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THE EXPORT TRADING COMPANY ACT OF 1982 AND THE  
PHOTOVOLTAICS INDUSTRY: AN ASSESSMENT

Final Report

Sam Enfield

and

Carlo La Porta

United States Export Council for Renewable Energy  
Washington, D.C.



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## ABSTRACT

The U.S. Export Council for Renewable Energy undertook an assessment of the potential advantages of recent export promotion legislation for the U.S. photovoltaics industry. The study reviewed the provisions of the Export Trading Company Act of 1982, surveyed the export trade sector to determine what impact the Act is having on export company activity, and surveyed the photovoltaics industry to begin assessing whether the Export Trading Company Act offers particular advantages to that industry for promotion of its product overseas.

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**THE EXPORT TRADING COMPANY ACT OF 1982 AND THE  
PHOTOVOLTAICS INDUSTRY: AN ASSESSMENT**

**INTRODUCTION**

The United States Export Council for Renewable Energy proposed a two-phase effort to assess the potential of the Export Trading Company Act of 1982 to help the U.S. photovoltaics industry export its goods and services. The overall objective of the ECRE proposal is to assist government policy formation and to provide members of the photovoltaic industry with a clear statement of exporting options and issues associated with the export trading company (ETC) concept.

This brief concludes the first phase. It was based on a review of current export trading company activity and export status of the U.S. photovoltaic industry. The Phase I information will help determine if a pv export trading company concept fits existing conditions, whether adequate interest exists in the banking and export trade sectors to pursue such an option, and whether real advantages are likely to evolve from application of the Export Trading Company Act.

Based on Phase I findings, a decision will be made whether to perform a more extensive analysis, the Phase II effort. As proposed, Phase II would:

1. Further indentify salient characteristics of a pv industry export trading company
2. Formulate a "strawman" model of a photovoltaics industry based ETC
3. Relate the Model ETC to current and perceived future issues.

The brief that follows is divided into two main sections. The first, and larger one, examines current export trading company activity. The second reviews the status of U.S. photovoltaics international trade and U.S. industry familiarity with the export trading company concept.

## EXECUTIVE SUMMARY & RECOMMENDATIONS

The U.S. Export Council for Renewable Energy assessed the applicability of the Export Trading Company Act of 1982 to the U.S. photovoltaic industry. This legislation was designed to increase competitiveness of U.S. industry overseas. The following summarizes the results of the study and recommends further action.

The four principle titles of the Export Trading Company Act of 1982 (ECTA):

- Instruct the Department of Commerce to promote formation of trading associations and companies
- Permit bank holding companies and their subsidiaries, and bankers' banks to invest in export trading companies
- Relax previous restrictions on financing of export trade by financial institutions
- Modify and relax application of U.S. antitrust laws to export trade

Title I, General Provisions, defines the purpose of the act and terms. It expands the definition of export trade to include services. This expansion will provide any export trading company dealing in photovoltaic equipment and systems greater flexibility to widen the scope of its operations and include them under the more liberal trade regulations the Act creates.

Title II, Bank Export Services. amends the Bank Holding Company Act of 1956 to permit bank holding companies, bankers' banks, and Edge Act and Agreement Act (see page 10) corporations (International banking organization) to own up to 100 percent of export trading companies, and to form joint ventures with non-banks. The important advantages established for exporting by Title II are:

- Expansion of export service industry through direct participation of banks
- Relief from standard collateral requirements when a bank loans money for an export project to an affiliated export trading company
- The ability to secure from the Export-Import Bank loan guarantees based on accounts receivable or inventories

of exportable goods

- Substitution of a bank's credit standing for that of a buyer's, with the bank guaranteeing payment to the seller (bankers' acceptances)

The principal advantages of Title II are that it should make available the banking industry's expertise and overseas presence to assist in the export of photovoltaic equipment. Project financing should also be easier to arrange.

Title III, Export Trade Certificates of Review, establishes antitrust immunity for export trading company joint ventures, defines what antitrust protection is provided, and places limits on potential damages in the event of antitrust litigation. Under Title III provisions, when an export trading company joint venture is formed, it can register for an antitrust exemption from the Department of Commerce. The applicant must adhere to a set of standards and criteria which mainly serve to protect domestic U.S. competitors and competition. In the event of litigation, the Title III guidelines supersede existing antitrust standards. Those companies holding a certificate may not be sued under the antitrust laws so long as their conduct complies with the terms of Title III.

The principal benefit that Title III should provide to the photovoltaic industry is collaborative marketing, whereby companies involved in the joint venture can establish product prices, determine types of service to be provided and by whom, pool resources and property, and set sales and geographic market guidelines. The establishment of such a joint venture could be highly beneficial while the photovoltaics industry passes through its early commercialization stage, and faces growing, frequently subsidized, competition from foreign firms.

Title IV, Foreign Trade Antitrust Improvements, modifies the Sherman Act and the Federal Trade Commission Act to require "direct, substantial and reasonably foreseeable effect" on domestic commerce or export commerce of a U.S. firm as the jurisdictional threshold for antitrust enforcement. Title IV also precludes a foreign company from suing in Federal Court if a joint venture's activities have no effect on domestic markets or competition.

Title IV supplements the Title III antitrust protection. The certificates of review stipulated under Title III offer more exact protection for the specific activities stated in the application, while Title IV provides a broader but less precise statement of protection. It is unclear which title will be more important. It is evident that more careful examination of the antitrust aspects of the Act will be required before photovoltaic companies will feel at ease in taking advantage of them.

#### Export Trading Company Review

ECRE surveyed a sample of bank export trading companies, joint venture applicants for Commerce Department Certificates of Review, multinational export trading companies and existing export management companies. The purpose was to assess the impact of the Export Trading Company Act on the overall export sector, and to identify relevant trends.

To date, ETCA has stimulated the most export trading company activity in the banking sector. Several banks with considerable experience in export trade have received permission from the Federal Reserve Board to establish export trading company subsidiaries. The development of export trading companies by banks with more limited international experience is expected to be much more gradual.

Similarly, several multinational corporations are moving more aggressively into the export trade area. Their initiatives usually involve their own product lines; however, most are prepared to market products of other companies that complement, but in some instances may be unrelated to, their own product line.

Although six joint venture export trading companies have completed applications for Commerce Department Certificates of Review under Title III, only one is a true joint venture among producers of the same product. One other is a regional trading company that will represent producers of like products. The remaining four propose to market complementary products manufactured by various companies, and may not require antitrust immunity. A general lack of confidence in the clarity and completeness of the antitrust immunities provided in ETCA

exists at this time, which will slow the use of these provisions of the act.

