication is never perfect between different levels of management. There is often a disconnect between the working team and senior managers.

A successful courtship is followed by some form of commitment – an engagement of sorts. The potential partners agree to exclusivity. At Coastal Power, we usually follow the initial engagement letter – the memorandum of understanding or letter of intent – with a project development or bidding agreement. In this longer agreement, we address in some detail such issues as development or bid preparation budget, development cost sharing, board approval process and co-ordination of that process among the partners, equity investment and balance sheet support commitments, dealings between the partnership and individual partners, and the major shareholder governance issues. While this is an engagement, some real money is spent and some major commitments are made. It is essential that the key money and governance issues be addressed, resolved, and put in writing as early as possible.

Our experience suggests that the engagement agreement should not be the end of the courting. One of the most important tasks during the exclusivity period is the drafting of the final shareholder agreement – a task that is virtually certain to create some tension or worse. It is very similar to the period leading up to the wedding day. If both parties continue to work on creating and building the relationship, this tension will pass.

Like marriage, sustaining a business partnership over the long term requires regular attention and continued effort. While it is often difficult in the increasingly complicated and fast-paced world of international business, senior managers – including chairmen and CEOs – need to find frequent opportunities to spend quality time together focusing on the relationship. F

ROBERT C. HART *is the president and chief executive officer of Coastal Power. He began his business career at Boise Cascade Corporation in 1968. Between 1970 and 1994, he formed several ventures focused on real estate and energy. The energy ventures included Inverness Coal, US Energy, Oxbow Geothermal and Hart Associates. From 1981 to 1983 he was president of Agip Coal USA, a subsidiary of ENI, the Italian national energy company. He joined Coastal Power in his present position in 1994.*

Developing investment

By DR. RAJENDRA K. PACHAURI
DIRECTOR OF TATA ENERGY RESEARCH INSTITUTE

The energy sectors of developing countries represent attractive investment opportunities

DR. RAJENDRA K PACHAURI
assumed his current assignment in 1981 as director of the autonomous, not-for-profit Tata Energy Research Institute, India's premier research institute providing professional support in the areas of energy, environment, forestry, biotechology and the conservation of natural resources to government departments, institutions and corporate organisations worldwide. He is also advisor (Energy and Sustainable management of Natural Resources) to the administrator, United Nations Development Programme. He has been a visiting research fellow at the World Bank. Dr. Pachauri holds a PhD in Economics and a PhD in Industrial Engineering from North Carolina State University.

SINCE THE BEGINNING OF THE 1990S, A major change has taken place in the financing of energy projects in most developing countries. Traditionally, energy investments were seen as an important element of government policy, and were regarded as essential to development of other sectors. However, some major changes have taken place recently, occasioned by:

- A rapid rate of growth in demand for energy, resulting not only from increased industrial production, but also from growth of transport and commerce. Even more important, however, has been the growth in demand for energy in the residential sector with an increase in demand for household appliances.
- With increasing globalisation of economic activities, investments in the energy sector are now sourced from other countries in addition to domestic finance. In other words, the new mobility of capital for energy investments brings into play a source generally inaccessible in the past.
- In the absence of appropriate organisational structures to deal with energy pricing issues, many energy supply organisations in the developing world have been unable to introduce rational price levels, thus constraining the generation of internal resources for expansion of the energy sector.

Energy investments from overseas are also important because of associated technological improvements. This is particularly true in the hydrocarbons industry, where technological advances worldwide, if tapped, can bring about major improvements in the efficiency of exploration for hydrocarbons, recovery of existing reserves as well as in refining and distribution. Overall, the gap in financing of the energy sector in developing countries continues to be large. In a study conducted by the Tata Energy Research Institute for the World Energy Council (WEC), demand for capital was estimated in keeping with the scenarios of growth used by the WEC. It was found that traditional sources of finance would become increasingly constrained; new energy investments required to meet energy demand in the developing countries since 1990 have been about $80bn annually. Of this $15bn annually has come from the private sector, and this volume is projected to grow rapidly in the future to staggering levels. Hence, it is vital that major institutional changes be brought about in developing countries not only to attract requisite levels of overseas investments for energy development, but also to facilitate efficient utilisation of these investments.

The traditional approach of governents taking decisions on each investment proposal needs to be replaced by a system that is far more transparent and professionalised. In particular, it would be essential to set up regulatory mechanisms and processes by which quick and impartial decisions are taken on energy sector investments.

Foreign investors and energy companies seeking business opportunities in the developing world also need to take certain actions in promoting the efficient flow of funds to the energy sectors of the recipient countries. Firstly, it would appear that a move towards integrated energy companies that combine expertise and investment options across the entire range of energy activities would have a decided advantage in future. At the same time, companies doing business in developing countries need to be sensitive to local conditions. Projects dealing with literacy, supply of drinking water in rural areas, environmental improvement and welfare of workers in general would provide a pleasant human face to the operations of companies coming from other countries.

The experience of the past 10 years or so and estimates of future demand clearly indicate that the developing countries need to assign a major role to investments from other countries for the development of their energy sectors.

Also, given the fact that energy demand in developed countries has now reached a plateau, and for environmental and economic reasons is not likely to grow significantly, it is the developing world that presents the most attractive investment opportunities for the future. A deeper dialogue on how to facilitate such investments on a large scale in the future is needed between organisations from north and south. F

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E E

Energia ed Economia

Aprile 1997 Bollettino di informazione dell'A.I.E.E. Anno I Numero 3

ASSOCIAZIONE ITALIANA DEGLI ECONOMISTI DELL'ENERGIA

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ENERGIA E SVILUPPO SOSTENIBILE

Cresce la domanda di energia nel mondo perché cresce la popolazione e perché migliorano le condizioni in molti paesi, anche se molti rimangono a livelli di consumo e di reddito molto bassi. La sperequazione in campo energetico è infatti molto forte: accanto a Paesi che consumano oltre 8 tonnellate di petrolio equivalente per abitante abbiamo Paesi che non arrivano a 100 kg di petrolio per abitante. Le prospettive non sono certamente per un riequilibrio di consumi, anche se c'è la tendenza nei paesi più ricchi ad essere più efficienti e cioè a consumare meno energia per unità di produzione o di reddito prodotto.

Ma la domanda che spesso ci viene posta a cui dobbiamo rispondere è se c'è sufficiente energia o meglio fonti di energia disponibili e non inquinanti nel prossimo secolo per consentire un equilibrato sviluppo all'umanità.

Se guardiamo infatti le fonti fossili ed in particolare gli idrocarburi ci accorgiamo infatti che nel corso di questo secolo che sta finendo abbiamo consumato circa il 50% delle riserve scoperte di petrolio e gas, che è ben noto, non sono ricostituibili. Migliore è la situazione delle riserve di carbone che però presenta, come fonte di energia, problemi di inquinamento.

Editoriale

Quindi, nonostante la tecnologia stia aiutando la ricerca petrolifera, dobbiamo aspettarci che, ai ritmi sostenuti dei consumi energetici mondiali, il livello delle riserve mondiali di idrocarburi inizi a ridursi, nel giro di qualche decennio, per poi esaurirsi.

Ma accanto al previsto esaurimento delle fonti fossili altri problemi ci sovrastano nella crescita demografica dell'umanità. Il primo è il sempre più difficile rapporto fra sviluppo economico e rispetto dell'eco-ambiente; il secondo è la disponibilità di risorse economiche e finanziarie sufficienti a mantenere un modello di sviluppo come l'attuale; il terzo è il mantenimento di un precario equilibrio in molte aree geografiche minacciate da fenomeni irreversibili prodotti dall'uomo.

Se accanto a questi problemi esistenziali e strutturali teniamo presente che guerre, disastri, scontri politici possono in qualsiasi momento mettere in pericolo il complesso flusso di materie prime energetiche e di prodotti che dalle aree di produzione arriva alle aree di consumo, ci rendiamo conto che parlare di sicurezza in campo energetico è pericoloso o quantomeno imprudente.

E allora dobbiamo mantenere vigile l'attenzione e continuare a rafforzare le misure, le politiche e le azioni che servono a fornire l'energia necessaria alla crescita economica e sociale del mondo sempre senza alterare i delicati equilibri ambientali che sono parte integrante del nostro ecosistema.

Tale compito peraltro sembra spettare essenzialmente ai paesi industrializzati che dispongono di risorse e tecnologie necessarie per lo sviluppo ed il finanziamento dei grandi progetti energetici nel mondo, più che ai paesi in via di transizione anche perchè i primi collateralmente possono ridurre le emissioni nocive, trasferire tecnologie ai paesi in via di sviluppo e migliorare l'efficienza energetica nei vari processi industriali.

Considerando le dimensioni dei problemi accennati e la vastità delle aree interessate, appare chiaro che i cambiamenti indotti dalle azioni che verranno svolte saranno graduali e potranno dare risultati solo nel corso di alcuni decenni.

Quindi occorre agire rapidamente per accelerare questi cambiamenti e rendere così possibile, senza alcuna penalizzazione, la disponibilità di tutta l'energia richiesta da una popolazione mondiale in crescita sul piano demografico, economico e sociale.

Di energia e sviluppo sostenibile l'AIEE con il Comitato Italiano del WEC e con l'Istituto Affari Internazionali discuterà il 14 maggio a Roma in un importante Convegno dedicato a questo tema a cui parteciperanno i principali esponenti dell'industria energetica italiana, del mondo economico e finanziario, e del governo.

Ci auguriamo, come al solito, di dare un utile contributo alla conoscenza dei problemi, al loro dibattito e forse alla formulazione di qualche proposta valida per un migliore e "sostenibile" sviluppo in campo energetico.

Edgardo Curcio

L'ATTIVITÀ DELL'ASSOCIAZIONE NEI PRIMI MESI DEL 1997

Il 21 marzo presso la Sala Conferenze dell'ENI si è tenuto un incontro con il Presidente dello IAEE Dennis O'Brien che ha presentato un interessante studio su "Energy industries to 2000" a cui ha fatto seguito l'Assemblea dei soci dell'AIEE.

Nella sua presentazione il Presidente dello IAEE dopo aver ricordato brevemente i grandi mutamenti in corso nel settore dell'energia ha tracciato uno scenario per l'industria energetica mondiale per il prossimo secolo. In campo petrolifero Dennis O'Brien prevede un rafforzamento delle grandi compagnie ed una concentrazione dei mercati nelle aree più importanti.

Ancora forti sviluppi per il gas naturale soprattutto in funzione di scelte ecologiche e mantenimento di un ruolo significativo per il carbone nelle aree dell'Asia centrale e dell'Europa orientale dove sono concentrate grandi riserve di questo minerale.

Nel dibattito che è seguito il Presidente dello IAEE ha risposto alle molte domande formulate dai soci AIEE ed ha concluso sottolineando il proprio apprezzamento per le attività e lo sviluppo dell'affiliata italiana che è divenuta recentemente la terza per importanza e numero di iscritti fra le oltre 30 affiliate dello IAEE sparse in tutto il mondo.

Nella relazione successivamente tenuta all'Assemblea dei soci il Presidente dell'AIEE ha fatto un breve consuntivo dell'attività svolta nel 1996 che si può sintetizzare in 16 convegni/seminari, un corso post-universitario in Economia e Gestione delle Fonti energetiche, numerosi articoli e collaborazioni con riviste e giornali e soprattutto una crescita del numero dei soci del 24%. Nel presentare i programmi per il 1997 il Presidente Edgardo Curcio ha in particolare ricordato la collaborazione con l'Università Luiss-Guido Carli con la quale sono previste varie iniziative tra cui la continuazione del Corso di specializzazione in Economia e Gestione delle Fonti Energetiche, la realizzazione di numerosi seminari e convegni a Roma, Milano e Firenze che toccano aspetti diversi del settore energetico, la trasformazione del Bollettino in un periodico mensile ed il lancio di una collana di quaderni AIEE a seguito di un accordo editoriale stipulato con gli Editori Riuniti di Roma. Successivamente il Tesoriere Ernesto Nathan ha presen-

Bilancio al 31.12.1996

Attivo		Passivo	
Banche	L. 21.121.376	Avanzo Eserc. prec.	L. 80.941.995
Titoli	L. 50.000.000	Disavanzo Eserc. '96	L. (9.820.619)
	L. 71.121.376		L. 71.121.376

Conto Economico

Entrate		Uscite	
Quote ass. '96	L. 46.439.000	Spese Gestione	L. 60.406.410
Ant. quote '97	L. 5.370.000	Quota IAEE	L. 7.781.469
Int. attivi	L. 3.845.425	Quota EFCEE	L. 390.810
Altre attività	L. 3.103.645		
Disav. Eserc. '96	L. 9.820.619		
	L. 68.578.689		L. 68.578.689

tato il Bilancio ed il Conto Economico dell'AIEE al 31 dicembre 1996 che è stato approvato dall'Assemblea.

La stessa ha provveduto anche a nominare il Consiglio di Amministrazione dell'Associazione per il biennio 1997-98 che risulta così composto: presidente: Edgardo Curcio; V. Presidente Vittorio D'Ermo; Tesoriere: Ernesto Nathan; Consiglieri: Giovanni Aliboni, Luigi De Paoli, Carlo di Primio, Riccardo Galli, Giuseppe Gatti, Giorgio Tolotti.

Il Consiglio di Amministrazione subito riunitosi ha nominato il Comitato Scientifico dell'Associazione che, per il biennio 1997-98, risulta essere costituito dai professori: C. Andrea Bollino, Ugo Bilardo, Fabrizio Di Lazzaro, Alessandro Lanza, Augusto Ninni, Edgardo Curcio.

