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**FINANCIAL PERFORMANCE OF THE  
ARMENIAN POWER SECTOR  
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TASK ORDER 13**

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# FINANCIAL PERFORMANCE OF THE ARMENIAN POWER SECTOR

## I. INTRODUCTION

This report addresses recent developments in the reform of the Armenian power market funds administration and highlights Hagler Bailly's recommendations for the near-term steps required to improve the transparency and fairness of market funds distribution.

The payment for electric power sales in the Armenian power sector at the time of the breakup of the former Soviet Union was very low. Armenergo was the government agency responsible for all facets of the power sector and was largely subsidized by the budget due to the shortfall in electric payments.

By the summer of 1997, the generators and distribution companies were divested from Armenergo as a conditionality of receiving World Bank loans. The Ministry of Energy (MoE) was created as the coordinator of state-owned shares in the power sector. Even though the assets for the generation and distribution companies were separated in to stock companies, Armenergo still retained many functions within the power sector such as fuel purchasing. The chart in Appendix A represents the flow of funds under the current structure of the Armenian power sector.

In previous years, the distribution companies claimed that cash collection was very low and there were no funds to provide for bulk supply services (generation, transmission, dispatch). Barter arrangements were declared illegal but certain offsets (such as for fuel purchases, taxes, equipment purchases) were still allowed.

To provide transparency in the cash collection and to provide the generators with some compensation for their services, a transit and clearing account system was created. Each retail customer would pay their monthly electric payment into a bank account or pay to the local post office. The local bank or post office would then transfer the funds to a regional bank, that in turn would send the cash to Armenergo. Armenergo would then allocate the cash to the enterprises in the power sector including itself. Offsets would be handled through Armenergo since Armenergo was coordinating fuel purchases from Russia (see Appendix A).

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## II. CREATION OF FUNDS ADMINISTRATION PROCEDURES

In mid-1999, the Ministry of Energy decided a change was needed in the transit account process. The MoE proposed a system of settlement allocations. Each month, the

settlement allocations would be developed by a committee of representatives from the power sector entities.

The MoE proposal included the following:

- Customers would pay into local banks or post offices as they always did;
- The local banks or post offices would transfer the cash to a regional bank with a bank account under the name of the distribution company;
- The regional bank, acting as a funds administrator, would send cash to the distribution company according to the prescribed monthly allocation;
- The regional bank would send the rest of the cash to the Energobank of the Ministry of Energy. The Energobank, acting as a funds administrator, would allocate the funds according to the settlement allocations as prescribed by the committee.
- Offsets would still be used for meeting some of the shortfalls from cash payments.

The committee met two months in a row, but it is our understanding that it has not met for several months.

### III. DATA COLLECTION AND VERIFICATION

The information provided in this report originated from several sources within the power sector including the Ministry of Energy. We conclude from our analysis of the financial data that:

- Data is consistently late in being provided even though the Ministry of Energy obtains the power sector statistics many months earlier;
- Data is not presented clearly and specifically;
- Key data is normally missing, though the type of key data missing is not always the same from one period of reporting to another;
- Data is sometimes inconsistent when two sources of the information are provided; and,
- Data is often illogical.

Transparent and clear funds administration procedures are badly needed in the power sector. We have provided summaries of our research of financial data in this report. The results of our study implies that there has been significant improvements in the power sector relating to cash collection and payments of debts. It is not clear, however, if there has been a significant change in payments or if the developers of the data have decided to report the data differently.

### IV. PAYMENTS BY THERMAL PLANTS TO GAS SUPPLIERS

The Yerevan Thermal Power Plant ("TPP") current debt (reflected in its accounting books) is about 11 billion drams (\$20.3 million), nearly all debt being for gas purchases from Russia. The need for Armenergot to act as a "middle man" in gas contracting is very unclear (see Appendix B). The presence of such an intermediary complicates the flow of payments for both gas received and energy sold. According to Yerevan TPP, Armenergo

is often late in paying for gas that the TPP receives for its operation. It is recommended that some consideration be given to power plant direct purchase of gas in order to instill accountability for over 90% of production cost and efficiency in fuel use.

The process of providing fuel supply to power plants is very complicated and financially unreliable. The diagram in Appendix B represents the typical schematic for fuel/energy transfers. Fuel expense is basically accounted for as a pass-through in the TPP's books, but, in reality, this treatment does not accurately characterize the actual transaction. According to data reported in the MoE annual report, all the gas consumed by Hrazdan and Yerevan power plants is paid through non-cash means (see chart #1 in Appendix C)<sup>1</sup>. Also, it should be noted that severe non-payments exists from the consumers of thermal energy (steam and hot water) to thermal power plants.

Appendix C presents an analysis of payment practices by thermal power plants to gas suppliers for three quarters of 1999. The payment Ratio (PR) that was calculated as the ratio of total bill and actual total payments indicates a decrease in payments from Armenergo to thermal power plants and from thermal power plants to gas suppliers. The comparison of the two charts below shows that the funds administration procedures changed during the 3<sup>rd</sup> quarter of 1999. It is not clear how the thermal power plants paid more to gas suppliers by the 3<sup>rd</sup> quarter of 1999 (apprx. 24.5 bln. AMD) than they received from Armenergo (apprx. 22.5 bln. AMD).

The gas quantities received by the thermal power plants and the resulting amount of energy generated is currently different than historical trend. The 1994-98 specific fuel consumption (heat rate) has increased by an average of 8% as compared to 1993 at Hrazdan TPP. The value is high, even considering the aging of generation equipment and the extreme operational schedules that occurred during the fuel blockade years.

The fuel consumption and energy generated calculations are based on the questionable heat rate figures. A precise set of volume meters needs to be installed at each unit on the thermal power plants to measure accurately the consumption of gas. Gas quality checks should also be enhanced at the power plants. There is no system to ensure that gas purchased by Armenergo is actually delivered to the plants at the quantity and quality contracted for.

