Is there sufficient finance to cover energy sector investments? Globally? In the economies in transition? If not, what close-gap measures have been taken? What are the consequences of failure to invest? Would such consequences warrant remedial policies? If so, which?

These are the questions addressed in the present paper.

1 THE FACTS:
ENERGY INVESTMENTS AND FINANCING POSSIBILITIES

1.1 Global energy sector capital requirements

The differences between the two studies are more pronounced for the year 2020: US$ 746-822 and 1207-2118 bill. respectively. This is primarily due to different assumptions concerning the rate of decline of energy intensities.

Be that as it may: energy sector investment needs are and will remain huge in absolute terms, and in any case “on the lower side” as they ignore investments in energy-efficient end-use.

In relative terms, the numbers are less intimidating: the WEC/IWASA Study projected energy investments to decline to 2 to 3% of world GDP, whereas the more recent WEC Study assumes investment requirements to remain at about the same level as in the past, at least until 2020, that is 3 - 4% of world GDP.

1 WEC/IWASA, Global Energy Perspectives to 2050 and Beyond, London, 1995, table 6-1
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1.2 Global financing possibilities

Are, say US$ 500 - 600 billion or even 1200 - 2100 billion, available every year for energy investments? The answer depends on world capital formation. World savings ratios are high (on average 22% of world GDP) and constant. Even in the economies in transition which are passing through a severe recession, the savings ratio attains 20%.

Table 1: Annual capital formation, 1990-2020, Case B “Middle Course”

<table>
<thead>
<tr>
<th>Region</th>
<th>GDP bill $/year</th>
<th>Savings, % of GDP</th>
<th>Capital formation bill $/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>developing countries</td>
<td>10300</td>
<td>24</td>
<td>2480</td>
</tr>
<tr>
<td>reforming countries</td>
<td>1400</td>
<td>20</td>
<td>280</td>
</tr>
<tr>
<td>industrialized countries</td>
<td>28600</td>
<td>20.5</td>
<td>5860</td>
</tr>
<tr>
<td>world</td>
<td>40300</td>
<td>22</td>
<td>8620</td>
</tr>
</tbody>
</table>

Source: WEC/IIASA, op. cit., for GDP: annex, for savings: p. 71

Comparing the global savings ratio of 22% with world energy investment needs of 3 to 4% of GDP suggests that, at the world level at least, capital availability is not a problem. World capital formation could “cover” investment needs of US$ 500 - 600 16 times. Regarding the various regions and countries, discrepancies between needs and financing possibilities may occur but would not really matter provided these regions and countries were integrated into the world capital market.

Surely, the energy sector will have to compete for available finance with other and, as a rule, better rewarded projects. But in the past, public finance compensated for this handicap. For example, the share of public capital in energy sector finance had exceeded 80% in the developing countries and had even reached 100% in the former socialist countries.

Neither is the international availability of capital a problem. In 1996, US$ 350 billion of foreign direct investments (FDI) sought a rewarding placement worldwide. This is 4% of world capital formation, - a number on the increase. But there are limitations:

- the bulk (US$ 200 billion or 64%) was invested in industrialized countries
- only US$ 13 billion or 4% was directed towards economies in transition (all sectors)
- only US$ 16 billion or 5% found its way into energy projects world-wide

It follows, that international finance can make a sizable contribution, but cannot substitute for domestic capital.

1.3 Regional balance between capital formation and energy investment needs

Again, there should be no problem of capital availability at the regional level. Table 2 shows that the ratio of regional energy investments to regional capital formation is low in the industrialized countries and “manageable” in the developing countries.

