Energy Services Companies: Where Are International Markets Going?

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The power industry in developing and reindustrializing countries continues its historic shift toward privatization and competition. This shift opens the door to the very large technical market for the goods and services that energy services companies offer. Signs indicate however that the energy services market will develop along competitive lines with energy being supplied by companies that provide a variety of power marketing, efficiency services and other services.

This article summarizes estimates of current energy efficient market size, lists projects that are viewed as pilot energy services projects, and discusses a number of factors that will affect the ESCO market abroad.

THE EXISTING MARKET FOR ENERGY-EFFICIENCY GOODS AND SERVICES

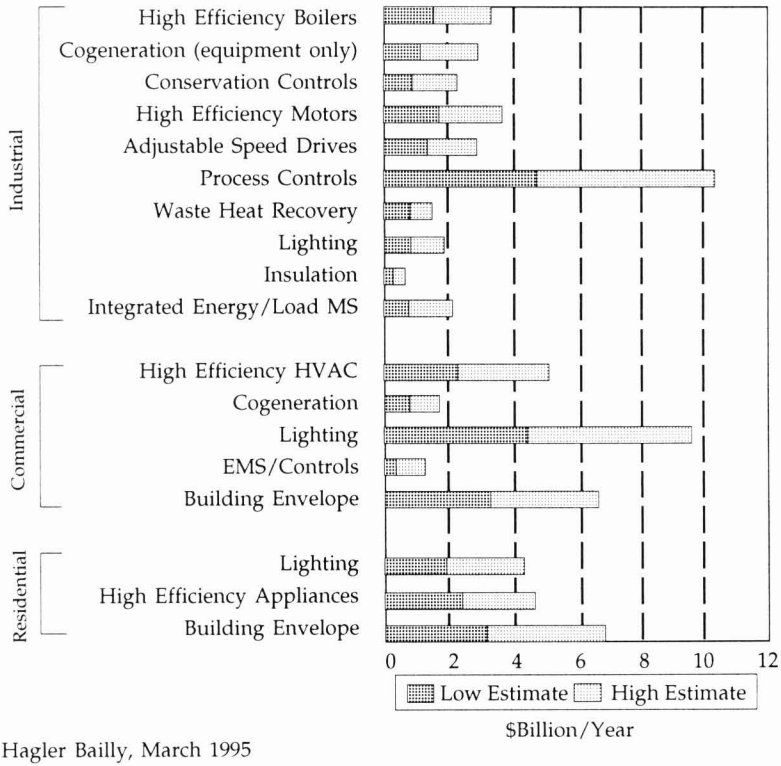
Energy Efficiency Markets

A study done by Hagler Bailly Consulting for the World Energy Efficiency Association estimates current sales of energy efficient goods and related services to be in excess of $34-42 billion per year, largely consisting of direct cash purchases by end users, with 45% in the industrial sector, 30% in the commercial sector and 25% in the residential sector. Non-OECD countries may already account for 10-20% of sales in some segments of this market. These figures relate to end-use efficiency markets only. Because of under- reporting, the analysts carrying out this study concluded that the real market was probably over $80 billion per year.

The breakdown of this market by geographic region is as follows:

Region	Market in $ billion/yr.	Percent
U.S./Canada	14-17	41
OECD Europe	7.1-8.8	21
OECD Pacific	4.4-5.5	13
Eastern Europe	1.4-1.7	4
Middle East/Africa	.34-.42	1
South American/Mexico	1.4-1.7	4
Other Asia/Pacific	5.4-6.7	16

Estimates of market share for various technologies are as shown below.



Source: Hagler Bailly, March 1995

ESCO Markets in OECD Countries

The portion of the OECD market captured by energy service companies is significant, possibly on the order of 10 percent. There is currently little firm data that I am aware of on the actual size of the ESCO industry. This is partly because the industry is composed almost entirely of privately-held companies and large public firms which do not report financial results of the efficiency divisions separately.

