

**CAN ENERGY SERVICE COMPANIES INCREASE INVESTMENT IN ENERGY
EFFICIENT LIGHTING IN EASTERN EUROPE?:
the case of Hungary**

Ian Brown
Expert
Directorate-General XVII - Energy,
Commission of the European Communities
Budapest, Hungary

Abstract

There exists a significant potential for improved energy efficiency through the use of lighting technologies in Western Europe, yet the slow up-take of these cost effective technologies indicates that capital is not allocated to such cost effective investments. This problem is magnified in Eastern Europe - the shortage of capital imposes a severe restraint on the take up of efficient and highly cost effective lighting technologies.

Against this background, this paper examines the question of whether third-party finance provided by energy service companies can help to improve energy efficiency in lighting by providing both the capital and the technical knowledge necessary. The available data on electricity use for lighting is given, but the shortage of data (and question marks surrounding its reliability) are problems in Eastern Europe. The paper then discusses whether third party finance could be used for energy and lighting efficiency improvements in the public sector in Hungary, and the question of who could provide such third-party financing services. The ability of existing and potential lighting energy service companies is examined. In particular, the access to capital of such companies is commented on.

Finally the paper looks at the roles of different actors - banks, the European Community, and the Western energy service companies in encouraging the development of third-party finance for lighting efficiency in Hungary, making some (low-key) recommendations for these bodies

BACKGROUND

As the recent IEA study¹ on the energy situation in 'Economies in Transition' discussed, the energy economies of Eastern European countries are characterised by an energy sector in which all investment decisions were made, and financed, by central government, and energy supply investments absorbed a higher share of total investment than was the case in Western Europe. Energy prices were kept at levels which under-recovered operating costs. Oil and gas, and in the case of Hungary electricity, were (and continue to be) imported from the Soviet Union on a barter basis. These imports were under-priced when compared to world market prices.

Energy Intensity and Efficiency in Hungary

In order to provide a background, the pattern of energy intensity in Hungary, by sector, is set out below in Table 1:

Table 1: Energy Intensity in Hungary by Sector

	Total toe/000\$	Indus toe/000\$	Services toe/000\$	Resid. toe/m ²
Hungary	0.43	0.50	0.15	26.4
OECD Europe	0.26	0.25	0.05	21.5

Source: IEA/OECD

While calculations of energy intensity are highly sensitive to the exchange rate used (which is not known for the figures in Table 1), these figures nevertheless indicate that Hungary produces considerable less output per unit

of energy consumption than the average of western Europe. This can largely be explained by the following three factors: the low level of energy efficiency; the poor economic performance (low per capita GDP); and by an industrial structure which is characterised by heavy industry.

Table 2: Electricity Consumption in Hungary - 1990

Net consumption GWh	Total lighting Gwh	%	of which street lighting GWh	%
37046	2327	6.3	617	1.66

Sources: MVMT, AEEF.

Note: the normal split of consumption by industry, household etc does not occur in the statistics of the Hungarian electricity industry. Consumption data is split between 'controlled' and 'uncontrolled'. 'Controlled' means industrial consumption which is contracted for, though this split results from the historical position that 'controlled' consumption was that which was agreed through central planning. Thus some industrial consumption is classified as 'other, non-controlled' consumption. Lighting is found in both the controlled and uncontrolled sectors.

Concerning, tariffs, while in the past electricity was priced below production costs, tariffs have risen considerably for the industrial sector, although domestic consumption is now cross-subsidised by industrial consumption. Street lighting tariffs are higher than domestic tariffs, and higher than industrial tariffs at night. Also demand charges for street lighting are considerably higher than those in the industrial sector, as shown in Table 3 below:

Table 3: Electricity Tariffs in Hungary (September 1991)

	Demand Charge Ft/kW/yr	Energy Charge Ft/kWh		
		Peak	Day	Night
Industrial Sector				
Demand up to 2.5 kVA	1440	6.20	6.20	3.00
Demand up to 3.5 kVA	2280	6.20	6.20	3.00
Demand up to 5.0 kVA	3540	6.20	6.20	3.00
Demands > 5.0 kVA	720	6.20	6.20	3.00
Public Lighting				
Directed lights	9600	4.20	4.20	4.20
Intensive lights	14400	4.20	4.20	4.20
Households				
		3.70	3.70	1.90

Discussions with Tungstram (the majority shareholder of which is General Electric), the Hungarian lighting manufacturer, and Tungstram Schreder, a luminaire and lighting equipment company (a Hungarian/Belgian joint venture) indicate that there is considerable potential for improved lighting efficiency. In street lighting, while high-pressure sodium lamps are widely adopted in Budapest, in other towns and cities mercury lamps are still common, while in rural villages even incandescent street lighting is widely found. Similar potential for efficiency improvements exists in institutional and commercial buildings, where high-efficiency fluorescent and compact fluorescent lamps have achieved a very low penetration.

