

Renewables Financing

Concepts from an Investmentbank





Agenda

1

Setting the Scene – Financing Renewables

2

Deutsche Bank & the Energy Sector

3

Energy Studies – First Pass Review

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Energy Studies – First Pass Review



The Energy Innovation Imperative

Addressing Oil Dependence, Climate Change and Other 21st Century Energy Challenges

“Global climate change is increasingly recognized as both the most dangerous and the most intractable of all of energy’s environmental impacts – indeed, the most dangerous and intractable of all of civilisation’s environmental impacts, period.”

“Human caused climate change is already occurring. Adaptation efforts are already taking place and must be expanded. But adaptation becomes costlier and less effective as the magnitude of climate change grows.”

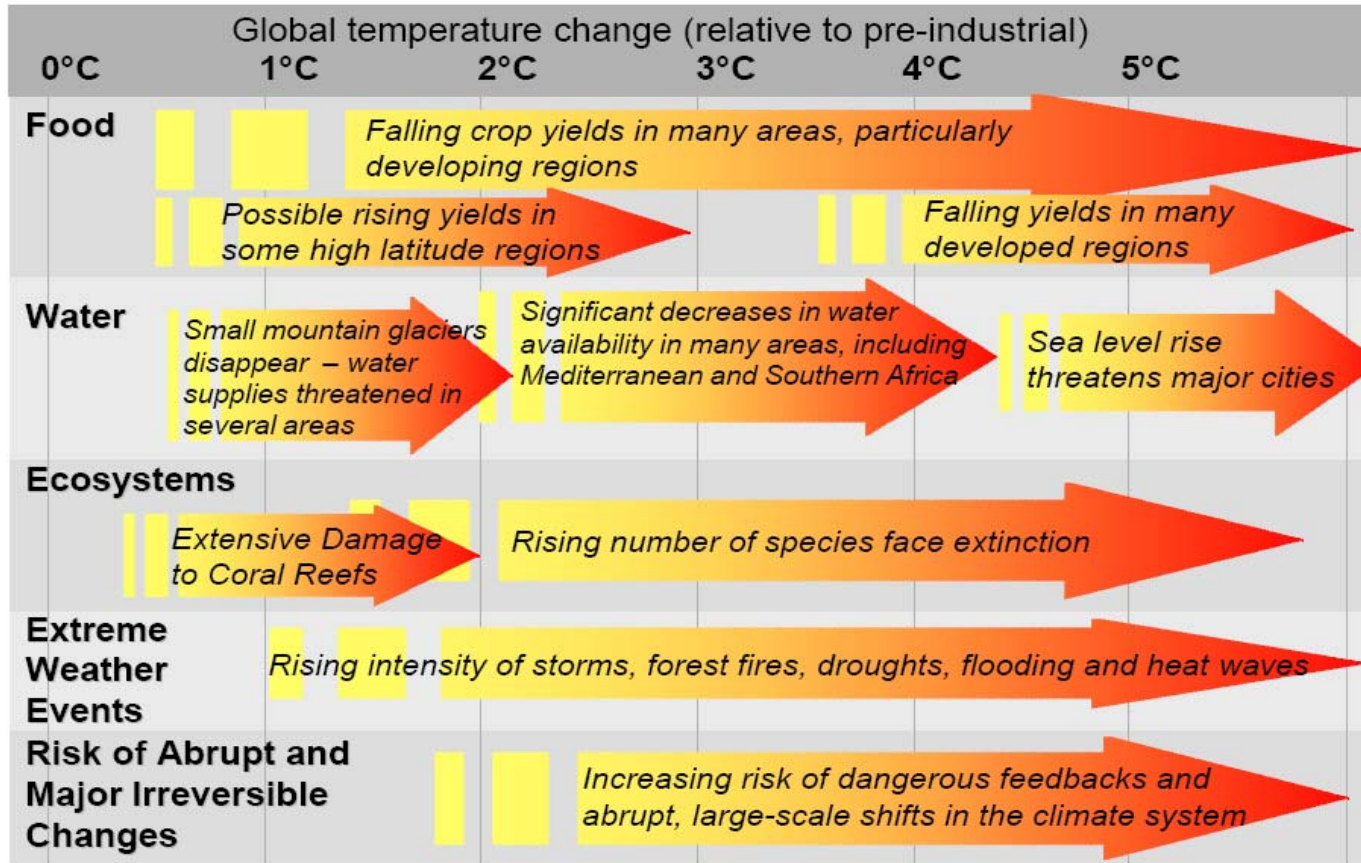
Source: *John P. Holdren Professor of Environmental Policy and Director of the Program on Science, Technology, and Public Policy at the John F. Kennedy School of Government at Harvard University, Professor of Environmental Science and Policy in Harvard’s Department of Earth and Planetary Sciences, and Director of the Woods Hole Research Center*