L'ATTIVITÀ ED I PROGRAMMI PER I PROSSIMI MESI

- Il **14 maggio a Roma** a Palazzo Rondinini è stato organizzato, con il Comitato Italiano del WEC e con l'Istituto Affari Internazionali, un Seminario sul tema "Energia e sviluppo sostenibile: quali azioni?" che servirà a presentare e dibattere il tema della Conferenza Mondiale dell'Energia per il 1997. É prevista la partecipazione di rappresentanti dell'industria nazionale energetica, del mondo bancario, del Governo, di esperti e del Segretario del WEC, Ian Lindsey.
- Il **15 e 16 maggio ad Abano Terme** si terrà un Seminario su "Utilizzazione termica dei rifiuti" organizzato dalla Associazione Termotecnica Italiana" a cui l'AIEE parteciperà come co-sponsor. Sono previsti importanti relazioni da parte di esperti, tecnici ed amministratori locali.
- Il **23 maggio a Milano** presso l'Università Bocconi organizzato dallo IEFE con l'AIEE si tiene un interessante Seminario di studio dal titolo "Verso una metodologia operativa per l'internalizzazione delle esternalità nel settore energetico".
  Sono previsti interventi di vari relatori dello IEFE ed una tavola rotonda coordinata dal Prof. De Paoli, a cui parteciperanno esperti e rappresentanti di molti enti e società elettriche.
- Il **3 giugno a Milano** presso l'Università Bocconi organizzato congiuntamente con lo IEFE si terrà un Seminario su "Le prospettive della ricerca petrolifera in Italia" che servirà a fare il punto sulle potenzialità geominerarie del territorio italiano in materia di idrocarburi a seguito della liberalizzazione della Valle Padana ma anche di nuovi ritrovamenti in diverse regioni italiane.
- Il **9 giugno** sempre a **Milano** presso la Sala Conferenze della Fondazione ENI - Enrico Mattei si terrà un Convegno su "Costi economici e costi ambientali nel settore elettrico" nel corso del quale verrà presentato uno studio degli Amici della Terra su "Valutazioni economiche e sociali della cogenerazione in Italia", nonché verranno discusse importanti relazioni e contributi sul tema da parte di società, Associazioni ed esperti.
- A **metà giugno** si dovrebbe tenere a **Roma**, presso la LUISS - Guido Carli Scuola di Management una "vernice" per la presentazione del libro di Vittorio D'Ermo "Le fonti di energia tra crisi e sviluppo", pubblicato dagli Editori Riuniti di Roma. L'incontro servirà anche a presentare il nuovo Corso di specializzazione in Economia e Gestione delle Fonti Energetiche che la Scuola di Management della LUISS organizzerà insieme con l'AIEE nel 1997, oltre ad eventuali altre iniziative formative sempre in campo energetico.
- A **fine giugno**, presumibilmente all'Hotel Ambasciatori di **Roma**, dovrebbe essere tenuto un seminario organizzato congiuntamente con l'ENEL e l'ISES sul tema "Una strategia per l'industria fotovoltaica italiana". É prevista la partecipazione di Mr. Braun, Chairman dell'Amoco/Enron Solar, di Mr. Shaw della BP Solar e di altri esponenti dell'industria fotovoltaica facenti parte di grandi gruppi petroliferi internazionali che esporranno le strategie di collegamento e sviluppo nell'ambito delle politiche più generali dei

loro gruppi.

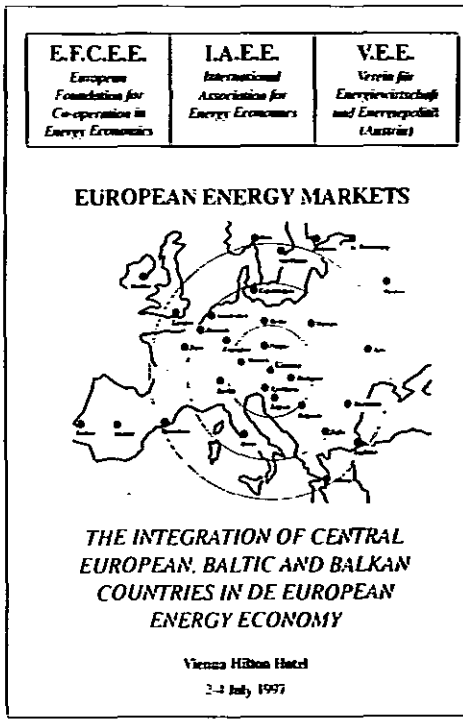
- A **fine settembre** dovrebbe essere organizzato a **Roma**, presso la Sala Biblioteca del CNEL un Convegno sul tema "Carburanti ed auto: i problemi ambientali delle grandi città". Il Convegno sarà organizzato congiuntamente con alcune aziende petrolifere.
- Il **10-11-12 novembre a Firenze** al Grand Hotel Baglioni, è previsto un Convegno internazionale di tre giorni su "Energy Efficiency in Household Appliances", organizzato congiuntamente con l'ENEA e l'ISIS, con il sostegno della Commissione Europea - a valere sul progetto SAVE - e di altri organismi internazionali e nazionali. Sono previste relazioni ed interventi di esponenti ed esperti di oltre 12 paesi sia europei che extraeuropei sul tema dell'efficienza energetica negli elettrodomestici. Collateralmente sono previste manifestazioni sociali e visite guidate.
- A **fine novembre a Roma**, all'Hotel Plaza, è previsto un Convegno i due giorni su "Tecnologie elettriche per la climatizzazione degli ambienti nel settore domestico e terziario" seminario tecnico-economico organizzato congiuntamente con 'AICAR, l'ENEL e il AEI sulle potenzialità di impiego e di sviluppo delle pompe di calore per la climatizzazione. Sono previsti interventi delle industrie interessate ed alcuni stand espositivi; per i partecipanti è pure prevista una manifestazione sociale.

COLLANA QUADERNI AIEE

Il 15 aprile è stato stipulato un accordo fra l'AIEE e gli Editori Riuniti di Roma per la stampa, pubblicazione e diffusione di una collana di volumi sui temi dell'energia scritti dai soci AIEE e messi in vendita dall'editore su tutto il territorio nazionale. Inizialmente si prevede l'uscita di due volumi nel 1997 ed altrettanti nel 1998.
I libri saranno messi in vendita al prezzo di Lire 16.000 l'uno, ma i soci li potranno acquistare dall'AIEE con uno sconto del 50% sul prezzo di copertina. Il primo volume, che è in fase di stampa, è stato scritto da Vittorio D'Ermo ed ha il titolo "Le fonti di energia tra crisi e sviluppo: mercati ed operatori". Si tratta di un importante testo di economia dell'energia, già utilizzato nel I° Corso di Specializzazione della LUISS, che analizza in modo completo la recente evoluzione delle varie fonti di energia nel mondo soffermandosi in particolare sul settore energetico del nostro Paese. Il volume è corredato da numerose ed aggiornate tabelle e grafici su tutte le principali situazioni energetiche divise per fonti e per principali aree geografiche. Il libro di Vittorio D'Ermo verrà presentato ai soci, alla stampa ed all'industria energetica a metà giugno a Roma, con una "vernice" organizzata congiuntamente dall'AIEE e dagli Editori Riuniti presso la LUISS Scuola di Management.

CONFERENZA REGIONALE IAEE

Segnaliamo questo importante Convegno che si terrà a Vienna il 2-4 luglio p.v. a cui parteciperanno relatori italiani dell'AIEE e importanti rappresentanti dell'industria elettrica e del gas europea. Per avere copia del programma completo e per registrazioni contattare la segreteria AIEE.



Norme e notizie legislative

a cura di Valerio Porfiri e Nicola Pedde

per ulteriori informazioni scrivere alla redazione o inviare una E-Mail a: mc1830@mclink.it

Camera dei Deputati

Disciplina della valutazione di impatto ambientale

Iniziativa del Deputato Valerio Calzolaio (Sinistra Democratica - Ulivo)
Cofirmatari: Maria Rita Lorenzetti (Sinistra Democratica Ulivo)
9 maggio 1996
alla data del 3 aprile 1997assegnato alla Commissione VIII (Ambiente e Territorio). Non ancora iniziato l'esame in sede referente.

Sintesi: la proposta di legge N° 428 chiede l'introduzione di una preventiva procedura valutativa dei progetti industriali e delle opere pubbliche per una più efficace protezione dell'ambiente. Ogni progetto dovrà, ai sensi della presente proposta, presentare un'analisi dello stato iniziale dell'ambiente e degli effetti delle opere; i motivi per cui l'opera è stata preferita ad altre in base a considerazioni di ordine ambientale; le misure adottate per eliminare o ridurre gli impatti negativi. Viene richiamata la proposta di direttiva del 10 febbraio 1982, presentata al Parlamento europeo, contenente disposizioni per l'attuazione di una politica di controllo e gestione dell'impatto ambientale.

Nuove norme in materia di sicurezza per gli impianti tecnici

Iniziativa del Deputato Valter Bielli (Sinitra Democratica - Ulivo)
Cofirmatari : Roberto Sciacca (Sinistra Democratica - Ulivo), Gianfranco Nappi (Sinistra Democratica - Ulivo), Mauro Guerra (Sinistra Democratica - Ulivo), Marida Bolognesi (Sinistra Democratica - Ulivo), Famiano Crucianelli (Sinistra Democratica - Ulivo), Angelo Altea (Sinistra Democratica - Ulivo), Adriano Vignali (Sinistra Democratica - Ulivo).
11 febbraio 1997
alla data del 18 marzo 1997 assegnato alla Commissione X (Attività Produttive - Commercio). Non ancora iniziato l'esame in sede referente.

Sintesi: la messa a norma degli impianti tecnologici, così come prescritto dalla legge 5 marzo 1990 n. 46, è a tutt'oggi ancora in gran parte da realizzare. Alla luce di questa considerazione, la proposta di legge N° 3182 chiede un parziale emendamento della suddetta legge ampliandone la portata e fornendo gli strumenti per una pratica e rapida attuazione. Di particolare rilievo risulta la proposta mirante alla concessione di agevolazioni fiscali al fine di agevolare la messa a norma.

Documento di Lavoro - Commissione Carpi -

Lo studio portato a termine dal gruppo di lavoro diretto dal sottosegretario all'Industria Umberto Carpi, nel quadro del riassetto energetico nazionale e della privatizzazione dell'ENEL, ha delineato quali saranno le regole del mercato per il prossimo futuro.

Tale riassetto si è reso necessario in attuazione delle direttive dell'Unione Europea in materia ed ha come punto cardine il mantenimento, grazie ad un complesso sistema di garanzie, della tariffa unica.

E' prevista la costituzione di una nuova società pubblica dove confluiscano la trasmissione ed il dispacciamento, scorporate dall'ENEL. Parallelamente sarà costituita una "Borsa dell'Energia" avente funzione di collettore della domanda ed assegnataria dell'energia elettrica verso i soggetti presenti sul mercato.

L'acquirente unico (AU), organismo catalizzatore dell'energia elettrica, resterà sotto il controllo del Tesoro e sarà preposto alla gestione del mercato dell'energia all'ingrosso (MEI).

A corollario dell'organismo centrale verranno costituite quattordici società su base regionale per la distribuzione, in conformità con i dipartimenti che l'ENEL si appresta a varare.

Decreto Rifiuti: l'Europa più vicina

Dopo un inter parlamentare alquanto tortuoso, il decreto legislativo Ronchi sui rifiuti, approvato il 30 dicembre 1996 dal Consiglio dei Ministri, è finalmente giunto al capolinea.

Le proteste contro le nuove norme introdotte dal provvedimento, come quelle dell'associazione ambientalista "Kronos 1991" e dell'associazione di categoria "Assorecuperi", avevano infatti rallentato il processo per la conversione in legge. Il decreto Ronchi introduce alcune novità come, ad esempio, la tariffa sui rifiuti (in misura dei rifiuti effettivamente prodotti con uno sconto per chi dà da riciclare le confezioni usate) che dal 1999 sostituirà l'attuale tassa, non espressamente contenute dalle direttive europee nè dalla delega del Parlamento al Governo.

"La liberalizzazione del settore del gas naturale dell'Unione Europea"

Si riporta la sintesi della tesi di laurea della dott.ssa Dora Elena Ianora che ha partecipato alla Borsa di Studio AIEE 1997 ed è stata selezionata fra le prime tre candidate al premio.

La struttura tipica dell'industria del gas naturale dei Paesi Membri dell'Unione Europea è caratterizzata dalla presenza di poche compagnie in posizione dominante. Tuttavia, tale struttura verticalmente integrata e, soprattutto, monopolistica sta incominciando ad evolvere, dietro la spinta della Commissione Europea e delle precedenti esperienze di liberalizzazione del Regno Unito e degli Stati Uniti, verso un modello di mercato più aperto e concorrenziale. Malgrado ciò, vi sono fortissime opposizioni da parte della maggior parte degli operatori alla liberalizzazione del settore ed, in particolare, all'introduzione del libero accesso alle reti. Poche questioni riguardanti le fonti di energia hanno suscitato un così acceso dibattito fra le parti come le proposte della Commissione Europea di introdurre il Third Party Access nelle industrie del gas naturale dell'Unione, come completamento del Mercato Unico. L'introduzione del libero accesso alle reti porterebbe dei notevoli vantaggi in termine di benessere sociale. Innanzitutto, essa consentirebbe ad altri operatori di entrare nel mercato della fornitura di gas, il che porterebbe, se accompagnato da adeguati provvedimenti regolatori, ad un aumento della concorrenza gas-to-gas e, di conseguenza, ad una diminuzione dei prezzi fronteggiati dagli utenti finali. Il sistema del libero accesso alle reti consentendo ai terzi di entrare nel mercato ed uscirne senza dovere sostenere elevati costi non recuperabili, renderebbe il mercato delle forniture contendibile. La minaccia di una concorrenza di tipo "hit and run" porterebbe, infatti, l'impresa già presente sul mercato, l'incumbent, ad abbassare i prezzi; nel caso specifico, dunque, le imprese che commercializzano il gas, tradizionalmente quelle di trasmissione, sarebbero costrette, dalla minaccia di entrata di altri operatori, a ridurre i propri margini di profitto. Tuttavia, l'introduzione del libero accesso rappresenta una condizione necessaria, ma non sufficiente, a determinare una concorrenza nel settore del gas; un ruolo fondamentale deve avere la regolamentazione. Non si può infatti avere un libero accesso alle reti "market-led", così come sostengono alcuni studiosi del settore (ad esempio Stern ed Estrada), cioè affidato alle libere negoziazioni di mercato. Né si può pensare che un sistema di TPA negoziato, verso il quale si è andato orientando il Consiglio dei Ministri Europeo, potrà portare alla concorrenza nel mercato del gas. Per quanto riguarda la fase della trasmissione, come insegna l'esperienza di liberalizzazione del Regno Unito, la semplice introduzione del libero accesso in un contesto, quale è quello della maggior parte degli Stati Membri, in cui vi sia una unica compagnia proprietaria della rete, non basta ad ottenere la concorrenza gas-to-gas; è, infatti, necessario regolamentare le condizioni sulla base delle quali viene concesso il vettoriamento, per evitare che la compagnia di trasporto rifiuti di concedere l'accesso, ad esempio sostenendo di non avere sufficiente capacità, o comunque pretenda per esso un compenso ingiustificatamente elevato, al solo scopo di bloccare l'entrata nel mercato da parte di un potenziale concorrente. E' necessario, innanzitutto, regolamentare le tariffe di accesso alla rete, in maniera da evitare che la compagnia proprietaria della rete stessa possa porre tale prezzo ad un livello troppo elevato. A tal proposito, l'esperienza del Regno Unito suggerisce di utilizzare il metodo di regolamentazione dei prezzi del "price cap", basato sulla de-