There is no shortage of energy efficient lighting technologies in Hungary. Tungstram manufactures CFL's in Hungary (including with electronic ballasts), and (at a higher cost) both Phillips and Osram lamps and luminaires are widely available. Tariffs on imported lamps of 11% (the average for manufactured goods) is not a significant barrier to their use in Hungary.

THE ROLE OF THIRD-PARTY FINANCING AS A MECHANISM TO IMPROVE LIGHTING EFFICIENCY

The potential for improvements in lighting efficiency, while not quantitatively enunciated in this paper, is not in doubt in Hungary. From discussions with lighting manufacturers, government officials, and personal

observation, it is clear that much potential exists. Thus the primary focus of this paper is not concerned with that potential per se, but rather with the question how can this potential for efficiency improvements be achieved. This paper stems from a study which this author carried out for the Energy Directorate (DGXVII) of the European Commission into the potential of third party-financing as a mechanism to improve energy efficiency in Hungary.²

A fundamental reason why the cost-effective potential for lighting efficiency improvements in Western Europe remains considerable is the lack of investment capital for improved lighting technologies. This problem is magnified in Eastern Europe, and Hungary is no exception.

Third-party finance is thus an obviously appealing mechanism, because it has brought about improvements in energy efficiency in a number of OECD countries. Third-party financing means the packaging together of technical services and the finance needed for energy-efficiency projects, by a single 'energy service company', with the cost savings produced by the project paying for the investment.

This approach, which originated in North America in the early 1980's, has become established, albeit on a limited scale, in Western Europe. Against this background the question has been raised, could third-party financing be applied in Hungary, in order to improve lighting efficiency?

The Public Sector as a market for ESCOs.

Public and institutional buildings, and public street lighting, clearly represent a key market for improved lighting efficiency in Hungary, and hence for third-party financing.

The central government is responsible for operating and maintaining central government buildings, and the defence estate. In the education sector, central government is responsible for further education establishments, while in the health sector special clinics and teaching hospitals are the responsibility of the Ministry of Health. The City Council of Budapest, and the 19 county councils outside Budapest are responsible for primary and secondary education buildings, general hospitals, and other facilities such as sports halls and swimming pools.

Officials of the Health and Education ministries interviewed stated that considerable potential both for improved energy-efficiency generally, and improved lighting efficiency in particular, does exist in both of these sectors, although this potential does not appear to have been quantified. However, in the Health Sector the majority of hospitals are 70 - 80 years old, and both the building fabric and lamps and luminaires are in need of improvement and modernisation.

As in a number of EC Member States however, the legal and administrative position concerning the use of third-party financing in this sector is unclear. Officials interviewed at the Ministry level stated that no legal or administrative obstacles exist to the use of third-party financing for lighting efficiency improvements. In practice however, experience suggests that it is likely that actually using third-party financing in local government, and institutions, will be difficult, at least at first. Nevertheless, twenty third party financed projects for street lighting efficiency improvements have already been undertaken in Hungary: clearly third party financing is possible in the public sector.

HUNGARIAN SUPPLIERS OF THIRD-PARTY FINANCING SERVICES

There is much interest among engineering companies, consulting engineers who specialise in energy audits, and among public sector agencies, in the concept of third-party financing. One energy service company has already been established, for which the target market is specifically lighting efficiency improvements in Hungary, and this company provides both an illustration of the possibilities of using third-party financing to fund lighting improvements in Hungary, as well as the difficulties. This company is called Credilux.

Credilux

Credilux is an energy service company which was established at the end of 1989 by five Hungarian joint venture partners in order to undertake third-party financing investments initially in the field of public street lighting. The five partners in Credilux are:

- Tungfram - Jointly Hungarian/US owned lighting manufacturer;
- Tungfram Schreder - a joint Tungfram/Belgian venture manufacturing light fittings;
- Energovill - an electrical contractor specialising in lighting installations;
- A Bank;
- AEEF - the State Agency for Energy Safety and Energy Management

The capital of the company was originally 16 million Ft (approx 180,000 ecu), although this has since been raised to 24 million ft (265,000) The company currently has only 2-full time staff, with the design and implementation of contracts being undertaken by the relevant partners in the company. The motivation of these partners to create this energy service company has been not only as a new business venture, but principally to safeguard part of the market of the partners relating to municipal street lighting, that was likely to be lost because of the lack of investment funds for such investments by local authorities. Credilux is currently marketing shared savings retrofits to municipal street lighting, although there are plans to expand the scope of the target market to cover industrial lighting and other areas of municipal lighting, notably sports halls.