With regard to payments for nuclear fuel, the fuel cost is again accounted for as a pass-through on the books of the nuclear power plant, with Armenergo as an intermediary. Fuel bills are paid by the Government of Armenia for nuclear fuel purchased from Russia. All fuel related items are considered classified and are not available for review and analysis.

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<sup>1</sup> In the charts in Appedixes C and D: CPR stands for "Cash Payment Ratio", CNPR means "Cash Plus Non-Cash Payment Ratio" (i.e. total payments in total bill).

**V. PAYMENTS FROM ARMENERGO TO GENERATING ENTERPRISES**

The chart in Appendix D describes the payment chain and presents the flow of funds in the Armenian power sector in 1998 and during the first three quarters of 1999. The payments from Armenergo to each of the enterprises are described below.

1. Yerevan TPP:

The TPP's O&M budget is proposed by the power plant management and approved by the Ministry of Energy. In reality, funds that the power plant receives are significantly different from the requested and approved amounts. The exhibit below provides the comparison of approved and actual received amounts for the first eight months of 1999.

**Exhibit 1**

**Approved and Received 1999 O&M Budgets for Yerevan TPP (in million of drams)**

	January	February	March	April	May	June	July	August
Approved				163.8	106.6	140	75	103.1
Received	50	25	43	97	25	20	70	56
% Diff.				59.2%	23.6%	14.3%	93.3%	54.3%

Source: Yerevan TPP

2. Hrazdan TPP:

The TPP's 1998 O&M budget was 4.188 billion drams (\$ 7.7 million) of which only 1.5 billion drams (\$2.8 million) was paid by the MoE. Fuel costs are accounted for as a pass-through. The O&M budget is proposed by the power plant and approved by the Ministry of Energy. In reality, funds the power plant receives are significantly different from requested and approved amounts. The station management estimates that the TPP needs about \$20 million for the next five years in order to maintain and refurbish power plant.

3. Vorotan Cascade:

The cascade received only 40% of its allowed tariff revenue from the MoE for O&M and capital expenditures in 1999.

4. Sevan-Hrazdan Cascade:

According to discussions with Cascade management, the Sevan-Hrazdan Cascade receives only about 30% of the budgeted funds.

5. Armenian Nuclear Power Plant (ANPP):

The ANPP's approved budget for operating expenses is about \$40 million per year. The power plant is receiving revenues of only about 50% of the energy it sells. The power

plant is also receiving a 20% credit through inter-governmental agreements for the purchase of spare parts from Russia.

## 6. Summary

The table below presents the payments from Armenergo to the generating companies based on data from the MoE annual report. The reported data is somewhat different from the information Hagler Bailly received during site visits to the generating companies. As indicated below, one group of generators is behind in receiving payment for the second year (Hrazdan TPP and Vоротan Cascade), while the Sevan-Hrazdan Cascade was overpaid in 1998, and remains to be overpaid at present (according to the MoE statistics). The significant decrease in payments to ANPP (3<sup>rd</sup> quarter of 1999 vs. 1998) should be also noted.

### Exhibit 2

#### Armenergo Payments to Generation Companies

	Amount paid by Armenergo, %, 1998	Amount paid by Armenergo, %, 2 <sup>nd</sup> quarter of 1999 (cumulative)	Amount paid by Armenergo, %, 3 <sup>rd</sup> quarter of 1999 (cumulative)
Yerevan TPP	63.90%	134.70%	129%
Hrazdan TPP	80.60%	84.40%	60%
ANPP	45.72%	not available	22%
Sevan-Hrazdan HPP	123.25%	138.71%	110%
Vоротan HPP	89.99%	43.58%	42%
Other HPPs	not available	42.06%	65%
Average payment	70.49%	-	53%

Source: ministry of Energy Annex 3 of Memorandum of Understanding

Summarizing the results of this analysis, that the practices of funds distribution between the Armenergo and generating companies are not clear. It should be clarified why Armenergo paid to generating companies only 29,773 mln. AMD (53%), while Armenergo had enough funds to pay more for purchased energy (Armenergo received from the distribution companies 40,353 mln. AMD (see chart #2 in the Appendix D for more detail).

## VI. CASH FLOWS FROM DISTRIBUTION COMPANIES TO ARMENERGO

The highest cash payment was made by the Yerevan and South Distribution Company for year 1998 and for the 2<sup>nd</sup> and 3<sup>rd</sup> quarters of 1999. The payments of the other two DISCOs (North and Center) are quite poor.

The average of cash and non-cash payments to Armenergo for electricity billed to the distribution companies decreased from almost 100% in the 2<sup>nd</sup> quarter of 1999 to 77% by the 3<sup>rd</sup> quarter of 1999.

As have mentioned above, the information reported by the Ministry of Energy is illogical. During the calculations of payment ratios some discrepancies in payment statistics reported for South Distribution Company were noted. According to the reported statistics, the cumulative total payment by the South Distribution Company to Armenergo through the 3<sup>rd</sup> quarter of 1999 is less (12,645 mln. AMD) than total payment made by South Distribution Company to Armenergo through the first half of 1999 (14,171 mln. AMD). This information should be clarified.

### Exhibit 3

#### Dynamics of Payments by the Distribution Companies to Armenergo (total payments in total bill)

Distribution Company	1998	2 <sup>nd</sup> quarter of 1999	3 <sup>rd</sup> quarter of 1999
Yerevan Distribution Company	75%	86%	84%
North Distribution Company	54%	44%	41%
Center Distribution Company	49%	75%	60%
South Distribution Company	71%	174%	102%
<b>Total payments</b>	<b>65%</b>	<b>97%</b>	<b>77%</b>

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

## VII. CASH FLOWS FROM RETAIL CUSTOMERS TO THE DISTRIBUTION COMPANIES

The two exhibits below present the comparison of payments by retail customers to distribution companies for three periods: 1998, 2<sup>nd</sup> quarter of 1999 and 3<sup>rd</sup> quarter of 1999. A decrease in payments by end-use customers to all distribution companies (see table below for details) has resulted in overall deterioration of average payment ratio by end-use customers from 113% in the 2<sup>nd</sup> quarter of 1999 to 83% in the 3<sup>rd</sup> quarter of 1999.