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3 UN, World Investment Report 1996, p. xiv and annex table 1
4 WEC: Financing ..., op. cit. p. 1, WEC/IIASA, Global ..., op. cit. table 6-1
"CAPITAL IS AVAILABLE"

**THE DEMAND SIDE**

World energy sector investment "needs": 500-600 bill. $ p.a.

or 3 - 4 % of GDP

Regional breakdown:
- Developing countries: 42 %
- Reforming countries: 21 %
- Industrialized countries: 36 %

**THE SUPPLY SIDE**


Energy investments: 6 - 7 %

Regional breakdown:
- Developing countries: 9 - 11 %
- Reforming countries: 32 - 49 %
- Industrialized countries: 3 - 4 %
However, in the economies in transition the share of capital formation potentially absorbed by investments in the energy sector is comparatively high. This was already so in the past. As a result of the recent recession, the underlying bias in favour of capital-intensive, supply-side investments had not been, and could not be, removed. Also as in the past, this high share can be attributed to investments in export-oriented extraction, conversion and transportation. As a result, there is perhaps not a algebraic but a practical limitation for the energy economy of this region to access its own capital markets to the full extent of its investment needs. But it does not need to do so, as it can access international capital markets particularly for investments in exportable energy.

Table 2: Regional capital formation and energy sector investment needs

<table>
<thead>
<tr>
<th>Regions</th>
<th>Energy sector investment needs bill. US$</th>
<th>Energy sector investments in % of capital formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries</td>
<td>220-240</td>
<td>9-11</td>
</tr>
<tr>
<td>Reforming countries</td>
<td>90-140*</td>
<td>32-49</td>
</tr>
<tr>
<td>Industrial countries</td>
<td>180-220</td>
<td>3-4</td>
</tr>
<tr>
<td>World</td>
<td>500-600</td>
<td>6-7</td>
</tr>
</tbody>
</table>

Note: long-term averages, rounded off. * WEC, Financing..., p. 81

Actual investments can of course be lower than projected ones, if the viability of energy projects is constrained as is often the case in the developing and reforming countries. In the latter, the difference between long-term “needs” (US$ 89 - 138 bill. p. a.) and present, actual finance (US$ 12 bill.) is significant. The “gap” is almost 90%. The gap is

- desperately big in countries with delayed deregulation and restructuring; for energy-poor CIS countries; for coal; and for small projects in the multi-million dollar range
- manageable for selected electric power projects in the several hundred million dollar range but too big to tackle the modernization of the entire industry
- small in countries that are advanced on the road to systemic reform and economic revival; for oil and gas; and for export-oriented projects in the multi-billion dollar range

The explanation: on the one hand the need to practically modernize the entire energy systems, and on the other severely constrained balance-sheet finance, budgetary allocations and domestic capital markets.

2 THE ISSUE: MOBILISING FINANCE IN A GIVEN CIRCUMSTANCE

If availability of capital is not the limiting factor, what then is the issue? The issue essentially consists of mobilising potentially available finance in a given circumstance.

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2.5 Conditions for mobilising finance
The good news first: in many a case, typically in the industrialized countries and growingly in Latin America and other emerging markets, there are no unsurmountable problems in mobilising finance for a particular project:
- either the investor judges the risk/return ratio of the project comparable with competing projects in other sectors or locations, or
- any handicap or residual risk is covered by public funding or a government guarantee.

This is not to suggest that even under favourable circumstances potential borrowers, lenders and risk insurers do not battle hard to agree on risk/reward sharing. Nor is it suggested that new risks need not be watched for even in the industrialized countries. Cases in point are stranded costs resulting from deregulation, and reluctance of investors to commit themselves in long-term capital-intensive projects (nuclear, hydro). However, regulators (in the first case) and capital markets (in the second) are at hand to address the issue.

2.2 Obstacles: the case of the economies in transition
The picture is qualitatively (and not just gradually) different if any of the two conditions mentioned above is not met. This is the case of many developing and most reforming countries.

In the economies in transition, the issue is not that some or all risks are high, but that the rewards do not match risks even bearing in mind the low degree of indebtedness of energy corporations. Moreover and growingly, the reforming states are unable or unwilling to compensate for risks by offering public funding or guarantees.

The resulting obstacles are depicted in the Text Box. As will be noted, most of these obstacles can be traced back to delays of market reforms in the energy and capital markets. Sure, much has already been achieved in terms of macro-economic, budgetary, fiscal, foreign trade and monetary reform. Fact, though, is that the energy sector rather than serving as a locomotive for reform, still serves as a buffer to soften the social, regional and industrial consequences of macro-economic reform. At the same time, governments are ever more reluctant (for monetary and budgetary reasons) to secure finance or guarantees. Hence, the rather lengthy list of obstacles to mobilising domestic or foreign finance.

