

CONSIDERING THE COGENERATION COMMITMENT:
DO GOVERNMENT INCENTIVES TIP THE SCALES?

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COGENERATION AND SMALL POWER production have the potential to be an innovative partial solution to the nation's energy problems: By burning certain waste products of an industrial process to generate power, or by recycling energy in a sequential power-generation process, an industrial plant can meet some of its own power needs and also sell power to a nearby electric utility. The federal government is committed to developing the potential of cogeneration, but must rely on industry to build and operate the facilities. Although industry has long possessed the technology to engage in cogeneration and small power production, over the past few decades there has been a decline in the number of these facilities due to the requisite capital investment. In addition, most companies were unwilling to subject themselves to state and federal utility regulation or to the risk of being unable to sell the energy they generated or to purchase backup power at reasonable rates. Because companies must weigh the costs against any potential benefits to be derived from a long-term project such as cogeneration or small power production before proceeding, the government has spent the last two years creating economic and regulatory incentives in an effort to tip the scales toward the cogeneration commitment. The Public Utility Regulatory Policies Act of 1978 (PURPA) creates a market for the sale and purchase of electrical power for qualifying facilities. Exemptions are provided from incremental pricing under the Natural Gas Policy Act of 1978 for facilities meeting other criteria. Energy investment tax credits can be available for these facilities under the Energy Tax Act of 1978 or the Crude Oil Windfall Profit Tax Act of 1980, and financial assistance may be provided for the construction of certain facilities producing energy from biomass under the Energy Security Act.

I. THE INITIAL INQUIRY

A. What Constitutes Cogeneration and Small Power Production?

A company considering instituting cogeneration or small power production must have an understanding of how the government defines those terms.¹ Title II of PURPA² amended the Federal Power Act to include the following definitions, thereby establishing the guidelines for facilities qualifying for the new incentives.

A small power production facility produces electricity by using biomass, waste, renewable resources (e.g., water, wind, and solar power), or any combination of those resources as its primary energy source.³ Use of other types of fuel is limited to purposes of ignition, testing, or control of the flame or for prevention of outages.⁴ A small power production facility cannot have a

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¹It is technically possible to combine cogeneration and small power production processes in one facility, but there is no government-sponsored incentive to do so.

²16 U.S.C. § 824a-3. (Supp. 1980).

³16 U.S.C. § 796(17) (A) (Supp. 1980).

⁴16 U.S.C. § 796(17) (B) (Supp. 1980).

capacity which, together with other facilities owned by the same concern using the same energy resource, and located within one mile⁵, is greater than 80 megawatts.⁶

A cogeneration facility produces both electric energy and forms of useful thermal energy through a sequential process.⁷ The sequence can operate in either direction. A topping-cycle cogeneration facility first produces electricity and then uses the reject heat emerging from this process to provide useful thermal energy.⁸ A bottoming-cycle cogeneration facility reverses the process, first producing useful thermal energy and then using the reject heat to produce electricity.⁹ Most existing industrial cogenerators are topping-cycle facilities,¹⁰ probably because a bottoming-cycle facility requires heat of a higher temperature than most industrial processes reject.¹¹ The Federal Energy Regulatory Commission (FERC), which is entrusted with administering the sections of PURPA on cogeneration and small power production, has made it clear that the sequential process is the key provision of cogeneration. The sequential process of reject heat from a power production or heating process being re-used in another power production or heating process is what makes cogeneration a conservation measure.¹²

B. *Qualifying Under PURPA*

The standards for qualification established by FERC pursuant to Title II of PURPA are designed to insure that a cogeneration or small power production facility is not really an electric utility company in disguise¹³, and that the fuel used for small power production is primarily an alternate energy source, not oil or natural gas. Small power production facilities must meet three criteria. Not more than 50 percent of the equity in the facility may be held by a concern "primarily engaged in the generation or sale of electric power (other than electric power solely from cogeneration facilities or small power production facilities)".¹⁴ The maximum size that a small power producer can reach and remain qualifying is 80 megawatts.¹⁵ The third cri-

⁵18 C.F.R. § 292.204(2) (1980).