## Exhibit 4

Payments by Retail Customers to the Distribution Companies (absolute numbers)  
(mln. AMD).

Distribution Company	1998		2 <sup>nd</sup> quarter of 1999		3 <sup>rd</sup> quarter of 1999	
	Billings	Payments	Billings	Payments	Billings	Payments
Yerevan EN	30,164	27,311	16,480	16,222	23,062	21,729
North EN	9,163	8,146	4,703	3,754	6,843	5,080
Center EN	16,039	13,089	9,320	8,920	14,143	9,309
South EN	17,463	14,631	8,957	15,537	14,270	12,422 <sup>3</sup>
<b>Total</b>	<b>72,829</b>	<b>63,176</b>	<b>39,460</b>	<b>44,432</b>	<b>58,318</b>	<b>48,540</b>

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

## Exhibit 5

## Payments by Retail Customers to Distribution Companies (percentage)

Distribution Company	1998	2 <sup>nd</sup> quarter of 1999	3 <sup>rd</sup> quarter of 1999
Yerevan	91%	98%	94%
North	89%	80%	74%
Center	82%	96%	66%
South	84%	173%	87%
<b>Total</b>	<b>87%</b>	<b>113%</b>	<b>83%</b>

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

Since the differentiated statistics on cash and non-cash receivables was not provided in the Annex 3 of MoU for the 3<sup>rd</sup> quarter of 1999, the detailed analysis of cash collections versus non-cash receivables cannot be conducted.

In the two tables below payments by end-use customer groups are classified to reveal the reasons for changes in the cash flows from different groups of retail customers to the distribution companies for the three study periods. The payment ratios of residential and budget retail customers improved for the 3<sup>rd</sup> quarter of 1999 as compared to the 2<sup>nd</sup> quarter of 1999. An overall decrease of the payment ratio from 113% in the 2<sup>nd</sup> quarter of 1999 to 83% in the 3<sup>rd</sup> quarter of 1999 was caused by the sharp fall of payments by "others" retail customer group to the distribution companies.

**Exhibit 6**

**Payments Classified by Retail Customer Groups, Absolute Numbers,  
(mln. AMD)**

Customer Group	1998		2 <sup>nd</sup> quarter of 1999		3 <sup>rd</sup> quarter of 1999	
	billed	Paid	Billed	paid	Billed	paid
Residential	28,021	23,994	16,004	12,348	22,852	18,332
Budget	5,482	4,310	2,800	1,742	3,334	2,335
Other	39,326	34,872	20,657	30,343 <sup>3</sup>	32,132	27,873 <sup>3</sup>
Total	72,829	63,176	39,460	44,432	58,318	48,540

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

**Exhibit 7**

**Payments Classified by Retail Customer Groups, (percentage)**

Customer Group	1998	2 <sup>nd</sup> quarter of 1999	3 <sup>rd</sup> quarter of 1999
Residential	86%	77%	80%
Budget	79%	62%	70%
Other	89%	147%	87%
Total	87%	113%	83%

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

Up to the 3<sup>rd</sup> quarter of 1999 the difference between the accounts receivable and accounts payable for the distribution sub-sector was remarkably low. The reason for this is the distribution companies are obliged to pay for bulk supply purchases that satisfy both billed energy and energy for commercial losses. In the 3<sup>rd</sup> quarter of 1999 the situation has changed as shown in exhibit 8.

**Exhibit 8**

**Accounts Payable and Receivable of the Distribution Sub-Sector,  
(mln. AMD)**

Period	Distribution companies payables	distribution companies receivables	Delta
1998	72, 829	74, 714	1, 885
2 <sup>nd</sup> quarter of 1999	38, 074	39, 460	1, 386
3 <sup>rd</sup> quarter of 1999	52, 269	58, 318	6, 049

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

The sharp increase in receivables compared to payables in the distribution sector was caused by regulatory changes introduced by the Energy Regulatory Commission. While retail rates were not reduced at that time, the bulk supply tariff for the distribution

companies was decreased and thus provided a higher margin for the distribution companies.

Chart #2 in Appendix D shows that the distribution sub-sector accumulates a large portion of the funds circulating in the power sector for their own operations. As it is shown on the chart, by the 3<sup>rd</sup> quarter of 1999 the distribution companies received from retail customers 48, 540 mln. AMD and transferred 40, 353 mln. AMD to Armenergo. Thus, the actual margin of the distribution companies amounted to 8, 187 mln. AMD, while it should not exceed 6, 049 mln. AMD.

### VIII. COMMERCIAL LOSSES AND NON-PAYMENT

The energy sector of Armenia encounters two major problems similar to the problems of other countries of the former Soviet Union: commercial losses and non-payments, which affect the amount of cash circulating within the power sector.

An analysis of the total losses in the distribution subsector of Armenia for 1998 is shown below. The analysis encompasses both commercial losses (non-billed energy) and non-payments (bad debt) in terms of lost revenues to the Government of Armenia (as the share owner of the energy companies at present).

#### Exhibit 9

#### Potential vs. Actual Revenues of the Power Sector

Indicator	Energy Sector, (mln. USD)	Yerevan + North Distribution Companies, (mln. USD)	Center+ South Distribution Companies, (mln. USD)
Potential revenues	150.05	80.25	69.81
Actual revenues	109.23	59.76	49.34
Shortfall in funds (Delta)	40.82	20.48	20.47
Potential VAT revenue	30.01	16.05	13.96
Actual VAT revenue	21.85	11.95	9.87
Shortfall in VAT (Delta)	8.16	4.10	4.09
Total Energy Sector Shortfall in Funds (Delta)	49.0	24.6	24.6

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

It should be noted that Yerevan and North distribution companies combined have the same amount of shortfall in funds as the combined Center and South distribution companies.

The summary table below reflects significant improvements in loss reduction, both on the transmission, and distribution levels.