Existing export management companies which have been providing export services to manufacturers for years are now attracting companies and banks interested in entering the export trade sector or expanding their existing export activities. The largest twenty or thirty of these companies, with annual sales of \$30 to \$40 million, are likely to be the foundation for export trading companies.

One multinational export trading company--Sears World Trade--has had discussions with photovoltaic companies, and appears genuinely interested in marketing systems overseas. Everyone surveyed expressed a willingness to consider exporting photovoltaics, but most lacked staff with any experience in the technology, a factor of real importance to them.

Because well-established industries offer more immediate prospects for profitable exports, they are likely to compete more effectively for the attention of export trading companies than is a new, higher risk industry such as photovoltaics. It appears the photovoltaics industry will, therefore, have to demonstrate carefully the near-term profitability of export ventures involving photovoltaic equipment. Unless the PV industry can demonstrate the profitability of a world-wide marketing effort, it appears any early cooperation with export trading companies will be on a project-by-project basis.

#### Photovoltaic Industry Export Review

ECRE surveyed a sample of the photovoltaics industry to determine the level of interest in export trading companies, and whether U.S. export activity provides a likely fit with the export trading company legislation.

The survey of eleven photovoltaic companies confirmed the importance of export markets to U.S. industry. All of the companies involved in exporting generated over fifty percent of their business from abroad. The interviews showed that only slight attention has been paid to the potential of export trading companies by these firms. Finally, everyone interviewed

expressed a desire to learn more about the export trading company options open to them.

### Recommendations

Based on review of the legislation, current activity in the export trade sector relevant to export trading companies, and the interest of the photovoltaics companies surveyed, ECRE recommends that a Phase II detailed assessment of export trading company options for photovoltaics international marketing be carried out.

The review of legislation and discussion with export companies and legal firms confirm that the legislation opens new avenues and opportunities for any industry involved in exporting. As a result of the Act, ECRE expects considerable expansion of the U.S. export service sector. This will involve growth of existing export companies and creation of many new ones. The traders interviewed appeared quite open to consideration of a new technology such as photovoltaics. Due to wide-ranging activities of such exporters, however, the photovoltaic companies will have to approach this opportunity in a well-prepared manner.

Thus far, the photovoltaic companies have not had or devoted the resources to assess adequately export trading company options open to them. Undoubtedly, more information must be provided to these companies before any progress on this option will occur on an industry-wide basis.

The Phase I study identified several areas where additional work will benefit both the Department of Energy program and the pv industry. What impact on technology research and development would rapid expansion of U.S. export sales have? Companies taking advantage of the export trade legislation might find themselves restricted to selling current technology, that is, single or semi-crystal flat plate silicon cells, and unable to introduce newer, less proven approaches. Such circumstances might affect private sector investment in photovoltaic research, thereby requiring an adjustment in the scope and content of the DOE supported program. The reverse could occur, wherein stimulated

export sales could "pull" new technological approaches into earlier commercialization. ECRE contends that additional review and analysis is needed to put future export sales in better perspective with regard to technological avenues and ultimately research and development requirements.

One of the most important issues raised and unresolved by Phase I concerns clarification of the antitrust provisions of the Export Trading Company Act. How far U.S. companies might go in cooperative marketing is still not clear. Legal analysis would be an essential component of any Phase II effort. Questions addressed would include an assessment of whether the U.S. pv industry could or should form a comprehensive national photovoltaics export company, or what would happen if several key firms, but not the entire industry, made such an arrangement. Selecting several such scenarios for analysis would be a significant contribution to the study of export promotion for technically-based industries.

Another area to consider in Phase II is the potential for other government agencies besides the Department of Energy to be involved in support of photovoltaic-oriented export activity. Such analysis should directly benefit DOE program management involved in direction of funding to the export promotion program at the Department of Commerce. Other agencies involved include the Export-Import Bank, the Overseas Private Investment Corporation, and U.S. AID. A thorough analysis might be expanded to include a review of multilateral and hemispheric banks and lending institutions.

Finally, Phase II would be an excellent vehicle for expanding the limited survey of the photovoltaics industry begun in Phase I. The concept ECRE suggested, analysis of a "strawman" export trading company, will depend on a more thorough assessment of the photovoltaic export trade already underway. A photovoltaic market analysis should evolve from Phase II which pinpoints the level of exports, destination, application, and methods for managing leads, concluding and financing sales. The

assessment of U.S. industry photovoltaic exporting will then be compared to a few export trading company options to build and examine the appropriate strawman or "men." A business plan development approach would be used to guide this phase of the analysis to ensure the results are relevant to the current situation in the private sector.

## CURRENT EXPORT TRADING COMPANY ACTIVITY

This section of the export trading company brief reviews current activity in the export trade field as it relates to the legislation passed in 1982. The following information is organized into these sections:

### Background

Export Trading Company Act (ECTA) -- Legislative/Regulatory Summary  
The ETCA and Development of Export Trading Companies  
Profiles of Selected Export Trading Companies  
Implications of ECTA for the U.S. Photovoltaics Industry

### BACKGROUND

On October 8, 1982, President Reagan signed into law the Export Trading Company Act (ETCA). This culminated several years' effort in the Congress to enhance the overall competitiveness of U.S. industry in international markets.

The United States has long been a major and successful force in the export business. From 1893 until 1971, this country enjoyed an unbroken string of trade surpluses. Since 1971, however, we have had surpluses in only two years, and our total trade deficit has been nearly \$150 million.<sup>1</sup> Much of this has resulted from our imports of oil; however, another important factor has been increased competition for international markets from overseas manufacturers.

At present, only 1% of U.S. manufacturers account for 80% of this country's exports,<sup>2</sup> and many of them are either multi-national corporations or companies with offices or facilities overseas. The Commerce Department has estimated that more than 25,000 small and medium-sized companies not currently exporting do produce goods and services that can be competitive in the world market. Furthermore, a high percentage of these firms are involved in emerging industries, where the greatest potential for international market growth lies.<sup>3</sup>

<sup>1</sup>George J. Stathakis; President & CEO, General Electric Trading Co.

<sup>2</sup>Charles R. Johnston, Jr.; former Dir. Cncl for Export Trading Cos.

<sup>3</sup>Tino Puri; Director, McKinsey & Co.