terminazione del massimo tasso di crescita a cui i prezzi, in un dato periodo, possono crescere. Poi, è necessario, perché possa effettivamente svilupparsi una concorrenza gas-to-gas nel mercato delle forniture, richiedere lo scorporo delle funzioni di trasporto e stoccaggio di gas dalle altre, in particolare da quella di commercializzazione. La sola regolamentazione delle tariffe non è sufficiente, poiché la compagnia proprietaria della rete può sempre rifiutare di concedere l'accesso, sostenendo di non avere sufficiente capacità di trasporto. Non è sufficiente nemmeno la richiesta di unbundling contabile ed operativo da parte delle compagnie verticalmente integrate, contenuta nella Proposta della Commissione del 1992; la mobilità dei lavoratori da un reparto all'altro renderebbe, infatti, molto probabile il passaggio di informazioni fra di essi: é poi difficile credere che si possa avere un comportamento neutrale da parte del management della divisione trasporto, nei confronti dei concorrenti richiedenti l'accesso. In ogni caso, poi, la Modifica della Proposta del 1993 ha eliminato anche questa seppur limitata garanzia di neutralità, poiché ha eliminato l'obbligo di unbundling operativo, mantenendo solo quello contabile. Per quanto concerne, invece, la fase della distribuzione, i grandi utenti industriali, i quali secondo le Proposte della Commissione potrebbero partecipare al sistema del Third Party Access, potendo scegliere la fonte di approvvigionamento più conveniente, beneficerebbero di prezzi finali più bassi. I piccoli utenti, i quali sono costretti ad acquistare il metano dalle società di distribuzione locale, potrebbero comunque beneficiare della concorrenza introdotta nel settore. Se adeguatamente regolamentata, infatti, la società di distribuzione locale trasferirà la diminuzione dei costi di approvvigionamento, derivante dalla riduzione dei margini di profitto delle compagnie di trasmissione, sui prezzi finali dei piccoli utenti. Date le caratteristiche di monopolio naturale che la fase di distribuzione locale presenta, solo grazie ad una regolamentazione che riesca a ridurre la rendita di monopolio delle società distributrici si potrà avere un beneficio in termini di minor prezzo per i piccoli utenti; in caso cotrario, infatti, si avrebbe semplicemente il passaggio della rendita dalla fase della trasmissione a quella più a valle. Un utile strumento regolatorio per cercare di introdurre una forma di concorrenza blanda nella fase della distribuzione è rappresentato dai meccanismi di "yardstick competition". Questi, infatti, consentono di effettuare dei confronti fra diverse imprese operanti in condizioni di monopolio, in termini di prezzo, costi e qualità dei servizi offerti. Pur essendo il confronto difficile, per la diversità di condizioni locali in cui operano varie società di distribuzione locale, sarebbe comunque possibile per il regolatore individuare eventuali forti scostamenti dei parametri della performance rispetto a quelli medi. Questo tipo di meccanismo, dunque, incentiva i fornitori locali a produrre efficientemente, in maniera tale da evitare l'intervento del regolatore. E', infine, importante regolamentare le tariffe per i cosiddetti "clienti obbligati", ossia quegli utenti che non hanno alternative nella scelta del fornitore. Tale regolamentazione è necessaria al fine di evitare che il fornitore locale, per evitare di perdere quote di mercato nel segmento dei grandi utenti industriali, i quali avendo la possibilità di partecipare al sistema di TPA possono scavalcare la rete locale, sia incentivando a mettere in atto politiche di prezzo predatorie, abbassando i prezzi fronteggiati da coloro che hanno la possibilità di effettuare il bypass ed alzando, contemporaneamente, le tariffe dei clienti "obbligati". La regolamentazione delle tariffe per questi ultimi, accompagnata dalla pubblicazione dei criteri di tariffazione seguiti dall'impresa di distribuzione per i grandi utenti, potrebbe evitare la messa in atto di un simile comportamento anticompetitivo.

Realizzato a cura del CDE - Centro Documentazione Estera
sulla base dei dati raccolti nella sperimentazione del sistema di Early Warning Internazionale
Valerio Porfiri - Nicola Pedde E-Mail : mc1830@mclink.it

Angola - L'enclave di Cabinda, posizionata tra il Congo e lo Zaire ma appartenente all'Angola, è controllata dal 1974 dal Fronte di liberazione dell'enclave di Cabinda (Flec). Nonostante la guerra civile angolana sia terminata nel 1994 ed i belligeranti del Mpla e dell'Unita abbiano firmato nel mese di marzo di quest'anno gli accordi per la nascita di un governo di unità nazionale, nella piccola enclave gli scontri continuano con inaudita violenza. La causa principale è costituita dalla massiccia presenza di petrolio, oro, diamanti ed altri minerali preziosi. La crisi zairese degli ultimi mesi, concentrando l'attenzione dei mass media sul dramma dei profughi, ha permesso alle truppe angolane di inasprire gli scontri nella più assoluta indifferenza della comunità internazionale.
V.P.

Arabia Saudita - Le autorità saudite hanno apertamente riconosciuto di essere impegnate in un programma di profonda ristrutturazione economica dovuto alla scarsità di energia elettrica. Il paese, che detiene un quarto delle riserve mondiali di petrolio ed un decimo di quelle di gas naturale, vede crescere la domanda di elettricità ad un tasso tre volte superiore a quello dell'economia. Il Ministro dell'Energia, Hashim Yamani, ha dichiarato che l'Arabia Saudita dovrà spendere, entro il Duemila, 40 miliardi di dollari per la produzione e la distribuzione di energia. Re Fahd, ricordando il problema dalle scarse finenze disponibili, ha sottolineato l'importanza della costruzione di nuove centrali per garantire la stabilità nazionale e dell'intera regione. L'Arabia Saudita, infatti, con una popolazione in maggioranza sotto i 30 anni, deve poter garantire un costante sviluppo economico per poter disinniscare il potenziale rischio di crisi sociali nel paese.
N.P.

Iran - Crisi delle relazioni diplomatiche tra Iran e Germania (ed altri paesi UE tra cui l'Italia) dopo la sentenza emessa da un tribunale tedesco secondo cui i vertici del governo di Teheran sarebbero i mandanti dell'assassinio di quattro esponenti curdi a Berlino nel 1992. Il presidente del Parlamento iraniano, Ali Akbar Nateq-Nouri, ha proposto l'adozione di un embargo commerciale verso le imprese europee ed una maggiore apertura verso le aziende russe. Germania ed Italia, rispettivamente primo e secondo partner commerciale europeo dell'Iran rischiano di vedere compromessi, alla luce della presente crisi, i propri scambi con Teheran. Posizione neutra viene tenuta, invece, da russi e giapponesi, anch'essi coinvolti economicamente in Iran con investimenti diretti ed aziende operanti in loco. Dura la reazione USA. Il congresso degli Stati Uniti, infatti, chiede all'Europa di non fare marcia indietro e di interrompere le relazioni diplomatiche e commerciali con l'Iran.
N.P.

Iraq - Si ritiene che la valuta derivante dall'applicazione della risoluzione ONU conosciuta come "Oil for Food" non coprirà più del 30 per cento delle necessità effettive della popolazione irachena. La percentuale, inoltre, minaccia di scendere al 20 per cento se le autorità di Baghdad non riusciranno ad ottenere dall'ONU l'autorizzazione per utilizzare parte delle somme derivanti dall'applicazione della risoluzione per finanziare l'acquisto di materie prime e pezzi ricambio per le aziende locali. Questo, infatti, permetterebbe una notevole diminuzione delle difficoltà finanziarie consentendo l'aumento delle merci presenti sul mercato. Le autorità irachene, intanto, proseguono i loro sforzi per diminuire l'abbondanza di liquidità sul mercato e limitare il rischio di un riutilizzo in operazioni contro la moneta locale, il dinaro.
V.P.

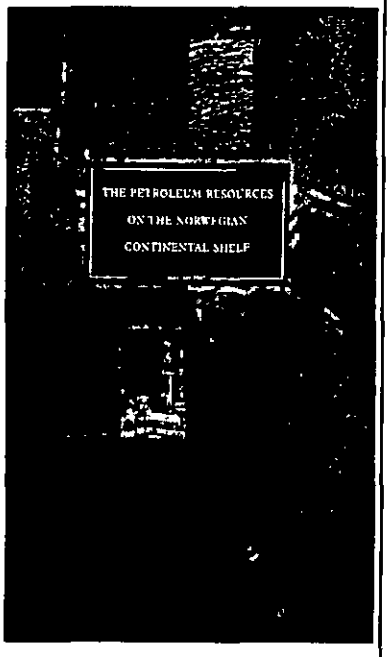
Russia - La recente conferenza organizzata dall'Adam Smith Institute di Vienna ha evidenziato la grave crisi dell'industria petrolifera russa nell'esportare il greggio estratto. E' possibile avviare all'esportazione solo un terzo della produzione (2 milioni BPD) mentre il prezzo del greggio si è posizionato, nel corso degli ultimi mesi, ad un livello tra i più bassi del mondo (circa 8$ al barile). La compagnia statale che gestisce il maggior numero di pipeline, la Transneft, viene ritenuta dagli operatori non in grado di gestire il trasporto del greggio, con costi esorbitanti. I progetti per la realizzazione di un nuovo oleodotto nella regione di Timan-Pechora e per il potenziamento della rete esistente procedono a rilento e la maggior parte degli operatori è costretto a far transitare la maggior parte del greggio, con problemi di bottleneck continui, nella pipeline centrale che attraversa la Bielorussia e l'Ucraina. I condotti meridionali, di contro, nonostante le interessanti possibilità di sbocco verso il Mediterraneo orientale, sono tuttora considerati instabili a causa del conflitto in Cecenia e della perdurante crisi in Georgia. E' da segnalare, infine, l'inadeguatezza delle strutture nei terminali, soprattutto i porti, che non consentono l'avviamento del greggio verso le destinazioni finali in modo rapido ed economico.
N.P.

Libri e monografie

U. Colombo - "ENERGIA - STORIA E SCENARI" - DONZELLI EDITORE - 1996 - £ 18.000

L'autore ripercorre la "storia" dell'energia strettamente legata alla crescita delle società umane. Il progresso del genere umano, infatti, sin da quando l'uomo primitivo imparò ad accendere il fuoco, è stato segnato dalla disponibilità di energia in qualità e forme adatte agli usi sempre più sofisticati richiesti dalla società.
Un aspetto importante che l'autore sottolinea è il fatto che dal 1800 ad oggi la popolazione è quasi sestuplicata mentre il consumo di energia è cresciuto di circa 20 volte, interessando principalmente i paesi industrializzati. In una situazione del genere proprio l'energia rappresenta il mezzo attraverso il quale ridurre i divari di reddito e di benessere esistenti tra i paesi industrializzati e i paesi in via di sviluppo. Tutte le fonti energetiche, tuttavia, presentano dei problemi in termini di disponibilità e di condizionamenti ambientali.
E' necessario quindi, operarsi per il superamento dell'attuale fase transitoria, definire nuove forme di energia e ridurre l'uso delle attuali fonti, tenendo presente che le scelte di oggi sono cruciali per la vita futura del pianeta.

"THE PETROLEUM RESOURCES ON THE NORWEGIAN CONTINENTAL SHELF" a cura di Norwegian Petroleum Directorate - Febbraio 1997



Il NPD, nell'ambito delle sue attività di supporto governativo finalizzate alla promozione di una gestione "sostenibile" delle risorse petrolifere nazionali, ha recentemente presentato quest'aggiornamento dello stato dell'arte del settore.
Il Rapporto, ricco di mappe tematiche e di grafici, presenta la stima della capacità produttiva nazionale diversificandola in Riserve, comprendenti i giacimenti dove la produzione è cessata, i giacimenti attualmente sfruttati e quelli che si prevede di sfruttare nei prossimi due anni, e in Risorse, ossia quei giacimenti per i quali le procedure di sfruttamento s'inseriscono in un processo di medio-lungo termine.
Vengono quindi illustrate le attività di ricerca di nuovi giacimenti, descrivendo le procedure amministrative, le modalità di acquisizione dei dati geofisici, il trend di crescita delle scoperte di nuovi giacimenti, nonché i principi di cost-effectiveness da applicarsi nella ricerca.
Sulla base di questi elementi ed in collaborazione con le compagnie petrolifere che operano in Norvegia viene poi presentata una previsione della capacità produttiva nazionale. Il Rapporto presenta inoltre una panoramica sullo sviluppo tecnologico a cui si è assistito negli ultimi cinque anni sia nel settore della ricerca che della produzione, e che hanno permesso una conoscenza più approfondita del substrato continentale norvegese.