Renewable energy resources

Energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy resources include: biomass, hydro, geothermal, solar, wind, ocean thermal, wave action and tidal action.

Projected Impact of Climate Change



Source: Stern Review on the economics of climate change, 2006



Global Utilities Senior's Executive View on Renewables

- 64% agree that the global utility sector is facing the biggest period of change in the last 20 years
- 75% said that the change is either revolutionary or significant
- 57% are convinced that developing new technologies and reducing environmental changes are pivotal to future developments in the sector

When looking into Renewables specifically Senior Executives said that for

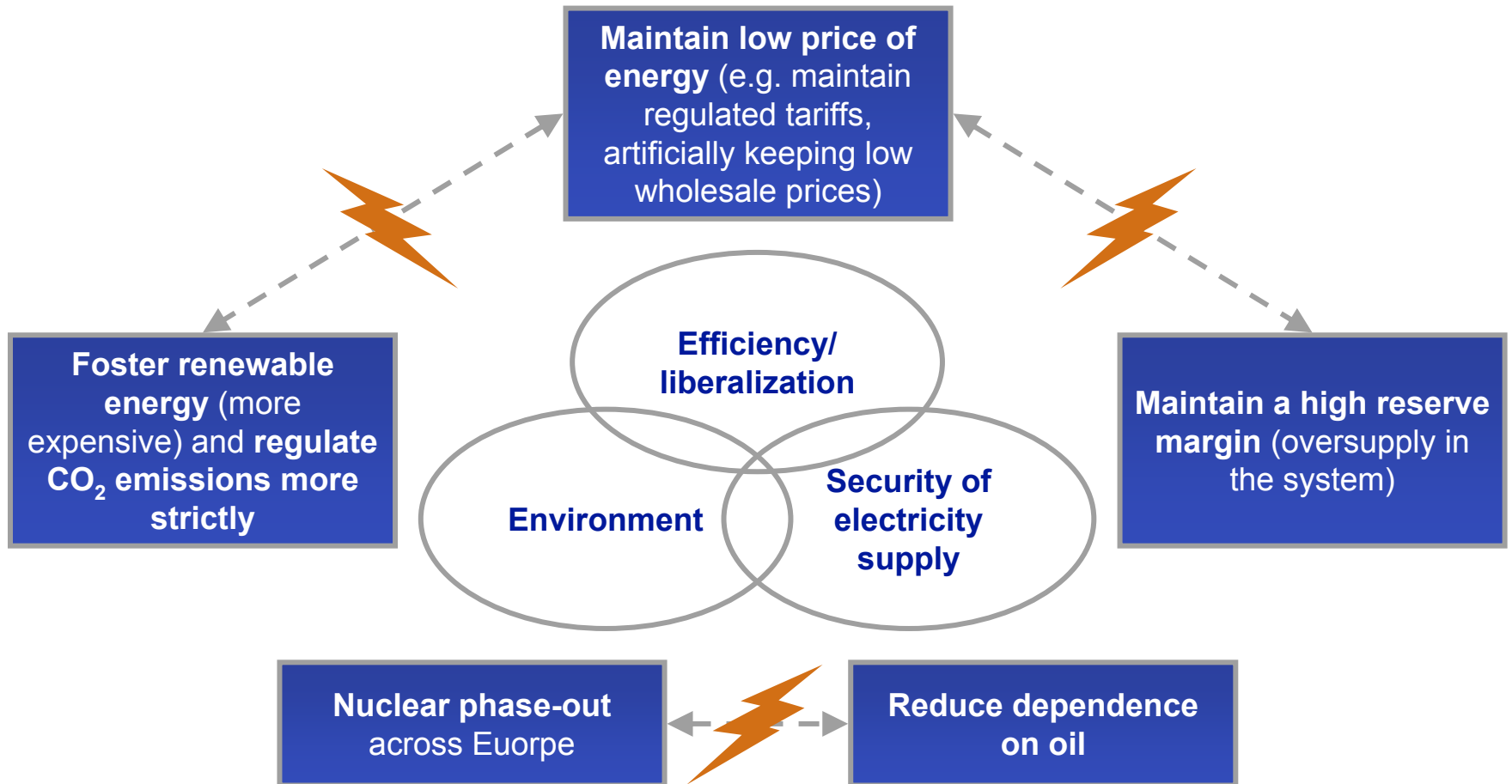
... Wind power plants 26%

... Solar power plants 20%

... Biomass (combustible) renewable 16%

expect that technological developments will have the greatest impact over the next 10 years.

Governments' conflicting objectives driving regulatory uncertainties





Investment levels will require a clear and stable regulatory and competitive framework

Regulatory uncertainties

- Generation
 - Incentives for capacity addition