**Exhibit 10**  
**Summary of Losses in Transmission and Distribution Sub-sectors**

Loss classification	1998 <sup>2</sup> , %	2 <sup>nd</sup> quarter of 1999 <sup>1</sup> , %	3 <sup>rd</sup> quarter of 1999 <sup>3</sup> , %
Total losses	33.1	26.8	24.6
Total transmission losses	7.7	5.9	5.8
Technical transmission losses	6	-	-
Commercial transmission losses	1.7	-	-
Total distribution losses	28.7	25.7	23.0
Technical distribution losses	15	15	12
Commercial distribution losses	13.7	10.69	11.01
Total technical losses	19.30	18.19	15.64
Total commercial losses	13.84	8.69	9.03

Source: Ministry of Energy Annex 3 of Memorandum of Understanding

## IX. AREAS OF CONCERN

Several areas of concern exist regarding the allocation of funds:

1. The payment procedure for the natural gas procurement process is very unclear. Hagler Bailly does not support the current status whereby Armenergo is the institution responsible for gas procurement. Thermal power plants should be allowed to procure and pay for the gas directly;
2. The reported information on the heat rates at the Hrazdan TPP should be verified;
3. One of the most important areas of concern is the reliability and consistency of data that the Ministry of Energy reports. The data needs independent verification through an audit process. Usually, the most important numbers are missing, which results in a distorted picture of payments;
4. The funds allocation procedures are not clear and reliable. In this regard the Armenergo's function the current market funds allocator should be reconsidered.

## X. RECOMMENDATIONS FOR IMPROVEMENT IN THE POWER MARKET FUNDS PROCESS

Hagler Bailly has developed several recommendations for improving the power market funds process. These recommendations were presented several times to various parties of the power sector and included:

1. An independent Funds Administrator should be retained to manage the flow of funds in the power sector (see Appendix E);

<sup>2</sup> Assuming 15% of technical distribution-level losses.

<sup>3</sup> Assuming 12% of technical distribution-level losses.

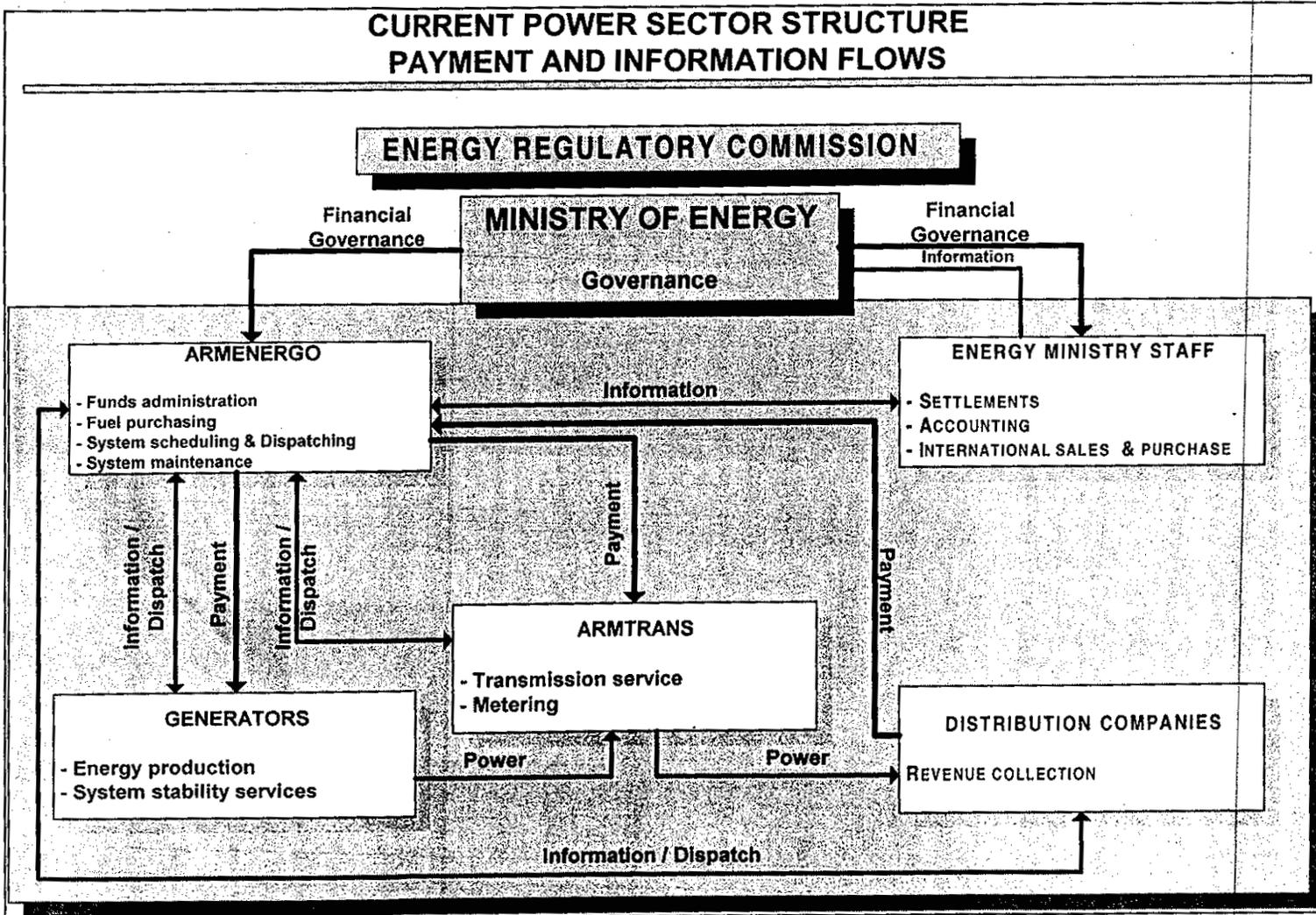
- Report on late payments and defaults.

Although Armenia has made considerable progress in improving collections overall, intra-sector transactions of financial resources still remain opaque and arbitrary, unless addressed properly by removing Armenergo from the funds administration function and codifying clear settlements the process can be expected to continue to be adversely affected. Given the pendency of privatization process, improvements in funds administration must remain a high priority.