"NORMATIVA TECNICA E LEGISLAZIONE AMBIENTALE - Guida alla Consultazione" a cura di EFA (Ente Fiere Anima) e CTI (Comitato Termotecnico Italiano) - Prima Edizione 1997 - Lit. 80.000

Scopo principale di questa Guida è quello di richiamare le norme tecniche e le leggi nazionali ed europee che riguardano argomenti di valenza ambientale (acqua aria, energia, rifiuti, ecc.), fornendo opportune indicazioni per la comprensione dei contenuti e per la ricerca dei documenti originali. Il testo è suddiviso in due parti: la prima è composta dai tre indici di ricerca (per argomenti, per norme tecniche e per leggi); la seconda è costituita da due sezioni: una, articolata in 370 schede di consultazione, dedicata alle norme tecniche e l'altra, con 371 schede, aggiornate a tutto il 1996, dedicata alle leggi. La ricerca risulta facilitata dalla struttura dell'indice per argomenti, costituito da un albero di tre livelli, il quale elenca oltre all'argomento e alle parole chiave, la norma tecnica e/o la disposizione normativa e la pagina di riferimento. Ogni scheda è poi strutturata in modo da rendere evidenti la tipologia (norma tecnica o disposizione normativa), una breve sintesi del testo originale, le parole chiave utilizzate come descrittori del contenuto della singola norma o legge, i riferimenti (legislativi in caso di leggi o normativi in caso di norme tecniche). La Guida vuole quindi essere uno strumento di ausilio per tutti gli operatori che potranno così disporre di un'aggiornata visione della produzione normativa di questo secolo in campo ambientale e delle norme tecniche di riferimento.

D. TABARELLI - "Alleanze e concentrazioni nel mercato petrolifero" - ENERGIA n° 4 - pagg. 30/35

Nell'articolo vengono illustrate le joint-venture tentate dalle compagnie petrolifere internazionali nell'ultimo anno. Attraverso queste iniziative è possibile evidenziare la duplice ragione che spinge le compagnie petrolifere ad allearsi. In primo luogo, le fusioni permettono di raggiungere una maggiore efficienza produttiva attraverso l'impiego di economie di scala e l'integrazione di attività complementari. In secondo luogo le compagnie petrolifere che ricorrono alle joint-venture mirano contemporaneamente a ridurre l'incertezza dei mercati concorrenziali.
L'articolo evidenzia che la propensione alle joint-venture, finalizzata soprattutto ad una riduzione dei costi, nasce anche da una crescente attenzione per le esigenze di redditività degli azionisti non più nel lungo ma nel breve periodo.
Dopo aver presentato una serie di iniziative sul mercato internazionale, Tabarelli sottolinea l'esigenza di interventi più efficaci nel mercato petrolifero italiano che attualmente appare caratterizzato da un sistema raffinativo meno efficiente e sottoutilizzato rispetto al resto d'Europa.

R. P. THOMPSON - "Electricity futures can prepare utilities for the day of reckoning" - POWER ECONOMIST - Volume 1, ISSUE 1 - pagg. 24/26

L'autore dell'articolo concentra l'attenzione sulla nuova situazione che si sta delineando nel mercato dell'elettricità.
L'avvio al cambiamento è stato dato dall'introduzione da parte del New York Mercantile Exchange (NYMEX) di contratti a termine nel settore elettrico.
Le compagnie elettriche, infatti, si stanno muovendo verso il libero mercato, proprio come altre industrie hanno già fatto, e questo crea rischi maggiori per le transazioni. L'iniziativa del NYMEX nasce, quindi, dall'esigenza di fornire agli operatori strumenti atti a fronteggiare il rischio di mercato. Un ulteriore strumento offerto da NYMEX è rappresentato dalle "options" che offrono la possibilità ai possessori di comprare o vendere il sottostante contratto a termine ad un prezzo predeterminato.
L'articolo evidenzia, inoltre, il fatto che attualmente si sta delineando sempre di più la figura di una compagnia fornitrice di "pura energia".
L'autore conclude il suo articolo affermando che negli Stati Uniti c'è ancora molto da fare per raggiungere un mercato competitivo, esistendo ancora poteri di monopolio. I mercati elettrici liberi significheranno più scelte per i consumatori e la possibilità di entrare nel mercato ad un numero sempre maggiore di fornitori che accresceranno la concorrenza e, quindi, l'efficienza del servizio.

S. VACCA' - "La sfida e gli obiettivi della politica energetica in Italia" - ECONOMIA DELLE FONTI DI ENERGIA E DELL'AMBIENTE n° 3/96 - pagg.5/19

L'articolo riprende la relazione presentata all'assemblea annuale dello IEFE dal prof. Vaccà. In esso viene ripreso ampiamente il tema della scarsità di risorse primarie nel mondo a fronte di un rapido aumento dei consumi ma soprattutto il problema della scarsità delle risorse ambientali. "La centralità del problema dell'energia per il futuro dell'umanità - si afferma - dipenderà sempre più dagli effetti dei modi di produrre e consumare energia sull'ambiente".
Parlando dei problemi di politica energetica nazionale si indicano poi nell'articolo tre principali obiettivi: a)lo sviluppo delle infrastrutture per il trasporto del gas (incluso quello liquefatto); b)la necessità di aumentare gli investimenti per il rinnovo e l'ammodernamento del sistema elettrico; c)l'attuazione di una riorganizzazione dei settori energetici nazionali ed, in particolare, un aumento della privatizzazione delle imprese e una regolamentazione dei mercati.

Agenda convegni e seminari

- *19-20 maggio* - ***"The North Sea Conference"*** - Le Meridien, Piccadilly London - Contattare: Petroleum Econ. - Tel. 0044 171 5531438 - Fax 0044 171 5531111
- 21-22 maggio - ***"Commercial Opportunities in the Gas Sector in Central and Eastern Europe"*** - The Marriot Hotel, Vienna - Contattare: The Adam Smith Institute - Conference Div. London - Tel. 0044 171 4903774 - Fax 0044 171 4908932
- 3-4 giugno - ***"Regulation, Competition & Strategic Development in a Changing European Energy Market"*** - The Cumberland Hotel London - Contattare: IEA - London - Tel. 0044 171 6083491
- 10-13 giugno - ***"World Gas Conference"*** - Copenhagen - Contattare: Petroleum Economist - P.O. Box 105 - London - Tel. 0044 171 8315588 - Fax 0044 171 8314567
- 17-19 giugno - ***"Power-Gen 1997 Europe"*** - Contattare: Power-Gen - P.O.Box 9402 - 3563 AV Utrecht - The Netherlands - Tel. 0031 30 2650963 - Fax 0031 30 2650928
- 2-4 luglio - ***"The Integration of Central European, Baltik and Balkan Countries in the European Energy Economy"*** - Vienna Hilton Hotel - Contattare: EFCEE - Bruxelles - Fax 0032 15 204857 - Energy Economics - Vienna - Fax 0043 1 5054371
- 7-10 settembre - ***"International Markets and National Policies"*** - Fairmont Hotel, San Francisco - California - USA - Contattare: IAEE, Cleveland - Tel. 001 216 4645365

Energia ed Economia

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Direttore Responsabile: ***Piero De Peverelli***
Direttore: ***Edgardo Curcio***
Responsabili di Redazione: ***Valerio Porfiri - Nicola Pedde***
Redazione: ***Katia Attallah - Fabrizio Cantore - Rita Pistacchio***

Registrazione del Tribunale di Roma n° 100/97 del 21 Febbraio 1997 - Anno I - aprile 1997

La Lettre

DU CONSEIL FRANÇAIS DE L'ENERGIE

Numéro 05 - Mai 1997

Conseil Mondial de l'Energie

WORLD ENERGY COUNCIL

Editorial

L'époque où le Président des Etats-Unis, Jimmy Carter, affirmait que le problème de l'énergie était l'équivalent moral d'une guerre semble particulièrement lointaine de même que celle où les Chefs d'Etat et de Gouvernement du G7 inséraient dans leurs déclarations des phrases comme celles-ci: «Les questions économiques qui ont dominé nos débats sont celles du prix et de l'approvisionnement en énergie ainsi que leurs implications sur l'inflation et le niveau d'activité économique de nos pays et du reste du monde. A moins de traiter le problème de l'énergie, nous ne pourrons résoudre les autres problèmes» *(Sommet de Venise, juin 1980).*

Depuis le milieu des années quatre-vingt, l'énergie n'a plus occupé les pensées de nos gouvernants, excepté lors du bref épisode de la Crise du Golfe (1990-1991). De fait, la facilité avec laquelle s'est résolue cette crise aux plans des approvisionnements et des prix a contribué à faire disparaître l'énergie de l'esprit de nos dirigeants et de nos opinions publiques.

Une telle attitude est-elle justifiée? Le Conseil Mondial de l'Energie dans son message pour 1997 intitulé «Le manque actuel de clairvoyance en matière énergétique compromet le développement durable» *conteste cette attitude dangereuse et «complaisante» dès lors qu'on essaie de mieux évaluer les situations réelles, surtout en prenant une vue à long terme.*

Le Conseil Français de l'Energie a donc été inspiré d'organiser les 12 et 13 mars 1997 à Strasbourg un Forum Régional sur le thème «L'Europe de l'Ouest va-t-elle manquer d'énergie? - La sécurité des approvisionnements énergétiques de l'Europe de l'Ouest: quels risques? quelles stratégies?». *Des différentes interventions, j'ai retiré la conviction qu'il n'était pas du tout superflu de revenir sur le contenu du message du CME. Celui-ci, dans sa brièveté même, me paraît très clair et persuasif: il faut «agir dès maintenant» et il faut «un engagement mondial».*

Mais c'est bien ici que réside le problème: peut-on dire qu'aujourd'hui les acteurs énergétiques évoluent avec la rapidité et l'intensité que requiert, selon le message du CME, la mise en place d'un développement énergétique durable? ooo

Il faut «agir dès maintenant» et il faut «un engagement mondial».

●●● *Mon impression est que la politique des entreprises énergétiques est le plus souvent conditionnée par des considérations à court-moyen terme tandis que l'énergie exige - de même que les problèmes du développement économique et de l'environnement - une stratégie et une action orientées par des perspectives de long terme.*

Autrement dit, comment concilier l'approche à court-moyen terme du marché et les impératifs de long terme de la société? Comment concilier la nécessité de faire du profit, moteur de la vie des entreprises, et celle de fournir l'énergie à temps aux pays qui ne sont pas en mesure de se la procurer et qui en ont vitalement besoin pour se développer?

Prenons l'exemple de la recherche scientifique et du développement technologique. Un freinage des investissements en R&D est désormais avéré. Dans le rapport final du groupe de travail sur la recherche et le développement stratégique de l'énergie du Département US de l'Energie publié en 1995, on peut lire: «Dans une économie de marché, le secteur privé aura tendance à moins investir en R&D qu'il ne serait souhaitable du point de vue des objectifs politiques à long terme. L'accent est mis, dans la R&D privée, sur les résultats à court terme, à temps de retour réduit, et sur des améliorations marginales à faible risque éloignées des investissements à plus long terme relativement plus risqués.» *Il est donc clair qu'il faut mettre en place des politiques adaptées remédiant aux carences du marché, dans le secteur de la R&D comme dans beaucoup d'autres.*

Cette constatation n'est en rien une critique du comportement des entreprises qui ne peuvent que suivre les lois du marché. Si, par ailleurs et en conséquence, des problèmes de développement durable se font jour dans le secteur énergétique et si deux milliards d'individus sont aujourd'hui privés de l'accès aux énergies commerciales, les entreprises ne sont pas à blâmer, qui ne peuvent substituer la logique du «bon Samaritain» à celle du marché.

Reste qu'il faut se demander comment répondre aux exigences actuelles des pays en développement en matière d'approvisionnement énergétique et à celles d'une disponibilité durable de ces fournitures pour une population de notre planète en augmentation. Mon avis est qu'il faut associer l'action précieuse et indispensable des entreprises à des interventions appropriées des gouvernements, dans le cadre d'une coopération internationale. L'intervention des gouvernements, à une époque de redécouverte des vertus du marché, n'a généralement plus beaucoup la cote. Pourtant, les entreprises et les pouvoirs publics ne doivent pas être perçus comme des concurrents cherchant à s'exclure mais plutôt comme des partenaires qui ont un rôle complémentaire à jouer dans une aventure difficile qui appelle des efforts notables: celle d'une offre future d'énergie plus durable au profit d'un monde en croissance et qui espère atteindre plus rapidement un plus haut niveau de vie, et donc de consommation d'énergie, qu'en se fiant aux seules forces du marché.

Paul Frankel, dans un livre paru en 1946, paraphrasait Georges Clémenceau en affirmant: «Le pétrole est une affaire trop sérieuse pour être confiée aux seuls pétroliers». Sans le moins du monde diminuer le rôle essentiel des entreprises énergétiques, je pense que cette paraphrase, étendue à l'ensemble du secteur de l'énergie, est encore de quelque actualité. ●

Giuseppe SFLIGIOTTI
Président du Comité Membre Italien et Président du Comité des Etudes du CME

La lettre

DU CONSEIL FRANÇAIS DE L'ENERGIE

L'EUROPE DE L'OUEST VA-T-ELLE MANQUER D'ÉNERGIE? LA SÉCURITÉ DES APPROVISIONNEMENTS ÉNERGÉTIQUES DE L'EUROPE DE L'OUEST: QUELS RISQUES? QUELLES STRATÉGIES?

Compte rendu élaboré par M. Christian Carouge, avec la collaboration de M. Jean Bercy (IFP), M. Didier Bossebœuf (ADEME), M. Richard Lavergne (DGEMP) et M. Jean-Eudes Moncomble (EDF)

Les 12 et 13 mars dernier, s'est tenu à Strasbourg le Forum régional ouest-européen organisé par notre association. Les actes de ce forum devraient être disponibles auprès de notre secrétariat général, dans les prochaines semaines[1]. En attendant, il nous a paru intéressant, pour l'information de tous ceux d'entre vous qui n'ont pu assister aux débats, d'en faire paraître un compte rendu dans notre Lettre. Il est accompagné de quelques extraits des deux interventions qui ont clos le forum : d'une part, le discours de synthèse de notre Président, M. Pierre Gadonneix, Président de Gaz de France, d'autre part, l'allocution de clôture de M. Franck Borotra, Ministre de l'industrie, des postes et télécommunications.

Les séances de travail ont réuni plus de deux cents congressistes. Plus de trente pays étaient représentés, en majorité européens, mais aussi des Amériques, d'Asie et d'Afrique. Cette assistance nombreuse et cosmopolite prouve l'intérêt d'une telle manifestation, dont le thème aurait pu être considéré comme dépassé et non actuel.

Après quelques paroles de bienvenue, M. Pierre Gadonneix a présenté les premiers intervenants chargés de tracer le cadre général de réflexion du forum.