Twenty contracts have been signed to date with 24 million ft invested, of which 12 million ft was invested in 1990. All of these contracts concerned municipal street lighting improvements, with the exception of one project in a municipal ice-rink. To date all investments have been made from the initial capital of the company, and no debt has been raised. The initial capital of the company was exhausted at the beginning of 1991, and was raised by a further 8 million ft from the original investors. However, this additional capital has already been invested, and without further capital, or raising debt, the number of projects which can be implemented is limited to the number that can be funded from earnings.

The obvious option of raising local debt finance in Hungary has been ruled out on the grounds of the current high levels of interest (around 40%) charged for such funds. The greatest single difficulty faced by energy service companies in Hungary is the present level of interest rates. The lack of access to moderately priced debt finance is a serious restriction on the growth of third-party financing in Hungary by Hungarian enterprises.

Credilux could make many more investments if capital was available, indeed more local authorities are approaching the company than they can respond to. In the opinion of Credilux, the total market for third party financing of street lighting improvements in Hungary is of the order of 500 -1000 projects. The crucial factor which will determine whether or not third-party financing can be a mechanism to improve lighting efficiency in Hungary is not the technical capability of the local manufacturing industry, nor even the entrepreneurial attitude of Hungarian service companies, but the availability of finance. This question is explored in more detail in the next section of the paper.

THE AVAILABILITY OF FINANCE FOR ENERGY SERVICE COMPANIES

The key factor which determines the viability of third-party financing as a mechanism to improve energy (and lighting) efficiency is the availability of adequate debt finance at a satisfactory cost. Such funds are difficult to obtain, and at interest rates of around 40%, prohibitively expensive if borrowed in Hungary.

Thus, both the cost, and the availability of finance from Hungarian banks is a major problem for the establishment of third party finance.

Two banks were interviewed for this study: the Hungarian Credit Bank, a Hungarian State owned commercial bank; and Citibank Budapest, a joint venture bank between Citibank USA (the majority partner) and the National Bank of Hungary (the minority partner) Both banks confirmed that the tight monetary policy of the government has severely restricted the availability of debt, while the high current interest rates, and uncertainty concerning market conditions have restricted demand for debt finance. For an energy service company debt would only be available at variable interest rates, and only if guaranteed by physical assets.

For an energy service company, which is a service company by definition, the need to have the physical assets to act as a guarantee for any capital borrowed is likely to restrict this activity to only the largest Hungarian companies (such as Tungstram) who may not be the most skilled or the most entrepreneurial, and which themselves are also victims of the credit squeeze.

However, the biggest problem in Hungary is not so much the availability of capital as it's cost. Energy service companies will not borrow at 40% or more interest rates. Credilux has funded all investments from equity - an extraordinary situation for any Western company - and now that this has been exhausted, so has the company's ability to invest. What are the possible solutions?

WHAT HELP IS NEEDED AND FROM WHOM?

Role of Utilities

In North America, and to a lesser, though significant extent, in Europe, electric utilities have been the prime movers in terms of instigating programmes for lighting efficiency improvements, usually in the context of a

wider programme of actions of demand-side management. What is the attitude and likely role of the Hungarian electricity industry? The MVMT -- the Hungarian Electricity Board, is the State owned monopoly generator, transmitter, and distributor of electricity in Hungary. In the past the MVMT was not responsible for the planning for the industry, but only for the implementation of the plans produced by the National Planning Office.

The MVMT have recognised that their planning must not only address the supply side of the equation, but also the demand side. Thus the MVMT has contracted with Ontario Hydro to evaluate the potential for demand side management in Hungary, and to draw up an implementation plan for the acquisition of such demand side resources.

Concerning third-party financing directly, the MVMT agreed in 1990 to invest in an energy service company led by a consortium of companies led by the State Agency for Energy Management and Energy Safety - the AEEF - energy service company, although this participation was to be limited initially to an investment of 10 million Fts. This project has not proceeded due principally to personnel changes at the AEEF..

Financial Institutions

It has already been mentioned that a key need for Hungarian energy service companies is finance, and that such finance is not available either in sufficient quantities or at a satisfactory price in Hungary. Thus what is the role of Western financial institutions? The key role of such institutions is obviously to provide adequate debt finance, at satisfactory rates of interest, but the experience with World Bank loans, and the need of Hungarian energy service companies for managerial and financial expertise suggests that joint ventures with Western energy service companies is the best approach for these companies, with the finance necessary being provided through this joint venture approach.