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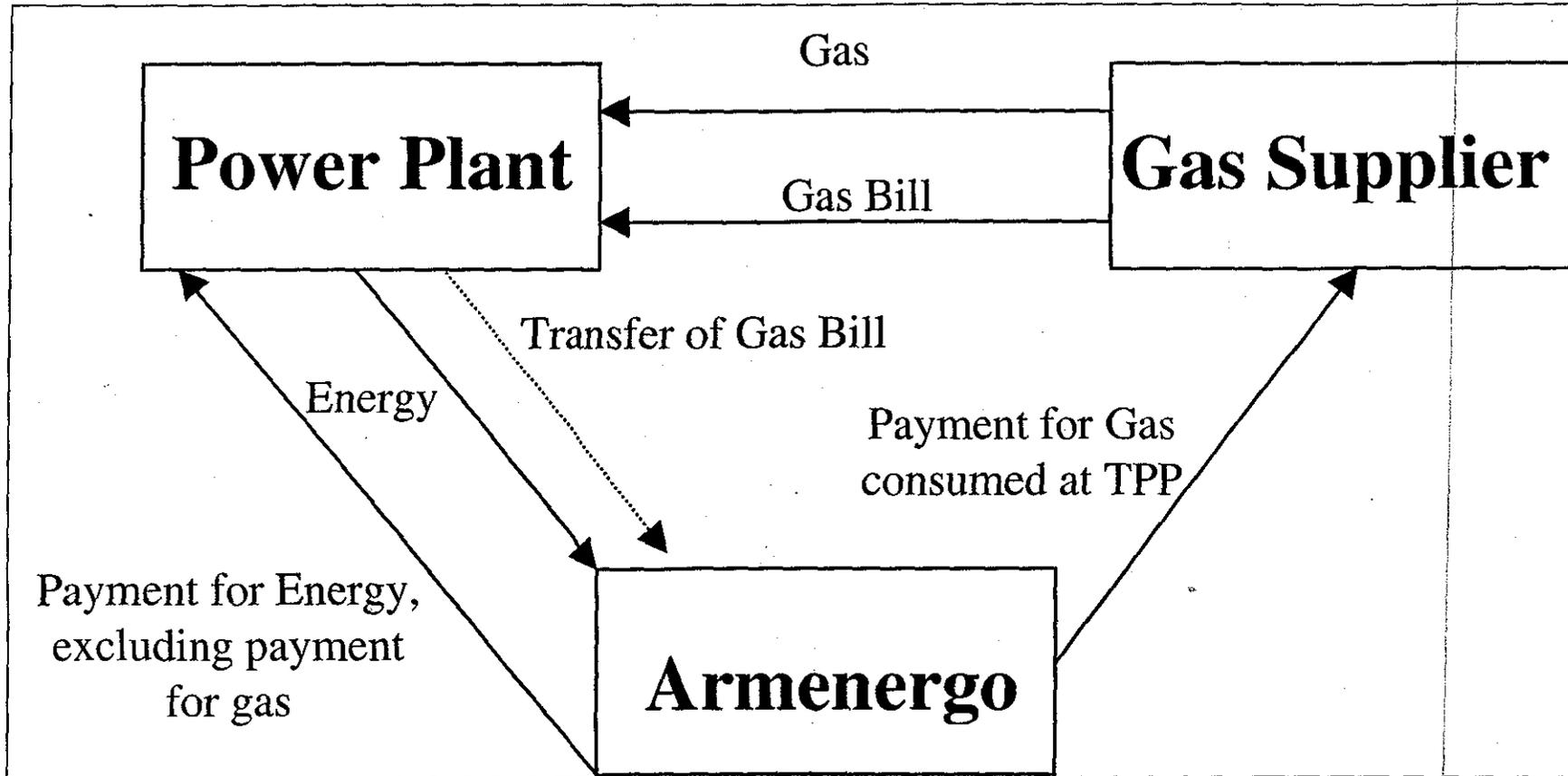
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APPENDIX A