⁶16 U.S.C. § 796(17)(A) (Supp. 1980).

⁷16 U.S.C. § 796(18) (A) (Supp. 1980).

⁸18 C.F.R. § 292.202(d) (1980).

⁹18 C.F.R. § 292.202(e) (1980).

¹⁰Inside F.E.R.C., July 28, 1980, at 2.

¹¹*Comptroller General's Report to the Congress: Industrial Cogeneration—What It Is, How It Works, Its Potential*, Doc. No. EMD-80-7 at 6, 11 (April 29, 1980).

¹²A plant that routes steam from its boilers to industrial processes without expansion in a turbine is not cogenerating. Neither is it cogeneration when a plant routes some of the steam from the boilers to cogenerating equipment and the rest to industrial processes. 45 Fed. Reg. 17,959, 17,961 (March 20, 1980).

¹³In Order No. 70-B, issued August 4, 1980, FERC amended its regulations by substituting the words "electric utility holding company" for the words "public utility holding company" to permit gas utility holding companies to own qualifying facilities, since FERC did not intend to prohibit companies without any electric utility interests from owning qualifying facilities. F.E.R.C. Order No. 70-B, Docket No. RM79-54 (August 4, 1980) (to be codified in 18 C.F.R. § 292.202, .206, .207). On September 26, 1980, FERC further amended its regulations to clarify that an "electric utility holding company" does not include a holding company that the Securities and Exchange Commission by rule or order under section 3(a)(3) or 3(a)(5) of the Public Utility Holding Company Act of 1935 has declared to be an exempt holding company. F.E.R.C. Order Granting Rehearing of Order No. 70-B and Amending Regulations, Docket No. RM79-54 (September 26, 1980) (to be codified in 18 C.F.R. § 292.202, .206, .207).

¹⁴18 C.F.R. § 292.206(a) (1980).

¹⁵18 C.F.R. § 292.204(a) (1980).

terion a small power production facility must meet to qualify under PURPA is that more than 75 percent of its total energy input must be from biomass and/or renewable resources,¹⁶ and the use of fossil-fuels may not exceed 25 percent of the total energy input in any calendar year.¹⁷

Qualifying cogeneration facilities share with qualifying small power production facilities the ownership requirement that the owner, if an electric utility, cannot hold equity in more than 50 percent of the facility.¹⁸ A topping-cycle cogenerator must meet an operating standard which requires the useful thermal energy output of the facility to be no less than 5 percent of the total energy output in any calendar year.¹⁹ If the topping-cycle facility uses any oil or natural gas and was installed on or after March 13, 1980, it must also meet the following efficiency standard: If, in any calendar year, the useful thermal energy produced is less than 15 percent of the total energy output, then the aggregate of the electric output and one-half the useful thermal energy output must be at least 45 percent of the total oil and gas input. If, however, in any calendar year the useful thermal energy produced is 15 percent or more of the total energy output, then the combination of electric output and one-half the useful thermal energy output need only be 42.5 percent of the oil and gas input.²⁰ A bottoming-cycle facility installed on or after March 13, 1980, that receives supplementary firing in the electric generation phase by use of natural gas or oil must meet a similar efficiency standard: the facility must produce in any calendar year an amount of electricity which is not less than 45 percent of the natural gas and oil input.²¹ FERC has not set operating standards for bottoming-cycle facilities.

Diesel cogeneration facilities installed on or after March 13, 1980, are not qualifying facilities under current FERC regulations.²² However, FERC appears to have no plans to place federal restrictions on diesel facilities, according to a FERC draft Environmental Impact Statement, because the resultant air quality degradation is not expected to warrant additional federal regulation in light environmental regulation by federal, state, and local environmental agencies. If air quality problems relating to diesel cogeneration become more serious than predicted, FERC would consider imposing restrictions.²³

A dual-fuel cogeneration facility, that is, a facility which produces electricity through the use of an internal combustion piston engine capable of changing automatically between gas and oil operation, may obtain qualifying

¹⁶In Order No. 70-B, issued on August 4, 1980, FERC denied a petition to change to 50 percent the requirement that 75 percent of a facility's energy input be from biomass, waste, or renewable resources. F.E.R.C. Order No. 70-B, Docket No. RM79-54 (August 4, 1980).