Small and medium-sized companies, however, generally lack the expertise and the resources to market overseas. And it is this situation that the framers of the Export Trading Company Act have sought to address. They have approached the problem in two ways. First, in Title II of ETCA, banking institutions (bank holding companies and bankers' banks, primarily) are authorized to invest in export trading companies. In this manner, significant reserves of capital and financial expertise will be made available to exporters. Second, in Title III of ETCA, by clarifying U.S. antitrust law as it relates to export activities, the Export Trading Company Act will facilitate joint export marketing ventures among producers of similar products. By permitting a number of firms to share the cost of export efforts, more small and medium-sized firms will be able to afford to enter the export market.

The implications of the Export Trading Company Act for the U.S. photovoltaics industry are significant. It is an industry characterized, if not predominated, by small and medium-sized firms. And it is heavily dependent on exports, as it currently sells about half its products in overseas markets. Thus, the Export Trading Company Act provides, in theory at least, appropriate types of assistance to help the photovoltaics industry address markets that are critical to its near and long term development.

## EXPORT TRADING COMPANY ACT (ETCA)--LEGISLATIVE/REGULATORY SUMMARY

The Export Trading Company Act is composed of four titles. Title I authorizes the establishment of an office in the Department of Commerce to facilitate the formation of export trading companies in the United States and their use by domestic industries. It also provides definitions in precise terms for a number of activities, organizations and concepts covered by the act.

The term "export trade" is defined to mean "trade or commerce in goods or services produced in the United States which are exported, or in the course of being exported, from the United States to any other country." The inclusion of services as an export commodity is a significant step beyond previous export trade legislation (i.e., Webb-Pomerene Act authorizing export associations). The concept of "in the course of being exported," though imprecise, does bring activities that can reasonably be construed as preparations for exporting under the coverage of the act.

A thorough, but not restrictive list of examples of exportable services is provided:

accounting, amusement, architectural, automatic data processing, business, communications, construction franchising and licensing, consulting, engineering, financial services, insurance, legal services, management, repair, tourism, training, and transportation.

Also provided is a list of examples of services that can be provided by ETC's:

consulting, international market research, advertising, marketing, insurance, product research and design, legal assistance, transportation, including trade documentation and freight forwarding, communication and processing of foreign orders to and for exporters and foreign purchasers, warehousing, foreign exchange, financing, and taking title to goods.

Export trading company is defined as: "a person, partnership association, or similar organization, whether operated

for profit or as a nonprofit organization, which does business under the laws of the United States or any State and which is organized and operated principally for the purposes of "exporting or facilitating the export of goods and services produced in the United States." The term "principally" is significant, because it establishes the intent of Congress to provide special support only for companies that generate more than one half of their revenues through the export of U.S. produced goods and services, rather than through imports to the U.S. or through trade between two foreign countries.

Title II of ETCA, the Bank Export Services Act (BESA), permits bank holding companies, bankers' banks and Edge and Agreement Act corporations\*, with certain restrictions and subject to Federal Reserve Board approval, to invest in and own as much as 100% of export trading companies. Edge and Agreement Act Corporations are bank subsidiaries which conduct international banking and other financial operations and which, like a bank holding company, are subject to Federal Reserve Board oversight. That these banking institutions--and not banks themselves--are specified in the legislation is significant for two reasons. First, this brings to bear a body of existing regulation governing the commercial activities of bank holding companies which, in effect, protects bank depositors from exposure to losses incurred by a bank's commercial subsidiaries. And second, through bankers' bank participation in export activities, the resources of a large number of smaller regional banks will become available for the support of export trade activities.

The principle restrictions on the involvement of banking institutions in export trading companies are:

- No more than 5% of a banking institution's capital and surplus may be invested in an ETC (25%, in the case of a non-banking Edge Act corporation).
- No more than 10% of a banking institution's capital and surplus may be extended in credit to an affiliated ETC.
- No preferential treatment of an ETC or its customers by an affiliated banking institution is permitted.

\* - for definitions, see page 10.

Because export trading companies will generally lack physical assets as collateral, even for loans from affiliated banks, Title II included two important provisions relating to export financing. The first relieves banking institutions of standard collateral requirements in the case of loans to their affiliated ETC's. In its regulations under BESA, the Federal Reserve Board simply requires that the banking institution have a security interest in the goods or services bought by the ETC with the loan or that a firm order exist for such goods from a bona fide customer.

The second provision on export financing establishes a program at the Export-Import Bank under which ETC's can receive guarantees on loans from private credit institutions that are secured by export accounts receivable or by actual inventories of exportable goods.

Title II also includes a financing provision that, while not restricted to export transactions, will certainly have an impact in that area. Section 207 significantly liberalizes limitations on the use of banker's acceptances for domestic and import as well as export commerce. Banker's acceptances facilitate sales by allowing a bank to substitute its' credit standing for that of a buyer, with the bank guaranteeing payment to the seller.

Title II of the act adds one significant definitional provision not provided in Title I: it prohibits bank-affiliated ETC's from being involved in product manufacture. Exceptions to this are permissible only for incidental product modification necessary for sale in foreign markets. The Federal Reserve Board states, in its discussion of regulations under Title II, that ETC's exist to serve other, unaffiliated companies, rather than to export goods and services that they themselves produce.

Title II appears to differ from Title I in one significant area in that an export trading company is defined as a "company" and not as a "person, partnership, association or similar

organization" permitted under Title I. From this definition, at least one legal opinion holds that banks are permitted to invest only in corporate ETC structures.

Finally, the Federal Reserve Board's regulations make explicit the requirement that, in order for an ETC to qualify for bank participation under BESA, more than half of its income must be derived from the export of U.S. produced goods and services, as opposed to imports to the U.S. or sales from one foreign nation to another.

Title III of ETCA, "Export Trade Certificates of Review", encourages exports by establishing a greater degree of antitrust immunity for joint overseas marketing efforts by otherwise unaffiliated companies. Through ETCA and the Commerce Department's accompanying regulations and guidelines, a process has been established through which a certificate can be obtained from the Department of Commerce, in consultation with the Department of Justice, that confers on the holder a limited antitrust exemption. Any activities of export trading companies, as defined in the title, and elaborated in the guidelines, are eligible for certification if they will:

- (1) result in neither a substantial lessening of competition or restraint of trade within the United States nor a substantial restraint of the export trade of any competitor of the applicant (NOTE: the consideration being the anti-competitive impact of the conduct, based on an assessment of the concentration of the domestic market, the ease of entry into it, and the market power of the applicant ETC and its members).
- (2) not unreasonably enhance, stabilize, or depress prices within the United States of the goods, wares, merchandise, or services of the class exported by the applicant, (NOTE: the consideration being the domestic impact of the export activity: price increases in an appropriate response to increased overseas demand are acceptable; export conduct for the purpose of manipulating domestic demand and prices is unacceptable.)