LE DÉCOR

Tout d'abord, **M. Ian Lindsay,** Secrétaire général du Conseil mondial de l'Energie, a dressé un tableau prospectif de l'évolution de l'énergie dans le monde, en s'appuyant sur les principaux résultats des études du Conseil mondial de l'Energie, en particulier *« L'énergie pour le monde de demain »*, publiée en 1993. Entre 1990 et 2020, la demande mondiale d'énergie primaire devrait s'accroître de moitié, sous l'impulsion du développement humain et économique des pays aujourd'hui en développement. Ces besoins devraient encore être satisfaits pour environ les 3/4 par les combustibles fossiles. Leurs réserves sont abondantes, 44 années de production actuelle pour le pétrole, 70 pour le gaz et 250 pour le charbon. Mais M. Ian Lindsay a souligné, d'une part, que l'indépendance énergétique des pays de l'OCDE devrait sensiblement se dégrader et que, d'autre part, les systèmes énergétiques n'évoluent que lentement. Il a rappelé les principales recommandations du Conseil mondial de l'Energie: tendre à la vérité des prix de l'énergie par l'élimination progressive des subventions, créer les conditions de mobilisation des financements nécessaires au développement énergétique, accroître les coopérations internationales et, enfin, relancer les efforts de recherche et développement dans le domaine de l'énergie.

Ensuite, **M. Philippe Moreau-Defarges,** Chargé de mission à l'Institut français des relations internationales, a décrit les bouleversements géopolitiques de l'Europe depuis le début de la décennie. La disparition de l'équilibre Est-Ouest renforce le poids des USA dans la protection de l'Europe, dont la construction demeure encore limitée et inachevée. Des zones d'instabilité (Russie, pourtour méditerranéen) subsistent. Il est primordial qu'un espace pan-européen de prospérité et de sécurité puisse se constituer, par élargissement tant de l'Union européenne que de l'Alliance atlantique. L'Europe n'est plus le centre du monde ; elle doit trouver la capacité de s'adapter à cette nouvelle situation si elle veut demeurer un acteur, et non pas un objet, de l'Histoire.

Enfin, **M. Arnulf Grübler,** Chercheur à l'International Institute for Advanced Systems Analysis, a présenté les perspectives énergétiques de l'Europe de l'Ouest, telles qu'elles ont été élaborées dans le cadre des études communes IIASA-CME. La croissance de la demande énergétique devrait être modérée, entraînant une diminution du poids de l'Europe dans le bilan énergétique mondial. Cette demande favorisera de plus en plus les énergies finales de réseau. Quant à la part des différentes énergies primaires, les scénarios étudiés montrent une très forte dispersion des possibles, en particulier lorsque l'on considère des horizons très éloignés (2050-2100). M. Arnulf Grübler a souligné certains facteurs de risques en matière de sécurité d'approvisionnement : remise en cause des efforts d'économie d'énergie, diminution des dépenses de recherche-développement, abandon des politiques de diversification des sources.

Le décor étant dressé, les débats étaient structurés autour de quatre tables rondes. Les trois premières présentaient les points de vue des grands acteurs de la scène énergétique: les consommateurs, les

(1) Vous serez tenu informés de cette disponibilité. Ces actes seront envoyés gracieusement à tous les participants au forum.

La lettre

DU CONSEIL FRANÇAIS DE L'ENERGIE

●●● **Non:** *l'Europe ne va pas manquer d'énergie. La demande ne devrait croître que faiblement et l'offre est abondante, comme nous le montrent les scénarios du Conseil mondial de l'Energie. Des technologies performantes rendent accessibles de nouvelles ressources, géographiquement plus diversifiées. La globalisation des marchés conduit à une interdépendance de plus en plus forte des économies des différentes régions du monde. Ces évolutions rendent moins cruciale l'aggravation prévisible de la dépendance énergétique de l'Europe.*

Mais: *des risques, des menaces existent ; des compromis doivent être trouvés entre des objectifs divers. Les vingt dernières années nous ont montré, pour l'énergie comme pour d'autres domaines, que le temps des certitudes est révolu. Nous sommes dans un monde incertain. Malgré ces incertitudes, nos anticipations actuelles sont optimistes quant à la possibilité d'obtenir un approvisionnement en énergie sûr, durable et compétitif. Mais ce sont nos actions et nos décisions d'aujourd'hui qui feront que ces anticipations se réaliseront ou non. On dit parfois: « Demain est un autre jour ». Mais, pour nous énergéticiens, demain se bâtit aujourd'hui. »*

M. Franck Borotra nous avait fait le grand honneur d'accepter de venir prononcer l'allocution de clôture du forum. Empêché au dernier moment de se rendre à Strasbourg, il a confié à M. Claude Mandil, Directeur général de l'énergie et des matières premières, le soin de lire son allocution. Dans celle-ci, après s'être associé au consensus sur l'abondance énergétique du monde actuel, le ministre a souligné que des risques subsistaient, tant politiques qu'économiques. Il a affirmé avec vigueur l'attachement du gouvernement français aux mécanismes de l'économie de marché, mais en soulignant les imperfections des marchés énergétiques qui rendent nécessaires des interventions des gouvernements. Prendre les décisions de long terme assurant une réelle sécurité d'approvisionnement, définir des missions de service public nécessaires à la cohésion sociale et régionale, favoriser le développement de systèmes énergétiques respectueux de l'environnement, tel est le rôle de l'Etat. Et le ministre conclut sur ces mots : *« Le marché constitue certainement la meilleure garantie d'une disponibilité des ressources, et cela d'autant plus que celles-ci seront mieux réparties (..) Il ne garantit pas pour autant une orientation durable de la demande d'énergie dans la bonne direction. C'est pourquoi il est essentiel qu'il soit éclairé par les signaux à long terme que constituent les politiques énergétiques des Etats. Je me réjouis que ces convictions, qui sont depuis longtemps celles du gouvernement français, soient semble-t-il largement partagées par bon nombre de participants à votre forum. »* ●

Un compte rendu ne serait pas complet sans mentionner les manifestations auxquelles les congressistes et les personnes accompagnantes ont été conviés en marge du forum.

Tout d'abord, le 11 mars en fin d'après midi, une réception de bienvenue était organisée dans les salons de l'Hôtel de Ville de Strasbourg, à l'invitation de Mme Catherine Trautmann, Maire de cette ville. M. Norbert Engel, Maire-Adjoint et Président de Gaz de Strasbourg, y a accueilli les congressistes par un discours mêlant énergie et poésie !

Le 12 mars, EDF et GFF ont convié les congressistes à une soirée de gala. Elle débuta par une promenade musicale, unanimement appréciée, dans l'Europe baroque, grâce au concert donné par l'ensemble strasbourgeois « Le Parlement de Musique », sous la direction de Martin Gester. Puis un dîner dans l'une des plus anciennes maisons de Strasbourg permit aux congressistes de découvrir certains aspects de la gastronomie alsacienne.

Brèves

L'Assemblée Générale du Conseil Français de l'Energie, présidée par M. Pierre GADONNEIX aura lieu le 26 juin 1997 de 15h à 17h au Gaz de France, 23 rue Philibert Delorme, 75017 Paris.

FORUM REGIONAL LATINO-AMERICAIN

Les 17 et 18 juin 1997 à Salvador, Bahia (Brésil) ***« Amérique et Afrique: opportunités de coopération pour l'intégration énergétique ».***

Contacter :
M. José Malhaes da Silva, Directeur Exécutif, Comité Brésilien du CME, Rua Real Grandeza 219 A,s. 1403, 22283-900 Rio de Janeiro, RJ - BRESIL
☎ : (+5521) 527 8593 / 528 5765
Fax : (+5521) 226 0508 / 528 5858

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Du 17 au 19 septembre 1997 à Riga (Lettonie) ***« Energy Strategies in the Baltic Sea Region from Support to Business ».***

Contacter :
Prof. N. Zeltins, Chairman, Organising Committee WEC Baltic Energy Conference, c/o Energy Efficiency Centre, Latvian Academy of Sciences, Institute of Physical Energetics, 21 Aizkraukles Str., Riga LV-1006 - LETTONIE
☎ : (+371) 2558 636 / 7138 918
Fax : (+371) 7820 339

FORUM REGIONAL POUR L'EUROPE CENTRALE ET ORIENTALE

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☎ : (+4822) 693 10 14
Fax : (+4822) 629 38 71

LETTRE DU CONSEIL FRANÇAIS DE L'ENERGIE
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DIRECTEUR DE LA PUBLICATION : Jean-Romain Frisch • RÉDACTEUR EN CHEF : Christian Carouge
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● ● ● opérateurs et les pouvoirs publics. La quatrième table ronde a permis à quelques responsables ouest-européens du Conseil mondial de l'Energie de mettre en évidence des éléments de synthèse mais aussi de confronter des expériences nationales différentes.

LES CONSOMMATEURS

Dans l'hypothèse d'une libéralisation des échanges énergétiques, un consensus émerge pour attribuer au consommateur un rôle important, actif, peut-être dominant dans le futur jeu d'acteurs. Il y a une opportunité à saisir. Les consommateurs ont une stratégie énergétique évoluant de plus en plus vers la notion de service ; de ce fait, le rôle des opérateurs devra évoluer vers une obligation de performance et des prestations de services complets. Si la sécurité d'approvisionnement reste un facteur important pour les consommateurs, la qualité, le prix et la facilité d'emploi des énergies deviennent les critères prédominants dans le contexte actuel d'abondance. Il importe, en particulier, que l'énergie participe à l'effort de compétitivité des industries européennes.

« ...Le consommateur européen a donc toute raison d'être serein et considère que la sécurité d'approvisionnement n'est plus un facteur discriminant entre les différentes énergies... »
Pierre Gadonneix

La libéralisation des marchés énergétiques semble inéluctable et souhaitée par les consommateurs. Mais des divergences entre les différents types de consommateurs apparaissent quant au degré d'une telle libéralisation et au rôle des Etats. Pour la grande industrie, la concurrence favorise la diversité des approvisionnements et leur compétitivité. Le rôle de l'Etat se limiterait au maintien d'un climat politique international favorable. Par contre, pour le consommateur domestique, les objectifs d'équité sociale, de service public ainsi que de développement de filières «internes» (nucléaire, énergies nouvelles renouvelables) laissent une large part à la régulation publique. Ils requièrent des opérateurs forts et stables, agissant sur le long terme.

« ...Le rôle de l'Etat, c'est également de faire en sorte que la fourniture d'énergie n'accroisse pas la fracture sociale et régionale. Dans le cas de la France, le service public constitue l'un des fondements de la société française, l'un des socles de base de la cohésion sociale et régionale... »
Franck Borotra

LES OPÉRATEURS

Le premier souci des opérateurs est d'assurer les débouchés de leurs produits en répondant au mieux aux attentes de leurs clients. En matière de sécurité d'approvisionnement, les risques de rupture sont réels et concernent surtout les hydrocarbures ; une dépendance élevée de l'Europe, une stabilité politique incertaine dans des régions productrices, une concurrence de plus en plus forte de régions nouvellement consommatrices, autant de facteurs de risques. S'y ajoute une remise en cause de l'outil de raffinage, du fait de faibles performances et du poids des investissements à réaliser, qui pourrait entraîner à terme un problème d'approvisionnement en produits finis.

Cependant, les opérateurs ont confiance dans l'avenir, du fait principalement des progrès technologiques. L'effort de réduction des dépenses d'exploration et de production protège le consommateur en terme de prix. Il permet, de plus, d'élargir le champ des possibles en autorisant l'accès, à moindre coût, aux huiles lourdes et aux sables asphaltiques.

Les opérateurs soulignent la nécessité de maintenir un effort intense de recherche-développement. D'autre part, la gestion des risques passe par la diversification des énergies. A ce titre, l'énergie nucléaire doit continuer à jouer un rôle ; mais il faudrait que le problème de son acceptabilité par les citoyens européens soit résolu, ce qui suppose un dialogue accru entre industrie, gouvernements et grand public. Enfin, les opérateurs insistent sur le développement nécessaire des initiatives, telle la Charte de l'énergie, visant à accroître la collaboration avec les pays fournisseurs d'énergie hors d'Europe occidentale.

« ...Il y a (...) un paradoxe entre l'objectif de fragmentation des acteurs à laquelle tendent certaines politiques de déréglation et l'apparition de méga-acteurs intégrés et développant une stratégie globale, toutes énergies... »
Pierre Gadonneix

LES POUVOIRS PUBLICS

Les panelistes conviennent de l'abondance à court terme des ressources énergétiques mondiales, mais, s'agissant de leur disponibilité pour l'Europe de l'Ouest, des nuances sont exprimées sur le degré d'intervention des pouvoirs publics qui permettrait de pallier d'éventuelles insuffisances des mécanismes de marché. Trois domaines font l'objet d'un consensus : tout d'abord, la fixation d'un minimum de « règles du jeu » auxquelles les marchés devront s'adapter ; ensuite, l'exercice d'une politique étrangère, au niveau de l'Union européenne, qui permette de maîtriser la vulnérabilité résultant de la dépendance croissante vis-à-vis des importations d'énergie ; enfin, l'internalisation d'externalités de long terme, telles que la préservation de l'environnement, en particulier pour l'effet de serre.

Pour les britanniques, les marchés suffiraient alors pour équilibrer l'offre et la demande. Les autres panelistes estiment que les pouvoirs publics doivent exercer une régulation plus forte, notamment sur les choix d'investissements de long terme, sur les choix de société qu'implique le mode d'organisation du marché de l'énergie, sur le soutien à la recherche-développement et, enfin, sur la promotion des énergies renouvelables. ● ● ●

« ...la France est donc convaincue que le marché est un puissant stimulant pour accroître l'efficacité et diminuer les coûts, mais il ne faut pas non plus tomber dans l'angélisme. Nous parlons d'un secteur qui est très éloigné des conditions idéales du marché, de la concurrence pure et parfaite... »
Franck Borotra

● ● ● D'autre part, la libéralisation en cours des marchés de l'énergie dans de nombreux pays offre aux économies européennes certaines opportunités ; la mise en application de la Charte de l'énergie apporterait un avantage supplémentaire.

