Guidebook for Small Combined Heat and Power Systems Seeking to Obtain Emissions Reduction Credits in New York State

Final Report 06-03
June 2006

New York State
Energy Research and
Development Authority

NYSERDA

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Final Report

Prepared for the

New York State Energy Research and Development Authority

Albany, NY

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NYSERDA
Report 06-03

NYSERDA 7615

June 2006

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PREFACE

The New York State Energy Research and Development Authority is pleased to publish this "Guidebook for Small Combined Heat and Power Systems Seeking to Obtain Emissions Reduction Credits in New York State." The report was prepared by Thomas Bourgeois, Daniel Rosenblum, and Chris Young of the PACE Energy Project and Andrew Greene of Navigant Consulting.

Combined Heat and Power (CHP) is typically more efficient than the separate generation of electricity in a central power plant and production of heat in an on-site boiler. This improved efficiency can result in a reduction of air pollutant emissions. CHP projects with significant reductions in emissions are eligible to participate in the NYSDEC emission reduction credit (ERC) program. Facilities certifying ERCs can trade them, thereby improving the financial benefit of installing CHP. This guidebook is intended to assist facility managers with quantifying emissions reduction credits. An additional report, "Emissions Allowance Market Opportunities for Small Scale CHP Projects," (NYSERDA Report #06-04) evaluates how allowance-based regulations can be interpreted and implemented with regard to small scale CHP projects to encourage more efficient, less polluting forms of energy generation.

The work was funded by the **New York Energy $mart**[SM] Environmental Monitoring, Evaluation, and Protection (EMEP) Program.

ACKNOWLEDGMENTS

NYSERDA, Navigant, and the PACE Energy Project appreciate the contributions of EMEP project advisors Praveen Amar (NESCAUM), Joel Bluestein (Energy and Environmental Analysis, Inc.), Sandra Meier (Environmental Energy Alliance of New York), Randy Orr (NYSDEC), Robert Groberg (HUD), Stuart Saft (Wolf, Haldenstein, Adler, Freeman and Herz LLP), Stephen Stone (DSM Engineering Associates, P.C.) and Laurie Gage (Cantor Fitzgerald).

TABLE OF CONTENTS

APPENDICES

SUMMARY

The Guidebook is intended for those who currently, or may at some future time, own or operate a combined heat and power (CHP) facility in New York State, and are interested in obtaining financial benefits for the reduction in nitrogen oxide (NOx) and other emissions resulting from the CHP system. The mechanism for obtaining financial value for these emission reductions is the emissions reduction credit (ERC) program administered by the New York State Department of Environmental Conservation (NYSDEC). ERCs are issued when an air pollution source (such as an end-user boiler) makes real, quantifiable, surplus and verifiable reductions in its emissions of NOx and other non-attainment pollutants. Once issued by NYSDEC, ERCs are bankable for current or future use and can be bought and sold in established emission trading markets.

ERCs are based on the emission reductions achieved at the end-user's location. Off-site emissions reductions, which can occur when a CHP project displaces higher-emitting central station power plants that would otherwise serve the CHP end-user, are ineligible for ERCs, but are recognized in the NYSDEC emission allowance set-aside programs for NOx and SO_2. The role of CHP in the allowance set-aside programs is addressed in a related NYSERDA report, *Emissions Allowance Market Opportunities for Small Combined Heat and Power Projects in New York State*.

For CHP projects that can demonstrate a significant reduction in NO_x emissions, ERCs can improve the economics of project development. Meaningful NO_x reductions are most likely to occur at facilities that are currently burning fuel oil (especially grades 4 or 6) in old, inefficient boilers. The cleaner the CHP technology used to replace the aging boiler, the greater the potential emissions reductions—and in turn, the greater the number of ERCs that may result. CHP technology runs the emissions gamut from non-emitting fuel cells to ultra-low emission microturbines, gas turbines, and engines.

Although no ERCs have been issued to date for CHP in New York State, the Guidebook explains the general process for documenting and submitting an application to NYSDEC for ERCs, with specific consideration of issues that are applicable to CHP units. Of particular importance, the Guidebook notes that the venting configuration of the CHP unit relative to existing permitted equipment may affect the regulatory determination of how many ERCs are awarded. In general, separate venting of new CHP units, rather than venting them through existing boiler stacks, may increase the number of ERCs that are granted.

The Guidebook notes that there are typically costs involved for staff time or outside assistance in preparing and pursuing an application for ERCs, as well as costs to sell them through emissions brokers or other intermediaries once they are granted to the CHP owner.

Despite the costs and efforts required to seek ERCs for CHP projects, the additional value (especially in conjunction with emission allowance set-aside programs) can help to make CHP projects more financially attractive, and encourage more development activity in New York State. The impact of the set-aside allowance programs is likely to be much greater than benefits from ERCs for CHP owners.

INTRODUCTION

This guidebook is intended for those who currently, or may at some future time, own or operate a combined heat and power (CHP) facility in New York State, and are interested in obtaining financial benefits for the reduction in emissions resulting from the CHP system. The mechanism for obtaining financial value for these emission reductions is the emissions reduction credit (ERC) program (under 6 NYCRR 231)[1], administered by the New York State Department of Environmental Conservation (NYSDEC). ERCs are credits for on-site emissions reductions measured against the lesser of actual or permitted emissions at the facility during a representative baseline period. These reductions, expressed in tons per year, must be permanent, substantiated in the facility's air emissions operating permit (which must be federally enforceable), and in excess of any reductions required by federal, state, or local law.

ERCs are based on the emission reductions achieved at the end-user's location. Off-site emissions reductions, which can occur when a CHP project displaces higher-emitting power plants that would otherwise serve the CHP end-user, are ineligible for ERCs. In addition, CHP installations at new facilities with no prior permitted emission activities, or facilities that have been mothballed or shutdown for more than five years prior to installation of the CHP system are also ineligible to receive ERCs under NYSDEC rules. ERCs are subject to review, approval and certification by NYSDEC.

Facilities that generate certified ERCs may find interested buyers who are planning major new or expanded projects that will emit nitrogen oxides (NO_x), volatile organic compounds (VOCs), or carbon monoxide (CO) above the thresholds set by New Source Review regulations. NOx, VOCs and CO are "non-attainment" pollutants, whose concentrations in one or more counties in New York State have historically exceeded regulatory thresholds designed to protect public health. ERC buyers are typically new or expanded electricity-generating plants and manufacturing facilities, which must obtain ERCs to offset the emissions their facilities will produce. ERC transactions occur in emission markets, and frequently involve intermediaries such as brokers and traders. Similar to other commodity markets, the value of ERCs is established by the supply and demand for such credits and can fluctuate substantially based on changing market conditions.

Facility developers in New York State (or Pennsylvania and Connecticut, pursuant to an agreement between NYSDEC and environmental agencies in those states) requiring NOx or VOC ERCs must obtain them from sources within the NY/CT/PA region where the severity of air pollution (known as a "non-attainment classification") is the same or worse than the non-attainment classification in the area where the

[1] 6 NYCRR 231 addresses requirements under the New Source Review program, which is being revised by NYSDEC in response to changes in federal New Source Review regulations issued by the U.S. Environmental Protection Agency. This Guide is written with the understanding that the NSR program, including the rules for ERCs, may change in the near future from those in effect today.

ERCs are used. Therefore, the ERC market in New York, Pennsylvania, and Connecticut is segmented by non-attainment classification, with ERCs originating in the most severe non-attainment areas (such as the New York City metropolitan area) commanding significantly higher market value than ERCs from less-severe air quality non-attainment areas. CO ERC requirements reflect the highly localized nature of this pollution problem, and the relevant ERC market is confined to a much smaller geographic area than for NOx and VOCs. CHP projects in NY derive most, if not all their potential ERC value from NOx reductions.

For CHP projects that can demonstrate a significant reduction in NO_x emissions, ERCs can improve the economics of project development. Meaningful NO_x reductions are most likely to occur at facilities that are currently burning fuel oil (especially grades 4 or 6) in old, inefficient boilers. The cleaner the CHP technology used to replace the aging boiler, the greater the potential emissions reductions—and in turn, the greater the number of ERCs that may result. CHP technology runs the emissions gamut from non-emitting fuel cells to ultra-low emission microturbines, gas turbines, and engines.

Although most ERC applicants to date have been operators of large commercial, industrial and utility facilities, New York State's ERC program is intended to encourage broad participation. For example, while some states require that applications for an ERC be made within a brief period following the emissions reduction project (e.g., 180 days in Pennsylvania) a project in New York can effectively occur within a five-year period prior to the ERC application. Moreover, in some states, certified ERCs lose value over time if they are not used. In contrast, credits in the New York State ERC registry do not expire or depreciate, nor are they subject to review in future years if regulations change.

This guidebook describes emissions reduction credits as they pertain to small-scale CHP projects. Although ERCs are intertwined with existing, modified, and new air permits, this guidebook is not intended to provide guidance on the more general issues involved air permitting. The guidebook assumes that any necessary air permits for a site have already been, or will be, obtained. Contacting NYSDEC's regional offices (listed in Appendix I) with any questions relating to the topic of air permits and air emission regulations that may apply to your CHP facility is recommended.