¹⁷18 C.F.R. § 292.204(b) (1980).

¹⁸18 C.F.R. § 292.206 (1980), *as amended* by F.E.R.C. Order Granting Rehearing of Order No. 70-B and Amending Regulations, Docket No. RM79-54 (September 26, 1980).

¹⁹18 C.F.R. § 292.205(a) (1) (1980).

²⁰18 C.F.R. § 292.205(a) (2) (1980).

²¹18 C.F.R. § 292.205(b) (1980).

²²18 C.F.R. § 292.203(c) (1980).

²³Inside F.E.R.C., June 9, 1980, at 2. The final Environmental Impact Statement is expected to be published around the end of 1980.

status if it was installed on or after May 15, 1980, and an application is made to FERC for a certificate of qualifying status.²⁴

Application to FERC for certification of qualifying status is an optional procedure²⁵ except for new dual-fuel cogeneration facilities. A cogeneration or small power production facility that meets the qualification criteria is deemed to be a qualifying facility.²⁶ A company may elect to seek an affirmative ruling that it is a qualifying facility. Upon receiving an application, FERC will issue an order granting or denying the application or scheduling consideration of the application. An order denying certification identifies which requirements were not met. If FERC does not issue an order within 90 days of the filing of a complete application, qualifying status is deemed to have been granted.

Similarly, FERC may revoke the qualifying status of a facility that fails to comply with the statements contained in its application.²⁷ So a qualifying facility planning to undertake substantial alteration or modification may choose to apply to FERC for a determination that the proposed changes will not result in a revocation of its qualifying status.²⁸

FERC has also established a mandatory reporting requirement for all facilities deemed to qualify under PURPA. The owner or operator of a qualifying facility must furnish notice to FERC of the following information: the name and address of the owner or operator and location of the facility; a brief description of the facility, including an indication whether the facility is a cogenerator or a small power production facility; the primary energy source to be used by the facility; and the power production capacity of the facility.²⁹

II. GOVERNMENT INCENTIVES FOR QUALIFYING FACILITIES

A. *Prods in PURPA*

PURPA was designed to encourage cogeneration and small power production by eliminating the barriers that had previously kept industry from installing these facilities. The Act authorizes FERC to prescribe rules requiring electric utilities to offer to sell energy to qualifying cogeneration and small power production facilities and to purchase electric energy from such facilities.³⁰

PURPA also sets the basic criteria for rates to be charged in the sale or exchange of electric power between qualifying cogenerators or small power producers and electric utilities. The rates charged for electricity sold by the

²⁴18 C.F.R. § 292.203(c) (3), (4) (1980).

²⁵18 C.F.R. § 292.207(b) (1980).

²⁶18 C.F.R. § 292.207(a) (1) (1980).

²⁷18 C.F.R. § 292.207(d) (1) (1980).

²⁸18 C.F.R. § 292.207(d) (2) (1980).

²⁹18 C.F.R. § 292.207(a) (2) (1980).

³⁰16 U.S.C. § 824a-3(a) (Supp. 1980).

utility to the qualifying industrial facility must be just and reasonable and in the public interest and must not discriminate against the qualifying cogenerator or small power producer.³¹ The criteria in PURPA for rates set on power sold by cogenerators or small power producers to utilities reflect a concern for the electric consumers of the utilities in receiving equitable rates as well as for the qualifying industrial facilities. The rates a utility company pays must be just and reasonable to the electric consumers of the electric utility and in the public interest and must not discriminate against the qualifying cogenerator or small power producer.³² The determination of what rates are just and reasonable for qualifying cogeneration or small power production facilities to receive for their electric power will not be made by use of the type of examination traditionally given to electric utility rate applications because the industrial facilities bear a risk in not being guaranteed a rate of return on their power generation activities.³³ In the regulations prescribed under these provisions of PURPA, FERC stipulated that an electric utility purchasing power from a qualifying facility is not required to pay more than the avoided costs of purchasing the same amount of power elsewhere.³⁴ FERC regulations on rates are to be implemented by the state regulatory authorities or non-regulated electric utilities.³⁵

The pricing criteria in the FERC regulations may be viewed as a back-drop to individual negotiations between a cogenerator or small power producer and a utility company. State or federal regulatory bodies will not interfere with an independent agreement between the utility and the qualifying facility, unless the utility is imprudent and its electric consumers would suffer as a result of the terms of its agreement with the cogenerator or small power producer. The FERC rules may improve the bargaining position of the industrial facility.