Loans for energy-efficiency investments are available via the World Bank, although these funds can only be borrowed from domestic bank agents of the World Bank. In the case of Hungary these loans are processed via the Hungarian Credit Bank, which charges Hungarian borrowers an interest rate which is only marginally less than that which would be paid on domestically borrowed funds. For this reason the current tranche of funds is actually under-subscribed. Indeed Credilux mentioned that they had considered borrowing from the World Bank facility, but the interest rate charged was insufficiently different from domestic funds to render the idea worthless.

The European Bank for Reconstruction and Development - EBRD - could also play a role in lending to western energy service companies who are willing to enter into joint ventures in Hungary.

Western Energy Service Companies

The main role in developing a market for third-party financing for energy-efficiency improvements, and lighting efficiency improvements as a sub-set of this, lies with western energy service companies. Hungarian energy service companies need access to finance, but they also need access to the managerial and financial expertise, and arguably project management expertise, of western energy service companies.

However western companies have been cautious of actually investing in Hungary. Expressions of interest have been plentiful, but hard cash has been rather less forthcoming. Thus the key role of governments, and/or the European Commission, is to act to encourage and facilitate such investment.

The European Commission

The European Commission plays a key role in providing aid to Central and Eastern Europe, since the Commission was charged by the G-24 group with the co-ordination and organisation of Western aid. This is provided under the auspices of the PHARE programme. What should the Commission do to encourage the use of third-party financing for lighting improvements in Hungary?

The answer, is, this author believes, a number of low- key, and rather unspectacular actions, the principal objective of which should be to encourage Western (and of course, from the point of view of the EC, European) energy service companies to invest in Hungary. This could be done through a small number of relatively low cost actions:

- The Commission will organise a seminar in Budapest in early 1992 which would act as a 'marriage-broking' event between Hungarian and Western energy service companies.
- At the same time the Commission will try to spread awareness of the concept of third-party financing by

organising one or more seminars for energy, and lighting, users in industry and the public sector.

- One of the actions which has helped to promote the use of third-party financing in European Community Member States has been the preparation of model contracts to assist both energy users and energy service companies in the somewhat complex business of negotiating a contract. The Commission should adapt the model contract which was prepared for EC countries to the Hungarian situation, and should widely disseminate this contract.
- In addition to these low key information actions, the EC could use part of the PHARE programme monies to set up either a fund for third party finance investments, or for a loan guarantee fund, which would ease access to borrowed capital.

CONCLUSIONS

There is a considerable potential for improved lighting efficiency in Hungary, in all sectors. Yet the shortage of capital for the higher initial cost of energy efficient lighting is significantly restricting any improvement in lighting efficiency, despite the fact that Hungary is in the relatively privileged position (for Eastern countries) of having a significant manufacturing capacity for such products, including CFLs.

Third party finance, implemented through energy service companies, offers an intellectually appealing way of overcoming the finance barrier to improving lighting efficiency.

In the public sector the national government sees no barriers - legal or administrative - which would prevent the use of third party finance for lighting improvements. In practice, at the local level, more difficulties with budget allocations and regulations are likely. Nevertheless, one energy service company has already been set up which is aiming at the market for improved street lighting, and ten contracts have already been concluded.

The shortage, and cost of capital are holding up the expansion - or even the continued existence - of this company. Capital is in both short supply and is expensive in Hungary. At rates of interest of 35 - 40%, third party financing of lighting improvements is not viable. There are several Hungarian companies with both the technical (if not the managerial) skills needed and the interest in becoming energy service companies, but all lack the necessary capital.

The key role in overcoming this problem should lie with the international financial institutions and with the western energy service companies. Third-party financing is a commercial activity which should stand or fall on its commercial viability. If this is potentially profitable for lighting improvements in Hungary, then western energy service companies should make invest capital and management skills.

However the capital which any western energy service company might bring must be provided by western financial institutions, who have shown some reluctance to invest in this area in the west, and are likely to be even more cautious in the east. Thus the EBRD could play a key role in this area. Alternatively, governments, or multilateral agencies, could provide loan guarantees which would ease the availability of finance.

RECOMMENDATIONS

Third-party finance does should not be funded by direct government financial assistance. However, some action is needed to 'kick-start' the market for energy service companies in Hungary.

- The European Community will offer encourage western energy service companies to invest in Hungary through seminars and 'marriage-brokering'. This is useful, but is unlikely to be enough. Some form of loan fund, or loan guarantee fund, should be examined.
- The EBRD could help by making loans available to Western energy service companies. Most aid by western governments to Hungary is in the form of technical assistance. This is valuable, but it helps western consultants more than it helps the development of the service industries necessary if energy efficiency is to be realised in Hungary. Loan guarantee funds for third party financing could be of long term benefit.

References

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