Hence also, and by necessity, a long list of unwanted implications: continued subsidization of the un-needy; delays in profitability, efficiency, environmental acceptability, nuclear and occupational safety; weakening of the competitive position of energy-intensive exporters on world markets; non-compliance with international agreements such as the Energy Charter Treaty.

3 THE SOLUTION:
FROM AD HOC CLOSE-GAP MEASURES TO SYSTEMIC REFORM

Focussing in the following on the economies in transition, what are the solutions? The answer is of no surprise: to proceed with market-oriented reforms of the energy and capital markets, to overcome the obstacles. And, pending implementation, to de-emphasize present ad hoc close-gap measures.
It is with a great deal of modesty that proponents of market liberalization ought to look at the ad hoc measures developed in the economies in transition, and particularly in the CIS, in order to close the most urgent gaps in financing energy investments. In essence, the policy consisted of categorising financing demands into four groups, to attach priorities to them and determine access to international and domestic capital according to these priorities. Table 3 shows recent related international capital inflow, which are assumed to be doubled by domestic resources.

**Text Box:**

**Obstacles to financing: the case of the economies in transition**

- lack of profitability:
  - regulated (low) gas/electricity tariffs
  - unpaid bills
  - supply obligations
  - inefficiency of operations
  - cross-subsidies in favour of households
  - cross-subsidies in favour of unprofitable facilities
- mass privatization rather than equity privatization
- uncertain assets and liabilities of the potential borrower:
  - lack of international comparability of accounts
  - undetermined environmental liabilities
- frequent and unpredictable changes of tax regimes
- unfavourable depreciation regimes
- uncertain law enforcement in case of disputes
- ineffective domestic capital markets:
  - small volumes, hence volatility
  - short-term orientation
  - capital flight
- discrimination of foreign investors/shareholders
  - prohibition of land ownership (property as security)
  - cap on foreign shareholding
  - restricted activity on stock exchange
  - no "national" treatment of competitors
- less: repatriation and currency risk

3.1 The high-priority, multi-billion dollar projects associated with exportable energy

For such megaprojects in the multi-billion $ range, favourable "island" conditions were designed to attract foreign and domestic capital. These included laws on production sharing, joint ventures, foreign direct investments; the grouping of banking and energy interests; or the provision of special securities ("State shares for loans").
Table 3: International finance for energy projects in reforming states

<table>
<thead>
<tr>
<th>financial instrument</th>
<th>US$ bill. p. a.</th>
<th>total = 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>foreign direct investments</td>
<td>3 - 4</td>
<td>67</td>
</tr>
<tr>
<td>bonds, loans</td>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td>multilateral credits</td>
<td>0.8 - 1</td>
<td>18</td>
</tr>
<tr>
<td>portfolio</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>multilateral grants</td>
<td>0.1</td>
<td>2</td>
</tr>
<tr>
<td>non-recourse finance</td>
<td>0.1</td>
<td>2</td>
</tr>
<tr>
<td>total</td>
<td>5.2</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: WEC, Financing..., op. cit. p. 87

This approach "worked". On average each year, it attracted an estimated US$ 3 - 4 bill. from foreign partners. Investments were directed to oil and gas extraction for exports. National control over the exploitation of natural resources was maintained. A disadvantage has to be seen, though: a strengthening of the monopolistic and oligopolistic market structures in oil and gas.

3.2 The medium-priority, several hundred million dollar programmes to restructure entire energy industries

Here, ad hoc measures included industry-wide investment funds administered by the respective national energy corporations, the placement of bonds and of general or American depository rights on foreign stock exchanges, the sale of minority stakes in energy companies to foreign strategic partners, mass privatization (of doubtful financial value), and restructuring loans from multilateral banks, such as the IBRD in the case of the coal and electricity industries.

Also this approach "worked". It attracted foreign capital of the order of US$ 1 - 1.5 bill. p. a. This inflow could have been easily doubled or tripled, had IPPs (independent power producers) been welcome.