Section 1 of this guidebook describes the energy efficiency and air quality benefits of CHP. Section 2 explains what ERCs are and how they can benefit small CHP projects. Section 3 is an overview of the regulatory process for creating ERCs, and Section 4 walks through the form that a CHP owner submits to NYSDEC for ERC certification. Section 5 covers NYSDEC's review process and the public comment period. Finally, Section 6 discusses the cost of certifying ERCs relative to their market value, which may impose a more significant obstacle for small CHP projects.

Section 1
THE BENEFITS OF COMBINED HEAT AND POWER

CHP, also known as cogeneration, is the simultaneous production of electrical or mechanical power and thermal energy from a single combustion process. CHP is typically far more efficient than the separate generation of electricity in a central power plant and the production of thermal energy in an on-site boiler. Among older central power plants that comprise the majority of installed capacity in New York State, two-thirds or more of the energy in the fuel burned is lost as waste heat, and further losses occur as the electricity is transported over transmission and distribution wires to the consumer. Even with the most modern combined-cycle power plants, approximately half the energy originally present in the fuel burned is lost during generation and subsequent transmission and distribution to the consumer. With an efficient CHP process, 60% to as much as 90% of the input energy is realized as useful energy output (cooling, heating, electric power, or mechanical drive). When properly designed, CHP projects can decrease building energy costs, increase business profitability, reduce air pollutant emissions, provide improved reliability, and reduce exposure to volatile fuel and electric power costs.

Despite these benefits, the potential for cost-effective CHP applications remains largely untapped across New York State. According to an October 2002 report prepared for the New York State Energy Research and Development Authority (NYSERDA), most of the unrealized cost-effective CHP potential is in the commercial and institutional sectors and is concentrated in the downstate region, where electricity costs tend to be higher than the state average.

Encouraging CHP projects is a policy objective of energy and environmental officials in New York State because these projects generally result in significant reductions of harmful air pollutants, as well as other environmental, energy, and economic benefits. Pursuant to the emission reduction credit program, NYSDEC recognizes and rewards projects, such as CHP that reduce emissions of NOx and other pollutants.

CHP projects that demonstrate a significant reduction in NO_x emissions are eligible to participate. NO_x reductions are most likely to occur at facilities that are currently burning fuel oil in old, inefficient boilers. Replacement technologies include non-emitting fuel cells, ultra-low emissions microturbines, gas turbines, and gas engines. The cleaner the CHP technology used to replace the aging boiler, the greater the potential emissions reductions.

Facilities with certified reductions earn emissions reduction credits (ERCs) that may be worth $1,000 to $10,000 or more per credit (one ERC is an emission reduction of one ton per year, in perpetuity). ERCs are

certified through a process that includes submission of forms to NYSDEC, a detailed technical review by agency staff, alterations to existing permits to make the new, reduced emissions level enforceable, a public review period, and finally, certification of the ERC and listing in the NYSDEC ERC registry (http://www.dec.state.ny.us/website/dar/boss/registry.pdf).

Facilities that generate the credits can then sell them to entities that are planning new or expanded projects that will emit NOx above the thresholds set by New Source Review regulations for major sources. ERC buyers are typically new or expanded electricity-generating plants and manufacturing facilities, which must obtain ERCs to offset the new emissions their facilities will produce. The credits may be bought and sold directly between a buyer and seller, or with the assistance of emissions traders or brokers, who specialize in bringing together potential buyers and sellers.

The value of ERCs is established by supply-and-demand market forces. One factor in the value of ERCs involves the location of both buyer and seller. New York State's air quality is not uniform, as reflected in the federal Environmental Protection Agency's designations of "non-attainment" zones—areas that do not meet federal standards for clear air. Downstate New York (the five boroughs of New York City, the counties of Nassau, Suffolk, Westchester, and Rockland, and the lower Orange County metropolitan area) is a "severe" non-attainment zone for ground-level ozone (or "smog", which is caused by an atmospheric mix of NOx and VOCs in the presence of sunlight) whereas upstate areas are designated as "moderate" Non-attainment. Buyers are required to obtain ERCs from sources in the same or a more stringent non-attainment classification within New York State (or Pennsylvania and Connecticut, based on an agreement between these states). As a result, ERC prices tend to be higher in "severe" locations and lower in "moderate" locations. Fortuitously, for CHP projects, ERCs are most valuable in the downstate severe non-attainment areas, where there is also the most untapped CHP potential.

Developers of small CHP projects face several hurdles in obtaining ERCs for emission reductions:

- The process of obtaining ERCs is unfamiliar and often perceived as complex.
- The fixed costs of applying for ERCs can result in a relatively high cost per ton for each ERC awarded.
- Buyers in the ERC market prefer blocks of 50 to 100 tons and other large lot sizes rather than the handful of ERCs that a small CHP developer may be offering.

This guidebook is intended to lessen the difficulties facing small CHP ERC applicants and increase the likelihood of participation. The guidebook identifies what information is required, to whom the information is submitted, and where to get answers to questions. It gives developers guidance on demonstrating to NYSDEC that the emissions reductions are genuine, meet the regulatory requirements, and can help reduce

the time and expense of certifying ERCs at a site. And finally, it suggests market strategies that may preserve the value for ERCs in lot sizes smaller than those the market typically seeks.

Section 2
WHAT IS AN EMISSIONS REDUCTION CREDIT?

The legal definition of an emissions reduction credit appears in 6 NYCRR 231-2.1(b)(14):

> Any decrease in emissions of a non-attainment contaminant in tons per year, occurring on or after November 15, 1990:
>
> (i) which is surplus, quantifiable, permanent, and enforceable; and
>
> (ii) which results from a physical change in, or a change in the method of operation of an emission unit[1] subject to Part 201 of this Title; and
>
> (a) is quantified as the difference between prior actual annual emissions or prior allowable annual emissions, whichever is less, and the subsequent maximum annual potential; and
>
> (b) is certified in accordance with the provisions of section 231-2.6 of this Subpart; or
>
> (iii) which results from a physical change in, or a change in the method of operation of an air contamination source not subject to Part 201 of this Title, and is certified in accordance with the provisions of section 231-2.6 of this Subpart.

It is important to note that an ERC relates to emission reductions for an **emission unit** rather than an entire **facility**.[2] Two broad types of activities qualify for ERC certification: (1) emissions unit shutdown and, (2) source reduction.

Emissions Unit Shutdown involves the *permanent shutdown* of a previously operating emissions unit and requires the surrender of the existing air permit for that unit to NYSDEC. The surrender of the air permit ensures that the emissions unit is no longer able to operate and continue emitting regulated air pollutants. Under NYSDEC rules, emission unit shutdowns are not eligible to receive ERCs if the entire facility is also shut down.

Source Reduction involves a permanent emissions reduction at an emission unit resulting from an emission rate reduction and/or utilization reduction, codified though an enforceable permit modification.

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[1] An "emission unit" is defined by NYSDEC as: "Any part or activity of a stationary source that emits or has the potential to emit any regulated air pollutant. An emission unit is represented as a grouping of processes for any one of the following: (a) a single emission point; or (b) a group of emission points provided that the appropriate compliance assurance methods can be demonstrated to the satisfaction of the department; or (c) a facility-wide process that cannot be reasonably associated with one emission point or a group of emission points.

[2] A "facility" is defined as: "All emission sources located at one or more adjacent or contiguous properties owned or operated by the same person or persons under common control."

Examples of provisions incorporated in a permit modification might include conversion of an emissions unit to a new fuel type, or installation of emission controls or other process changes that reduce emissions at the site. Most CHP-related ERC projects fall into this category.

ERCs created as a result of an emissions unit shutdown are subject to 25% retention of the total certified reductions by NYSDEC. There is no retention for ERCs created as a result of source reduction: 100% of certified reductions accrue to the applicant.

This guidebook focuses on the creation of ERCs from emissions reductions that result from installing a new CHP unit at a facility. The thermal and electrical power from the CHP plant may replace a system that produced only thermal power or both thermal and electric power. The new CHP unit may lead to the complete retirement of previously installed emissions units, or a reduction in the emissions of the pre-existing equipment through reduced utilization and/or emission rate reductions of that equipment. Either approach is eligible to earn ERCs. The decision to retire older equipment rather limit the emissions of such equipment when CHP is installed is generally based on an evaluation of the project's economics and the operational needs of the end-user.

Examples of CHP installations include natural gas–fired microturbines, engines, combustion turbines, or fuel cells that generate electricity plus hot water and space heating and replace boilers fired by number 6, 4, or 2 oil. The old boilers that provided space heating and hot water might be taken out of service, retained to serve only as an emergency backup, or operated at a markedly reduced rate. Opportunities to create ERCs are greatest when the existing unit is very old and inefficient, burns number 6 fuel oil, and when such equipment is replaced with high-efficiency, low-emissions, CHP equipment.

The emissions rate of the new CHP unit relative to that of the existing boiler it replaces or displaces in part, is an important variable that affects the number of ERCs resulting from a CHP project. Among the available CHP technologies, fuel cells and microturbines offer the lowest emissions rates. Gas turbines with controls and rich-burn gas engines with control technology are next. Uncontrolled gas combustion turbines and low-emitting lean-burn engines have higher emissions rates and therefore offer fewer emissions reduction opportunities.