Other benefits for qualifying facilities included in PURPA are in the form of exemptions from various Acts regulating electric utilities. Qualifying cogeneration facilities and qualifying small power production facilities with power production capacity not above 30 megawatts are exempt from all sections of the Federal Power Act except those dealing with wheeling, interconnection, emergency authority, the filing of statements by directors of public utilities, and enforcement of general licensing requirements.³⁶ Another PURPA exemption provides that qualifying cogeneration and small power production facilities are not to be considered electric utility companies under the purview of the Public Utility Holding Company Act of 1935.³⁷ PURPA authorizes FERC to exempt qualifying small power producers with a capacity not exceeding 30 megawatts and qualifying cogenerators from state laws and regulations governing wholesale sales of power.³⁸

³¹16 U.S.C. § 824a-3(c) (Supp. 1980).

³²16 U.S.C. § 824a-3(b) (Supp. 1980).

³³H. R. Rep. No. 1750, 95th Cong., 2d Sess. 97 (1978).

³⁴18 C.F.R. § 292.304(a) (2) (1980).

³⁵16 U.S.C. § 824a-3(f) (Supp. 1980).

³⁶18 C.F.R. § 292.601 (1980).

³⁷18 C.F.R. § 292.602(b) (1980), *as amended by* F.E.R.C. Order Granting Rehearing of Order No. 70-B and Amending Regulations, Docket No. RM79-54 (September 26, 1980).

³⁸16 U.S.C. § 824a-3(e) (Supp. 1980).

B. Other Government Benefits for Qualifying Facilities

Congress and federal agencies have developed, and are still considering, other ways to entice industry into installing cogeneration and small power production facilities.

1. Exemptions Under NGPA

For a cogeneration facility to be exempt from Title II of the Natural Gas Policy Act of 1978 (NGPA) on incremental pricing and Part 282 of FERC's rules implementing that part of the NGPA, it must either have qualifying status under PURPA as set forth in I.B. above or it must meet the different qualifying requirements specifically established for purposes of the incremental pricing exemption.³⁹ To meet these special qualifying requirements, the cogenerator must have been in existence on November 1, 1979; must have used natural gas as a fuel on or prior to that date;⁴⁰ and, for topping-cycle facilities, must have an overall energy efficiency of no less than 55 percent or an internal energy efficiency of no less than 70 percent⁴¹ as computed under FERC definitions.⁴² Although natural gas used for supplementary firing is not ordinarily eligible for an exemption from incremental pricing,⁴³ FERC has exempted it to the extent that qualifying facilities generate electricity which is sold to a utility.⁴⁴

A separate exemption from the incremental pricing provisions of the NGPA is available for qualifying mechanical cogenerators.⁴⁵ To qualify, the owner or operator must show that the cogenerator produces mechanical energy and forms of useful thermal energy in a sequential process and meets certain efficiency standards set forth in FERC regulations.⁴⁶

2. Tax Credits for Energy Investment

The Energy Tax Act of 1978, as amended by the Crude Oil Windfall Profit Tax Act of 1980, provides a 10 percent tax credit until December 31, 1985, for the installation of boilers which primarily use biomass as a fuel.⁴⁷ Pursuant to the Crude Oil Windfall Profit Tax Act of 1980, certain investments in cogeneration equipment are entitled to a 10 percent energy credit from January 1, 1980, through December 31, 1982.⁴⁸ Cogeneration equipment does not qualify if the facility uses oil or natural gas for any purpose other than startup, flame control, or back-up, or if more than 20 percent of its total fuel input in any taxable year consists of oil or natural gas.⁴⁹ The Treasury Department still must issue regulations on this subject.