United States

A U.S. DOE-funded study estimates that the total installed cost of projects constructed in the United States in 1992 was $500 million. This figure has been corroborated by industry participants, who indicate that it was a valid estimate of the annual size of the market. Less firm estimates of the current ESCO market put it at as high as $1 billion. To date, the installed cost of all projects implemented by ESCOs in the U.S. is about $2.3 billion. Hundreds of companies compete in the market, although the majority of business is handled by fewer than 30 companies.

Worth noting here is the close related demand side management market in the United States. State and federal rulemaking triggered explosive growth in DSM programs in the late 1980s. Utility expenditures increased from $873 million in 1989 to $2.5 billion in 1992 to over $2.8 billion in 1993. In 1993 utilities reported to the Energy Information Administration (EIA), part of the U.S. Department of Energy, that they expected their expenditures to increase to about $3.8 billion by 1997.

In 1994, however, the year for which we at present have complete and reliable data, DSM expenditures flattened, actually declining by 1% to reach $2.22 billion, down from $2.72 billion the year before. In December 1995, the EIA estimated that total utility costs for DSM would decrease 4.5 percent to $2.6 billion in 1995 and to $2.5 billion by 1999. Actual data reported by the utilities for 1995 is now being analyzed by the EIA, and their report will be issued this month. According to staff members, preliminary review of the data shows no major changes in DSM spending. This flattening indicates that the ESCO business related to regulated DSM activity faces the same flattening as well as uncertainty about the future of the ESCO industry in general.

Europe

The market in Europe has been less well developed than in the United States. In the United Kingdom, where performance contracting is

called Contract Energy Management (CEM), CEM has enjoyed healthy growth of around 20 percent per year, with market penetration usually estimated at less than 20 percent of the market. BP Energy has estimated that the potential size of the Contract Energy Management market in the United Kingdom is about 9 billion pounds, or US$ 14 billion. In their view, less than one percent of the market has been penetrated by ESCOs. In 1995 there were about 20 active ESCOs with a total turnover of about $300-500 million per year. Fast domestic growth and low market penetration in the U.K. market have caused U.K. ESCOs to focus on their own domestic market, acting as a deterrent to ventures outside of their own borders. Many of the ESCOs in the United Kingdom are currently backed by large energy supply companies, an increasingly common trend in most countries.

Spain has at least six ESCOs, operating mostly in the industrial sector. The government's energy efficiency agency IDAE was involved in 132 projects between 1988 and 1992 with a total investment of $165 million. There are also ESCOs in Australia, Belgium, Czech Republic, France, Germany, India, Luxembourg, Poland, Portugal, Netherlands, Switzerland and Thailand. Undoubtedly, there are others as well.

Best information available to this author is that most OECD-based ESCOs have tended to remain in their own markets, and few have ventured outside their own countries. U.S. ESCOs have executed some foreign operations, but historically they have had limited experience abroad. Only a few U.S. and European ESCOs have actively pursued the potentially huge performance contracting market in the developing countries.

ESCO Markets in Non-OECD Countries

The volume of ESCO business in non-OECD markets is minuscule. Only a handful of ESCOs have achieved over US$ 1 million in "project" sales in their target markets. Projects in district heating, boiler conversions, street lighting, and large building retrofits are recent and are considered as pilot projects.

One confidential study for a major finance institution has made a rough estimates on the order of $2 billion in energy efficiency project investment during the next five years, split equally between larger and smaller projects. Larger projects include large industrial efficiency projects such as a proposed $45 million boiler upgrade for a Russian pulp and paper mill as well as mass market distribution projects such as

the capacitor leasing project in India. This program is now about $25 million per year and may grow to over $100 million per year in sales. Compact fluorescent bulb distribution projects in major markets such as China or India are included in this estimate. Types of projects include:

- ESCO demand side project portfolios (small industries, buildings, street lights- $250 million projected business volume). Start-up ESCOs try to grow to around $5 million over 3-5 years with projects in the $100-500,000 range. A few ESCOs have projected annual sales of $25 million or more. Some are focusing on larger projects such as street lighting) in the $2-3 million range;

- ESCO water and heating utility project portfolios ($300 million), such as a proposed $100 million fund for 2-3 million motor retrofits for water utilities in Brazil, or a series of $2-3 million projects to install controls and energy management systems in district heating networks in Eastern Europe;

- Small combined heat and power co-generation plants ($300 million), sized to meet the needs of the thermal host and coupled with demand-side energy efficiency measures within the firm, with costs in the $2-10 million range.