Section 3
OVERVIEW OF THE REGULATORY PROCESS

The process for obtaining ERCs for installing a CHP system touches on a number of intersecting air regulatory policies and can be somewhat bewildering for the lay person. While it may be intuitive to think of an ERC relating to a CHP project as the net reduction in total emissions (at the facility and on the power grid) attributable to the project, the regulatory determination of ERCs differs for two reasons. First, pursuant to NYSDEC policies, ERCs only reflect on-site emissions reductions despite the obvious fact that electricity produced by CHP systems displaces central power plant electricity production and the associated emissions. Secondly, NYSDEC ERC regulations define ERCs at the emission unit, rather than for the overall facility. As discussed below, emission unit ERC quantification can result in more ERCs being awarded than if a facility-level accounting method were used.

In general, if the new CHP unit uses the same emissions stack as a currently permitted emission unit (such as a boiler), it would be considered part of the existing "emission unit" due to the sharing of a single emission point, and therefore require a modification of the existing permit rather than a new permit[1]. (Appendix IV summarizes some of the air permitting requirements associated with CHP and other distributed generation technologies)[2] The modified permit will specify the maximum permissible annual NOx emissions that can be released through the "single emission point" (the stack) and for each piece of equipment individually. The ERCs for this project will be based on the emission reductions of the common stack, comparing pre-project baseline emissions (using the lesser of actual or permitted emissions prior to the modification) to post-project maximum permissible emissions. In other words, the maximum emissions associated with the new CHP unit, will reduce the number of ERCs resulting from diminished use of the existing boilers.

In contrast, if the CHP system is its own "emission unit" because it does not share an emission point with the existing boiler, the CHP emissions will generally not reduce the amount of ERCs resulting from the reduced use of the boiler (and the permit modification limitations which make it enforceable). The only way in which the emissions of a CHP project (vented separately from the existing emission unit) will

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[1] Regardless of whether the CHP unit is treated as a permit modification or as a new emissions unit, the system would be required to meet emission standards for distributed generation facilities, under 6 NYCRR Part 222. NYSDEC has proposed new standards that would take effect on May 1, 2006 for DG units with a nameplate rating of 50 kW or greater.

[2] For more comprehensive information about permitting of CHP and other DG units in New York State, see: *Clean Distributed Generation in New York State: State and Local Siting, Permitting and Code Issues*, prepared for NYSERDA by PACE University Energy Project and Energy and Environmental Analysis, November 2003.
http://www.law.pace.edu/energy/pdffiles/DG_GUIDEBOOK_TGB_NOV2003.pdf

reduce the ERCs resulting from modification of the existing emission unit permit, is if the CHP project's maximum potential emissions exceed the "Major Source" thresholds.[3] If the CHP unit (or multiple CHP units in a single project, if developed as part of a long-range plan) breaches the Major Source threshold, then it is required to obtain emission offsets (either ERCs or onsite emission offsets that can be "netted" against the CHP emissions increase). In such a project, some or all of the emissions decrease for the existing boiler would likely be used as an offset and netted against the CHP project's emissions, to reduce the CHP project's "net" potential emissions increase to less than the major source threshold. For modifications to an existing major source in non-attainment areas, the applicant must review the applicability of New Source Review requirements if the modification is part of a "significant source project" (defined as potential NOx or VOC emissions for a project greater than 2.5 tons per year in Severe non-attainment areas and 40 tons per year in marginal/moderate non-attainment areas).

The regulatory logic of why the location of a CHP emissions point can affect the number of ERCs issued for the project stems from the definition of an ERC in the NYSDEC rule: an emission reduction from an emission unit. There is no requirement that an ERC produce an overall emission reduction at the facility, even though it is both intuitive and likely in common practice. The following example helps to illustrate the concept.

A college campus with a central steam boiler has annual NOx emissions of 40 tons per year (and a 50 ton per year permit maximum or "potential to emit"). It wishes to install three separate CHP units to provide heat and electricity for half the campus, thereby reducing the old boiler's actual emissions to 20 tons per year. Each CHP unit will emit 5 tons of NOx annually through its own stack, for a total of 15 tons. In order to obtain ERCs, the college submits a minor modification application of its existing air permit reflecting the 20-ton decrease in actual emissions from the old boiler resulting in a new maximum permitted emission level of 30 tons per year. Overall, the net effect of the project at the College is a 5 ton emission decrease. However, because the CHP emissions units are both individually and collectively[4] below 25 tons of NOx emissions per year, and they are not vented through the existing boiler's stack, they will not count against the 20 ton per year emission reduction (and 20 ERCs) applicable to the boiler. If the three CHP units were vented through the old boiler stack, and the maximum potential to emit in the amended air permit was limited to 35 tons (20 tons from the old boiler plus 15 tons combined from the three CHP units), there would only be 5 ERCs created.

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[3] The Major Source maximum potential emissions threshold is 25 tons per year of NOx in a "Severe" non-attainment area (such as Downstate New York) and 40 tons per year in other parts of New York State which are classified as "Moderate" non-attainment areas.

[4] Multiple new emission units at a facility undertaken as a result of a long range plan are treated as a single "source project." If the maximum potential emissions of a source project exceed the major facility threshold of 25 tons, it would be treated as a major new source -- unless there are on site emission reduction projects that can be netted against it bringing it below 25 tons net. If the CHP source project still exceeds 25 tons of NOx per year, it would be required to obtain ERCs to offset the potential emissions on a 1.3 to 1 basis in a Severe non-attainment area, like Downstate New York.

From a practical standpoint, many small CHP systems that meet the NYSDEC DG emission standards will stay below the major source threshold of 25 tons per year of NOx in the Severe Downstate non-attainment areas. For example, a modern low-NOx combustion turbine (even without post-combustion emission controls) will typically not exceed the 25 ton NOx threshold if it is 2.5 MW or smaller.

Despite the ERC benefits from venting CHP units separately from existing equipment, many CHP developers are likely to still find it attractive to use existing emission stacks, if they are in good condition and meet permit and code requirements. Use of the existing stacks avoids potentially significant construction expenses, and may entail less regulatory burden and fewer aesthetic concerns with neighbors and abutters. In some cases (particularly older apartment buildings with unused stacks for retired incinerators) there may be dormant emission stacks that can be reactivated and meet code requirements when used with the new CHP equipment. Use of the existing but dormant stack may yield more ERCs, and mitigate aesthetic concerns that would otherwise result when neighbors see a new emissions stack being constructed. An appropriate determination on how CHP emissions are vented for a given facility should be tailored to the specific situation of the facility, and is beyond the scope of this guidebook.

The required provisions and criteria for certification, registration, and use of emissions reductions as ERCs are set forth in 6 NYCRR 231-2.6 (included Appendix III). NYSDEC is the regulatory authority charged with overseeing the ERC certification process. NYSDEC maintains nine regional offices across the State, where ERC applications are submitted. The locations and contact numbers for the regional offices can be found at: http://www.dec.state.ny.us/website/about/abtrull3.html; a map of the NYSDEC regions appears in Appendix I; a list of the counties in each region is in Appendix II.

Application forms are available at the NYSDEC website, http://www.dec.state.ny.us/index.html. The regional office reviews the permit application, and the central office in Albany then conducts a technical review. When the review is complete, the regional office issues the final certification.

It is recommended that copies of all forms and attachments be sent to the Albany office when the CHP owner or operator submits an application to the regional office. To expedite processing and ensure coordination from the start, the applicant should also request a pre-application meeting with the regional air pollution control engineer and ask to also involve a technical review specialist from the central office as well.

The process of obtaining ERCs begins with an air permit modification, regardless of whether the CHP is permitted as a new unit or as a modification of an existing unit. Thus, it is an absolute prerequisite that the ERC applicant have a valid air permit for an existing emission unit to begin the process. As part of the

permit modification, the applicant initiates the ERC process by notifying the regional office and the ERC staff at NYSDEC headquarters of its intent to file for ERCs.

Once the permit modification is underway, the applicant can complete the NYSDEC ERC Quantification Form, which flows from the permit modification, and is the primary basis of the ERC application. The information requested on the form is designed to ensure that the credits represent actual emissions reductions and that the reductions meet certain standards. The form requires that the applicant establish the prior actual annual emissions and the future emissions, with supporting data and calculations.

The form involves two steps.

Step 1 is quantifying the ERCs:

- establishing a "baseline" representing current or past emissions;
- determining past allowable emissions;
- determining future emissions after the reduction due to the CHP investment; and
- calculating the difference—the ERCs.

Step 2 is certifying the ERCs:

- Are they "surplus"?
- Are they "quantifiable"?
- Are they "permanent"?
- Are they "enforceable"?

These concepts and terms will be explained in subsequent sections.

The form is sent for review to the ERC staff at the Bureau of Stationary Sources within the Division of Air Resources of the NYSDEC. After NYSDEC is satisfied that the applicant has met the criteria, a notice of the permit modification and creation of ERCs is published. Following a 30-day public comment period, the ERCs are registered and can then be traded.