³⁹18 C.F.R. § 292.205(c) (1980).

⁴⁰18 C.F.R. § 292.502(a) (1980).

⁴¹18 C.F.R. § 292.502(c) (1980).

⁴²18 C.F.R. § 292.502(b) (5), (6), (7) (1980).

⁴³18 C.F.R. § 292.205(c) (4) (1980).

⁴⁴F.E.R.C. Order No. 49-A (Dec. 27, 1979).

⁴⁵Section 206(d) Exemption for Mechanical Cogeneration Facilities From the Incremental Pricing Provisions of the Natural Gas Policy Act of 1978, Docket No. RM80-62 (October 23, 1980) (to be codified in 18 C.F.R. 282.203, .209).

⁴⁶*Id.*

⁴⁷26 U.S.C. § 46(a)(2)(C) (Supp. 1980).

⁴⁸26 U.S.C. § 46(a)(2), 28(l)(2)(A)(viii) (Supp. 1980).

⁴⁹26 U.S.C. § 48(l)(14)(C) (Supp. 1980).

Amendments to both of these Acts are currently under consideration. One would increase the energy investment tax credit to 20 percent. Another would extend tax credits to utility companies which install cogeneration facilities, the argument being that utilities have the capacity to build cogenerators at less expense than industry and other private developers.⁵⁰

3. Financial Assistance

Financial assistance for cogenerators or small power producers is available for the construction of biomass energy facilities under Title II of the Energy Security Act of 1980. This program is to be administered jointly by the Secretaries of Agriculture and Energy. The Act defines an eligible "biomass energy project" to be "any facility (or portion of a facility) located in the United States which is primarily for . . . (B) the combustion of biomass for the purpose of generating industrial process heat, mechanical power, or electricity (including cogeneration)."⁵¹ Assistance provided under the Act is in the form of loan guarantees,⁵² price guarantees,⁵³ purchase agreements,⁵⁴ and, for the construction of small-scale facilities,⁵⁵ loans.⁵⁶ For the two-year period beginning October 1, 1980, Congress has appropriated \$1.45 billion for the biomass energy program. After September 30, 1984, all forms of government financial assistance will cease; however, funds already committed may be paid after that date.⁵⁷

4. Research Projects

The Department of Energy (DOE) is supervising industrial cogeneration demonstration plants, conducting marketing studies, and developing other programs to encourage cogeneration.⁵⁸ The demonstration projects being designed now are for the textile, pharmaceutical, and glass industries. Another pilot project being researched by DOE is the technology of an atmospheric fluidized bed gas turbine cogeneration system for industrial application. Others planned include solar cogeneration systems, organic Rankine cycle bottoming units, and demonstration cogeneration plants for the chemical and refinery industries and the magnesium extraction industry. The studies DOE is conducting will assess the potential for cogeneration in major industries, evaluate existing and future cogeneration capacity in the U.S., and report on the environmental effects of increasing cogeneration capacity.

⁵⁰Inside F.E.R.C., July 28, 1980, at 2-3.

⁵¹Energy Security Act, Pub. L. No. 96-294, § 203(5) (1980).

⁵²*Id.* § 214.

⁵³*Id.* § 215.

⁵⁴*Id.* § 216.

⁵⁵Small scale biomass energy projects are defined as those with an anticipated annual production capacity which is the energy equivalent of not more than 1,000,000 gallons of ethanol. Energy Security Act, Pub. L. No. 96-294, § 203(19) (1980). The Secretary of Energy is responsible for determining energy equivalency and has determined that a gallon of ethanol contains 84,400 Btu's. 45 Fed. Reg. 52,911 (August 8, 1980).

⁵⁶Energy Security Act, Pub. L. No. 96-294, § 213 (1980).

⁵⁷*Id.* §§ 204, 221.

⁵⁸Inside D.O.E., August 1, 1980, at 9.