- Equipment and appliance manufacturing projects ($150 million), generally in the range of $5-10 million per project.

Examples of completed ESCO-type projects include those in the table opposite.

Central and Eastern Europe Markets

The Czech Energy Efficiency Center (SEVEN) estimates that energy savings could reach one-third of total energy use with technologies currently available. According to SEVEN, the energy efficiency center in Prague, per capita energy consumption in the country is twice that of Western Europe. Over 9,000 boilers have been installed in the **Czech Republic**, including 550 cogeneration units, two-fifths of which are more than 30 years old. With 11 million people, healthy economic growth of around 4 percent, and an industrial market for energy efficiency equipment that has been estimated at US$3.15 billion, the market here is sizable. The Czech government is actively promoting energy efficiency. A

Project	Country	Size	Developers
Decin	Czech Republic	US$ 8 million	City of Decin Wisconsin Electric Power Co. Edison Development Co. NIPSCO Development Co. Center for Clean Air Policy
Bulovka	Czech Republic	US$2.7 million	Energy Performance Services Landis & Gyr
Bhivandi capacitor program	India	Rs. 68.4 million (US$ 2.2 million)	Maharashtra State Electricity Board Asian Electronics Ltd.
Bhoruka	India	Rs. 8.26 million (US$ 265,000)	Bhoruka Steel, Ltd. INTESCO (US & India) Industrial Development Bank of India

Source: World Energy Efficiency Association

number of programs exist to promote efficiency. Examples include the Program for State Support for Reducing Energy Consumption in Buildings and Apartments of the Ministry of Industry and Trade; the Energy Savings program of the Ministry of the Economy; corporatization of the former state utility CEZ, and various other energy sector privatization efforts; and the intention to eliminate by 1998 subsidized prices for fuels and energy.

Poland's economic policy is aimed at continuing high economic growth, increased foreign and domestic investment, and continued economic restructuring. The number of private companies operating with foreign capital increased by almost 50 percent in 1993 alone. Foreign investment is expected to continue to grow. Landis and Gyr has developed a successful ESCO pilot project in southwestern Poland. **Hungary** has embarked on a course of trade liberalization and other market and economic reforms. Investment legislation now allows 100 percent foreign ownership of businesses. Estimates are that twenty percent of industrial output is now produced by companies with Western capital.

Asian Markets

India has initiated a program of reforms that promise to make that country more open and competitive on the global scale. Restrictions have been relaxed on foreign equity holding, lessening of export requirements, streamlining of technology licensing, liberalization of foreign currency exchange policy, lowering of import duties etc. **Thailand** is moving toward more rational energy pricing, reduced custom duties on energy efficient equipment, policies that promote industrial and commercial energy efficiency programs etc. The **Philippines** have provided tax relief and other fiscal incentives to potential investors in cogeneration, renewable and nonconventional fuel technologies. In 1980 **Malaysia** launched an aggressive energy conservation campaign that includes financial incentives in the form of grants, tax incentives (including accelerated depreciation) and soft loans and stronger regulations and standards. **South Korea** has targeted energy conservation as one of six major policy objectives for the seventh five year plan. The Korean Energy Management Corporation has made low-interest loans available for efficiency improvements. **China** first included energy conservation as part of its five year plan starting in 1981.

Latin American Markets

Brazil, facing capital restraints for power development, is seeking alternative strategies to include efficiency improvement to meet power demand. A number of ESCOs have sprouted in response to this policy. **Mexican** industry and buildings are the target of a number of government sponsored efforts (through FIDE and CONAE for example) to create pilot projects in lighting, energy efficient motors and in refrigeration.