LA TABLE RONDE FINALE

Le débat final a mis en évidence tout d'abord le contraste, qui ressort des débats, entre le court terme et le plus long terme. Sur ce point il n'y a pas d'équivoque et il est indispensable que les gouvernements et les entreprises énergétiques, par leurs actions complémentaires, permettent de garder une vision de long terme. Une question importante, dans un contexte rendu encore plus incertain par exemple par la fiscalité, est de savoir qui veut investir dans le secteur énergétique.

La question de la sécurité d'approvisionnement ne prend sens que lorsqu'on précise le contour de l'Europe. En fait, même si l'on réunit Europe de l'Ouest et Europe de l'Est, du strict point de vue statistique, la dépendance énergétique augmente dans le futur. Certains voient dans cette dépendance croissante une opportunité (par exemple en matière d'activités économiques) mais aussi un plus grand risque. Le rôle de la Russie dans ce contexte a été confirmé et une plus grande coopération entre les pays jugée indispensable. C'est dans cet esprit que l'on peut poser la question de la solidarité européenne, notamment entre petits et grands pays. Une autre question fut de savoir qui, en définitive, portait le risque de rupture d'approvisionnement.

Chaque intervenant a été d'accord pour mettre ce débat dans la perspective du mouvement de libéralisation dont les avantages mais aussi les inconvénients ont été largement discutés. Ainsi, comment dans ce nouveau contexte organiser la recherche-développement ? L'importance d'un cadre politique stable a été soulignée.

LES AUTRES INTERVENTIONS

En complément des tables rondes, trois personnalités avaient été invitées à présenter leurs vues sur ce problème de sécurité des approvisionnements énergétiques.

Tout d'abord, **M. John Mitchell,** Président du programme Energie et Environnement du Royal Institute for International Affairs, a souligné que le contexte stratégique de l'approvisionnement énergétique de l'Europe s'était transformé. Depuis 1973, les sanctions politiques délibérées dans le domaine des hydrocarbures ont été le fait des importateurs et non plus des exportateurs. La menace d'un cartel de producteurs augmentant sans cesse les prix s'est évanouie. Certes, il reste des risques de rupture momentanée des approvisionnements pétroliers ou gaziers ; il faut être capable de gérer ces ruptures pour éviter des dommages économiques persistants et des conflits politiques continuels. Pour le pétrole, des solutions globales sont possibles ; pour le gaz, il s'agit d'un problème commercial et non pas physique, qui concerne la totalité de l'Europe.

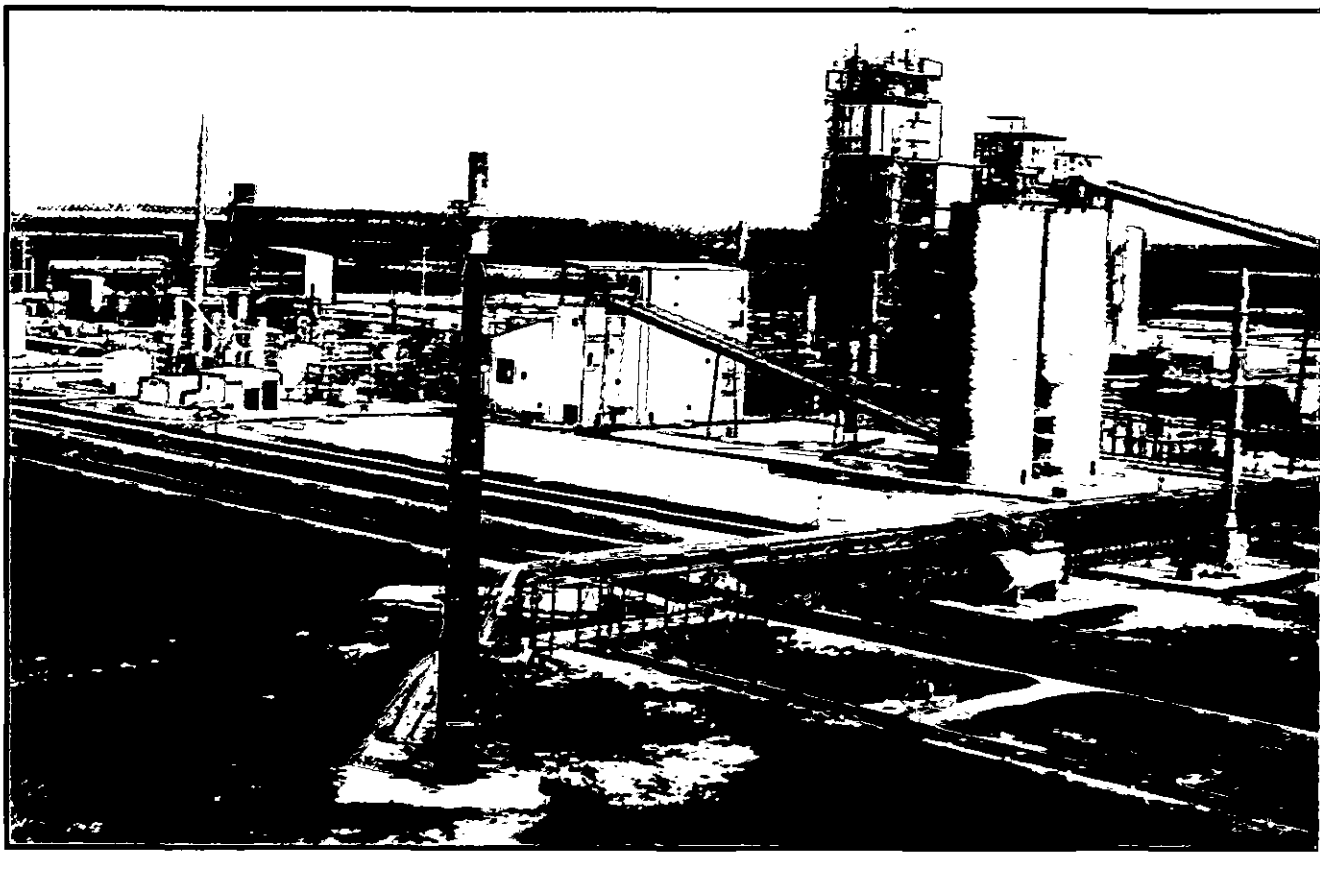
Ensuite, **M. Robert Priddle,** Directeur exécutif de l'Agence internationale de l'énergie, a expliqué que la sécurité d'approvisionnement à la fin des années 90 soulève tout un ensemble de problèmes complexes. On est loin de la simple substitution des produits pétroliers que les pays de l'OCDE recherchaient en 1974, lorsqu'ils ont créé l'AIE. La libéralisation des marchés est un champ d'expérimentations, loin d'être achevées ; ses bénéfices potentiels sont considérables mais elle complexifie l'environnement. Ses conséquences les plus marquées sont, d'une part, le transfert du pouvoir décisionnel des gouvernements vers le marché et, d'autre part, un pouvoir accru des consommateurs, accompagné d'une plus grande liberté de choix. Les gouvernements doivent comprendre les nouveaux mécanismes décisionnels du marché pour définir les contributions politiques qui restent nécessaires pour la sécurité d'approvisionnement énergétique. Le rôle de l'AIE est de les y aider.

Enfin, **M. Peter Schütterle,** Secrétaire général du Secrétariat de la Charte de l'énergie, a fait le point des négociations en cours relatives à cette Charte. Il en a rappelé les objectifs : protéger les investissements directs étrangers, assurer la liberté du commerce et du transit de l'énergie, développer des procédures d'arbitrage international. Tout en reconnaissant que la phase actuelle - ratification par les instances de chaque pays du Traité de la Charte signé par 49 pays - ne se prête pas à une médiatisation importante, il a souligné qu'en dépit d'incertitudes géopolitiques majeures et de la nécessaire lenteur des restructurations économiques dans les pays en transition, la Charte marque une volonté, commune à plus de cinquante pays, de développer une coopération harmonieuse dans le domaine énergétique.

SYNTHÈSE ET CONCLUSION

La synthèse des travaux et des débats du forum a été dressée par **M. Pierre Gadonneix.** Dans son intervention, il a développé les différents points mentionnés ci-dessus. Citons sa conclusion : *« En exergue de ce forum, nous avions posé une question :« L'Europe de l'Ouest va-t-elle manquer d'énergie? ». Ma réponse, à l'écoute de nos débats et de nos réflexions, serait : « Non, mais...! ».* ● ● ●

Strategic Value of Fossil Fuels



Conclusions and Recommendations
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International Energy Agency

FOREWORD

This Executive Report brings to the public the deliberations, findings, and conclusions about the strategic value of fossil fuels. These conclusions identify a number of challenges which the fossil fuel community will have to face. The report also contains five extremely important recommendations for governments, industry and the public to undertake in the coming years to ensure that the global population appropriately and correctly captures the full benefits of fossil fuels.

This Report contains the views and opinions of 220 international energy and environmental experts, from governments, industry, research institutes and universities, who gathered in Houston, Texas, in May 1995 for the IEA Conference on the Strategic Value of Fossil Fuels: Challenges and Responses. The Conference was co-sponsored by the International Energy Agency, the United States Department of Energy and the United States Energy Association. Support was also provided by the United States Agency for International Development, the United Nations, the World Coal Institute and the World Energy Council.

Seven major themes were discussed at the Conference: Communicating the Value of Fossil Fuels; Fossil Fuel Industry's Responsiveness to Public Requirements; Fossil Fuel Utilization and Global Climate Change Initiatives; Energy Trade: The Role of Governments and the Markets; Infrastructure Development for Fossil Fuels Deployment; Strategic Utilization of Fossil Fuels and Environmental Regulation; and International Technology Development, Transfer and Deployment.

The themes provided a framework for enunciating the strategic value of fossil fuels, and the challenges to and responses by the fossil fuels community. By strengthening the understanding of the common issues in the various fossil fuel industries, the Conference sought to capture the synergies available through closer co-operation and joint efforts by these industries.

A major focus of the Conference was to find responses to the question of what can the fossil fuel community do better. It addressed fully the measures necessary to improve the operations as well as the image of fossil fuels. The delegates explored strategies between developed and developing countries to identify ways to use fossil fuels in a manner that will be fully compatible with the sustainable development mandates of the future. With full recognition that it will require all forms of energy resources to meet the world's demands, the delegates proposed measures for fossil fuels to optimize its contribution in a sustainable future.

The delegates have produced a Statement that should be brought to the attention of governments and multilateral organizations for their consideration for endorsement and adoption. It is hoped that the views within the statement will make a significant contribution towards a better understanding of the challenges faced by the fossil fuel community, and the potential responses which can be implemented at the national, regional or international level by industries and governments.

CONFERENCE CONCLUSIONS

IEA CONFERENCE ON THE STRATEGIC VALUE OF FOSSIL FUELS: CHALLENGES AND RESPONSES

HOUSTON, TEXAS, 8-12 MAY 1995

OVERVIEW

Energy requirements continue to be driven by economic growth, expanding populations, the need to provide commercial energy to those currently without access, and the desire of citizens of the world to improve their standard of living, health, safety and security.

Fossil fuels currently account for about 90 % of the world's commercially traded energy supplies. International Energy Agency and World Energy Council assessments suggest that fossil fuels are likely to remain the major source of energy supplies in many countries for several decades to come.

If fossil fuels are to continue to play the major role in providing the energy supplies needed to meet national goals for economic development and energy security they must do so in a way which also meets goals for environment protection. Both governments and industry have a responsibility and a role in responding to the challenges posed by commitments to address global climate change concerns and by community desires to reduce other local environmental impacts such as high urban concentrations of particulates and ozone as well as SO_X and NO_X emissions. This will require a very substantial industry and government involvement in the application of new and improved fossil fuel technologies.

It will also be important to increase public understanding of the strategic value of fossil fuels, as well as the challenges and the necessary responses concerning fossil fuels while at the same time ensuring a high level of industry credibility through demonstrated responsiveness to these world-wide demands.

STRATEGIC VALUE OF FOSSIL FUELS

Participants in the Conference identified the following strategic values of fossil fuels which will be important influences on the future choices of energy supplies

- the generally very **large and wide-spread resource base** for fossil fuels (oil, gas and coal) which can support the substantial growth expected in world wide energy demand;
- the very significant **established infrastructure** for the use of fossil fuels which can support economic development;
- the **reliability** of fossil energy systems, and **affordable cost** of the resources;
- the **wide-ranging, new and improved fossil fuel technologies** available to meet current and future environmental standards;
- the **flexibility and convenience** of fossil fuels to provide **diverse** forms of energy, thereby enabling consumers to choose among different forms of end-use services.

THE CHALLENGES

The critical question is whether fossil fuels can continue to provide a major percentage of the world's energy supply in a manner compatible with the demands for quality of life improvement through economic development and environment protection. Key issues in addressing this question are whether

- the fossil fuel infrastructure can be developed rapidly enough in a way which can meet these economic and environmental objectives, particularly in transitional economies and developing countries;
- the risks involved in financing new and improved fossil fuel technologies can be reduced sufficiently to attract the substantial financial resources necessary;
- the barriers can be significantly reduced or eliminated for the transfer of energy technologies which can improve the efficiency of fossil fuel use, and minimize environmental impacts;

- the security of supply of internationally traded fossil fuels can be enhanced through the removal of barriers to trade;

- the most efficient and effective roles can be identified which governments and markets can play in the development of energy resources and trade.

RESPONSES

Responding to these challenges and barriers will be a task for both governments and the fossil fuel industries in developed, transitional and developing countries. International organizations and non-governmental bodies have a role to play in this process. Innovative and co-operative measures will be required to promote economic growth, to improve living standards and to deal with environmental issues and possible climate change. The following key actions must be pursued

- achievement of efficiency gains and reduced environmental impacts through the development and application of advanced energy technologies coupled with better infrastructure and the use of fuel preparation technologies. Development and application of emission control technologies will also play a significant role in reducing environment impacts.

- identification of awareness of new technologies as a priority by the fossil fuel industry and dedication of full resources to reducing the barriers. Information dissemination will be important to enhance awareness of technology capabilities and costs, technology needs, and climate change mitigation strategies.