5. Exemptions From Oil and Gas Phaseout Requirements of FUA

The Secretary of Energy is authorized by the Powerplant and Industrial Fuel Use Act of 1978 (FUA) to provide a permanent exemption for a cogeneration facility that petitions for an exemption from the provisions in the Act prohibiting electric powerplants from using natural gas or petroleum as a primary energy source,⁵⁹ when the petitioner demonstrates that "economic and other benefits of cogeneration" are unobtainable unless petroleum or natural gas are used in the facility.⁶⁰

The Economic Regulatory Administration (ERA) of the Department of Energy published revised proposed rules on August 11, 1980, which could have the effect of excluding most new cogeneration facilities from powerplant status. Section 103 (a) (7) (A) of the FUA defines "powerplant" to mean "any stationary electric generating unit, consisting of a boiler, a gas turbine, or a combined cycle unit, which produces electric power for purposes of sale and exchange . . ." ⁶¹ Under the former interim rules, cogenerators were not considered electric generating units, and thereby were not considered powerplants, if less than half of the annual electric power of the facility was sold or exchanged for resale.⁶² This definition did not take into account that electricity is a small percentage of the total energy output of most cogenerators, but more than 50 percent of what little electricity they produce is sold or exchanged for resale. The ERA believed that this definition might result in the designation of most new industrial cogenerators as powerplants, and thereby discourage cogeneration.⁶³ Consequently, the proposed interim rules modify the definition of "electric generating unit" to mean either a facility for which more than 50 percent of the useful output is electricity, or alternatively, a facility for which more than 50 percent of the electric power generated is sold or exchanged for resale on a net basis.⁶⁴ Under either of these definitions, most new cogenerators could escape being labelled as powerplants.

The proposed interim rules also create a new method of qualifying for a permanent cogeneration exemption. ERA has identified 11 states heavily dependent on gas and oil to fuel industries and utilities and has provided a blanket exemption for cogenerators in those states up to a statewide energy limit on the total amount of energy that oil- and gas-fired cogenerators covered by the FUA prohibitions could consume.⁶⁵ The limits are based on (a) the amount of oil and gas electric generating capacity which could be displaced in the state before there was a risk of displacing new alternate fuel-fired powerplants and (b) the potential market for oil- and gas-fired cogeneration in 1988. The limit for each state would be one-third of the lesser of these two estimates.⁶⁶ The 11 states initially identified by ERA as those which can

⁵⁹42 U.S.C. §§ 8322(c), 8352(c) (Supp. 1980).

⁶⁰42 U.S.C. §§ 8322(c) (1), 8352(c) (1) (Supp. 1980).

⁶¹42 U.S.C. § 8302(a) (7) (A) (Supp. 1980).

⁶²45 Fed. Reg. 53,368, 53,369 (August 11, 1980).

⁶³*Id.*

⁶⁴*Id.* at 53,370.

⁶⁵*Id.*

⁶⁶*Id.* at 53,371.

certify cogenerators as eligible for this exemption under the state limit⁶⁷ are California, Florida, Louisiana, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, Texas, and New York.⁶⁸ The other two methods by which a cogenerator in any state can qualify for an exemption under the FUA are a showing of oil and gas savings or public interest due to special circumstances.⁶⁹

6. Exemption From Environmental Requirements

If the Environmental Protection Agency (EPA) determines that cogeneration has lower emission levels than conventional electric power generation, EPA may provide an exemption from pollution control requirements for companies that operate cogeneration facilities.⁷⁰

III. WEIGHING ALL THE FACTORS

The considerations that a company must balance on the cost benefit scale concern finances, technical feasibility, prospects of government regulation, and institutional goals.

The initial hurdle in assessing the economic practicality of installing a cogeneration or small power production facility is the large capital investment required. Even if a company has available the millions of dollars that the Government Accounting Office (GAO) estimates is necessary,⁷¹ the company may be unwilling to invest the funds for this type of project. Operating costs would depend upon the cost of fuel to fire the facility and the extent to which the facility is used in terms of capacity and time. Any energy sold to a utility brings in revenues to balance against the costs. However, the rates cannot be higher than the utility's avoided costs, i.e., the price the utility company would have to pay to purchase the power elsewhere; so the industrial company has no guarantee that it can sell its excess energy output for more than it cost to generate it. The amount of savings also depends on the cost to the industrial of purchasing power if it had not power production facilities of its own, and consequently on the type of power alternatively available. If the company with cogeneration or small power production facilities were otherwise to rely on oil or gas, the savings from generating its own power would be greater than if it could instead use coal, hydroelectric, or nuclear power. The return on the investment made to enter into a cogeneration or small power production venture is hard to project because the savings differ for each plant over time.