- (3) not constitute unfair methods of competition against competitors engaged in the export of goods, wares, merchandise, or services of the class exported by the applicant, (NOTE: the consideration being the impact of the activity on the exports of domestic competitors: a reasonable displacement of competitor's export sales is acceptable; the restriction of domestic export competitors from sources of supply is unacceptable).
- (4) not include any act that may reasonably be expected to result in the sale for consumption or resale within the United States of the goods, wares, merchandise, or services exported by the applicant, (NOTE: the consideration being to avoid supporting export activities that lead to resale of the exported products within the U.S.; not, however, concerned with the sale overseas of products that will be substantially transformed into more finished products that will be exported to the U.S.).

The antitrust immunity provided by the Certificate of Review protects its holder and the members identified in it from civil and criminal liability under Federal and State antitrust laws for the conduct that is specified in the certificate and that occurs within its effective period. No immunity from foreign competition laws is provided. The certificate can be revoked only by the Secretary of Commerce, in the event that the Secretary or the Attorney General finds that the export activities in question no longer comply with the four eligibility standards.

Civil action for damages and an injunction halting activities specified in the certificate is still permissible, however, in case the certificate was improperly issued or in case, because of changed circumstances, the certified activity no longer meets the four eligibility standards. Any such suit must be entered into within two years of the time that notice of a violation of the standards occurs and within four years of the time of the action causing the damage. There is a definite presumption that the certified activity complies with the eligibility standards. And only single damages may be awarded to the plaintiff in case he or she prevails, as opposed to the treble damages involved in regular

antitrust litigation. Furthermore, if the defendant prevails in such a case, his or her court costs and reasonable attorney's fees are covered by the plaintiff. While the possibility of such litigation imposes on the certificate holder a responsibility to ensure that his or her activities correspond with those listed in the certificate and that circumstances permit those activities to remain in compliance with the four eligibility standards, failure to maintain compliance carries far less serious implications than does a violation of standard antitrust laws.

Title III of ETCA, by virtue of the fact that it is a vehicle for antitrust immunity, relies heavily on definition and interpretation for its meaning. The Department of Commerce, in its guidelines for ETC certification, addresses the sensitive issues of the structure and terms under which companies can cooperate in joint export ventures. Structural issues are described as including:

organizational and managerial aspects of the export venture, such as the manner in which the overseas price will be established, the role members will play in the management decisions of the venture, the manner in which business information will be disclosed to or exchanged between members and/or non-members, and restrictions on the activities of members in export markets or on their withdrawal from the export venture.

Agreements that would have to be reached among members of a venture are described as including:

agreements among members on the allocation of export quotas, agreements to pool products for export shipment, agreements setting prices, terms and conditions of sale in foreign markets and distributorship agreements with foreign distributors.

Similarly, the Commerce Department's Interim Rule (March 11, 1983) governing the certification process requires the disclosure of extensive, detailed, and, above all, sensitive business information related to the export activities for which certification is sought. Information is requested regarding, among other things:

- the applicants' and its members' annual business information
- the goods or services which the applicant proposes to export under the certificate

- the U.S. market shares of all companies involved in those product areas
- the specific export services and methods of operation to be provided and employed by the applicant under the certificate
- whether the export activities to be conducted under the certificate will involve any exchange of information regarding domestic prices, production, sales or other confidential business information.

The act also provides for the confidentiality of this information, breachable only:

- with the consent of the person who submitted the information
- upon demand by Congress or a judicial or administrative proceeding
- in case such disclosure is essential to the issuance, amendment or revocation of the certificate itself.

Other significant definitional aspects of Title III and the departmental guidelines for its administration include:

- the prohibition on manufacture by ETC's, except in product modification incidental to exports, similar to that included in Title II
- the definition of persons eligible to apply for certificates of review as any U.S. individual, partnership, profit or non-profit corporation, state or local government, or U.S. subsidiary of a foreign company (foreign companies may receive the protection of a certificate as members of an applicant U.S. trading company)
- the definition in Title III of export trade as "trade or commerce in goods, wares, merchandise, or services exported, or in the course of being exported, from the United States or any territory thereof to any foreign nation. It is significant that no requirement exists in Title III that the exported goods be of U.S. manufacture, as is the case in Titles I and II.

Title IV of the Act supplements Title III by providing antitrust immunity for all export activities except those that have a "direct, substantial and reasonably foreseeable effect" on U.S. domestic or import commerce or on the export commerce of another U.S. business. Opinion is divided as to whether this

provision offers more useful antitrust immunity than does Title III. Title IV immunity does not require the expense of the certification process. Nor does it involve the risk of disclosure of confidential business information. Title III certification, on the other hand, limits any damages resulting from an antitrust suit to single--as opposed to treble--damages. Furthermore, the Certificate of Review confers on the holder a government imprimatur that has a distinct marketing value in and of itself.

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**Definitions for this section**

**Bank holding company** - A holding company which owns at least 25 percent of any bank subsidiary and which is registered with the Federal Reserve Board. BHC activities other than banking must be closely related to banking, such as credit cards or leasing

**Bankers' bank** - A bank whose only clients are other banks. Small banks form bankers' banks to offer a variety of services that they could not independently offer.

**Edge Act corporation** - A corporation chartered, supervised and examined by the Federal Reserve Board for the purpose of engaging in foreign or international banking or other foreign or international financial operations.

**Agreement Act corporation** - A federally or state chartered corporation that agrees not to exercise any power that is impermissible for an Edge Act corporation.

## THE EXPORT TRADING COMPANY ACT AND THE DEVELOPMENT OF ETC'S

Previous to the enactment of the Export Trading Company Act (ETCA), there were three basic forms of export business ventures. Each has been affected in different ways and to varying degrees by ETCA.

Webb-Pomerene Associations. Approximately 300 Webb-Pomerene Associations exist. They are associations of companies within a particular industry that receive very limited antitrust immunity for conducting cooperative export efforts. Because of the very limited nature of the antitrust immunity, and because of inconsistent administration of the Webb-Pomerene Act by the Justice Department and the Federal Trade Commission, very little export activity has occurred in this manner.