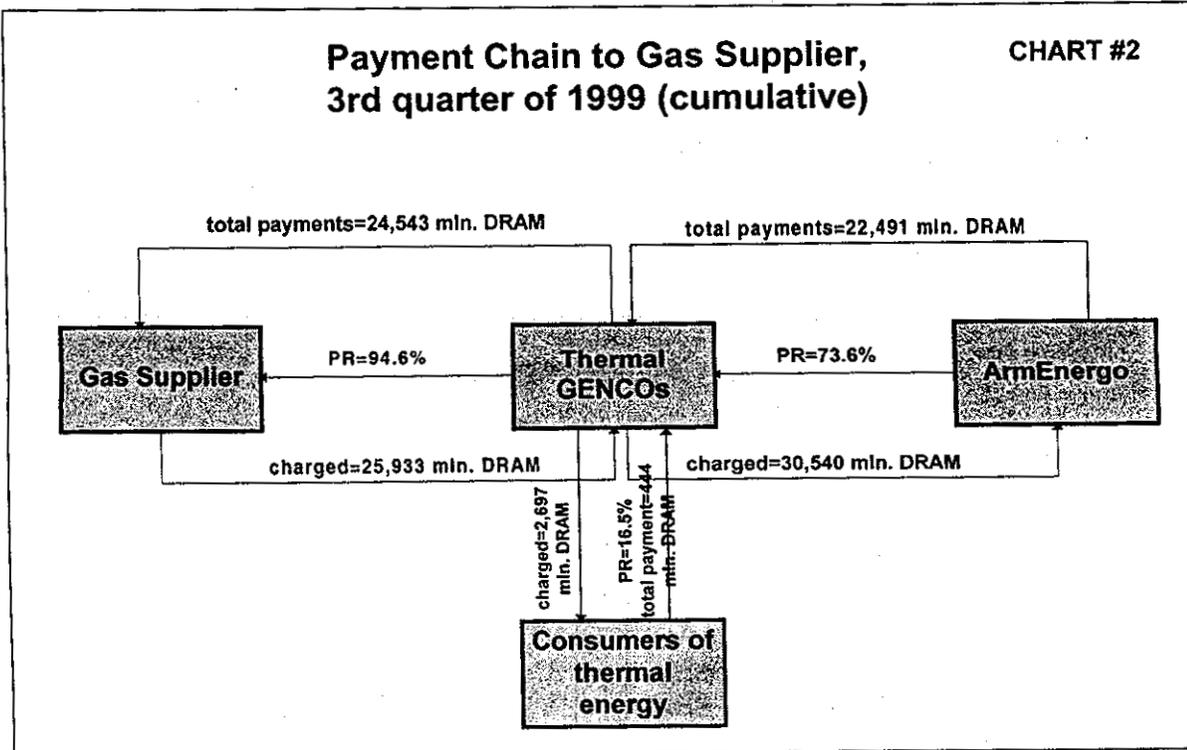
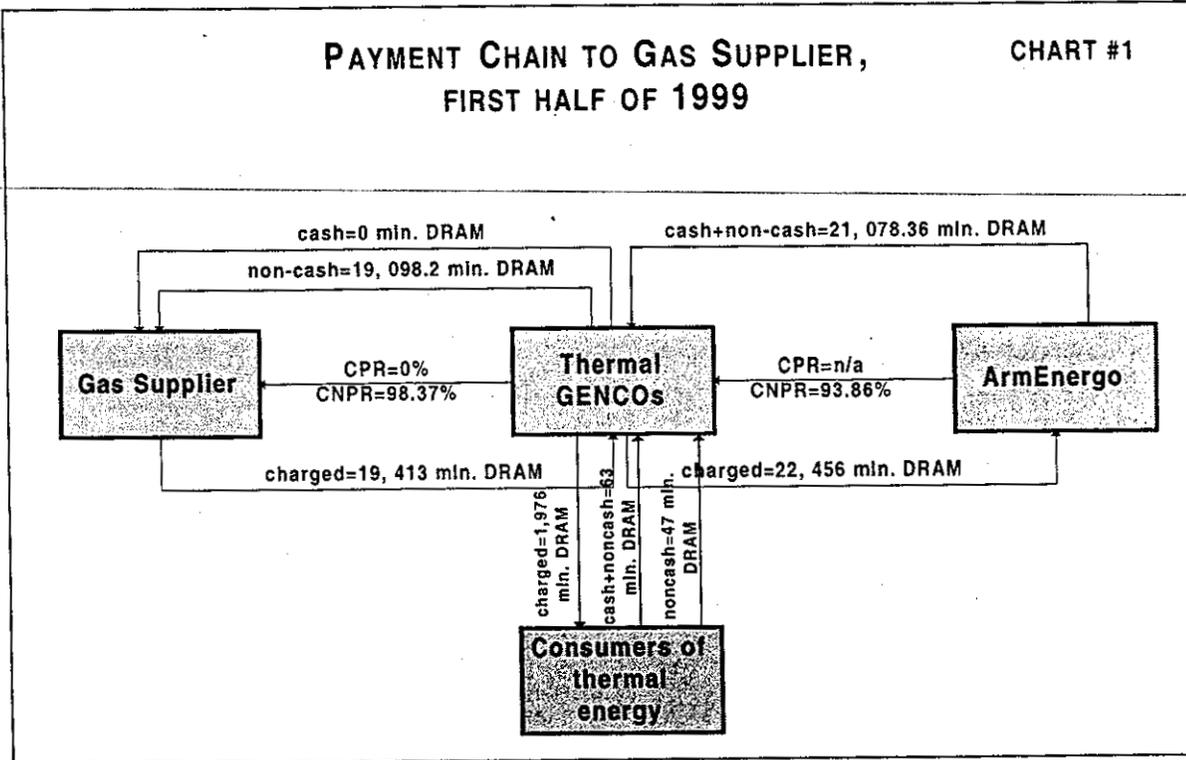
Source: Hagler Bailly