INDUCEMENTS AND CONSTRAINTS THAT WILL AFFECT THE ESCO MARKET ABROAD

Pro: high inefficiency: The developing and reindustrializing countries are much less efficient than are OECD countries. An oft cited figure is that the industrial, commercial, and residential sectors of these economies are roughly 40 percent less efficient than are their OECD counterparts. This creates a very large possible technical market for ESCO goods and services.

Pro: power shortages: Despite considerable progress over the past 10 years in reducing power shortages in developing and

Selected Countries Experiencing Power Shortages

Country	Operating Reserve Margin (%)	Extent of Power Outages
Armenia	NA	Severe shortfall/rationing
Brazil	7.0	Unplanned outages mainly in residential areas
Chile	12.0	Unplanned outages, brownouts
Columbia	–2.0	Rationing and rotating brownouts
Czech Republic	25.0	Brownouts and rationing
Georgia	NA	Frequent outages
India	–13.0	Peak shortfall
Indonesia	14.0	Chronic outages
Malaysia	2.0	Infrequent brownouts
New Zealand	21.0	Brownouts
Pakistan	–6.0	Brownouts
Panama	–9.0	Severe shortfalls
Philippines	–4.0	Rotating outages
Romania	14.0	Severe shortfalls
Slovakia	5.0	Some brownouts
Taiwan	–2.0	Infrequent brownouts

Source: Hagler Bailly Consulting

reindustrializing countries, many problems persist. The table provides examples.

Pro: liberalization in industrial policy: The movement begun in the early 1980s toward privatization of infrastructure in both developing and industrialized countries alike will certainly continue well into the next decade. The collapse of the Soviet Union and its sphere of influence throughout Eastern and Central Europe has buttressed this movement, as has liberalization of trade and investment policy throughout South and East Asia. Privatization deserves some special note here.

Once governments open the door to private generation a number of issues arise:

- how should IPP's be selected? negotiation? competitive bidding?
- how can private involvement be regulated? shouldn't there be a permanent independent regulatory body?
- *should transmission and distribution be opened to competition as well?*
- *how should utilities streamline their operations to remain competitive?*

Once these changes have begun they proceed inexorably. One unregulated subsidiary in the United States estimated that over 300 companies are active worldwide pursuing independent power projects. Since there are a limited number of projects being tendered for private participation, this developer concluded that either the number of projects has to go up, or the number of companies has to go down.

Given the increasing spirit of competitiveness in the industrialized world's electricity sectors, it seems unlikely that the number of companies seeking to penetrate international markets will decrease. Rather, the number of projects will go up. This can most easily be done by having the average project size go down. As private power markets cause the policy and regulatory climate in developing countries to become more receptive and effective, it is likely that the decreased risk will increase the attractiveness of smaller projects. Energy efficiency projects would thus benefit.

Pro: leadership by strong companies: The major suppliers of energy efficiency equipment, such as GE, ABB, Honeywell, Landis and Gyr, Johnson Controls as well as ESCOs such as Generale de chauffe of

France, GEA A.G. of Germany, Groner Energikontroll, ADS/ ECONOLER, Energy Performance Services, Proven Alternatives, Energy Masters Corporation, HEC Energy Corporation, INTESCO and others have been establishing partnerships and project teams in developing and reindustrializing countries. Locally owned ESCOs have also been established, such as Thermax in India and Credilux in Hungary.

Pro: International assistance as "market transformers": The **International Finance Corporation** (IFC) has launched a Renewable Energy and Energy Efficiency Investment Fund (REEEIF) to mobilize capital from strategic and institutional investors for projects in renewable energy and energy efficiency.

The Industrial Development Bank of India has identified some 120 projects that are ready for financing under an energy audit program sponsored by the **World Bank**. The Industrial Credit and Investment Corporation of India has evaluated several energy efficiency technologies with support from **USAID**, including pilot projects in industrial waste heat recovery that could represent up to $1 billion in replication potential in India over the next 10 years.