3.3 The low-priority, multi-million dollar plant enhancement

This investment category did not enjoy the special attention of the higher policy echelons as their importance was local or otherwise limited. The fate of plant-specific investments depended on their own merit (as opposed to considerations of national interest) and on direct, bilateral negotiations between industry leaders and multilateral or commercial banks, foreign government agencies (for example in the case of “Activities Implemented Jointly” under the UN Framework Convention on Climate Change), foreign strategic partners and equipment manufacturers.

On average, perhaps US$ 0.5 bill. p. a. may have been attracted from foreign sources for this investment category, - a minor proportion of needs.

3.4 The no-priority majority of investment projects

The majority (almost 90 %) of long-term investment “needs” (Table 2) failed to attract finance, - for lack of economic viability, of “own” financial resources, of relevance from a “higher” viewpoint (export potential, safety, environment), or for lack of managerial initiative, skill and acquaintance with financial project engineering. Entire energy industries (coal, district heating) and entire (energy-poor) countries fall into this group, such as Moldova, Armenia, Georgia.
Not only did those not have the means of maintaining their energy systems operational, but did they have to divest themselves of assets (gas pipelines, power plants, storage facilities) in order to pay for fuel imports and spare parts (equity-for-debt swaps).

However laudable the imagination with which economies in transition have financed the most pressing investment needs in their energy economies, it is evident that top-down prioritization is not a long-term substitute for resource allocation determined by markets. Only these allow the economic hard core of the energy sector to finance most of its investment needs from its own resources, and to attract supplementary external finance.

The experience so far gained in the more advanced reforming countries - Hungary, Poland, the Czech Republic - corroborates the message that investment financing becomes easier in deregulated or deregulating markets (oil, electricity), but remains difficult in markets where progress is slow (coal, district heating).

4 THE POLICY MESSAGE: CONCLUSIONS AND RECOMMENDATIONS

Policy makers will note from the above, that availability of capital does not impede the financing of energy projects worldwide. The issue could be its mobilisation in a given circumstance. They will also note that in most industrialized and, growingly, developing countries and emerging markets, financing is not a general policy issue. However, a serious policy issue emerges when projects are not appealing to private investors on their own merit and when this handicap is not compensated for by governments. Contrary to the past, at present governments the world over are increasingly reluctant or unable to commit public funds or offer guarantees for energy projects.

In response, a number of countries opted for deregulation and privatization. In the economies in transition and pending the implementation of deregulation, policy makers designed close-gap measures to finance “priority” projects with the double proviso to maintain state control but not to involve the state directly. These measures have been effective in the sense that they attracted domestic and foreign finance. However, they usually carried a bias in favour of large-scale, centralized, supply projects and related monopolistic and oligopolistic market structures. Because of these and other handicaps, close-gap measures cannot serve as a lasting substitute for markets that enable project financing on the basis of “objective” risk/return ratios.

Under such circumstances, the challenge before policy makers is to enable legislative, institutional and regulatory frameworks which render capital and energy markets compatible with world markets and the requirements of “sustainable” development, thereby rendering deserving energy projects financially attractive on their own merit.

This implies in particular: liberalization of energy prices and tariffs, phasing-out of subsidies and
cross-subsidies; stabilization of tax and depreciation regimes; neutrality with regard to ownership, including equity privatization of energy enterprises if otherwise finance cannot be obtained; reliable law enforcement; non-discrimination of foreign investors/shareholders/competitors; ratification of international instruments such as the Energy Charter Treaty; strengthening and international integration of domestic capital markets; and generally, regulatory mechanisms that address market imperfections (such as market power and lack of information) and new risks (such as stranded investments).

There is also a policy message for the energy businesses, national and international, to build the necessary knowledge base and skills: ratings, syndication, drawing rights, project engineering, collaterals ... are not just terms, but key to operate successfully on financial markets.

The reward justifies the effort: experience elsewhere, including by the more advanced reforming states demonstrates the strong relationship indeed interdependence, between market reform and mobilization of finance for energy sector investments.