The Export Trading Company Act has considerably clarified and enhanced the antitrust immunity available to industry export associations. Expectations are high in both legal and business circles that industry groups will collaborate very effectively in export activities, particularly in partnership with banking organizations as is permitted under Title II of ETCA, and Bank Export Services Act (BESA). Concern does exist, however, in those same legal and business circles, about the sufficiency of antitrust immunity provided under ETCA. At this early stage, with virtually no legal or administrative precedents under ETCA, there is some concern about proceeding aggressively into joint export ventures based on a Commerce Department Certificate of Review under Title III of ETCA. It has been suggested that only in situations where either an entire industry participates in the ETC or the ETC's competitors are simply not concerned about its impact on their own market shares will this type of venture proceed without further clarification of ETCA's antitrust protections.

Export Management Companies (EMC's). Several thousand Export Management Companies exist, usually to offer individual companies the type of export services outlined in Title I of ETCA. The vast majority of EMC's are very small companies, each accounting for less than \$5 million in annual export sales. Perhaps twenty

or thirty EMC's, however, are significantly more substantial, accounting for \$30-40 million annually in export sales. Industry analysts consider that only companies of this larger scale can offer a full range of export services to a diversity of product manufacturers. These companies represent, then, the best model for future ETC development and may be the greatest beneficiaries of the Export Trading Company Act. With banking institution participation, EMS's should instantly have stronger capital bases and will enjoy increased managerial and financial capabilities. Furthermore, both banking organizations interested in taking advantage of Title II and industry groups seeking to exploit the antitrust immunity under Title III should be attracted by the existing expertise of export management companies. Thus, due to ETCA, well-developed and successful EMC's should find themselves more highly courted by customers as well as financiers.

Multinational Corporation Export Trading Companies. Multinational corporations are not new to the export business. As both overseas manufacturers and marketers, many multinational corporations account for exports worth billions of dollars' a year. Prior to passage of ETCA, several had already formed export trading companies for their own extensive exporting and to market products of other companies that fill out, and thus complement, their product lines. ETC's also permit them to countertrade\* more effectively, which helps in the sale of their products. By becoming a viable business venture in and of itself, an ETC has the promise of being a more effective export organization than an international corporate division.

With certain exceptions, however, multinational corporations do not appear interested in marketing similar products of competing businesses. Therefore, the antitrust immunities provided under ETCA are of limited value to them. Furthermore, multinationals already have well developed international networks and substantial financial resources. Therefore, the Bank Export Services Act in ETCA provides little of real significance to them--other than competition and foreign exchange

\*countertrade refers to acceptance of foreign products in exchange for exports. The goods are then marketed domestically and/or overseas

handling capability. Still, multinational ETC's may well gain significantly from ETCA through stimulated export sales in general and increased demand for their services as a result.

Bank-Owned Export Trading Companies. One form of export trading company which did not preexist ETCA and is directly attributable to it is the banking institution-owned ETC. Interest in the export trading company concept among the banking community has been consistently high, and already more applications for banking investments in ETC's have been received by the Federal Reserve Board than applications for Certificates of Review by the Department of Commerce. With international office networks in place, and often with trading divisions owned by overseas subsidiaries already in operation, bank holding companies and bankers' banks have only to organize and staff domestic export management offices and to promote export services to interested companies before they are fully in the export trading business. This may not be typical of banking involvement in ETC's, however. Many banking institutions that are interested in entering the field are not interested in being the sole investor in such an untried venture, and will prefer to enter into partnerships with existing export management companies and other interested parties in the formation of ETC's.

Future Export Trading Company Growth. Mr. Ron Wakeford, Executive Director of the Council for Export Trading Companies, has developed a matrix to depict the various forms that ETC's might take, in terms of their geographic coverage of the U.S., the product lines they might carry and the foreign markets they might address. In each area, there are three variables: an ETC might serve companies from a state or local area,

a distinct region of the U.S., or the whole country; an ETC might carry a single product line, a series of related product lines or multiple product lines; and an ETC might market to a single foreign country, to a distinct geographic region, or to the whole world. This matrix yields 27 possible combinations--27 possible types of ETC's. In fact, considerable diversity is already in evidence among existing and prospective ETC's (see following section).

Such diversity notwithstanding, a profile of a representative ETC has been suggested by Mr. Charles R. Johnston, Jr., a Director of the Council for Export Trading Companies. The characteristics of a mature ETC will likely include, according to Mr. Johnston:

- strong ties to producers
- capability of taking title to goods
- representation of a diverse range of products to avoid overdependence on one product line
- in-house product specialists
- access to a well-developed foreign sales and distribution network
- trade expertise and continuity of management
- strong trade financing capabilities, including:
  1. ability to provide or obtain substantial credit
  2. capacity to undertake local currency loans
  3. countertrade expertise
- capacity to absorb or cover risk in:
  1. market entry
  2. unforeseen import restraints
  3. currency devaluation
  4. freight rate fluctuations
- ability to meet foreign buyer needs
  1. supply product based on foreign specifications
  2. quote prices on various terms including landed basis
  3. arrange and clear all necessary export licenses, shipments through customs, pay duties and freight charges
- capitalization large enough to establish and maintain foreign sales and service operations as well as warehousing facilities if necessary

- ability to undertake third country and import transactions
- ability to conduct sales in volumes that permit cost savings in transportation, insurance and warehousing

While this outlines the form of a well-established ETC, it may take several years to achieve. Most observers foresee ETC's developing gradually, on a project-by-project basis, although there are already exceptions (e.g., Sears World Trade). Charles Johnston predicts that ETC's will grow based on investments by regional banking institutions, shipping companies, port authorities, high export potential companies and state economic development authorities (e.g., New York/New Jersey Port Authority). He believes that new ETC's will develop around specialized product lines and regional orientations, both in terms of client industries and overseas markets. Clients will be required to demonstrate the commercial viability of the venture in terms of the competitiveness of the product, of their ability to deliver it on a timely basis and of their own financial and technical soundness. Johnston foresees ETC's subcontracting out for many of the basic export services in the early years, but developing before long the capability in-house to provide the comprehensive range of requisite services listed above.

## PROFILES OF SELECTED EXPORT TRADING COMPANIES

Considerable activity is occurring at all levels of the export trading company sector as a result of the Export Trading Company Act. While at this time the only new entries to the field that are directly attributable to ETCA are the banking ETC's and one company applying for a Commerce Department Certificate of Review, many companies not previously involved in the export business are considering some form of participation in ETC's.