Companies need to research whether it has been established that the processes utilized in their particular industry are technologically adaptable to cogeneration or small power production. Small power production is possible

⁶⁷*Id.* at 53, 370.

⁶⁸*Id.* at 53,371.

⁶⁹*Id.* at 53,374.

⁷⁰Inside E.P.A., July 17, 1980, at 8.

⁷¹*Comptroller General's Report to the Congress: Industrial Cogeneration—What It Is, How It Works, Its Potential*, Docket No. EMD-80-7, at 48 (April 29, 1980).

only for plants that either produce a waste product that can be safely and efficiently used as fuel or can harness some alternate energy source.

Industries' concern about excessive regulation has been reduced by the various government programs designed to encourage cogeneration and small power production. But a company considering installing one of these facilities would want to be sure it could meet the various standards and requirements to be eligible for nonregulation and other government benefits.

If a plant determines that cogeneration or small power production is feasible from economic, technical, and regulatory perspectives, plant management may still have reservations about such a commitment if it sees this kind of energy project as inconsistent with its institutional goals. Power generation would be a different type of production that would not expand the primary product market. The advantages of greater security of energy supply and a potential for reduced electric costs may not justify the diversion of capital from the main line of business, in the minds of plant managers.

IV. CONCLUSION

Studies conducted by various government agencies show the significance of cogeneration and small power production in the nation's energy conservation plan. A recent Energy Information Administration report to Congress predicted that by the year 2000 almost 20 percent of industrial energy requirements will be met by new technologies, the two largest of which were expected to be conversion of biomass and industrial cogeneration.⁷² FERC completed a study which showed that a government program promoting cogeneration could result in the construction of at least 5,900 megawatts of topping-cycle cogeneration capacity by 1995, based on existing technologies.⁷³ GAO focused on the paper and pulp, chemical, and petroleum refining industries and projected that if just these three industries developed cogeneration to the maximum amount technically possible, the nation could save from .26 to 1.5 quadrillion Btu's of energy (the equivalent of about 123,000 to 719,000 barrels per day of crude oil) in the year 1985.⁷⁴ Realizing that these figures may be overly optimistic, GAO altered its analysis to consider various inhibiting factors and concluded that a more reasonable estimate of energy savings from cogeneration in 1985 would be .48 to .72 quadrillion Btu's or about 228,000 to 354,000 barrels per day of crude oil equivalent.⁷⁵ It is hardly surprising that, after hearing these conservative projections, the government is anxious to encourage industrial plants to install cogeneration and small power production facilities.

Government incentives have had an impact on economic considerations through the regulation of rates for power purchased for and sold by industrial power production facilities, requirements that utility companies

⁷²3 E.I.A. Ann. Rep. to Congress 175-77 (1979).

⁷³Inside D.O.E., August 1, 1980, at 9.

⁷⁴*Comptroller General's Report to the Congress: Industrial Cogeneration—What It Is, How It Works, Its Potential*, Docket No. EMD-80-7, at 15 (April 29, 1980).

⁷⁵*Id.*

cooperate with industry in cogeneration and small power production efforts, tax credits, and financial assistance. Through exemptions from the Federal Power Act, the Natural Gas Policy Act of 1978, the Public Utility Holding Company Act of 1935, and the Powerplant and Industrial Fuel Use Act, cogeneration and small power production facilities have been relieved of the heavy government regulation to which utility companies are subject. The government has taken affirmative steps to encourage industrially operated cogeneration and small power production, but the government's power is limited to persuasion.

The ultimate decision rests with each company which must justify its efforts in terms of institutional goals. Upon this cost-benefit scale all factors are measured. Only time will reveal how many industrial companies will find that incentives created by government thus far are sufficient to tip the scales in favor of a cogeneration or small power production commitment.