
SUPPLEMENTARY INFORMATION: On May 30, 1980, the Federal Energy Regulatory Commission (Commission) issued a Notice of Proposed Rulemaking Exempting Mechanical Cogeneration Facilities from all Incremental Pricing Provisions of the Natural Gas Policy Act of 1978 (15 U.S.C. 3301 et seq. (NGPA)). This rule is intended to make available to mechanical cogeneration facilities the same exemption from incremental pricing of natural gas under Title II of the NGPA that is provided to electric cogeneration facilities.

Background

Title II of the NGPA requires that the natural gas used in certain industrial facilities be subject to incremental pricing by means of surcharges. Section 206 of the NGPA establishes certain exemptions from these incremental pricing surcharges. Section 206(c)(3) provides that incremental pricing shall not apply

** to the extent provided by the Commission by rule to any qualifying cogenerator (as defined in section 3(18)(B) of the Federal Power Act, as amended by the Public Utility Regulatory Policies Act of 1978) [PURPA].

On September 18, 1979, the Commission issued rules implementing Title II of the NGPA and establishing a mechanism for the incremental pricing program. One provision of these rules implemented section 206(c)(3) of the NGPA for purposes of the incremental pricing program. This provision exempted from the incremental pricing program all gas used for cogeneration by qualifying cogeneration facilities are defined in section 3(18)(B) of the Federal Power Act. However, at that time the Commission had not promulgated rules establishing the criteria for “qualifying cogeneration facilities” under section 3(18)(B) of the Federal Power Act. In order to facilitate the operation of the incremental pricing rules the Commission, on November 9, 1979, issued an interim rule for qualification of gas-fired cogeneration facilities for purposes of the incremental pricing program. This interim rule established an exemption from incremental pricing for certain cogeneration facilities which were in existence and used natural gas as an energy input on or prior to November 1, 1978.

On March 13, 1980, the Commission issued a final rule under section 201 of PURPA establishing requirements for a determination of qualifying status for small power production and cogeneration facilities. This rule maintained the criteria for the exemption from incremental pricing established in the interim rule, and also established additional criteria for other facilities not previously eligible for the exemptions from incremental pricing set forth in 18 CFR 282.202(e).

The application of these exemptions, however, is limited by section 3(18)(B) of the Federal Power Act to cogeneration facilities which produce electric energy, and other forms of useful energy. Cogeneration facilities which produce mechanical energy and other forms of useful energy are not eligible under the final rule in Docket No. RM79-54 for these exemptions from incremental pricing.

Mechanical cogeneration facilities can produce the same fuel efficiencies as can cogeneration facilities producing electric energy. The proposed rules reflected the Commission’s belief that cogeneration facilities which produce mechanical energy should be afforded the same exemption from incremental pricing surcharges as is available to cogeneration facilities which generate electricity. Section 206(d) of the NGPA authorizes the Commission to exempt from incremental pricing “any other industrial facility or category thereof.” The proposed rule represented an attempt to utilize this authority to place mechanical and electrical cogeneration on an equal footing and thus allow the exemption from incremental pricing. Any rule providing for an exemption by the Commission under section 206(d) is subject to Congressional review before it can become effective.

The Basis for a Section 206(d) Exemption

Cogeneration involves the production of both useful heat and power through the sequential use of energy. Shaft power, compressed air and hydraulic power are all variations of the high-grade energy form known as mechanical power or energy. Production of any of these mechanical energy forms, with

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18 CFR Part 292
[Docket No. RM80-62; Order No. 104]

Section 206(d) Exemption for Mechanical Cogeneration Facilities From the Incremental Pricing Provisions of the Natural Gas Policy Act of 1978

Issued: October 23, 1980.
AGENCY: Federal Energy Regulatory Commission.
ACTION: Final rule.

SUMMARY: The Federal Energy Regulatory Commission hereby adopts regulations that implement section 206(d) of the Natural Gas Policy Act of 1978 (NGPA). These rules exempt mechanical cogeneration facilities from the incremental pricing of natural gas under Title II of the NGPA. Prior to taking effect, this rule must be submitted to the Congress for review.

EFFECTIVE DATE: Thirty days after transmittal to Congress, provided that neither House of Congress passes a Resolution of Disapproval, in accordance with section 507(b) of the NGPA.

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*18 CFR 292.205(e).
utilization of the reject heat from a facility, represents energy-efficient cogeneration with an energy conservation potential similar to that available from cogeneration involving the production of electricity.