Due to the freedom that banking institutions now enjoy to participate in ETC's, and due to the availability of antitrust Certificates of Review for industry cooperation in export activities, the most notable development in the export trading company sector is a blurring of the distinctions that have heretofore existed between the types of export ventures described in the preceding section. Much as the matrix developed by Wakeford reveals a wide variety of possible combinations to be represented by ETC's, so are the developing combinations of multinational corporations, banking institutions and industry associations in export trading companies displaying considerable diversity. This is probably a healthy sign, both of a broad-based interest in export trade and a flexible legal environment in which it can be conducted.

The following profiles are of companies that have for some time or will soon be export trading companies. Traditional export management and trading companies, export subsidiaries of multinational corporations, new bank ETC's and companies applying for Commerce Department Certificates of Review are represented. Many commonalities exist between them, but perhaps the only characteristic shared by them all is that they are evolving, moving at varying rates of speed into areas of business activity opened up by the Export Trading Company Act.

## Export Management Companies

### 1. Sallagh & Thrall - Philadelphia, Pa.

- 50 years of experience in exports
- not using ETCA so far; not marketing competing products, not interested in ownership by bank, although do foresee possibility of participation in ETC joint venture with banks, insurance companies, freight forwarders in area
- internal capital base, standard lines of credit
- strong concentration in certain regions, although working in 70 - 80 countries
- rely on contacts to uncover project opportunities
- interested in, but not involved in energy; not oriented toward high technology, although dealing in chemicals and air pollution control equipment

### 2. MITCO International, Inc. - Minneapolis, Minn.

- 2 year old trading company marketing locally produced goods
- not using E.C.A so far; not marketing competing products, possible bank investment, however
- not well set up to handle countertrade at this point
- consider product expertise critical to marketing success
- no in-house expertise in PV area, but have looked at wind generators and water purification

### 3. XPORT - World Trade Center, New York, New York

- owned by N. Y./ N. J. Port Authority to export local goods
- publically funded
- conducting pilot project marketing selected products
- expect to market competing products, thus to need Commerce Department Certificate of Review
- fee-based services at this time; if to take title to goods, will need greater operating capital fund

## Multinationally-Owned Export Trading Companies

### 1. Sears World Trade - Chicago, Ill.

- based on international purchasing and sales experience of Sears
- ETC initially buying for Sears, now representing unaffiliated companies, involved in countertrade
- expect to market competing products, thus to need Commerce Department Certificate of Review
- involved in joint venture with one bank already, more expected, to assist in handling of foreign currencies
- have discussed representation with three PV module manufacturers, prefer systems approach at this time

2. General Electric Trading Company - New York, N. Y.

- developing out of international trade of product divisions and International Division
- primarily interested in products that fill out GE line; no competing products; emphasis on medium technology, short-of-cycle, off-the-shelf, flow goods, as opposed to large scale, high technology products; will move in that direction in time
- Lead Bank Program - developing relationships with regional banks
- aware of PV and GE work in solar, but not marketing it overseas at this time

3. Burlington International Services, Inc. - Portland, Ore.

- international sales and purchasing experience through BN
- concentrating on BN subsidiaries, but opening up to unaffiliated companies in trade that will complement current trade (regional, rather than product, specific; e.g. very strong in China)
- possible marketing of competing products; thus possible need for Commerce Department Certificate of Review
- conventional capital base and credit financing
- conceivable interest in representing small PV company

4. Peabody World Trade Corporation - Stamford, Conn.

- developed out of International Division of Peabody 2 yrs. ago
- representing diversified subsidiaries and unaffiliated companies
- foresee possible need for Commerce Department Certificate of Review
- standard capital base and credit financing
- do take title to goods
- always seeking new products; already marketing diesel engines, generators, irrigation equipment

5. Motors Trading Company - Detroit, Mich.

- concerned only with marketing GM products and with countertrade to assist in that

Department of Commerce Certificates of Review Applicants

1. U. S. Farm Raised Fish Trading Company - Jackson, Miss.

- new trading company; new industry, very concentrated
- identical, competing products marketed; cooperation to achieve greater volume capability - definite antitrust implications
- skeleton staff, will borrow staff help from members
- considering partnership with bank to acquire infrastructure

2. International Trailer Sales, Inc. - Independence, Mo.

- 2 yrs. international experience marketing truck trailers
- assembling complete product line from various companies; no duplication of products, antitrust implications imprecise; Certificate sought to help in obtaining financing, standard credit arrangements
- brokering deals, preferably, but also taking title to goods
- avoiding countertrade, dealing only in cash

3. Intex Trading Company - Old Greenwich, Conn.

- 13 yr. export involvement through parent company
- ETC to assemble portfolio of engineering services offered by various firms
- brokering of bids currently, foresee possible direct procurement of bids with subcontracting to members
- standard financing arrangements
- conceivable interest in energy project export management

4. Universal Trading Group, Ltd. - St. Louis, Mo.

- based on 4 yr. experience of parent, Mid-East Health Care Co.
- exporting medical equipment, supplies & services, although expanding to other medical areas and unrelated product areas (tires)
- regionally focussed (Middle East, but broadening)
- marketing competing products; definite antitrust implications
- interested in manufacture; adverse implications for bank participation
- handling countertrade
- standard financing from capital base and lines of credit

Bank Export Trading Companies

1. Heller Trading Company - Chicago, Ill.

- experience in international financial management through Walter E. Heller International Corporation
- ETCA provides the opportunity to invest in and operate an export trading company
- will joint venture with industry teams, the more broadly based within an industry, the better
- prepared to handle countertrade
- willing to discuss possible venture with PV industry; interested in short term return on investment, thus interested in industry's demonstrated investment potential

2. First Interstate Trading Company - Los Angeles, Ca.

- several years experience through Export Finance Group
- providing deal structuring services and financing now, foresee taking title to goods in future
- seeking middle-market (\$5 - \$50 mil.) customers
- regionally focussed; West and Midwest for companies, Far East and Asia for markets
- not involved in countertrade at this time
- not marketing competing products at this time
- identifying market needs, selecting to meet those needs from companies that have made initiatives to them
- some energy involvement and open to PV; recognize prospects overseas for U. S. alternative energy developments

IMPLICATIONS OF THE EXPORT TRADING COMPANY ACT  
FOR THE U. S. PHOTOVOLTAICS INDUSTRY

Throughout the history of the Export Trading Company legislation, its objective has been to enhance the competitiveness of U. S. industry in international markets. It is, above all, an attempt to encourage the development of a broad-based export trading service industry that can help tens of thousands of small and medium-sized businesses enter the export market. Although it remains to be seen how effective the act will be overall in this regard, it is clear that a higher level of export activity is resulting from it.