- provision of appropriate opportunities for transitional and developing economies to acquire improved clean fuel technologies, equipment and manufacturing processes. This is likely to entail reliance on market measures and the use of venture capital to find and invest in commercially promising, energy efficient technologies. Joint implementation measures under the UN Climate Change Convention can be expected to play a role in this process along with other creative approaches to resolving implementation barriers.

- continued exploration of the large and widespread fossil fuel resource base so that increasing energy demand can be met through the development of reserves in the most economic manner and with the minimum environmental impact.

- concentration of government endeavors on fostering competitive markets and trade, ensuring that prices and policies are transparent, maintaining policies that promote capital formation, and improving environmental quality in the most flexible and cost-effective manner. Governments should actively consider market liberalization, including the challenges of privatization and deregulation, in order to realize the significant gains in the efficiency of resource allocation. Regulatory measures, where necessary, should clearly indicate the desired outcomes. Joint government and industry efforts will be essential.

COMMUNICATING THE MESSAGE

A sustained initiative by governments and fossil fuel industries in developed and developing countries is needed to ensure that the community is aware of the strategic value of fossil fuels. This initiative should focus on improvement of public awareness of the fossil fuel industries' role in societies and economies, in order to help people understand to what extent fossil fuels contribute to economic growth and how fossil fuel users are responding to environmental concerns. This process must also demonstrate the willingness of industry and government to learn about people's concerns. New information technologies will be influential in this process.

These views are those of the participants and should not be taken as the views of the organizations represented at the Conference.

Conference Overview

This conference presents a unique opportunity to address the collective of fossil fuels rather than individual fossil fuels. The focus of the conference will be to answer the question of what can the fossil fuel community do better. This question will be answered through the views of private sector and government experts who can provide an analysis of the current situation and an understanding of the measures necessary to improve the operations as well as the image of fossil fuels. With full recognition that it will require all forms of energy resources to meet the world's demands, the issue of how can fossil fuels optimize its contribution in a sustainable future will be examined.

These views will incorporate throughout each theme and session the consideration of users, both major ones such as power utilities and individual ones such as transportation, the long term, experiences that are applicable to the full range of developed and developing countries, and the concept of sustainable development through the use of fossil fuels. As more governments adopt sustainable development concepts as part of their daily operation and planning, the fossil fuel community, including electric utilities, must define its future to coincide with these changing views. The conference will create a dialogue and explore strategies between developed and developing countries to identify ways to use fossil fuels in a manner that will be fully compatible with the sustainable development mandates of the future.

The conference will produce a statement by the worldwide fossil fuel community attending the conference that can be brought to the attention of governments and multilateral organizations with the intent that the statement will receive endorsement.

Conference Objectives

1. The world will be reliant on fossil fuels for decades to come. Both developed and developing countries are certain to expand their use of fossil fuels. Yet, there will be strong resistance to this expansion if the fossil fuels community cannot demonstrate that it can be accomplished in a manner that minimizes environmental degradation. The conference will develop views on how economic development and environmental protection can be compatible.

2. The conference expects to document how the fossil fuel industry has responded to society's requirements. Over the past several decades, the public has expressed desires for improved environmental protection, enhanced safety and security, lower energy prices, adequate energy supplies to prevent shortages, and convenient access to the services that end-use energy provides. The role of the fossil fuel industry in meeting these challenges will be discussed.

3. Some 85% of the world's growth in energy demand will occur in developing countries. Access to capital and technology, both available in developed countries, must be available to developing countries, as well, if fossil fuel use is to be sustainable over the next several decades. The conference will address innovative approaches to resolve the issues of technology acquisition and financing fossil fuel projects with particular attention to incorporating and paying for environmentally sound development.

4. The conference will expand upon ideas and mechanisms to improve the image of the fossil fuel industry. The public's perception of the fossil fuel industry is generally negative in many countries. Few positive items are reported by the news media; accidents make headlines, hence, most images are negative. The conference will explore positive contributions from the fossil fuel industry and discuss ways to communicate the value of fossil fuels.

Conference Themes

A. Communicating the Value of Fossil Fuel

Most citizens are unaware of the contributions fossil fuels provide to improved living standards, health and safety, national security and economic development. Hence, without any

particular, awareness of the positive contributions of fossil fuels, the public can be influenced by exposure to negative perceptions. The conference will be designed to highlight positive contributions of fossil energy and to discuss how to better communicate these contributions to policy makers as well as to the public. This Working Group will have the task of developing an overview of the specific values of fossil fuels and an integrated strategy to communicate those values to the wider community.

B. Fossil Fuel Industry's Responsiveness to the Public Requirements

The public is increasingly expressing its views on the reliability, safety and location of energy facilities. Regulatory mechanisms provide for public input and influence over a variety of policies that determine how the industry performs. The conference will explore how the industry has responded to public demands and what remains to be done. This Working Group will seek to identify the range of regulatory mechanisms impacting on the fossil fuel industry, the general nature and expectations of public input into those policies, and how dialogue with the public can be expanded.

C. Fossil Fuel Utilization and Global Climate Change Initiatives

Global climate change initiatives will have a major impact on the future utilization of fossil fuels. Many governments and multilateral organizations are considering initiatives to restrict the growth in greenhouse gas emissions. The status of current international initiatives will be reported. The anticipated effects on the industry will be examined. A range of options for industry actions to respond to the global climate change concerns will be identified.

D. Energy Trade: The Role of Governments and the Markets

In many nations, the role of government in the energy sector, both in terms of ownership and regulation is being examined. Concurrently, several initiatives are underway to increase global trade by reducing barriers to the operation of open, competitive markets. Debate continues on the appropriate extent of government intervention in ownership and trade of energy resources. The conference will discuss how fossil fuels are affected by the current discussions. The Working Group will identify the key actions at the national and international level which are expected to play a positive role in enhancing energy trade.

E. Infrastructure Development for Fossil Fuels Deployment

The delivery apparatus to bring the fuel to the energy using facility, the support systems at the facility location, the transmission and distribution of the final energy product to the customer's point of use, and the clean-up of the waste streams resulting from conversion processes all must undergo change in the long term deployment of fossil fuels. As alternative transport systems using fossil fuels are deployed, a major shift in refueling and maintenance support systems may be necessary. Also, the development of new and responsive capital markets and financial institutions to accommodate the expansion will be a major concern. The conference will develop a statement of the infrastructure development requirements for the long term deployment.

F. The Strategic Utilization of Fossil Fuels and Environmental Regulation

Many countries have placed a very high priority on economic development and see fossil fuels as playing one of the major roles in assisting in the achievement of this strategic objective. At the same time, there are community concerns to protect the local or regional environment from degradation or further deterioration. Environment protection regulations, on issues such as sulphur and nitrous oxides, particulate emissions, water quality, land access and use, can restrict opportunities for development and use of fossil fuels. However, careful development of site specific strategies can enable development to proceed without significant impact on the local or regional environment. The conference will identify and discuss ways in which national strategic interests might be pursued while protecting the environment.

G. International Technology Development and Deployment

Expanded utilization of fossil fuels may rely on development of advanced technology that reduces environmental degradation and improves efficiency. Deploying this technology will be a major challenge to the industry, particularly to find solutions to financing constraints in many countries. This Working Group will develop an overview of technology development and demonstration needs, indicate whether and when international collaboration is appropriate, and identify strategies for financing the application of environmentally friendly fossil fuel technologies in developed and developing countries.

Working Group A: Communicating the Value of Fossil Fuels

Working Group B: Fossil Fuel Industry Responsiveness to Public Requirements

Joint Discussion Summary

The working groups agreed that a lack of understanding about the strategic importance of fossil fuels of oil, natural gas and coal in the energy mix is a serious problem worldwide. In addition, The fossil energy industries must be prepared to respond to public requirements. In particular, the following points need to be effectively communicated:

- Fossil fuels are used and produced because they are necessary to the economic well-being of people throughout the world.
- As virtually all credible projections (including those of IEA) indicate, societies throughout the world will rely on fossil fuels well into the next century to meet a large portion of their energy needs.
- No practical alternatives to fossil fuels are as yet available for most applications or are likely to be available in the near future.
- While supplies are finite, economic reserves will not run out in the foreseeable future.
- While uncontrolled use of fossil fuels can cause environmental damage, methods to limit and control this are readily and economically available.
- The fossil fuel industry is made up of responsible people who respond to the needs of their customers and societies.

International organizations including, but not limited to, the IEA and the World Energy Council(WEC) have a responsibility to ensure that governments, other international organizations, non-governmental organizations and industries are aware of the need to communicate a realistic understanding of the strategic value of fossil fuels to the public and to decision-making groups in their countries.

The working groups further agreed that a sustained communications initiative is necessary in both industrialized and developing countries. To this end, the IEA and WEC should ensure that an ongoing steering committee is established to develop and implement this communications initiative. The role of the

steering committee should be to provide support to the governments, international organizations, non-governmental organizations and industries who will perform the actual communication according to their own needs and priorities.

Governments, international organizations, non-governmental organizations and industries have a responsibility to ensure that their publics have a realistic understanding of the strategic value of fossil fuels in their energy mix. This understanding may be conveyed through the educational system, the mass media and through other means of communications such as conferences and professional organizations.

The fossil fuel industries must realize that they have an obligation to improve communications to the public about their role in their societies and economies, the value of their products, and the requirements for its availability. They have the obligation to make information readily available about the value of fossil fuels and their impacts on society.

A wide variety of tools and messages are available to organizations involved in communicating the strategic value of fossil fuels. Among the options that they have are:

- Make energy—including fossil energy—a compelling public issue.
- Develop a worldwide inventory of positive case histories about fossil fuels and promote their dissemination.
- Communicate the connection between energy supplies—especially fossil fuels—and economic well being.
- Stress the need to use the world's energy sources—including fossil fuels—as efficiently, economically and cleanly as possible.
- Emphasize the importance of access to both capital and technology in developing and utilizing fossil fuel supplies.
- Develop appropriate and effective communications methods and tools to reach news media and educational institutions throughout the world.
- Stress the need for scientific evidence in the formulation of energy and environmental policies, laws and regulations.
- Educate the public to understand the energy implications of their personal actions and the needs to use energy supplies efficiently and wisely.
- Develop and disseminate case histories of how industry can create a positive relationship with the communities in which it operates by being responsive to public needs through both the regulatory process and through other methods.

Working Group C: Fossil Fuel Utilization and Global Climate Change Initiatives

Discussion Summary

- The world's population will grow and the economies and social aspirations of developing countries will grow with it.
- The need for all forms of energy is enormous, with much of the energy going into electric power.
- Fossil fuels have been and are projected to be the largest source of fuel for a large number of applications including electric power plants and transportation.
- Fossil fuels will, therefore, continue to have an important role for the foreseeable future.
- The issue of global climate change has not yet been fully defined in terms of specific, confirmed impacts from the use of fossil fuels. While the science of climate change identification is still

evolving, governments continue to pursue a process to deal with the issue.

- The environmental consequences of using fossil fuels must be faced as should the environmental consequences of using all fuels and energy sources. Industry needs to be involved because government will continue to address the climate change issue. There are no prescriptive solutions because many are not persuaded by the science or by the issue of whose emissions count most; past emissions by developed countries or future emissions by developing countries.

- Dealing with local types of pollution, such as air, water and solid waste, will be more consistently supported than will global climate change, but global climate change is expected to continue as an issue.

- Technology transfer and diffusion of efficient, lower emission technologies is essential. It needs to occur both at the micro level through a multitude of industrial projects that are commercially viable as well as at a macro level making use of broad integrated systems approaches. Technology developments are essential for long term mitigation solutions via increased efficiency, decreased emissions and enhanced energy generation/production/transportation systems.

- Government and industry worldwide should work together to promote the more efficient and sustainable uses of energy and raise individual awareness of the consequences of various energy choices.

- Since the largest share of greenhouse gas emissions will soon come from the developing world, there must be cost-effective investments in those countries. Financing needs are great, but so are the needs for developing legal and regulatory and basic economic frameworks. Basic legal and regulatory frameworks are the building blocks through which investors can finance new/innovative technologies.

- The U.S. government, for example, is funding several programs aimed at industrial restructuring and institutional capacity building in developing countries. This is a prerequisite to effective investment in these countries.

- "Joint Implementation" has a role to play in finding least-cost responses; "credits" during the pilot phase are an issue and several developing countries have some concerns with Joint Implementation. A single common target for reductions may not be the best way for countries to agree to reduce emissions. Voluntary self-pledges may be better.

- Major energy projects take long times to construct and to have an impact on the environment. These factors require all participants to have realistic time frames, which can sometimes be measured in decades.

- The extensive risk for the companies investing in developing countries must be considered when programs are planned and expectations developed.

- There is evidence that developing countries are recognizing their contributions to climate change and that they are ordering, new energy efficient systems to promote sustainable economic development and reduce greenhouse gas emissions.

- IEA can use the WEC as a platform to communicate with developing countries.

- A critical role for industry is the development and dissemination of new technologies. This must be done in a way that demonstrates and documents their "economic sense."

- The statement that "the increase in greenhouse gas emissions and the potential effects on global climate presents today's greatest challenge to the fossil fuel industry", was questioned, at least for developing countries. It was suggested that the greatest challenge for a developing country is access to energy supply at an affordable cost to fuel economic growth.

- Industry has responded to global climate change concerns in a large number of ways with a wide variety of projects and initiatives. The use of venture capital to find and invest in commercially promising, energy efficient technologies is one of the most innovative. The energy industry needs to better communicate what is happening to enhance its image and to establish the "strategic value of fossil fuels" in the public mind.

- There is a need for cooperation between OECD and developing countries for information exchange on technologies, needs, economics, mitigation strategies, etc. Industry must have access to this information so it can define market and business opportunities.

Working Group D: Energy Trade: The Role of Governments and the Markets

Discussion Summary

We concur on these three points about the role of government and markets in energy trade.

- Fossil fuels should be developed in the most effective and efficient manner possible.

- Market mechanisms should be relied upon wherever possible, but countries will vary in their reliance on markets given social, cultural and political realities. Market models that work for some countries and regions may not apply to others given costs of production, transportation and fuel technologies.

- With effective, reasonable development of fossil fuels, energy trade will follow wherever comparative advantages exist. Governments should create environments favorable to fossil fuel trade, encourage fair trade practices, and avoid market distorting policies. Cross-border interconnections allow optimization of systems and can foster a more favorable environment for investment.