Section 4
THE QUANTIFICATION FORM

Section 231-2.6 of the NYSDEC regulations requires that an applicant for ERC certification submit an ERC Quantification Form with sufficient documentation to establish that the reductions are surplus, quantifiable, permanent, and enforceable. The form is reproduced here, with explanations, and is also available at ftp://ftp.dec.state.ny.us/dar/library/forms/ercquan.pdf. Prior to filing the ERC Quantification Form, the applicant must have submitted a request for a permit modification. The ERC Quantification Form contains three parts: Sections A, B and C. Keep in mind that although the ERCs may be triggered by the installation of a new CHP unit, the basis of the ERCs awarded is the reduction of emissions from an existing emissions unit. As noted above, if the CHP unit (or significant source project's) emissions fall below Major source thresholds, and are separately vented from the existing emission unit, they will not count in the determination of emission reductions eligible for ERCs.

SECTION A: DETERMINATION OF THE BASELINE PERIOD

Information needed in Section A includes the following:

1. Complete fuel use records for the most recent two-year period.
2. If the most recent two-year period is not representative of normal operations, complete fuel use records for a representative two-year period within the past five years (going back further than five years is not permitted).
3. Documentation of the emissions levels and emissions rates from the equipment that is to be retired or subject to a more restrictive emissions cap.
4. If actual emissions data is not available, then standard emissions factors for the type of equipment or the equipment manufacturer's emissions rate guarantee may be used as substitute data.
5. The precise reference for the published emissions factor (e.g., the page number of EPA's Compilation of Air Pollutant Emission Factors, a document known as "AP 42 Emission Factors").
6. Records of inspections and maintenance schedules if required by NYSDEC
7. Questions to be answered:
    - How much fuel did the emission unit consume over the last two years?
    - Is the consumption over this period "typical"?
    - If the period was not typical, what made it atypical?
    - What are the emissions from the current equipment on the site?
    - What supporting tests, records, or other documentation verify the emissions rate?
    - What standard emissions factor, such as EPA's AP-42, applies to the equipment?
    - What is the precise reference for the published emissions factor?
    - What type of fuel oil does the facility use? What is its nitrogen content?

Section A, page 1 of the ERC Quantification Form requests the facility name, NYSDEC Facility ID Number, the NYSDEC Emissions unit ID number, facility address, contact person, and other general information related to the site. The applicant is also required to certify that the information provided is true (to the best of the applicant's knowledge) and describe the nature of the project leading to the proposed creation of ERCs. Section A, page 2 establishes the baseline period—a period that reflects typical current emissions so that future emissions, reflecting the emission reduction activity, can be compared and the number of ERCs determined.

Quantification Form, page 2
A. Determination of the Baseline Period

A.1 Emission Reduction Non-attainment Contaminant (circle **all** that apply):
NOx VOC CO PM-10

A.2 Emission Reduction Date: _____/_____ /_____

NOTES: (see 6 NYCRR 231-2.1(b) (1))
1. Emission reductions that occurred prior to November 15, 1990 are not subject to Subpart 231-2 and therefore do not qualify for certification as emission reduction credits (ERCs).

2. The emission reduction date is the date the emission reduction physically occurred (past reduction) or the date the reduction is scheduled to occur (future reduction).

3. In order for the NYSDEC to certify emission reduction credits for future reductions, such reductions must be tied to a proposed source project or proposed major facility.

A.3. Has the emission reduction physically occurred?
Yes _____ No _____

A.4. Describe action(s) taken (or to be taken) to reduce emissions for which ERCs are requested:

A.5. What is the baseline period for the emission reduction: ___/___ /___ to ___/___ /___

NOTES:
1. For an emission reduction which has actually occurred, the baseline period is the two consecutive year period immediately preceding the date of the reduction.

2. For a future reduction, the baseline period is the two consecutive year period immediately preceding the date that the NYSDEC receives the permit application for the proposed

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project for which the emission reduction credits will be
used as offsets or for netting purposes.

3. For both items 1 and 2 above, another two consecutive
year period may be used which is more representative of
normal source operation based upon actual operating hours,
production rates, and material input. This two consecutive
year period must be within the five-year period immediately
preceding the reduction (or application receipt date) and
is subject to the review and approval of the NYSDEC.
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In completing item A.1 on page 2, most owner-operators of CHP projects will enter NO_x, since reductions of this pollutant are greatest and have the most value. For A.4, the applicant enters the type of reduction to be taken. For clean DG projects that are the subject of this guidebook, the type of reduction will be likely be "source reduction" but could also conceivably be an "emission point shutdown." With regard to item A.5, establishing the emission unit's baseline period for the emissions reduction is a crucial step in the quantification process. Here, information is needed about the emission unit's actual fuel usage, the emissions rate of the current combustion equipment, and the nitrogen content of the heating oil. The minimum baseline period is 12 months. For any months for which data are missing, the emissions are assumed by NYSDEC to be zero.

Standard Baseline Period

The standard baseline period depends on whether the emissions reduction has already occurred (Note 1) or will occur in the future (Note 2):

- For an emission reduction credit that has physically occurred the baseline period is the two-consecutive-year period immediately preceding the date that emissions were reduced.
- For an ERC which is scheduled to occur in the future, the baseline period is the two years immediately preceding the date of receipt by the department of a permit application for a proposed source project which proposes to use the ERC. Future emission reduction projects are not allowed to create ERCs that can be traded to other parties; ERCs for future reduction activities are limited to on-site use for new or modified emission sources that require offsets under NSR requirements.

The focus of this Guide is on past reductions, which can produce tradable ERCs that can add market value to a CHP project. Determining the baseline period can be straightforward, but an applicant may have reason to use "another two year consecutive year period…which is more representative of normal source operation" (Note 3 on the form).

Alternative Baseline Period

The applicant may select a period of two consecutive years within the past five years, if the immediately standard baseline period (two years prior to the reduction activity) was not representative. The applicant is

prohibited from selecting a baseline period that goes back any further than five years from the date of the source reduction.

This option is subject to NYSDEC's review and approval. To exercise it, the applicant must demonstrate to the satisfaction of NYSDEC that the period selected is "more representative" than the immediately preceding 24 months. This showing will require that the applicant organize the records for the entire period, encompassing the alternative period as well as the most recent two-consecutive-year period.

The site owner can propose a legitimate adjustment to the baseline period provided that the rationale is clearly stated and supported with evidence. A convincing case must be made—based on indicators such as fuel usage, hours of operation, production rates, material input, or other factors that are relevant to the business operation—that the selected period is in fact a more appropriate baseline than the most recent 24 months.

To prove that the energy usage in this alternative 24-month period is more representative of normal source operation, the applicant must identify the factors that determine energy and fuel usage at the facility. In the multifamily building sector, as an example, the following represent some of the factors that determine fuel use at a site:

Deviation of weather patterns from normal

- Were winter months unusually warm?
- Were summer months unusually cool?

For example, if the heating degree-days for the most recent two-year period were well outside the long-term norm, the owner might propose a different two-year period that exhibited more typical weather patterns. Degree-day statistics for cities and states are available from the National Weather Services Climate Prediction Center website, http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/.

Temporary changes in intensity of usage

- Was there a one-time increase in vacancy rates that can be demonstrated to be an anomaly?
- Was there a temporary shift in building demographics that lowered demand for heat and hot water?
- Did major service disruptions or curtailments occur that had material impact on boiler hours of operation?

The business records of the site should provide evidence on the typical vacancy rates at the facility and the deviation from normal for the most recent period. Similarly, the business records of the site should verify that there was a temporary and anomalous change in the type of tenant (average family size, mix of young versus old, single versus family, and so on).

SECTION B: DETERMINATION OF PAST ALLOWABLE ANNUAL EMISSIONS

To be certified, emissions reduction credits must be surplus, quantifiable, permanent, and enforceable. Applicants calculate proof of the surplus and quantifiable criteria in Sections B and C of the Quantification Form. Past allowable annual emissions are determined in Section B (page 3) and then compared with prior actual emissions in Section C (page 4). NYSDEC uses the lesser of the two numbers as the baseline emissions level for purposes of calculating emissions reductions.

Quantification Form, page 3
B. Determination of Past Allowable Annual Emissions

Facility Creating ERCs:_____ Emission Unit ID#:_____

B.1 State Register or Federal Register publication notice date proposing any RACT or MACT requirement that may be applicable to the facility applying for emission reduction credits:

Pollutant	RACT Date	MACT Date	Other Applicable Requirement[1]
NOx	__/__ /__	__/__ /__	__ /__ /__
VOC	__/__ /__	__/__ /__	__ /__ /__
CO	__/__ /__	__/__ /__	__ /__ /__
PM-10	__/__ /__	__ /__ /__	__ /__ /__

[1] Identify applicable requirement: _____

B.2 Reduction date (see Line A.2 on page 2): __/__ /__.

B.3 What are the allowable annual RACT emissions from this emission unit (tons/year)?
NOx _____ VOC _____ CO _____ PM-10 _____

B.4 What are the allowable annual MACT emissions from this emission unit (tons/year)?