The incentive provided through the exemption of cogeneration from incremental pricing is intended to promote the efficient use of energy by cogeneration facilities. However, as noted, under the existing rules, only those cogeneration facilities which generate electricity are eligible for the exemption; those producing only mechanical power are excluded. Not only is this distinction inequitable, since energy resources may be conserved absent electrical generation, but it may create a significant incentive for needless equipment. An industrial company with a need for mechanical power which could be obtained through cogeneration might have an economic incentive through lower natural gas prices to cogenerate electrical instead of mechanical power. This electricity would, in turn, be used to power electric motors, which would be used to drive the machinery. Thus, several intermediate steps would be taken to obtain mechanical power.

The expense of installing the generators and motors would be needlessly incurred, since the cogeneration prime mover could directly supply the required mechanical power. Moreover, the intermediate conversion to electricity would result in energy losses since motors and generators are always less than perfectly efficient. By making mechanical cogeneration facilities eligible for the exemption from incremental pricing, this rule would remove this incentive to install unneeded equipment.

In the proposed rule, the Commission emphasized that this rule will not affect any of the provisions of Order Nos. 69 or 70 which pertain to electrical cogeneration. The final rule does, however, adopt certain terms and criteria similar to those used in Order No. 70 for qualifying electrical cogeneration facilities. In order to ensure that mechanical and electrical cogeneration facilities are afforded similar treatment under the incremental pricing provisions of the NGPA, the efficiency standards adopted are similar to those prescribed for electrical cogeneration facilities in Order No. 70.

Summary of Comments

The Commission received thirteen comments to the proposed rule. A public hearing, scheduled for July 1, 1980, was cancelled due to lack of public response. All of the thirteen comments expressed general support for the proposed rule; eight comments offered specific recommendations for revisions.

Measurement of Mechanical Power and Related Issues

The proposed rule provided that the useful mechanical power output of a cogeneration facility could be determined at the output of the prime mover—or at some further stage of energy conversion, at the discretion of the cogenerator. Comments were requested as to whether the term "output of the prime mover" is appropriate, and whether the determination of mechanical power output should be permissive in regard to the point of measurement. Comments were also requested on the feasibility of measuring mechanical power output.

Seven commenters addressed the related issue of mechanical power measurement. To varying degrees, these commenters suggested that on-going measurement of the mechanical power output of an engine is generally infeasible. The commenters requested that the proposed requirement for measurement of mechanical power be replaced with a requirement that mechanical power be estimated. The Commission believes that these requests have merit, and adopts this recommendation.

Since a calculation which is appropriate for one cogeneration facility may be unsuitable for another, the rules do not specify a specific mechanical estimation technique. Rather, calculations are to be based on standard engineering methods, and must reflect the calendar year period specified for the operating and efficiency standards. The location of the estimate is within the discretion of the cogenerator. Calculations may be based on the design characteristics of the prime mover, or on actual measurements.

NI-Gas requested a more specific definition of the term "prime mover." This commenter believed that the proposed rule was unclear as to whether, for example, a steam turbine or the boiler supplying steam to the turbine is the prime mover. A prime mover is a device which converts other forms of energy (such as thermal energy or chemical energy) into mechanical energy. The Commission is mindful, however, that any simple definition of such a fundamental concept may work to exclude some novel technology or innovation. The Commission, therefore, decided not to add a definition of "prime mover" to the rules. Instead, the phrase "at the output of the prime mover" has been modified to read "... at the output of the steam turbine, combustion turbine, or other prime mover..." This change will serve to clarify the intent without running the risk of an overly narrow definition. Thus, in the NI-Gas example, the prime mover is the steam turbine.

Revised Language

Several commenters requested clarification of certain portions of the proposed rules, and offered alternative language. The American Paper Institute (API) suggested that the statement of the operating and efficiency standards in § 282.211(c) be combined. With regard to rules on electrical cogeneration facilities, an operating standard was adopted for topping-cycle systems to ensure that some form of cogeneration facility exists. Efficiency standards were adopted for topping-cycle systems using oil or gas to ensure efficient use of these scarce fuels. Exemption from incremental pricing is available to electrical cogeneration facilities only if both operating and efficiency standards are met. Since the Commission's sole concern with mechanical cogeneration facilities in this docket is exemption from incremental pricing—and the Commission has decided to afford the exemption to mechanical facilities on the same basis as electrical facilities—both operating and efficiency standards must be met in order for a mechanical cogeneration facility to qualify for an exemption. Since both standards are applicable in all cases, the Commission will accept API's recommendation and simplify the statement of the standards.