 - Subsidies to renewables
 - Attitude towards nuclear
 - Asset disposals
- Supply
 - End of regulated tariff
- Distribution
 - Allowed return
 - Potential forced divestiture
- ETS / CO₂ regulation
 - Free allowances
 - Post-2012 targets and framework

Need for stable framework to promote necessary investments

Market uncertainties

- Fuel price volatility
 - Gas
 - Coal
 - CO₂ allowances
- Poor gas market efficiency/liquidity
- Cyclicity of generation markets
 - High capital-intensive business
- Technology evolution
- Competitive dynamics



Sustainable Development & the Renewables Sector

A free market does not function according to rules of social responsibility and therefore needs to work within certain boundaries that serve social and environmental as well as economic goals.

Actors in the „sustainability arena“

- Voters: Citizens
- Politicians: Political Parties
- Public Bureaucracies
- Special Interest Groups: NGO's etc.
- Consumers
- Enterprises
- Employees and Trade Unions
- Science

The institutional environment does not produce enough incentives for sustainable energy innovations

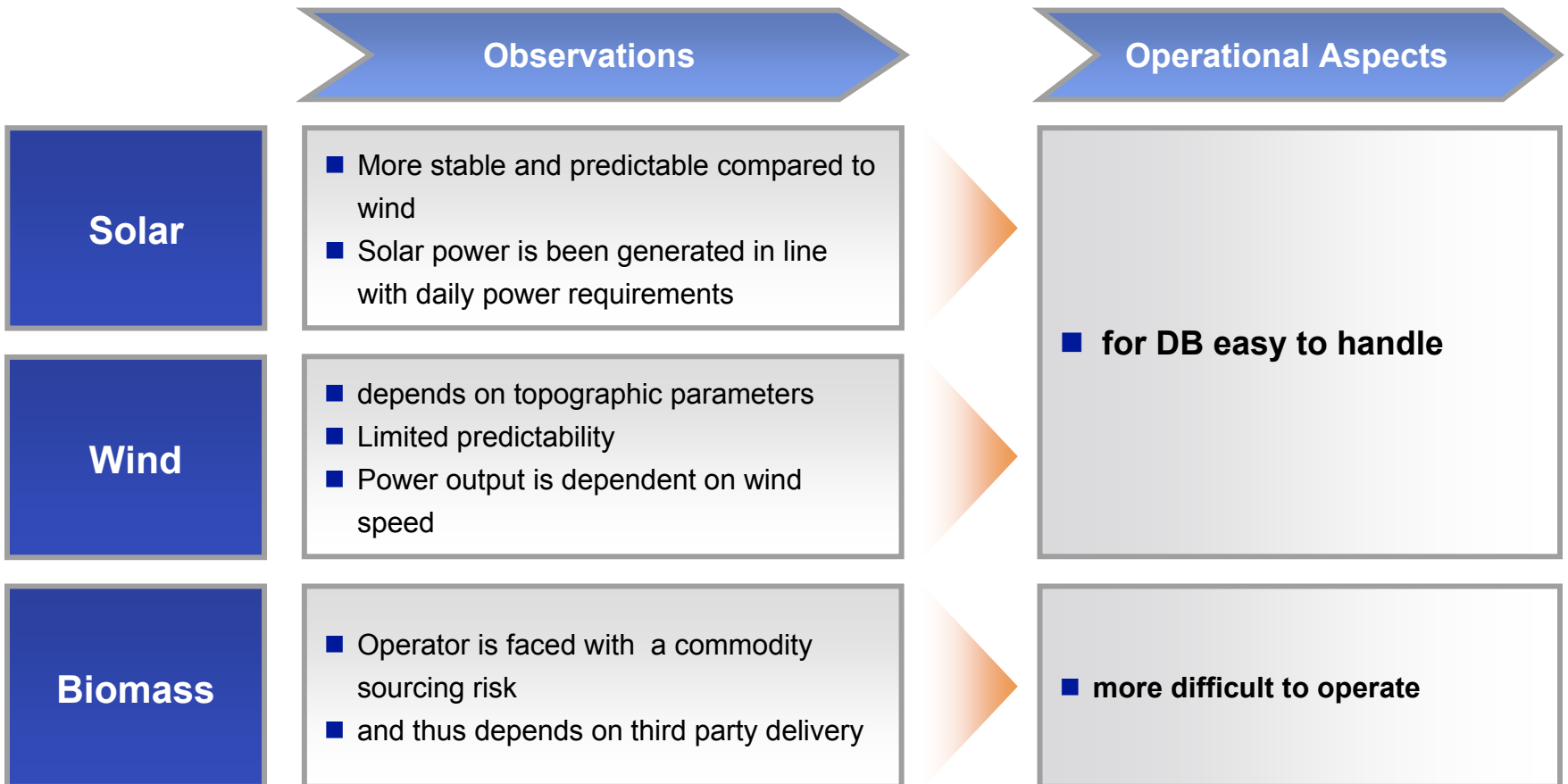
Environmental policy measures are needed to attract sustainability goals