NOx _____ VOC _____ CO _____ PM-10 _____

NOTES (Lines B.3 and B.4):
1. If the past reduction occurred after the notice date a RACT or MACT was proposed, then the corresponding RACT or MACT must be considered when determining the prior allowable emissions from the emission unit that is subject of this quantification form.

2. For a future reduction, if the date that the emission reduction credits are certified is after the notice date for a proposed RACT or MACT, then the corresponding RACT or MACT must be addressed when determining the prior allowable

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emissions from the emission unit that is subject of this
quantification form.

B.5 Are there any federally-enforceable permit
conditions in effect to limit the emissions from the
emission unit that is the subject of this
quantification form?
Yes ____ No ____. If yes, what are the emission
limit(s) (tons/year)?
NOx _____ VOC _____ CO _____ PM-10 _____

B.6 If Lines B.3 through B.5 are not applicable, then
enter the maximum annual potential of the emission
unit based on 8,760 hours of operation per year.

NOx _____ tons/yr VOC _____ tons/yr CO _____ tons/yr
PM-10 _____ tons/yr

B.7 Enter the lesser of Lines B.3, B.4, B.5, or B.6:
These are the prior allowable annual emissions.

NOx _____ tons/yr VOC _____ tons/yr CO _____ tons/yr
PM-10 _____ tons/yr
```

For many small CHP systems, which are considered minor sources, completing Section B entails entering information for line B5 or line B6 regarding the **existing** (pre-CHP) emissions unit.

- *Minor sources* are those with a state facilities permit or a registration; applicants fill out line B5, which is the current permit limit on annual emissions; if the emission unit is exempt from air permitting, and has no specified annual emission limits, the annual emissions are presented B6, assuming the maximum possible use of the facility in all hours of the year.
- *Major sources* are large units covered by Title V and subject to RACT (Reasonably Available Control Technology) or MACT (Maximum Achievable Control Technology) limitations on emissions; these applicants complete B1, B2, B3, and B4.

Past allowable annual emissions (expressed in tons per year) are the lowest of three figures: any applicable RACT or MACT requirements, federally enforceable permit conditions that limit emissions levels, or the unit's maximum potential to emit. The emissions are entered on line B7 and are calculated as follows.

B1. Major sources: The applicant identifies any State Register or Federal Register publication notice dates proposing any RACT or MACT requirements, or any other requirements that may be applicable to the facility applying for ERCs. These dates, if applicable, are entered at line B1.

B2. Major sources: The date on which reducti ons physically occurred or are scheduled to occur is entered here. The reductions must be tied to a proposed source project or proposed major facility (Note 3 to A2 on page 2).

B3 and B4. Major sources: Emissions limits determined through B1 are entered here. The applicant is asked to enter the allowable annual RACT emissions or allowable annual MACT emissions, in tons per year, if applicable, at lines B3 or B4. This figure may materially affect the amount of ERCs that are available from the site. The applicant must use the *latest* regulatory emissions rate, even if it is not yet in effect, when determining the baseline. See the discussion of surplus below for more details and an example calculation.

B5. Minor sources: If there are any federally enforceable permit conditions in effect that limit emissions from the unit, the limit is entered here, in tons per year. The figures come from the NYSDEC operating permit for the emissions unit.

B6. Minor sources: If no RACT or MACT requirements or federally enforceable permit conditions are applicable to the unit, the applicant enters the maximum annual potential to emit, based on 8,760 hours of operation per year, in tons per year.

B7. All sources: The applicant enters the lowest number from lines B3, B4, B5, and B6. This is the prior annual allowable emissions.

Surplus

Whether the major source reductions are surplus must be determined. This criterion is the subject of Notes 1 and 2 to lines B3 and B4. This requirement does not apply to minor sources.

Emissions reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the state implementation plan (SIP) for air quality, in SIP-related requirements, other State air quality programs, or federal rules that focus on reducing criteria pollutants or their precursors. If one of these programs relies on emissions reductions at the CHP unit to meet air quality-related program requirements, the unit's reductions are no longer surplus. The legal definition of *surplus* can be found in Appendix III and at 6 NYCRR §231-2.6.a.ii.5(a) .

Baseline emissions must be calculated from the most current air emissions requirements even if these requirements have not yet taken effect. If the request to certify ERCs is submitted after the date of a notice, the petitioner must use the future emissions rate in calculating the emissions baseline.

The example below clarifies the application of the surplus concept when regulations are changing. Here we assume that before a hypothetical facility files for ERCs, the emissions rate from its 1100-horsepower engine was 6 grams Brake Horsepower (BHP) per hour. The facility owner can demonstrate to the satisfaction of NYSDEC that its two-year average emissions rate was 50 tons per year of NO_x. But at the time the facility files the Quantification Form, NYSDEC has just published notice of a new regulatory standard requiring engines to operate at 3 grams BHP per hour. Even though the regulations are not in

effect, only out for notice, for purposes of the Quantification Form, the new regulatory rate of 3 grams BHP per hour must be applied.

Calculating surplus emissions for a 1100-hp engine

Actual emissions rate: 6 g/BHP/hr.
1999 activity level: 6,500 hours 6500 hours * 6 g/BHP/hr * 1100 HP = 47.4 tons
2000 activity level: 7,200 hours 7200 hours * 6 g/BHP-hr * 1100 HP = 52.5 tons
Two-year average actual emissions = 50 tons

New regulatory emissions rate: 3.0 g/BHP/hr.
1999 activity level: 6,500 hours 6500 hours * 6 g/BHP/hr * 1100 HP = 23.6 tons 2000 activity level: 7,200 hours7200 hours * 6 g/BHP/hr * 1100 HP = 26.2 tons
Two-year average allowable emissions = 25 tons

The forthcoming regulation has reduced the ERCs that the site can certify from 50 tons per year to 25 tons per year because the newly noticed permissible regulatory emissions rate is 50% of the old rate; the site must take a 50% cut in the ERCs that it can quantify. The new permissible emissions rate, 25 tons, is entered at line B3 of the Quantification Form. If you are not a Title V (major source) facility you may skip lines B3 and B4.

SECTION C: DETERMINATION OF EMISSION REDUCTION CREDITS

Quantification Form, page 4

C. Emission Reduction Credits

C.1 Enter the prior actual annual emissions (in tons per year) for each applicable non-attainment contaminant (attach data summaries and calculations):
NOx _____ VOC _____ CO _____ PM-10 _____

C.2 Enter the prior allowable annual emissions (in tons per year) for each applicable non-attainment contaminant (from Line B.7 on page 3).
NOx _____ VOC _____ CO _____ PM-10 _____

C.3 Enter the lesser of the prior actual annual emissions or the prior allowable annual emissions (in tons/year):
NOx _____ VOC _____ CO _____ PM-10 _____

C.4 Enter the future maximum annual potential (in tons/year, after control, and based upon an 8,760-hour year unless limited pursuant to federally-enforceable permit conditions):

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NOx _____ VOC _____ CO _____ PM-10 _____


C.5 Subtract Line C.4 from Line C.3. These are the
emission reduction credits (tons/year).
NOx _____ VOC _____ CO _____ PM-10 _____

NOTES:
1. The emission reduction credits on Line C.5 must be
certified before they may be used or sold. The applicant
must either submit an application for a modified air
pollution control permit (air permit), or if the emission
reduction credits are being created due to a facility
shutdown, the applicant must surrender all air permits. The
public will be given 30-days to comment on this
quantification form and the corresponding permit action.

2. The New York State Department of Environmental
Conservation shall retain 25% of NOx and VOC ERCs created
from the shutdown of an emission unit at a major facility
or a major facility in moderate and severe ozone non-
attainment areas as set forth at 6 NYCRR 231-2.6(a)(6).
Retained ERCs may be used as part of a net emission
increase determination of non-applicability or as internal
offsets or as emission offsets at the facility in which
they were created.
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ERCs are calculated by comparing the baseline emissions level of the unit with the future maximum annual potential to emit, after control, based on an 8,760-hour year (unless limited by federally enforceable permit conditions).