Given these observations, we concluded the following about the role of government.

At the minimum, government can promote dialogue. Governments should ensure that markets are competitive, that prices and policies are transparent, that where privatization or deregulation are in force effective regulatory policy is put in place, that sound policies are in place to promote investment and financing, and that environmental quality is maintained. Governments can dampen regional conflicts that might impede energy trade. Governments should coordinate policies across countries and regions to enhance energy trade.

We raised several caveats and considerations regarding the role of government.

- Governments may not have a role in energy production, but may encourage the coordination of networks.

- The role of government will vary depending upon the existing legal/institutional framework, the extent to which countries have rules regarding property rights and sanctity of contracts Governments have a role in designing and implementing effective, sound, legal/institutional frameworks.

- Governments may have a role to play in fostering infrastructure development, including support of compatible standards, that will lead to emergence of markets, but that role should diminish as markets mature.

- The role of government will vary with energy import dependence and national security interests.

- Energy policies must be evaluated for environmental impacts. The distorting impacts of environmental policies on energy market operations must also be recognized. Governments can promote the transfer of environmental protection technologies and help to build consensus among conflicting interests.

Working Group E: Infrastructure Development for Fossil Fuels Deployment

Discussion Summary

1. Fossil fuel infrastructure deployment is a key element to achieve the goals of energy security, environmental protection, and sustainable economic development. Differences between groups of countries should be noted. IEA member countries, nations in transition towards market economy and the newly industrializing countries reflect different policy frameworks, institutional set-ups and energy infrastructure development priorities. Prerequisites to a cost-effective fossil fuel infrastructure development strategy are: stable long-term energy and environmental policies, transparent institutional framework, open market and project financing regime.

2. Fossil fuel infrastructures need definition: According to the Working Group, infrastructures include facilities and means in the fossil fuel cycle which are shared by different actors and users, or which serve more than one segment or activity in the fuel cycle. In the oil system and chain, examples are:

   overseas transport, harbors and pipelines, refineries, and fuel delivery grid; in the coal system and chain: support to mining development, coal beneficiation, coal transport, and solid waste management; in the natural gas system: gas pipelines and LNG supply system, natural gas delivery; in the power system: power grid, distribution and dispatching. Concerning fossil fuel transportation infrastructure, lead times and investments to make available a capacity unit change dramatically for the different fuels, with natural gas requiring comparatively, the largest amount of capital (and time) to have a unit capacity deployed into a new market.

3. The Working Group believes that effective fossil fuel infrastructure should improve energy security by favoring international energy trade, diversity of fuel supply sources while serving a variety of energy uses. Environmental concerns should be alleviated whenever fossil fuel infrastructures are properly designed and maintained. Advanced planning of fossil fuel infrastructures is the way to ensure fossil fuel flexibility and minimize cost of delivery.

4. The Working Group recommendations to energy policy-makers and executives are:

   a. adoption of market-based approaches rather than command and control approaches in the development of fossil fuels infrastructures;

   b. promotion of regional cooperation to distribute the risk of implementing and creating new fossil energy infrastructure;

   c. promotion of initiatives which improve the climate for private sector investment in fossil energy infrastructure;

d. preservation of clear management and coordination before, during, and after the process of de-centralization and privatization of fossil energy infrastructure; and

e. incorporation of technology progress and cooperation to design and build new types of fossil energy infrastructures and to improve existing types.

5. The special needs of non-Member countries deserve recognition and assistance. Support is suggested to countries in transition towards market economy in their fossil fuel infrastructure retrofitting and upgrading programs. Also in the newly industrializing countries, enhanced international cooperation is the best means to accelerate design, construction and operation of the new fossil fuel infrastructure, notably coal and oil infrastructure, which is required during the next several years to respond to the growing energy needs. Five elements of a "fossil fuel infrastructure charter for the non-Member countries" are identified:

   a. free trade of energy and technology services must be a basic tenet; clear rules should be established to facilitate equity investments, joint ventures, ownership and repatriation of profits, there is no shortage of capitals through the Working Group sees a shortage of good projects;

   b. long-term energy and environmental policy guidelines and standards should be established;

   c. technology training programs and indigenous technology assessment capacity should be promoted;

   d. regional cooperation and trade agreements should be developed; and

   e. government - industry partnerships and technology acquisition programs should be facilitated.

6. In this context, roles for IEA Member countries include:

   a. continuing fossil fuel technology collaboration, joint R&D projects and information exchange;

   b. identification and promotion of best technology practice and dissemination;

   c. activation of "joint implementation" schemes to contribute to fossil fuel infrastructure development in the non-Member countries; and

   d. assistance in the setting-up of market-oriented energy institutions and policy frameworks.

7. Energy policies must be evaluated for environmental impacts. The distorting impacts of environmental policies on energy market operations must also be recognized. Governments can promote the transfer of environmental protection technologies and help to build consensus among conflicting interests.

Working Group F: The Strategic Utilization of Fossil Fuels and Environmental Regulation

Discussion Summary

The strategic value of fossil fuels is founded on a set of characteristics that ensure its relevance, even indispensability, over the foreseeable future. They include:

- Availability.
- Established infrastructure.
- Proven & refined technologies.
- Transportability.
- Storability.
- Flexibility in meeting users needs (i.e. transportation).

In addition to these characteristics, the full value of fossil fuels is not realized unless additional criteria are present:

- Security of supply exists in the form of multiple sources and transmission systems.
- Diversity of supply is present in terms of a variety of fuel inputs (coal, oil, gas).
- Competition is real and robust ensuring appropriate market driven pricing.

Currently meet over 90% of world energy demand is provided by fossil fuels, and they are expected to supply about the same % of demand in 2010. The actual demand for supplies will in many cases increase over that period by from 50 - 100%, with associated facilities and infrastructure will increasing proportionately. Although in some countries and regions other energy sources provide a significant proportion of energy needs. The majority of economic activity, both domestic and international, is dependent on fossil derived energy, in large part due to its security of supply, and its convenience and reliability.

The key advantages of fossil fuels are:

- Very large resource in place and available.
- Resource is widely distributed throughout many countries, especially in the case of coal but less so for oil and natural gas.
- Variety of forms and qualities of fuel to choose from.
- Can be converted into a variety of convenient forms of energy for end users, most importantly in the transport sector where its power to weight ratio is unsurpassed to date.
- Many of the technologies for the production and use of fossil fuels are well established both technically and commercially.
- Generally well established infrastructure for distribution and use of fossil fuels, particularly in developed countries.
- Significant amount of employment is directly related to fossil fuel production and use, with a much larger component of the workforce dependent on the availability of energy derived from fossil fuels and linked to the wealth creation activities of nations.

The importance of these advantages will vary from country to country, and between regions within countries. In the case of developing countries, fossil fuels are valued highly on the basis of their availability locally and the limitations on national abilities to engage in trade in energy commodities due to capital shortages.

Different communities have different expectations concerning energy supplies depending on their state of development. Important expectations are:

- Secure supplies, both in the immediate sense of reliable and stable supplies, and in terms of continuous supplies over time.
- Convenient form of energy which can be matched readily to the specific needs of consumers, whether large or small energy users, mobile or stationary users, urban or remotely located.
- Lowest possible price in a competitive market.
- Minimum impact on environment in both the production and use of energy.
- Safe supplies of energy which minimize risks to public health.
- Improved energy efficiency and availability of relevant technologies.
- More effective government and industry co-operation on addressing energy related issues.
- Ability to affordably support economic development.

Against this background there is a demand in the market place for fossil fuels. Community expectations and responses concerning the environment are played out through the interlinked roles and activities of energy producers and users, legislators, regulators, special interest and community groups. Where differences of view exist between these groups, governments are generally expected to create the framework of the process in consensus building on expenses and ultimately to adjudicate on the solution.

The main groups of environmental impacts are:

-Water quality	- surface water, ground water, drinking water sediment and acid water runoff.
-Air quality	- particulates, SO_x, NO_x, acid deposition (CO_2 addressed by Working Group C).
-Health and safety	- worker health and safety; community health and safety.
-Soil degradation	- dust, exposing subsurface, subsidence.
-Waste disposal	- liquids, solids, heavy metals, hazardous/toxic waste.
-Competing land use	- wildlife and wilderness, heritage sites, cultural, urban expansion, specified easements for transport, subsidence.
-Visual impact	- mine sites, transport infrastructure, storage facilities, conversion facilities, distribution systems.

In a competitive environment, the option of self regulation will only be effective if there are meaningful sanctions to discourage unacceptable actions by 'renegade' players. This is particularly so in the case of environment protection where the market has yet to place values on many externalities.

There are a number of strategic policy options/issues which are suggested to help in the process of efficiently addressing environmental impacts.

- The basic environmental objective should be defined so as to maximize flexibility for adopting the most cost-effective solution. The goal of sustainable development should be the driving force in the process.
  - consideration should be given to matching the environmental objectives to the local conditions.

- regulation should focus on specified outcomes rather than the means to achieve those outcomes.

- market based instruments offer potentially viable regulatory tools provided the relevant externalities can be reasonably internalized in monetary terms.

- active and early consultation among all stakeholders affected by a project is essential.

- Solutions to environmental concerns need to be pursued which can offer opportunities to enhance efficiency and competitiveness.

- Meaningful monitoring regimes will be essential to ensure goals are met and affected groups are satisfied with project performance.

- Competing objectives need to be identified and taken into account, whether environmental or development or both by: identifying all the objectives, all the facts, all the interested parties, issues of consensus and divergence; ensuring a common understanding of the issues; agreeing on how to reach a mutually acceptable solution. Overall there is a need for greater awareness that the benefits gained from fossil fuel extraction and use carry with them a burden and a responsibility for environment protection.

- A wide range of technology is available to respond to environmental concerns; new and improved technologies are also emerging. The challenge is to reduce the costs of applying those technologies and to incorporate the technologies into projects and installations from the beginning.

- Capital limitations on investment in environment protection technologies, particularly in developing countries, will need to be overcome if progress is to be made in improving environmental quality.

- Environmental objectives at the local, regional and national levels need to be harmonized to minimize conflict and duplication of regulatory effort.

- Environment regulations should not be used as a mechanism for distorting trade.

- A continuing dilemma will be how to respond to emerging environmental concerns when the science of the problem or the most effective solutions are not well understood or agreed. A cautious approach is desirable.

The following key non-environmental issues will influence longer term success of the fossil fuels industry:

- Market driven competition and the role of taxation in addressing consumption patterns.

- Security of supplies.

- Elimination of subsidies and employment impacts.

- Stimulating adoption of clean, efficient technologies.

Conclusions

A strategy for fossil fuels in a sustainable development future needs to:

- Take account of the strategic value of fossil fuels, particularly:

  – the availability of fossil fuels.

  – the adequate availability of technology and infrastructure.

  – the convenience and flexibility of storage and use.

- Address the key environmental impacts of fossil fuel extraction and use, notably the impact on water, air, land and human health.

- Respond to these challenges in a manner which:
  - maximizes the flexibility for adopting the most cost effective solution.
  - harmonizes local, regional and national objectives.
  - stimulates the continuing development and deployment of new, cleaner and more efficient technologies.
  - recognizes the potential for capital limitation to constrain the application of effective technologies, particularly in developing countries.
  - focuses consensus building among stakeholders on environment concerns and responses.

Working Group G: International Technology Development, Transfer and Deployment

Discussion Summary

1. Today there are many economically efficient and ecologically clean technologies for which to use fossil fuels, particularly for electricity and heat production. All around the world, it is understood that technology transfer is not only reasonable, but it also makes good sense. It is also understood all around the world that technology transfer, properly done, is mutually beneficial.

2. The adoption of appropriate (low tech-medium tech-high tech) technologies by the countries which need these technologies, from the industrialized countries which provide these technologies, is often the most effective way of saving money and time while upgrading environmental quality, development status, and economic health.

   There are some successful examples of technology transfer in developing countries. Many of them construct state-of-the-art facilities for producing and processing of fossil fuels, constructing power plants, environmentally operating these plants, and so on.

   For a technology importing country, this technology transfer is an instrument for environmentally responsible development; for a technology exporting country, technology transfer is an instrument for expansion of business opportunities. Technology transfer on a commercial basis, mutually beneficial in a number of areas for both parties, is an important measure of success.

3. The most serious problems — if we talk about developing countries — are environmental infrastructure, financing, and a sustaining infrastructure (operation, maintenance, spare parts, etc.) to maintain and further deploy the technology. In some cases, environmental infrastructure and financial resources could be correlated with political instability. These factors, coupled with management problems, can result in the violation of intellectual property rights and reduced return on investment which, in the end, can prevent any new technology transfer activity. The important questions are in education and raising of national popularity in countries receiving technologies.

   Some concrete projects are implemented easier if they meet the requirements of the Government energy and environmental policies and are part of the national and/or regional energy development plans (in the countries where they exist); if they are the priority projects for economic development; if they comply with the social and cultural peculiarities of the region or the country where the projects are implemented; if they improve the environment and match the local geographical and climactic conditions. An importing country or company should thoroughly assess the local requirements and conditions, study the existing chain of economic relations from the energy and

material resources to the end users, involving governmental and local agencies in the planning process. Needs Analysis, including reasonable and realistic assessment of the balance between in-country content and exporting country content for the project and for future deployment of the technology, is also important.

4. The transition economy countries (i.e. NIS, Poland) also need to acquire appropriate technologies from the industrialized countries, even though they have a technological base, engineering and manufacturing capability and "know how". This might be done by means of:

- transfer and/or adaptation of some upgraded and updated technologies to the developing countries;

- joint designing and demonstration of upgraded and updated technologies;

- acquisition of licenses for improved technologies, equipment and manufacturing processes.

5. Technologies grow obsolete fairly rapidly. That is why it is important to provide for the possibilities of upgrading of technologies to maintain compatibility with advances in the state-of-the-art and changes in the regulatory climate. This renovation should be performed in cooperation with local scientists and engineers who would be using the technology. It is desirable to combine local technologies with appropriate advanced technologies to comply with the local conditions and achieve economic efficiency, commercialization, and deployment, of the imported technologies.

6. When transferring technologies, personal contacts (including technical support), exchange of credible information, training and education of specialists are very important.