- Regulations
- Taxation
- Subsidies in terms of fixed price off take agreements
- Voluntary Agreements: Kyoto Protocol
- Tradeable Permits: e.g. EU Allowances

Renewable Energy Sector and its Prerequisites for Financing

- **Policy frameworks and financing tools** will enable Renewable Energy to move from margins of energy supply into mainstream
- Renewables Energy Financing requires **new thinking, new risk management, and new forms of capital**
- Renewable Energy Projects usually carry higher up-front capital costs and lower operational costs than their conventional counterparts
 - external financing requirement is therefore high and must be amortised over the entire project lifecycle
 - Projects are small, transaction costs (feasibility analysis, due diligence, legal and engineering fees consults, ...) are disproportionally high and do not vary significantly with project size
- **Market forces** will determine how and where Renewable Energy is used; The ideal solution assumes
 - mature technology
 - efficient markets
 - full internationalisation of environmental and social costs
- **Public interventions** are needed to help accelerate investments in the Renewable Energy sector
- A tool for catalysing investment in the sector is creating price support mechanisms that provide stability and predictability over the medium and long term; this translates into a reduction of cost of capital, higher investments into the Renewables Sector and at a later stage lower prices that consumer have to pay

Renewable Energy Sources – Some Recent Observations



Financing Concepts

Debt / Equity Finance

- Equity
 - Private Client Investor Base
 - Private Equity
- Debt
 - DB Arranger, funds originated from Third Parties
 - Bridge Financing during construction phase

Lease Finance

- Off Balance Structures
 - For Stadtwerke
 - Other Utilities
 - Industrials
- Tax Driven Structures
 - Italy (Depreciation 8y vs 16y)
 - France (Depreciation 1-2 y vs 16y)