Technical Definitions

NI-Gas commented on the definition of mechanical cogeneration facility. The definition in the proposed rule limited the term "useful thermal energy" to energy "used for industrial or commercial heating or cooling purposes..." The definition of cogeneration...
facility in Order No. 70 is less restrictive. In that definition, the useful thermal energy must be "used for industrial, commercial, heating, or cooling purposes". Each term—industrial, commercial, heating, and cooling—stands alone. Under this definition, the useful thermal energy may be used in an industrial (or commercial) process other than heating or cooling. Process steam, for example, may be used directly in a chemical reaction. Heating or cooling purposes which are neither industrial nor commercial are also permitted under the definition in Order No. 70. Residential heating uses, for example, would be included. NI-Gas recommends that the less restrictive language found in Order No. 70 be used to define a mechanical cogeneration facility. The Commission has adopted this recommendation.

NI-Gas also recommended that the definitions of mechanical cogeneration facility and supplementary firing be modified to indicate that only facilities covered by Phase I of incremental pricing are included. As mandated under Title II of the NGPA, the Commission is required to implement the incremental pricing program in two phases. The Phase I rules apply only to the use of natural gas by large industrial boiler fuel facilities. On May 7, 1980, the Commission issued Phase II rules in Docket No. RM80-10 expanding the scope of the incremental pricing program to other industrial uses of natural gas. This Phase II rule was submitted to Congress for a mandatory review prior to taking effect. On May 20, 1980, the House of Representatives passed a Resolution of Disapproval, and the Commission has since vacated its Phase II Order. Therefore, only natural gas used as boiler fuel by large industrial facilities is now subject to incremental pricing. Both of NI-Gas's proposed definitions would explicitly restrict the definitions of mechanical cogeneration facility and supplementary firing to boiler fuel use of gas which is not otherwise exempt from incremental pricing. NI-Gas proposes these changes as an effort "to avoid needless confusion."

The Commission has decided not to adopt the recommended changes. The Commission believes that these recommendations would be likely to cause confusion at the end-user level. On the one hand, the definitions of basic terms would become strikingly different when applied to electrical or mechanical cogeneration facilities. Many end-users have both types of cogeneration in the same plant. On the other hand, the recommended modifications would make the definitions contingent upon the status of other exemptions, such as the agricultural use exemption.

Since other exemptions are themselves contingent upon various circumstances (alternative fuel tests, or monthly gas consumption, for example), confusion would likely arise concerning the timing for filing for an exemption, and the time when such exemption would become effective. Moreover, future consideration of a second Phase II rule would likely require the definitions of mechanical cogeneration facility and supplementary firing to be substantially modified and expanded. On balance, the Commission does not believe that end-users who are not presently subject to incremental pricing would be confused by promulgation of an exemption in broad inclusive language.

The Glass Packaging Institute (GPI) recommends an expansion of the definition of cogeneration to include facilities in which mechanical or electrical energy is produced. Certain energy conversion systems, while not producing electrical or mechanical energy, may displace the need for such energy. The example cited by GPI is a system which rejects thermal energy from an industrial process is used in an adsorption refrigeration unit rather than a bottoming-cycle mechanical drive. GPI claims that the absorption system displaces a requirement for electrical or mechanical power and, therefore, the system should be considered the functional equivalent of a cogeneration facility.

The Commission recognizes that a facility such as that described by GPI could be highly energy efficient. However, GPI’s proposal would be difficult if not impossible to administer. The efficiency of a non-mechanical "cogeneration facility" would have to be determined on the basis of a hypothetical displaced system. Any such evaluation of what might have been rather than what is leaves room for serious differences of opinion. GPI mentions the possibility that a cogeneration use might be claimed where thermal output from a "bottoming-cycle" is used simply for space heating. GPI states that this situation could be expressly excluded by not allowing the displacement of electric resistance heating. But the owner of such a system could reasonably claim that an electric heat pump was displaced—much the same as GPI’s example facility displaces an electric air conditioning unit. There would be no straightforward way to resolve such a dispute. For these reasons, the Commission has decided not to adopt GPI’s recommendation. However, it notes that the facility described by GPI would not be subject to incremental pricing under the Phase I rule since it does not use natural gas as boiler fuel.

**Efficiency Standards**

The Masonite Corporation (Masonite) recommends that lower efficiency standards be used for qualification of mechanical power facilities than were used for electrical cogeneration facilities. Masonite suggests that the proposed 42.5 percent test set forth in § 282.209(b) [§ 282.211(c) in the proposed rule] be reduced to 38.5 percent. No recommendation is made concerning the 45 percent efficiency requirement for cogeneration facilities with less than 15 percent of total energy output in the form of thermal energy.