The implications of ETCA for the U. S. photovoltaics industry are significant. As will be demonstrated in the following section, the industry is heavily involved in -- if not dependant on -- the export market. It clearly stands to benefit from any mechanism that can enhance its export capability even further. In addition, the U. S. photovoltaics industry is predominated by small and medium-sized companies which are only marginal commercially at this time and which must devote substantial proportions of their resources to technology and product development. For these reasons, the photovoltaics industry needs a free standing export management industry that can provide export capabilities to it as economically as possible.

There are certain considerations which will influence the manner in which the photovoltaics industry utilizes the export trading company sector, however, and the extent to which such usage goes. In the first instance, there is considerable concern about the adequacy of the antitrust immunities provided by Titles III and IV. As has been suggested by more than one observer of the current situation, joint export ventures within an industry may only be viable, from an antitrust perspective, if either all of the industry is involved and potential opposition is co-opted or if the venture is not perceived as a serious threat by non-participants. How much time will pass until legal precedents clarify the extent of the antitrust immunities in ETCA is uncertain.

Another factor which may influence the ability of the photovoltaics industry to take advantage of export trading companies is the perception among the export traders themselves of the profitability of the overseas photovoltaics market. The early activity among export trading companies may center in industries with proven products and markets and with demonstrated profitability at a scale that justifies the investment of the necessary resources. It will be important for the photovoltaics industry to identify as clearly as possible its near-term overseas marketing prospects, and to identify the types of export trading companies to which that information will be of greatest value. As was described in the preceding section, there is considerable diversity within the export trading company sector already. The Export Trading Company Act appears to be creating even more. Understanding the common ground between the maturing export trading sector and the emerging photovoltaics industry will be critical to a successful marriage of the two.

## U.S. PHOTOVOLTAIC INDUSTRY EXPORT ACTIVITY

An underlying premise to the proposed assessment of export trading companies is that the new legislation should help increase the competitive position of the U.S. pv industry abroad. The first section of this brief has outlined what advantages the export trading company may offer a firm marketing overseas. It is also incumbent on ECRE to determine if members of the photovoltaic industry will benefit from the legislation given the scope of their current marketing overseas, and whether members of the industry have given any consideration to export trading companies.

In order to answer these two questions, a limited sample of the photovoltaic industry was identified and surveyed. Representatives of eleven companies were interviewed. The survey population included the top three or four U.S. producers of pv modules, a balance of system supplier, a production system supplier, a systems integrator, several smaller module producers, and a large firm still in the pre-commercial R&D stage.

### Knowledge of and Interest in Export Trading Companies

Eight of the eleven firms are heavily involved in export of photovoltaic technology and hardware. The interviews confirmed the significant share of export sales for U.S. producers. Every company involved overseas reported that at least fifty percent of its sales were foreign. Given the importance of export markets, every person interviewed expressed an active interest in receiving more information about export trading companies. Seven of the eleven interviewed had heard of export trading companies, but only two or three companies seemed to have investigated them in any way. Above all, there were uniform statements that the information received to date on export trading companies was hard to understand, or did not make clear what advantages they offered.

The industry discussions reveal that the companies have not had the resources to investigate the implications of the Export Trading Company Act for their business. Even large firms, expected to be more financially capable of such a review, have given little consideration to the potential of an export trading company. Some of the interviewees felt that it would only serve as a holding company, and did not offer any clear advantage over what they were currently doing. No-one seemed to appreciate the potential scale of a well-founded export trading company, nor the wide ranging services it could provide.

Some industry representatives expressed concern about the anti-trust aspects of the ETC Act. They observed that the photovoltaics industry is highly competitive, and could not envision an export trading company grouping several manufacturers of the same type of product. The advantages of a vertically organized ETC were more clear, and it was felt such a concept would benefit smaller companies, especially those providing balance of system components. There was also concern that control would be lost over high-technology exports, when the manufacturer wished to protect proprietary or advanced state-of-the-art concepts and designs. Based on the industry survey, these and other issues related to current export activity will have to be addressed more thoroughly.

#### Current Export Activity

As noted above, foreign sales of photovoltaic equipment represent over fifty percent of the business for the firms included in the survey. The interviews indicated that the whole range of marketing options is currently being employed. Three basic distribution systems are at work:

- Joint ventures with foreign firms
- Direct international sales supported by domestic and overseas offices
- Use of foreign distributors, agents, and representatives

None of the three dominates, and in most cases, the companies

are employing several or all of them simultaneously. The companies or divisions of large companies are still so small that maintaining presence overseas can represent an economic burden. The relation between greater presence and sales is not clear; however, judging from industry comments, more presence should certainly generate a stronger market position, if not immediate sales.

Some of the oil company-affiliated pv companies use the offices of the parent firm to assist in marketing, or in some cases for direct marketing. One respondent noted that in some cases, the parent firm overseas offices will be avoided if the sales can be made more smoothly. Smaller companies naturally use agents more frequently than the larger firms. Joint venture partnerships have also proliferated, usually being employed to assist the U.S. company gain entree to a market that has traditional ties with another advanced country in Europe. Problems with finance have also stimulated creation of joint ventures for sales in third world countries. Regarding distribution strategies, the market is still too small to be able to identify any clearly superior approach.

No single class of application seems to dominate international sales. Most firms reported that telecommunication systems generally rank very high as a percent of their business, but agricultural systems for pumping/irrigation, cathodic protection, and remote residential systems also have significant market shares. It does not appear that the overseas market is yet experiencing the installation of multi-megawatt utility connected systems such as those supported by PURPA legislation in the U.S. Clearly, several companies rely heavily on institutional sales, that is, systems bought for experimental or demonstration purposes by international assistance or lending institutions.

It was beyond the scope of the Phase I effort to poll industry on the nature of competition overseas. Over the last few years a large number of companies have been formed abroad, and they represent a serious marketing challenge to the U.S.-based industry. An assessment of competition will have to be conducted as part of a subsequent, more detailed study to determine how the export trading company concept addresses competition from other countries, particularly when government export subsidies assist the foreign firms.

The companies surveyed seem confident that the photovoltaics market will continue to grow at a significant rate. One leading firm expects sales growth to return to a 50-60 percent annual rate. The overall magnitude of future growth remains subject to speculation. Tables I and II illustrate the disparity existing in several market projections performed from 1977 to 1982.