APPENDIX B



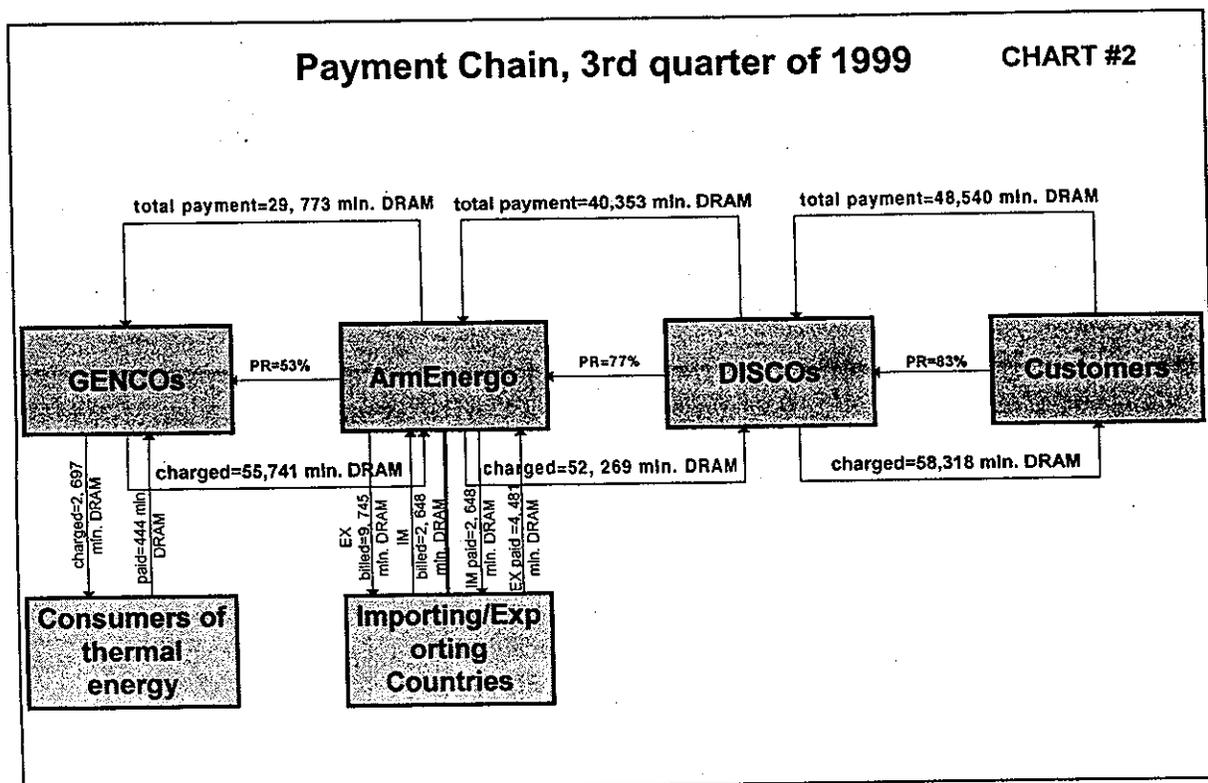
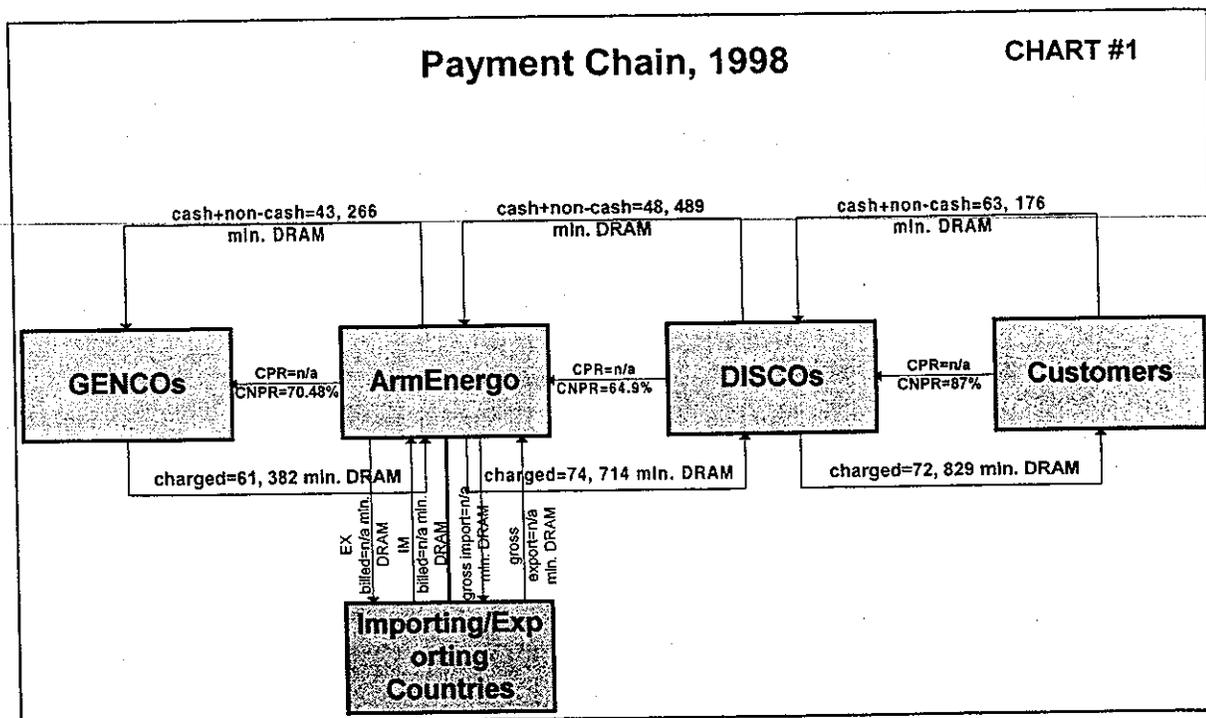
Source: Hagler Bailly, MoE