Masonite states that the Commission is "essentially ignoring the losses which occur between the electrical generator source and the end user." An example is given of two equivalent pump systems, one mechanical and the other driven by an electric motor receiving its power from an electrical cogeneration facility. Masonite explains that the electrical cogeneration facility would have to be sized larger than the mechanical system to account for "electrical transformation and transmission line losses", as well as power losses in the electrical motor. In order to adjust for such power losses, lower efficiency standards are recommended for the mechanical system.

Masonite is correct in recognizing that the Commission's rules ignore losses which occur between a generator and ultimate user of electricity. In this regard, in the preamble to the proposed rule, the Commission stated:

The proposed rule does not require theoretical conversion of mechanical energy to an electrical energy equivalent. A cogenerator developing only mechanical power most probably desires this form of energy for use in his facility. It is appropriate to relate this mechanical energy to an equivalent efficiency standard, rather than to attempt a determination of what quantity of electricity could reasonably be generated from the cogenerator’s mechanical power.

The converse is equally true. The rule does not attempt to require determination of the quantity of electricity that would be necessary to serve a mechanical load. A cogenerator is presumed to produce energy in the form desired. The fact that other...
hypothetical systems may be less efficient should not affect the qualification of an actual system. As a matter of policy, the Commission believes that cogeneration facilities producing either electrical or mechanical power output should be measured against a common standard of efficiency.

**Multiple Steam Turbines**

Two commenters, Masonite and SOHIO, made similar recommendations concerning the aggregation of cogeneration units at the same site. Masonite points out that turbines used for producing mechanical energy “are quite often smaller and more numerous in use at a site than those turbines driving electrical generators. Both commenters suggest that aggregation of multiple mechanical power turbines at a single site be allowed for purposes of qualifying under the rules. SOHIO recommends a plant with four or more prime movers or heating loads be permitted to qualify based on an overall plant steam balance.

SOHIO argues that a plant with many individual pieces of equipment “would not have the instrumentation required to measure power production, or the total hearing load.” The question of how mechanical energy may be measured has been addressed elsewhere. Meters and gauges are not required. A plant with many small turbines should not incur any extra cost of instrumentation.

Under the Commission’s definition of “mechanical cogeneration facility,” a group of turbines may be considered as a single unit for purposes of the rule if each draws steam from, and exhausts steam to, common steam headers. In this situation, all of the turbines occupy the same position in the “cascade” of energy through a sequential process.

However, the Commission chooses not to adopt a rule which would allow an entire industrial plant to qualify for exemption on the basis of an overall steam balance. The purpose of this rule is to afford an exemption from incremental pricing to gas-fired cogeneration. The rule is not intended to exempt an entire industrial boiler fuel facility from incremental pricing on the grounds that the plant contains certain cogenerating appliances. Only the cogeneration applications are eligible for exemption under this rule.

In the comments, SOHIO provided a diagram of an industrial facility containing a variety of backpressure and extraction steam turbines. This facility also contained an unspecified block of “heating and non-heating loads” served directly from the boiler and not part of any sequential use of energy. Such steam loads were considered by the Commission previously in promulgating rules under section 201 of PURPA. In the preamble to those rules, the Commission stated:

> many industries commonly route steam directly from their boilers to processes without expansion in a turbine. This practice is simply raising of process steam; it is not cogeneration. The fact that some other steam from the same boiler is routed to cogeneration equipment does not mean that all steam from the boiler is used for cogeneration. The coincident raising of process steam relates to the cogeneration rules in two ways. First, any energy expended in raising such steam should not be entered into any efficiency calculations. Secondly, natural gas used for raising process steam is not rendered exempt from incremental pricing solely because the boiler may also supply steam for cogeneration.

The Commission further wishes to amplify that condensing mechanical drive turbines served directly from a boiler do not comprise cogeneration since there is no sequential use of energy.

Moreover, any topping-cycle mechanical cogeneration facility must meet the five percent useful thermal output standard under § 228.209(b) in order to qualify for exemption from incremental pricing. The standard requires that no less than five percent of the total energy output during any calendar year period, be in the form of useful thermal energy. Thus a plant containing only mechanical drive and other non-thermal use of steam does not meet the requirement. This holding is analogous to the Commission’s treatment of combined-cycle electric generation facilities under Order No. 70.

**Congressional Review and Effective Date**

The rule set forth below is issued pursuant to section 206(d) of the NGPA. That section requires that such rule be submitted to the Congress for review prior to taking effect. After submission to each House of Congress, the rule may take effect following 30 days of continuous session of Congress (as set forth in subsection 507(b) of the NGPA) unless either House adopts a resolution of disapproval within that 30 day period.