The strength of current sales confirms that a commercially viable market for photovoltaic systems in remote, off-grid sites exists around the world. This market should accelerate as photovoltaic costs continue to be reduced. One estimate of the remote-site market was prepared by Frost and Sullivan, and is presented in Tables II and IV.\* Such forecasts do not, unfortunately, reveal how the position of the U.S. dollar in international currency markets affects exports, or relate the increase in the value of the dollar abroad to reductions in technology costs. Nor do they address the serious issue of financing sales in third-world markets with weak currencies. These forecasts do confirm the importance of continuing to seek more efficient means of capturing overseas markets.

The survey of photovoltaic companies performed for this study underscores the need for a closer examination of the export trading company concept. The first section of this brief

\*These figures overstate known production volume, but indicate high expectations for pv sales abroad

described the advantages export trading companies should offer the photovoltaic industry. A more detailed examination of the photovoltaic industry is now needed to examine how current sales are managed, how sales are financed, and what key factors drive lead generation and market growth. Matching the results of such an examination with further review of the export trade sector and potential of export trading companies to determine how to best match current and evolving needs of the U.S. photovoltaic industry is the logical next step. Such a closer examination will be enthusiastically received by members of the U.S. industry.

THE FOLLOWING TABLE ILLUSTRATES VARIOUS PHOTOVOLTAIC WORLD SALES PROJECTIONS MADE FROM 1977 TO 1982 BY SEVERAL LEADING PHOTOVOLTAIC MARKET RESEARCH FIRMS.

WORLD PHOTOVOLTAIC SALES PROJECTIONS IN MEGAWATTS				
YEAR OF PROJECTION	COMPANY	1982 PROJECTION	1984 TO 1986 PROJECTION	1988 TO 1990 PROJECTION
1977	BDM	30	140	
1977	ITC	20	300	
1978	SERI	25	700	2,500
1980	MONEGOM	14	500	8,000
1982	PVES*	12 TO 15	100 TO 200	500 TO 1,000

IN MAKING ITS FORECAST, PVES CONSIDERED THE FOLLOWING FACTORS AND MADE THE FOLLOWING ASSUMPTIONS:

- CONSERVATIVE MODULE PRICES WERE USED IN THE FORECAST, THOUGH MANY INDUSTRY ANALYSTS BELIEVE A SINGLE R&D BREAKTHROUGH COULD GREATLY LOWER FUTURE COSTS.
- NO NET ESCALATION IN OIL PRICES WAS ASSUMED.
- THE FORECAST ASSUMED THAT THERE WOULD BE NO FUNDAMENTAL PHYSICAL FAILURES IN THE SILICON P-n JUNCTION CELL.
- IT WAS FURTHER ASSUMED THAT THE UNITED STATES SOLAR TAX REBATES WILL CONTINUE.
- THERE WILL BE NO MAJOR REDUCTION IN THE PRICE OF ELECTRICITY BECAUSE OF ANOTHER TECHNOLOGY.
- THERE WILL BE NO 30X-EFFICIENT, LOW-MATERIAL-USAGE, RELIABLE SOLAR-ELECTRIC CONVERSION MECHANISMS DISCOVERED BEFORE 1988.

THE PVES FORECAST CLAIMS TO BE CONSERVATIVE, BY TAKING INTO CONSIDERATION THE FACT THAT THE RATE OF DECREASE IN PHOTOVOLTAIC PRICES HAS SLOWED, AND THAT THE ESCALATION OF OIL PRICES HAS TAPERED OFF.

TABLE

● STRATEGIES UNLIMITED, ANOTHER LEADER IN PHOTOVOLTAIC MARKET FORECASTING, ESTIMATED THE WORLD MARKET FOR PHOTOVOLTAIC MODULES IN SHIPMENTS IN MILLIONS OF DOLLARS FROM 1982 TO 1986. THIS FORECAST APPEARS IN GRAPH FORM BELOW AND IS MUCH MORE CONSERVATIVE THAN THE PHOTOVOLTAIC ENERGY SYSTEMS (PVES) FORECAST.



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TABLE III

FROST & SULLIVAN FORECASTS  
FOR REMOTE SITE PHOTOVOLTAIC SYSTEMS (MW)

Telecommunication Remote Site Applications

	<u>1980</u>	<u>1982</u>	<u>1984</u>	<u>1986</u>	<u>1988</u>	<u>1990</u>
North America	.5	1.1	2.1	3.2	3.5	3.7
Europe	.25	.75	1.0	1.39	1.5	1.8
Africa	.3	.66	1.26	1.92	2.1	2.2
Middle East	.3	.7	1.36	2.08	2.27	2.4
South America	.35	.77	1.5	2.2	2.45	2.59
Asia/Pacific	.44	.92	1.76	2.69	2.94	3.1

Cathodic Protection

	<u>1980</u>	<u>1982</u>	<u>1984</u>	<u>1986</u>	<u>1988</u>	<u>1990</u>
North America	.36	.96	1.89	2.85	3.66	4.5
Europe	.16	.24	.48	1.46	1.90	2.0
Africa	.3	.9	1.7	2.5	3.7	4.7
Middle East	.4	.9	1.5	2.7	3.5	5.0
South America	.2	.3	.9	1.3	1.9	3.0
Asia/Pacific	.2	.3	.6	.9	1.5	2.5

TABLE IV  
 FROST & SULLIVAN FORECASTS  
 FOR REMOTE SITE PHOTOVOLTAIC SYSTEMS (MW)

Agricultural Applications (Pumping/Irrigation)

	<u>1980</u>	<u>1982</u>	<u>1984</u>	<u>1986</u>	<u>1988</u>	<u>1990</u>
North America	1.2	3.2	5.0	20.0	65.0	91.0
Europe	.9	1.1	3.5	10.5	59.0	89.0
Africa	1.53	1.87	5.95	31.45	100.0	151.3
Middle East	1.1	2.2	14.7	35.0	111.0	220.0
South America	.6	.7	2.3	12.0	39.0	59.0
Asia/Pacific	.76	.93	2.97	15.7	50.0	75.0

Rural Electrification

	<u>1980</u>	<u>1982</u>	<u>1984</u>	<u>1986</u>	<u>1988</u>	<u>1990</u>
North America	.5	1.7	12.0	45.0	80.0	155.0
Europe	.3	.7	3.5	19.0	42.5	125.0
Africa	.66	2.0	7.7	56.1	127.6	385.0
Middle East	.22	1.3	2.5	20.0	44.0	130.0
South America	.3	1.2	10.0	22.0	52.0	130.0
Asia/Pacific	.5	1.4	5.7	21.0	77.0	124.0