USAID in cooperation with Brazil's national utility and the National program for Conservation of Electricity (PROCEL) recently worked out the concept and financial structure for two energy efficiency financing mechanisms -a medium term line of credits and an energy service company development fund. USAID expects that the World Bank, the IFC, and Brazilian commercial banks will take part in these activities. USAID has also identified Brazilian energy services companies interested in participating in the fund.

Pro: beginnings of interest by financial institutions. Partly sparked by ESCO activity of the European Bank for Reconstruction and Development's energy efficiency unit, the interest of the IFC and World Bank, the Interamerican Bank, the Asian Development Bank commercial banks have begun to show interest in ESCO investment.

Despite the above encouragements, the ESCO market abroad remains small and slow growing. The following are some of the more common constraints on energy services activity:

Con: end user credit risk: In the United States much of the performance contracting market developed around public or quasi public clients, such as schools and hospitals.. Energy services activity in Central Europe focuses on similar clients, most notably district heating and state owned industries. These potential clients are in poor financial condition

and uncertainties abound about ownership, potential effects of privatization, lack of a paying customer base etc.

Con: high development costs: Energy efficiency projects are small and hence development costs are very high relative to total project cost and to possible earning streams. Ready access to an experienced source of financing is also not available. Political and regulatory problems make it difficult to aggregate projects to spread development costs over a wider project base.

Con: customer motivation and ease of doing business: As in OECD countries, potential energy services clients in developing countries often place energy efficiency at the low priority end of decision making, focusing instead on revenue increasing, business expansion measures. In many countries, energy supply has reached the crisis stage and so attention there goes to buying back-up or on-site power generation equipment. The institutional base for energy efficiency—established developer and experienced engineering firms, experienced bankers, experienced licensing and permitting authorities—is lacking.

Prices in many countries, while generally becoming more market based, remain subsidized. Metering and collections are not done or are done poorly. Only in a few countries are electric utilities themselves involved in energy efficiency programs and this provides a thin experience base.

ESCOs have only recently been established in developing countries, and aside from funding for multi-national firms, banks are reluctant to provide financing. Smaller ESCOs tend to be thinly capitalized, and even parent companies are slow to provide balance sheet based guaranties for ESCO projects.

Conclusions:

1. The technical market for ESCOs in developing and industrializing countries is enormous, but penetration of that market to date has been minuscule and very slow to develop;

2. Market development will continue to be slow until liberalization of the business climate overcomes the inefficiencies and ineffectiveness of publicly controlled economies or sectors. This will not happen quickly and will follow the general pace of industrial and commercial sector modernization;

3. Energy services companies have a bright future but probably in the form of more diverse companies providing electricity, efficiency services and possibly a wide range of other goods and services. Those stand alone energy service companies that are not able to compete will either fail, be acquired or be restricted to smaller niche markets.

ABOUT THE AUTHOR

Dr. James Burke Sullivan is senior energy advisor to the U.S. Agency for International Development. He also serves as president of the World Energy Efficiency Association.

Previously, Dr. Sullivan was the director of the Office of Energy and Infrastructure at USAID. He managed a budget of US$25 million and a staff of 27 engineers and other professionals. Under his leadership, the office initiated energy efficiency programs in over 35 developing countries in Latin America, Eastern Europe, Asia, Africa and the Middle East. USAID's energy efficiency portfolio is the largest of any bilateral donor. Programs focus on policy reform—including privatization—technology cooperation and finance. He and his office collaborated closely with colleagues in developing countries as well as with staff of the World Bank and regional multi-lateral banks.

He has published extensively on the topics of energy efficiency and on private participation in the energy sector. For his leadership in energy efficiency, he received the International Award of the Energy Forum of the U.S. Energy Association and Johnson Controls.

He had served on presidential advisory committees, technical committees of the U.S. National Academy of Sciences, and boards of directors and technical advisory boards of a number of non-governmental organizations. His undergraduate training is in civil engineering. He has a doctorate in applied mathematics and hydrodynamics from the Massachusetts Institute of Technology.