C1. The first step in the calculation is to enter the prior actual annual emissions, in tons per year. Prior actual annual emissions are the emissions that occurred over the baseline period, determined in Section A. Applicants are required to attach data summaries and calculations. If data are missing for one or more months, NYSDEC assumes that the usage in those months is 0. This provides a very strong incentive to locate data for every month of the 24-month baseline period and to submit this in the review process. Interpolation of data for a subset of the 24 month period is not permitted. For example, if data are available only for the final 6-month period of a 24-month baseline, it is not acceptable to use the average of those 6 months to fill in the prior (missing) 18-month period.

C2. The next step is to enter the prior allowable annual emissions, in tons per year, from line B7 (page 3).

C3. The lesser of lines C1 and C2 is entered on line C3; it represents the baseline emissions level of the unit.

C4. The applicant enters post-reduction emissions as the future maximum annual potential, in tons per year, after control, based on an 8,760-hour year (unless limited by federally enforceable permit

conditions). This figure will most likely be the emissions limit that is specified in the permit modification that the applicant has undergone in parallel with the ERC certification process.

C5. Subtracting line C4 (post-reduction emissions) from line C3 (baseline emissions) yields the emissions reduction credits.

Quantifiable

Applicants must prove that their emissions reductions are quantifiable in Section C. A creditable emissions reduction must be quantified through methods and procedures that are reliable, accurate, and replicable.

The authority for establishing the testing and monitoring protocols is defined in 6 NYCRR Part 227, Stationary Combustion Installations. The testing, monitoring and reporting requirements are provided in Appendix IV. There is a hierarchy of acceptable testing protocols; in order, they are as follows:

- continuous emissions monitoring;
- performance test data on the unit requesting certification;
- performance test data on a similar unit; and
- equipment vendor emissions data and guarantees.

Quantification of emissions reductions can be based on EPA's AP 42 emissions factors, as described at 6 NYCRR §231-2.6 a.ii.5(b). There is likely to be some tradeoff between the precision of the estimate and the cost of obtaining higher degrees of accuracy: the protocols at the low end of the hierarchy may be less precise, but obtaining more accurate data may prove costly.

If stack-testing information performed at the site is available, it should be provided as part of the submission. Stack testing at the site is not a requirement, however, nor are other more sensitive (and expensive) data collection protocols, such as continuous emissions monitoring. NYSDEC's Division of Air Resources has developed a document for ascertaining the nitrogen content of fuel that is necessary for developing emissions factors for boilers. A copy is attached as Appendix V, Calculating Emissions Factors for Boilers.

Performance test data for a comparable unit should come from a reputable third party, and all relevant information about the test results should be submitted. The source of emissions data can be equipment vendor emissions data and guarantees.

NYSDEC expects small-scale CHP sites to use emissions factors to fill out line C1. The emissions factor used, whether from EPA's AP 42 or from a product manufacturer, should come from precisely the same model as the one being certified. The source must be cited, with page numbers. The applicant should identify the source of the information and attach photocopies of the relevant pages from AP 42 or the manufacturer's spec sheets, with model, model number, and other relevant details; the page numbers should

be part of the photocopies. To substantiate fuel use, the applicant must submit copies of all billing records for the period.

The EPA AP 42 emissions factors are available at the EPA website under the Technology Transfer Network Clearinghouse for Inventories and Emission Factors, http://www.epa.gov/ttn/chief/. A direct link to emissions factors is http://www.epa.gov/ttn/chief/efinformation.html

Emissions of NO_x may be estimated by boiler owners. NYSDEC expects that emissions estimates will be based on a fuel nitrogen content of 0.5%. This figure was derived from 1990–1994 nitrogen content data compiled from Consolidated Edison, Long Island Lighting Companies, and the Massachusetts and Maine departments of environmental protection.

Permanent and Enforceable

Emissions reductions must also be permanent and enforceable before they qualify for ERCs.

Permanent. The emissions reduction must be nonreversible, and the applicant must commit to the new, lower level of emissions. The NYSDEC definition of *permanent* is found in 6 NYCRR §231-2.6.a.ii.5(c) and is reproduced in Appendix III; in short, permanent means that the reduction is irreversible through the life of the emissions unit.

Enforceable. To be certified, the emissions reduction that gives rise to a creditable ERC must be enforceable. Note 1 in Section C of the Quantification Form states that the applicant must submit a modified air pollution control permit. The NYSDEC definition of *enforceable* is found at 6 NYCRR §231-2.6.a.ii.5(d) and is reproduced in Appendix III. The term describes emissions limitations that are legally binding and are enforceable by both NYSDEC and EPA. Limitations that are directly measurable may be considered enforceable (e.g., limits on the allowable capacity of equipment; requirements for installation, operation, and maintenance of air pollution control equipment; limits on hours of operation; and restrictions on amounts of materials combusted, stored, or produced).

Section 5
NYSDEC REVIEW AND PUBLIC COMMENT

NYSDEC reviews the Quantification Form and the supporting documentation and then determines whether to certify the ERCs. The ERCs must be certified before they can be used or sold.

Clear and thorough documentation will expedite the review and certification process. The ERC quantification process requires that all documentation (6 NYCRR 231-2.12 (a)(5)) necessary to support the calculations of prior actual annual emissions accompany the form. The process will likewise be expedited if both the regional office and the NYSDEC headquarters office have been notified about the impending application. In advance of submitting the Quantification Form for review, the applicant should have called a pre-application meeting that included representatives from the regional office as well as representatives from the ERC review staff at the NYSDEC headquarters.

ERC quantification forms and all associated documentation are reviewed by technical staff at the NYSDEC Headquarters office in Albany. However, the application for the ERC is logged in at the regional office. Since both the regional and headquarter offices are involved it is important to ensure that all parties have the relevant information. If the application is incomplete NYSDEC reviewers will seek additional information. Review and final approval by NYSDEC can take from a period of a few months to a year or more. NYSDEC does not maintain publicly available information on the average length of time required for processing the ERC Quantification form. When review is complete NYSDEC then notifies the applicant of its decision

ERCs are certified for a minimum of one ton. Once the one-ton threshold has been passed, ERCs can be certified in fractions of a ton. For example, an ERC for 0.68 ton of NO_x will not be certified, but a project that reduces 2.68 tons of NO_x can receive ERCs in the amount of 2.68 tons.

PUBLIC PARTICIPATION

Note 1 of Section C requires a 30-day period for the public to comment on the certification as well as the action taken on the modified permit application.

Once the technical review of the ERC application has been completed and all issues addressed by the applicant, the ERC application is put out for a public notice in the *Environmental Notice Bulletin.*

Air Guide 10 gives some examples of model notices for ERCs issued by NYSDEC. The model notice to certify past reductions is reprinted in Appendix VI, and the model notice for future reductions is in

Appendix VII. Air Guide 10 can be found on the Web at
http://www.dec.state.ny.us/website/ogc/egm/airguide10.html#e.

The regulations that govern public participation in the ERC certification process are found at §231-2.10 (http://www.dec.state.ny.us/website/regs/231b.htm#231-2!10). In the early years of the ERC program, it was quite common for parties to take part in the public participation process and raise issues challenging the ERC certification. However, in recent years there have been very few challenges to ERC certification.

Section 6
BOTTOM-LINE ISSUES

Combined heat and power units can lower building energy costs, increase business profitability, reduce air pollutant emissions, provide greater reliability, and reduce exposure to volatile fuel and electric power costs. In addition, small-scale CHP can be a least-cost alternative to investment in new distribution lines. Unfortunately, because they are small in scale, many CHP projects face practical impediments that make it difficult to take advantage of ERCs. The basic problem is that many of the costs of certifying ERCs are fixed, and thus small projects end up paying a significantly higher cost per ton certified than do larger installations. In addition, purchasers of ERCs prefer to purchase larger blocks of ERCs than will be available from a small CHP project. This section of the guidebook addresses these issues.