Accordingly, this rule will be effective on the day following expiration of the 30-day period for Congressional review. In consideration of the foregoing, if neither House of Congress passes a Resolution of Disapproval of the regulations transmitted to them in this rulemaking within 30 days of Congressional review, as determined in accordance with section 507(b) of the NGPA, Part 282 of Subchapter I, Chapter 1, Title 18, Code of Federal Regulations, is amended as set forth below, effective on the day following expiration of the 30-day Congressional review period.


By the Commission.

Kenneth F. Plumb, Secretary.

1. Section 282.203 is amended by deleting the introductory paragraph and by adding a new paragraph (c) to read as follows:

> § 282.203 Exempt end-uses:

> (c) Exemption for mechanical cogeneration facilities under section 206(d).

2. The Table of Contents for Sections for Part 282 is amended to add a new § 282.209 entitled “Exemption for mechanical cogeneration facilities under NGPA section 206(d).”

3. Part 282 is amended by adding a new § 282.209 to read as follows:

> § 282.209 Exemption for mechanical cogeneration facilities under NGPA section 206(d).

(a) Definitions and general rules. For purposes of this section:

1. “Mechanical cogeneration facility” means equipment used to produce mechanical energy and forms of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes, through the sequential use of energy.

2. “Topping-cycle mechanical cogeneration facility” means a cogeneration facility in which the energy input to the facility is first used to produce useful mechanical power output, and the reject heat from such power production is then used to provide useful thermal energy.

3. “Bottoming-cycle mechanical cogeneration facility” means a cogeneration facility in which the energy input to the facility is first applied to a useful thermal energy process, and the reject heat emerging from the process is then used to produce mechanical power output.
(4) "Supplementary firing" means an energy input to the mechanical cogeneration facility used only in the thermal process of a topping-cycle mechanical cogeneration facility, or only in the mechanical power production process of a bottoming-cycle mechanical cogeneration facility.

(5) "Useful mechanical power output" of a mechanical cogeneration facility means the total mechanical energy made available for use, exclusive of any such energy used in the mechanical energy production process.

(6) "Useful thermal energy output" of a topping-cycle mechanical cogeneration facility means the thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application.

(7) "Total energy output" of a topping-cycle mechanical cogeneration facility is the sum of the useful mechanical power output and useful thermal energy output.

(8) "Total energy input" means the total energy of all forms supplied from external sources:

(9) "Natural gas" means either natural gas unmixed, or any mixture of natural gas and artificial gas;

(10) "Oil" means crude oil, residual fuel oil, natural gas liquids, or any refined petroleum products;

(11) Energy input in the case of energy in the form of natural gas or oil is to be measured by the lower heating value of natural gas or oil; and

(12) Useful mechanical power output may be estimated at the output of the steam turbine, combustion turbine, or other prime mover or at a subsequent energy conversion point.

(b) Exemption from incremental pricing for topping-cycle facilities. Natural gas used in any topping-cycle cogeneration facility, other than gas used for supplementary firing, is eligible for an exemption from incremental pricing under Title II of the Natural Gas Policy Act of 1978 (NGPA) and Part 282 of the Commission's rules if the useful thermal energy output of the facility, during any calendar year period, is 5 percent or more of the total energy output;

(1) for facilities in which the useful thermal energy output is less than 15 percent of total energy output, the useful mechanical energy output of the facility plus one-half the useful thermal energy output, during any calendar year period, is equal to or greater than 45 percent of the total energy input of natural gas and oil to the facility;

(2) Exemption from incremental pricing for bottoming-cycle facilities.

(c) Exemption from incremental pricing for bottoming-cycle facilities.

(1) General Rule. Natural gas used in any bottoming-cycle mechanical cogeneration facility, other than gas used for supplementary firing, is eligible for an exemption under Title II of the NGPA and Part 282 of the Commission's rules to the extent that reject heat emerging from the useful thermal energy process is made available for use in mechanical power production.

(2) Efficiency standard. For any bottoming-cycle mechanical cogeneration facility using natural gas or oil for supplementary firing, the useful mechanical power output of the facility, during any calendar year period, must be 45 percent or more of the energy input of natural gas and oil for supplementary firing.

(d) Supplementary firing. Natural gas used for supplementary firing in any mechanical cogeneration facility is not eligible under this section for exemption from incremental pricing.

(e) Waiver. The Commission may waive any of the requirements of paragraphs (b) or (c) of this section upon a showing that the facility will produce significant energy savings.