Equity Stakes

- In renewable energy projects as underlying trading asset



Some Market Observations & DB's position

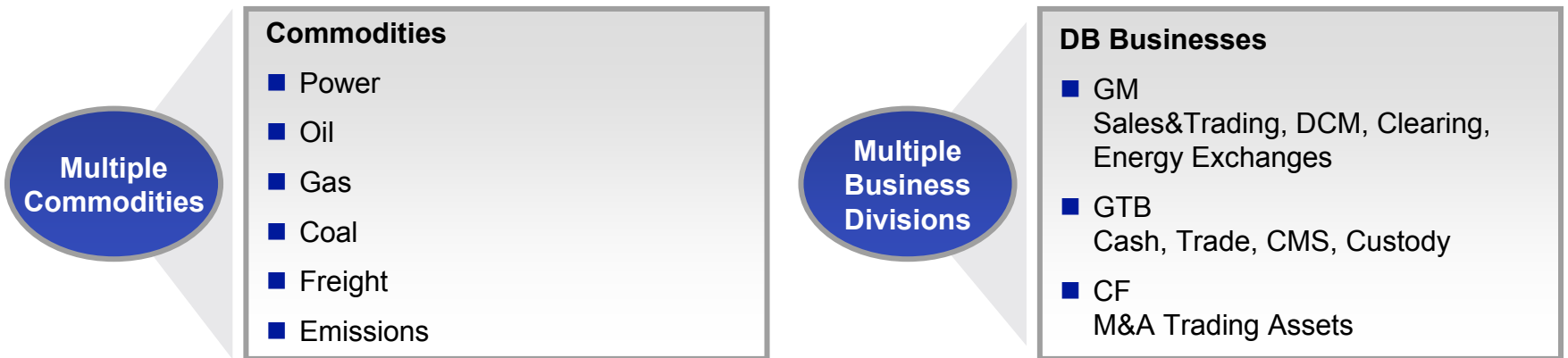
- Financing traditionally resides in the Project Finance Arena
- The construction risk, financing companies are facing with „new players“ in the renewables energy business will migrate to larger General contractors with fixed price offers for turn key projects
- This compares to what we currently see with established large players in the market

DB is a partner to arrange for the entire Capital Structuring as well as sourcing of funds both, Debt & Equity.

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DB's Interaction with Clients in the Energy Industry



- Companies operate in different stages of development which implies a different approach for credit and for product areas in each of these stages
- Clients are reaching out for banking partners which are able to manage multiple commodities, transaction businesses, and clearing capabilities
- As trading volumes are steadily increasing the ability of managing the embedded risk is pivotal in the success with these clients

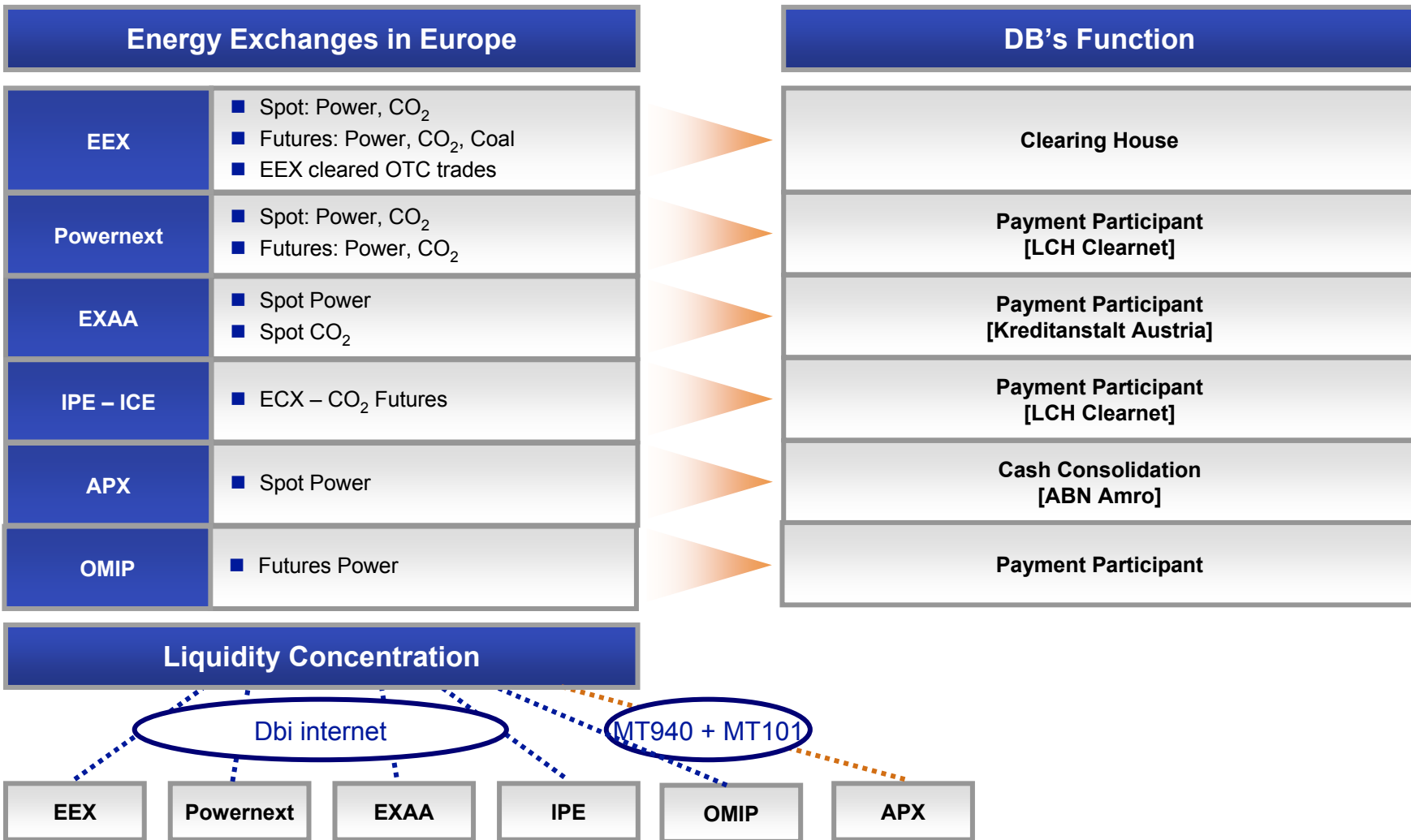
McKinsey recently called this „The Need for an integrated approach in the Energy Sector“.