APPENDIX C



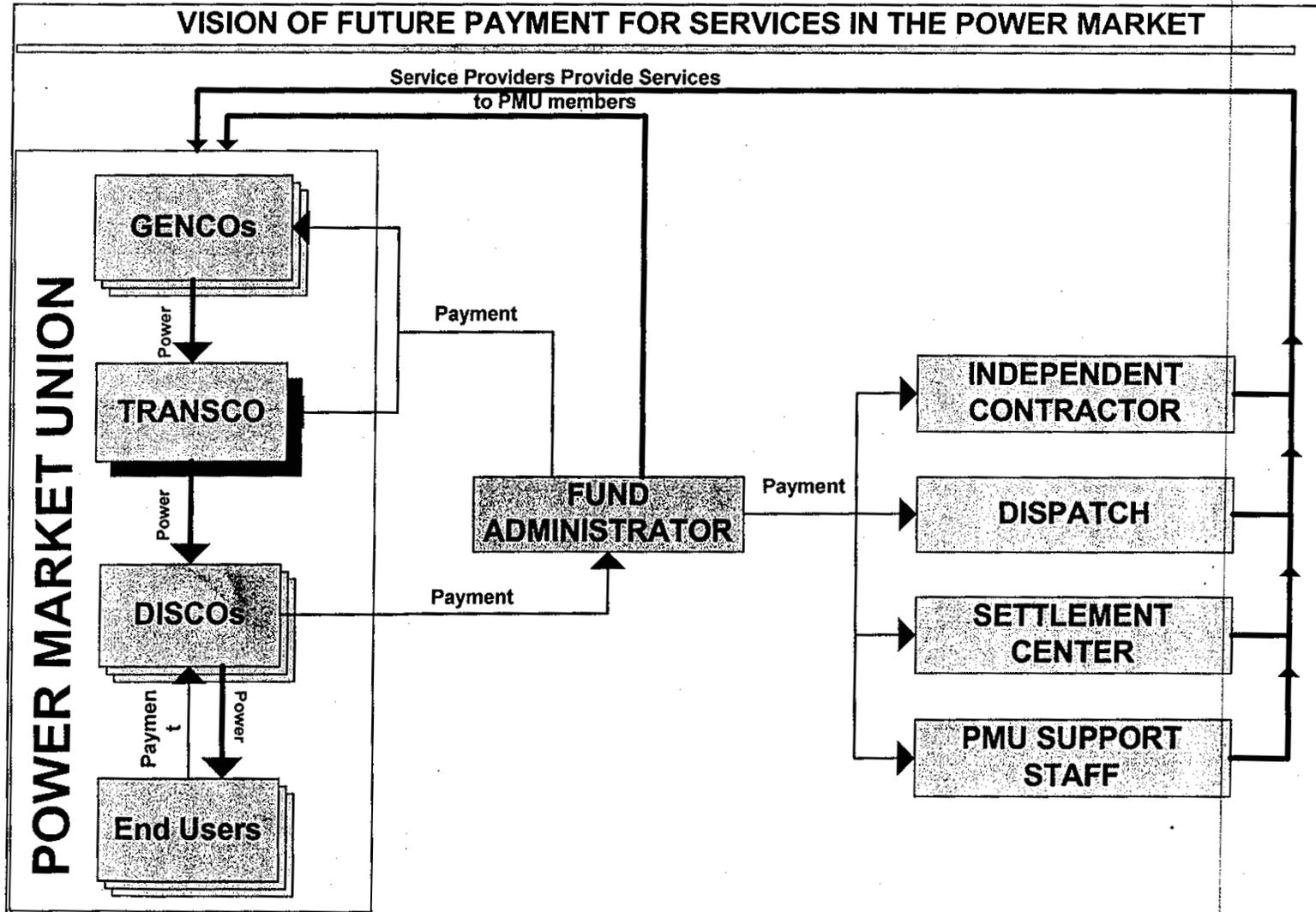
Source: Hagler Bailly, MoE

APPENDIX D



Source: Hagler Bailly, MoE

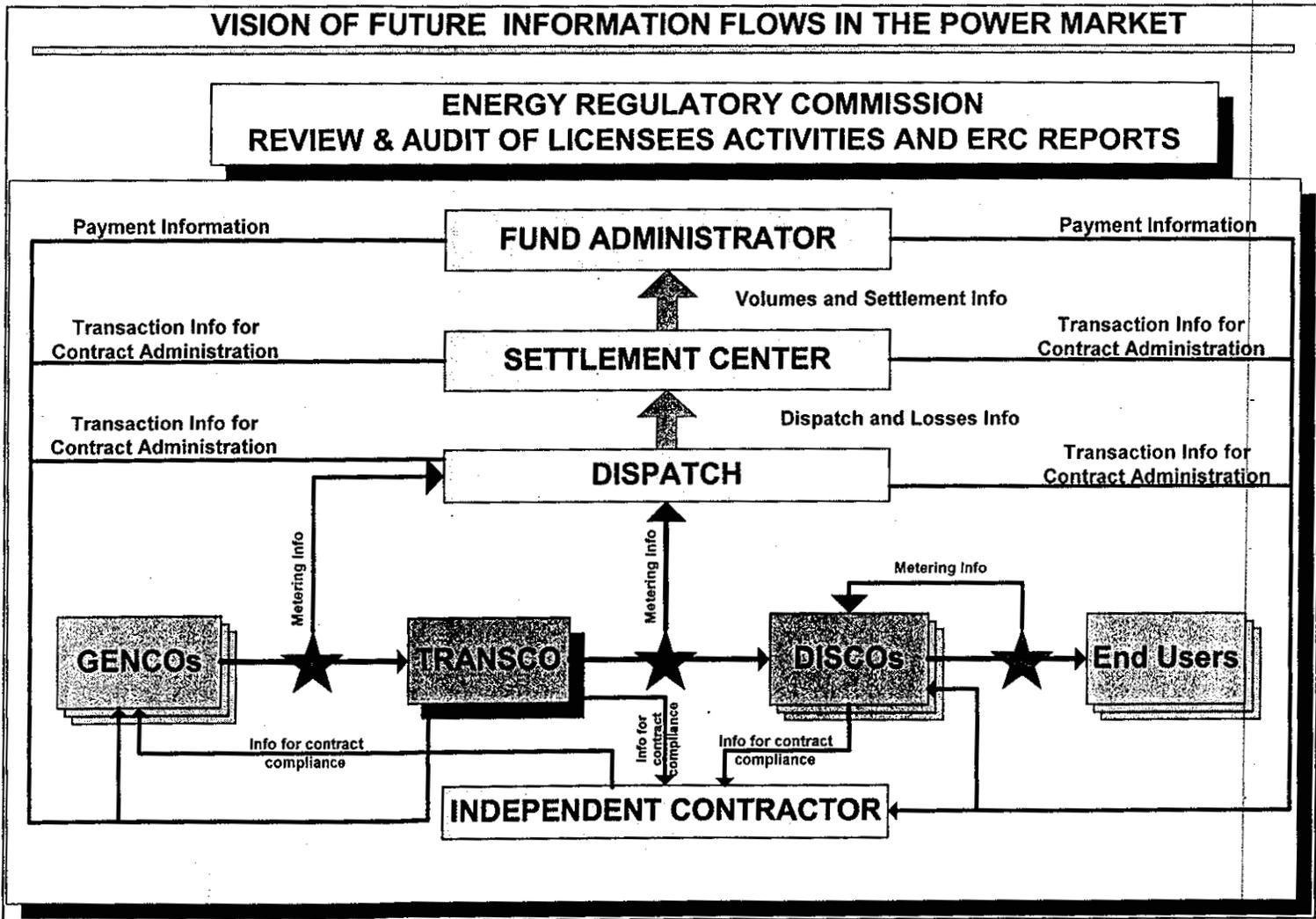
APPENDIX E



Source: Hagler Bailly

Hagler Bailly

APPENDIX F



Source: Hagler Bailly

Hagler Bailly