TAX TREATMENT

Like emissions allowances, ERCs awarded to a facility owner are regarded by the Internal Revenue Service as capital assets, which do not depreciate in value. When sold, the net ERC proceeds (net of broker fees) are subject to the gain/loss provisions applicable to capital assets. Normal carry-back and carry-forward provisions allowing the gain or loss to be applied to other time periods also apply. Typically, the tax basis of an ERC awarded for an emission-reducing project would be the value of the ERC minus all costs associated with obtaining certification; the costs associated with the actual equipment or process change used to achieve the emissions reduction would not be included.

COST PER TON CERTIFIED

There are certain fixed costs to ERC quantification and certification that exist regardless of project size. All sites must organize the information necessary to complete the Quantification Form and attach detailed data summaries. There are also costs involved in obtaining the permit modification that guarantees the enforceability of the emissions reductions and in validating the future maximum annual emissions potential.

Costs of certifying emissions reduction credits may include the following:

- documenting fuel oil consumption over two or more years;
- attorney's fees and consultant fees if these services are utilized;
- emissions testing when required;
- application preparation and submission time and costs;
- costs for public notice NYSDEC review process; and
- record maintenance.

A small CHP project must spread the fixed costs over a small number of ERCs. For example, a multifamily building complex may be able to certify five tons of ERCs at a cost of $15,000 to $20,000, for an average cost per ton certified of $3,000 to $4,000. A large site that is certifying 100 tons will incur only slightly higher costs and thus have a far lower cost per ton certified.

In the downstate severe non-attainment area, the price of ERCs has ranged from a low of approximately $5,000 per ton to as much as $29,000 per ton. In April 2003, the price was $11,350 per ton of NOx. There is no recent transaction data for ERCs in the New York severe non-attainment area. The asking price may be in the range of $14,000 to $15,000 per ton and the bid at $10,000. Where the trading price would eventually end up is dependent on the supply and how badly the source needs the ERCs.

CHP building projects often generate less than 10 tons of ERCs, and most will have less than 15 to 20 tons. If 5 tons are eventually certified and sold at $11,350 and if the certification costs fall in the high range of estimates, as much as 30% to 40% of the potential return on the ERCs is lost.

ERC BROKERAGE COSTS

Smaller projects are at a disadvantage in the marketplace as well. Buyers of ERCs tend to seek larger lots than small projects generate. For example, a new factory or power plant may require 100 tons to 300 tons of ERCs. A buyer looking for 100 tons will prefer to execute one contract for 100 tons, rather than 10 contracts at 10 tons each. If a seller places seven tons on the ERC registry, and other holders of ERCs have lot sizes of 50, 100, or more tons, the amount the buyer is willing to pay per ton for the seven-ton contract may be considerably less than what it is willing to pay for the 50- or 100-ton contract.

Trades can be made directly from the State's ERC registry, but it is likely that small CHP projects will want to use the services of emissions brokers, who match buyers and sellers of ERCs. The emissions traders require a commission on the order of 7.5% to 10% for their marketing services, adding a further cost and diminishing the overall return on ERCs for a small CHP site. However, for very small projects they will likely ask for a minimum flat fee. There are significant processing costs that are incurred no matter what the size of the project. For example the emission broker may require a minimum fee of $1,000 to $2,000 for the transaction, if 7.5% of the total proceeds from the trade are less than the minimum threshold

Emissions brokers report that the bid-ask spread in these markets can be substantial. When the seller is offering a small lot to an illiquid market with a large spread, this odd lot is likely to sell at a price that is markedly lower than the price obtained by a seller with a much larger lot.

Because of the inherent problems in making a market for ERCs at small lot sizes, it may be advantageous for the project developer, rather than the site owner, to hold title to the ERCs. In that way the developer could aggregate ERCs from several projects and bring them to market in larger lots.

INTERSTATE COMMERCE IN ERCs

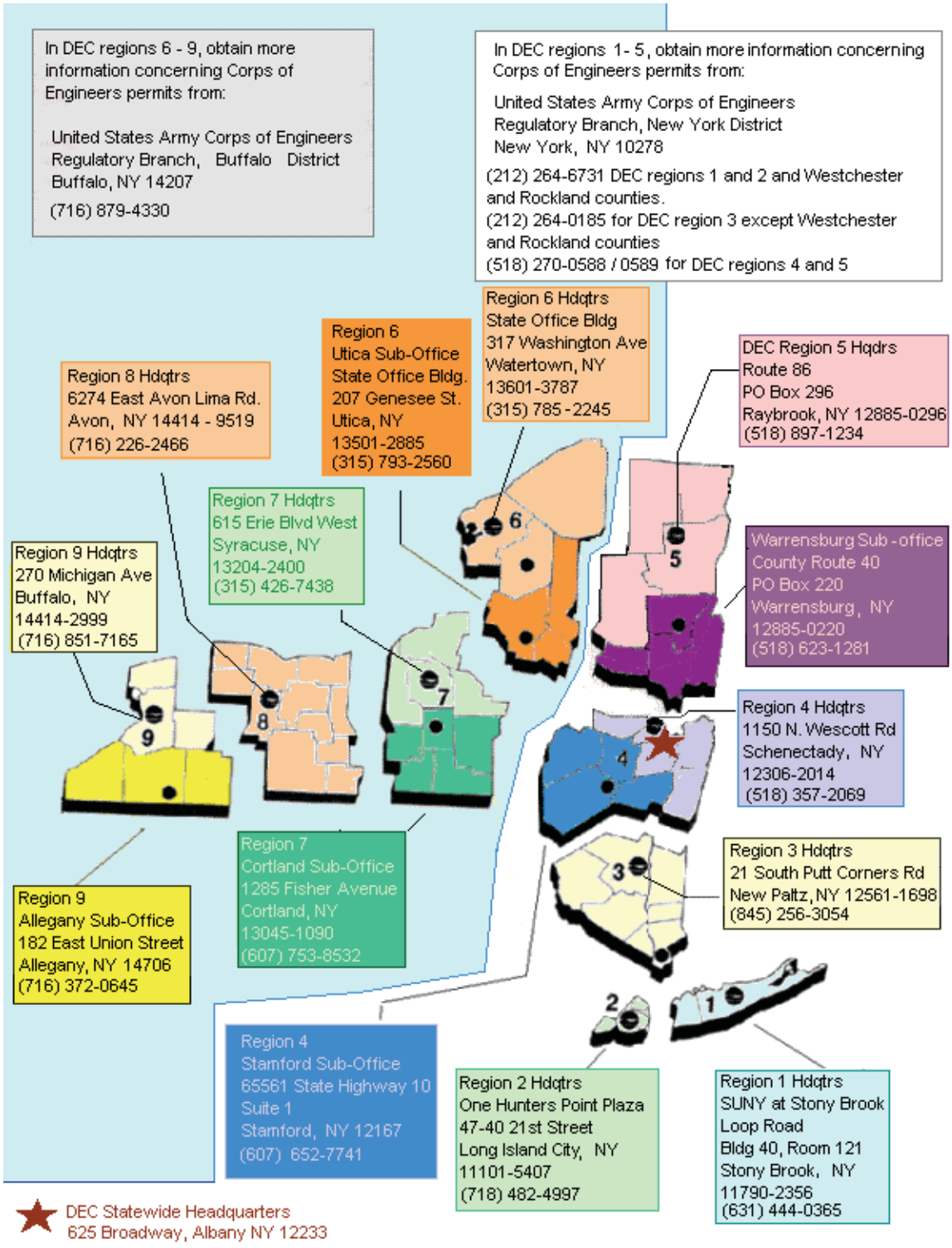
Certified ERCs can be sold in New York State or in any other state within the Ozone Transport Region that has a reciprocal trading arrangement with New York. Memoranda of understanding have been signed with Pennsylvania and Connecticut allowing the exchange and trade of ERCs among these states. ERC transactions between New York and Pennsylvania have been active in the past.

Trades can be made only (1) between areas of equal non-attainment severity and (2) from an area of greater severity to an area of lesser severity. For example, a trade can occur from a severe non-attainment area in Pennsylvania to a severe non-attainment area in New York, but not from a moderate non-attainment area in Pennsylvania to the severe non-attainment area in New York.

APPENDICES

APPENDIX I

NYSDEC REGIONS: MAP AND CONTACT INFORMATION



APPENDIX II

COUNTIES AND NYSDEC REGIONS

Region	*Counties*
1	Nassau and Suffolk
2	New York City: boroughs of Manhattan, Brooklyn, Bronx, Queens, and Staten Island
3a	Rockland, Westchester, and Lower Orange County Metropolitan Area (towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, and Woodbury)
3b	Dutchess, northern Orange, Putnam, Sullivan, and Ulster
4	Albany, Columbia, Greene, Montgomery, Rensselaer, Schenectady, Delaware, Otsego, and Schoharie
5	Clinton, Essex, Franklin, Hamilton, Fulton, Saratoga, Warren, and Washington
6	Jefferson, Lewis, Herkimer, Oneida, and St. Lawrence
7	Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, and Tompkins
8	Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, and Yates
9	Allegany, Cattaraugus, Chautauqua, Erie, Niagara, and Wyoming

County	**Region**
New York City (five boroughs)	2
Albany	4
Allegany	9
Broome	7
Cattaraugus	9
Cayuga	7
Chautauqua	9
Chemung	8
Chenango	7
Clinton	5
Columbia	4
Cortland	7
Delaware	4
Dutchess	3
Erie	9
Essex	5
Franklin	5
Fulton	5
Genesee	8
Greene	4
Hamilton	5
Herkimer	6
Jefferson	6
Lewis	6
Livingston	8
Madison	7
Monroe	8
Montgomery	4
Nassau	1

County	**Region**
Niagara	9
Oneida	6
Onondaga	7
Ontario	8
Orange	3
Orleans	8
Oswego	7
Otsego	4
Putnam	3
Rensselaer	4
Rockland	3
Saratoga	5
Schenectady	4
Schoharie	4
Schuyler	8
Seneca	8
St. Lawrence	6
Steuben	8
Suffolk	1
Sullivan	3
Tioga	7
Tompkins	7
Ulster	3
Warren	5
Washington	5
Wayne	8
Westchester	3
Wyoming	9
Yates	8

APPENDIX III

ERC DEFINITIONS

§231-2.6.a.5.
(ii) a complete "Emission Reduction Credit Quantification Form" with supporting documentation establishing that the emission reduction is surplus, quantifiable, permanent and enforceable. The above mentioned ERC criteria are described below:

§231-2.6.a.5.ii
(a) Surplus. The applicant must ensure that the emission reduction for an emission unit is in excess of any reduction required by RACT or MACT or any other regulations applicable to the emission unit during the baseline period for the emission reduction. The determination of "surplus" is as follows:
(1) for an emission reduction which physically occurred prior to the state or federal register publication date proposing RACT or MACT requirements, the applicant is eligible for the full amount of the reduction. Otherwise, the applicant is eligible only for the lesser of the prior actual annual emissions or prior allowable annual emissions reflecting RACT or MACT emission limits.
(2) For a future reduction as defined in section 231-2.1, if the date of certification of the ERC is prior to the state or federal register publication date proposing RACT or MACT requirements, then the applicant is eligible for the full amount of the reduction. Otherwise, the applicant is eligible only for the lesser of the prior actual annual emissions or prior allowable annual emissions reflecting RACT or MACT emission limits.

§231-2.6.a.5.ii.
(b) Quantifiable. The applicant must use a reliable basis for quantifying the reduction. Continuous emissions monitoring data, stack test data, emission statements, EPA's AP-42 data, fuel and solvent purchase records are acceptable bases for quantifying emission reductions.

§231-2.6.a.5.ii.
(c) Permanent. The applicant must ensure that all reductions are permanent as defined in section 231-2.1.

§231-2.6.a.5.ii.
(d) Enforceable. For any ERC to be enforceable, the permit modification establishing the ERC must be noticed in the Environmental Notice Bulletin and a local newspaper for a 30-day public comment period.

APPENDIX IV

OVERVIEW OF AIR PERMITTING FRAMEWORK FOR SMALL CHP

Exempt Activities

- Exempt activities do not require a State Facilities Permit (SFP) or Minor Facility registration, but are not exempt from other controlling local air pollution control regulations.•Subpart 201-3.2(c)(3) [http://www.dec.state.ny.us/website/regs/201c.htm#category]:
- Internal combustion engine powered by diesel or natural gas, within any severe ozone non-attainment area, and have maximum mechanical power rating <225 BHP (or < 400 BHP if outside severe area). •Subpart 201-3.2(c)(5) [http://www.dec.state.ny.us/website/regs/201c.htm#category]:
- Gas turbines with heat input at peak load < 10 MMBtu/hour if burning fossil fuels (or < 20 MMBtu/hour if built before 6/9/89).

Minor Facility Registration

- •Defined in Subpart 201-4 [http://www.dec.state.ny.us/website/regs/201d.htm] •Applicable to any stationary source with potential to emit capped-by-rule pursuant to Section 201.7.3(e) [http://www.dec.state.ny.us/website/regs/201g.htm#201g!3]
- Cap by Rule Emissions Thresholds:
  (1) 50 percent of the major stationary source thresholds for regulated air pollutants,
  (2) 5 tons of a single hazardous air pollutant,
  (3) 12.5 tons of any combination of hazardous air pollutants,
  (4) 50 percent of any lesser threshold for a single hazardous air pollutant that the Administrator may establish by rule and upon incorporation into state regulation Valid registrations last forever, and they need no renewal absent a facility modification or sufficient increase in emissions.
- Minor Facilities must annually certify to DEC that the facility's emission rates, even for exempt or permitted activities, remain below the 50% cap. •Some minor facilities must retain records of validation for below-cap emissions on site.

State Facilities Permit (SFP):

- SFP candidates are usually facilities whose potential to emit (PTE) exceeds the major source threshold, but whose actual or anticipated emissions are below this level. [25 tons per year for severe non-attainment areas; 100 tons per year for other areas.
- •PTE equals the facility's capacity to emit a pollutant when operating at maximum physical and operational design limits.
- •SFPs will obtain federally-enforceable emission caps equal to 50% of the major source threshold, or of similar variances granted by DEC.
- •SFP requirements can be found in Part 201-5.3
- [http://www.dec.state.ny.us/website/regs/201e.htm#201e!3].

New Emission Standards for Distributed Generation Units Over 50kW (potentially effective in late 2006) §222-1

APPENDIX V

NYSDEC DIVISION OF AIR RESOURCES POLICY GUIDANCE ON CALCULATING NITROGEN EMISSIONS FACTORS FOR BOILERS

The policy was developed to provide emission factors for boilers with heat inputs ranging from 10mmBTU/hr. up to and including 100mmBTU/hr., for the purposes of capping out of NOx RACT, Title V or to determine the baseline emissions for a cost effectiveness analysis. It also can be used in ERC quantification analysis.

For the purposes of capping a facility, the emission estimate should be based upon a nitrogen content of one standard deviation above the average or 0.5%. This nitrogen content level will provide some certainty that the facility will not exceed the major facility threshold of 100 or 25 ton per year. The estimated emission rate for this nitrogen content is 0.5 lb/MMBtu or 75 lb/1000 gallons of fuel burned.

If a facility believes that the NO emissions from its units are below 0.5 lb/MMBtu when burning 0.5% nitrogen X oil, the facility may perform stack tests to confirm the emission rate. The oil being fired must be sampled for nitrogen content. If the nitrogen content of the oil is not 0.5%, then Figure 2 should be consulted to determine the emissions expected at the particular nitrogen content (e.g. if 0.4% nitrogen oil is being fired, the expected NO emissions would be about 0.45 lb/MMBtu).

If the tested NO emissions are different than the line in Figure 2, then the O.5 lb/MMBtu may be changed by the percentage that the tested emissions differ. For example, if the boiler actually emits 0.40 lb/MMBtu instead of 0.45 lb/MMBtu when firing 0.4% nitrogen oil, then the boiler could be expected to provide similar performance (12% below 0.5 lb/MMBtu or 0.44 lb/MMBtu) when firing 0.5% nitrogen oil.

The Department shall continue to collect nitrogen in fuel data and will revise this policy as necessary.

Source: NYSDEC DAR-6 Nitrogen in Fuel (previously issued as Air Guide-32).

APPENDIX VI

MODEL PUBLIC NOTICE OF ERC CERTIFICATION FOR PAST REDUCTIONS

The Department has received (an) application(s) from [owner's name] for (a) modification(s) to (an) existing air pollution control permit(s) for [brief description of source(s), i.e., combustion units, process units, incinerators] located at [list facility name/company, street location, town, county]. These/This modification(s) is/are being proposed by the applicant for the purpose of establishing certified emission reduction credits for past reductions which were the result of [shutdown, curtailment, voluntary emission controls, source reduction, etc.] of an/some emission source(s) at this facility.

The [owner name/company] will be establishing emission reduction credits of [___ tpy (list contaminant(s), either NOx, VOC, CO, or PM-10)] in accordance with 6 NYCRR Part 231 "New Source Review in Non-attainment Areas" with these/this permit modification(s). The application [list application ID #] is available for review at the Region ___ office. Contact person is [list contact person name, address, and phone #]. Comments will be received for 30 days from the date of this notice.

APPENDIX VII

MODEL PUBLIC NOTICE OF ERC CERTIFICATION FOR FUTURE REDUCTIONS

The Department has received (an) application(s) from [owner's/company name] for (a) modification(s) to (an) existing air pollution control permit(s) for [brief description of source(s) i.e., combustion units, process units, incinerators, etc.] located at [facility name, street location, town, county]. These/This modification(s) is/are being proposed by the applicant for the purpose of establishing certified emission reduction credits which will be transferred to and used in support of a [proposed major facility or proposed source project] at [name of user of emission reduction credit, facility name, location]. The emission reduction which is scheduled to occur on [proposed date] will be the result of [shutdown, curtailment, voluntary control, source reduction, etc.] of an/a number of emission sources at [name of applicant's facility, location].

The applicant will be establishing emission reduction credits of [___ tpy (list contaminant(s) either NOx, VOC, CO, or PM-10)] in accordance with 6 NYCRR Part 231 "New Source review in non-attainment Areas" with these/this permit modification(s) which will become effective on the date specified above. The reductions must physically occur prior to commencement of operation of the [proposed facility/source project] at [user facility name].
The application [list application ID #] is available for review at the Region___ office. Contact person is [name, address, phone #]. Comments will be received for 30 days from the date of this notice.

APPENDIX VIII

CALIFORNIA PRE-CERTIFICATION EXAMPLE

State of California
AIR RESOURCES BOARD
Executive Order DG-002
Distributed Generation Certification of
Capstone Turbine Corporation's
C60 MicroTurbine

WHEREAS, the Air Resources Board (ARB) was given the authority under California Health and Safety Code section 41514.9 to established a statewide Distributed Generation (DG) Certification Program to certify electrical generation technologies that are exempt from the permit requirements of air pollution control or air quality management districts;

WHEREAS, this DG Certification does not constitute an air pollution permit or eliminate the responsibility of the end user to comply with all federal, state, and local laws, rules and regulations;

WHEREAS, on December 5, 2002, Capstone Turbine Corporation applied for a DG Certification of its C60 MicroTurbine, engine and controller, which application was deemed complete on February 21, 2003;

WHEREAS, Capstone Turbine Corporation has demonstrated, according to test methods specified in Title 17, California Code of Regulations (CCR), section 94207, that its natural gas-fueled C60 MicroTurbine has complied with the following emission standards:
1. Emissions of oxides of nitrogen no greater than 0.5 pound per megawatt hour;
2. Emissions of carbon monoxide no greater than 6.0 pound per megawatt hour;
3. Emissions of volatile organic compounds no greater than 1.0 pound per megawatt hour; and
4. Emissions of particulate matter no greater than an emission limit corresponding to natural gas with a fuel sulfur content of no more than 1 grain per 100 standard cubic feet;

WHEREAS, Capstone Turbine Corporation has demonstrated that its C60 MicroTurbine complies with the emissions durability requirements in Title 17, CCR, section 94203 (c);

WHEREAS, I find that the Applicant, Capstone Turbine Corporation, has met the requirements specified in article 3, Title 17, CCR, and has satisfactorily demonstrated that its C60 MicroTurbine meets the 2003 DG Certification emission standards;

NOW THEREFORE, IT IS HEREBY ORDERED, that a DG Certification, Executive Order DG-002, executed at Sacramento, California on February 21, 2003, is hereby granted.

For information on other
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Guidebook for Small Combined Heat and Power Systems Seeking to Obtain Emissions Reduction Credits in New York State

Final Report 06-03

State of New York
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