Deutsche Bank Product Franchise in the Energy Industry

Basic Products		Capital Market Products
Clearing Products	Transaction Products	“Value Added” Products
Clearing Services <ul style="list-style-type: none"> ■ Minimum / Month ■ Volume ■ Item Margin Accounts <ul style="list-style-type: none"> ■ Spot ■ Futures ■ CO₂ 	Guarantees <ul style="list-style-type: none"> ■ OTC Trading Counterparts ■ Grid Providers ■ Energy Exchanges ■ X-Border Capacity Auction Transaction Flows <ul style="list-style-type: none"> ■ Domestic ■ X-Border Cash Pooling <ul style="list-style-type: none"> ■ Intra Account ■ X-Border Collateral Management <ul style="list-style-type: none"> ■ Corporate Guarantees ■ Payment Guarantees ■ Marketable Securities ■ Cash Risk Management Rating Advisory	Long Term Financing <ul style="list-style-type: none"> ■ Syndicated Loans ■ Project Finance ■ Structured Export Finance ■ Leasing for Renewables ■ Debt Capital Market MM Investments Structured Deposits <ul style="list-style-type: none"> ■ Fixed Rate Bonds ■ Floating Rate Notes Counterparty Trading <ul style="list-style-type: none"> ■ via Brokers OTC Trading <ul style="list-style-type: none"> ■ incl. CDS to manage Counterparty Risk Acquisition of Trading Assets <ul style="list-style-type: none"> ■ Upstream ■ Midstream ■ Downstream ■ Storage ■ Transmission for Oil, Gas, Coal, Energy, Freight



DB operates as 1 of the Top 2 Energy Clearing Banks



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Energieversorgung für Deutschland

Statusbericht^(a) für den Energiegipfel 3. April 2006

-1-

First Pass Review ...

- Wholesale energy prices in Europe have developed differently since 1998; Germany now ranks No 4, while Finland remains the country with the lowest cost of energy and Great Britain has turned into the one with the highest:

Country	Ranking 1998	Ranking 2006	Increase Energy Cost
Finland	1	1	+ 50%
Spain	3	2	+ 0%
France	2	3	+ 40%
Germany	6	4	+ 20%
Switzerland	7	5	- 10%
Italy	5	6	+ 60%
Great Britain	3	7	+ 90%

- Production Cost for Energy displays a wide distribution with lignite and coal the cheapest and renewable Energy the most expensive, however showing a strong profitability improvement for the latter:
 - Lignite & Coal Power Production 2,9 – 3,8 Cent / kWh
 - Gas (LNG) Power Production 5,2 – 7,9 Cent / kWh
 - GuD Power Plants 5,4 – 7,3 Cent / kWh
 - Renewable Energy Production on average 9,5 Cent / kWh subsidies

(a) Bundesministerium für Wirtschaft u. Technologie; Bundeswirtschaftsministerium für Umwelt, Naturschutz und Reaktorsicherheit

Energieversorgung für Deutschland

Statusbericht^(a) für den Energiegipfel 3. April 2006

-2-

First Pass Review cont'd ...

- **Influence of Commodity Price Increases on the Energy Production Cost:**
100% increase of the commodity price translates into an x% increase of the Power Production Cost
 - Uranium 5 %
 - Coal 30 %
 - Gas 70 – 80 %
- **The vulnerability of Power Production from price volatility related to the Uranium commodity cost is 14 times less than compared to volatility in Gas Prices**
- **For retail customers the commodity price dependency is less than 25% for Power and 32% for Gas; major cost drivers are**
 - energy grid and gas pipeline tolling fees representing 35 (power) and 40 (gas) % of the retail price
 - taxes, and other governmental charges with 40% for power and 28% for gas

While for wholesale clients the commodity drives a major part of the energy cost, energy prices for retail clients are driven by at least 68% non commodity cost drivers.

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Energieversorgung für Deutschland

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-3-

Conclusions and Tasks

1. Energy Availability

Defining strategies on how to decrease dependency of importing oil and gas until 2030

2. Modernizing the Energy Production

Energy demand in Germany is expected to remain stable, no major increases expected; What will be the level of investments needed to cater for the replacement of nuclear power and outdated other power plants? What role will renewable energy production play in a balanced energy mix?

3. Energy- and Power Prices

It is expected that due to increasing demand of developing countries as well as governmental regulations energy prices will remain high. Enforcing competition, transparency of markets, economically sound set up of emission trading and increasingly higher capacity for renewable energy production are expected to smoothen future price increases and will help to remain competitive in Germany for both, wholesale and retail customers

4. Climate Protection

Global warming has to be stopped involving developed and developing countries; more research has to be done to search for technologies emitting less CO₂

5. Innovation and Technology

This is seen as a guarantor for less dependency of commodity imports and a base for higher exports

6. European and International Cooperation

Global commodity markets, international legal framework, and the European Markets demand at the same time a secure, economically sound, and environmentally acceptable international cooperation

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Leitlinien für eine moderne Energiepolitik

-1-

Statement of Ludwig Georg Braun, President of the German Industrie- und Handelskammertages
Press Conference March, 28th 2006

First Pass Review ...

How can we achieve a sustainable, affordable, and secure energy supply for both Mid- and Large Corporates in Germany? The findings are based on a questionnaire done by the German IHK with 1,100 participating companies:

- 1. Long term availability of energy supply needs investments into technology and powerplants;**
By latest end of 2006 the industry requests an energy concept as a basis for long term investments.
- 2. Higher competition on power and gas markets**
80% are convinced that within the power market there is not enough competition (for gas markets – 90%);
An improved efficiency within the grid infrastructure is regarded to be the most important factor to bring down energy prices, both for power and gas.
- 3. Let the market drive the Energy Mix**
Subsidies for lignite have to be stopped from 2015 onwards, however new technology research will need to be supported; installed nuclear power capacity in Germany is requested to be kept in operation until the forecasted lifetime has expired.
- 4. Energy research has to be intensified and to be kept open for all technologies**
Technological research has decreased by 60% compared to budgets in the 80ies (appr. 1 bill EUR); Investment has to be brought back to those levels increasing from 430 mio to 900 mio EUR.
- 5. Efficient use of energy within Mid- and Large Corporates in Germany**
The Germany IHK promotes the idea of in company workshops to share experiences and ideas on how to decrease the cost of energy.



Leitlinien für eine moderne Energiepolitik

-2-

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Press Conference March, 28th 2006

First Pass Review ...

- Corporates demand a much stronger involvement of the European Commission
- This includes a strategic Pan European Energy Policy to secure energy supply within the EU
- Within Europe corporates promote the idea of a better integration of energy grids
- The formation of „New“ Energy Conglomerates on an European level is seen to be important however needs to fulfill the requirements of the „Europäische Wettbewerbsbehörde“; At the same time protectionistic behaviour of some member states has to be avoided
- Energy price competition is strongly driven by taxes; the state driven energy price proportion has to be decreased and harmonized throughout Europe



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