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**BEFORE THE
PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Adoption of Rules for)
Alternative and Renewable Energy Technologies)
and Resources, and Emission Control Reporting)
Requirements, and Amendment of Chapters) Case No. 08-888-EL-ORD
4901:5-1, 4901:5-3, 4901:5-5, and 4901:5-7 of the)
Ohio Administrative Code, pursuant to Chapter)
4928, Revised Code, to Implement Senate Bill No.)
221.)

COMMENTS OF VERTUS TECHNOLOGIES INDUSTRIAL LLC

INTRODUCTION

Vertus Technologies (Vertus) is a wholly owned subsidiary of Nviro Cleantech plc, a company based in the British Isles which identifies, develops, and brings to market new technologies focused on clean energy solutions. Vertus has announced its intention to deploy the first of-its-kind clean coal processing facility in Cincinnati, Ohio and has submitted an authorization request to begin construction. The Vertus facility will use Reductive Thermal Processing (RTP) clean coal processing technology to treat coal pre-combustion in order to remove unwanted contaminants, such as sulfur, chlorine, nitrogen, and mercury. The RTP technology can also be utilized to convert biomass material into a more efficient energy resource, which allows efficient cofiring with both dirty coal and the clean coal product produced by Vertus. Additionally, Vertus technology allows safe and fuel-efficient transport of biomass fuels and the capacity to store biomass fuels without the danger of decomposition.

On May 1, 2008, Governor Strickland signed into law Amended Substitute Senate Bill No. 221 ("SB 221") amending various provisions of Amended Substitute Bill No. 3 ("SB 3"). Among the changes, was the inclusion of an Alternative Energy Portfolio Standard ("AEPS"). The legislation mandates that twenty-five (25%) of all kilowatt hours of electricity sold by electric distribution utilities and electric services offers be obtained from "alternative energy resources" by 2025.

Vertus has a wealth of experience in development and commercialization of clean energy technologies. The company has interacted with countries around the world and navigated various regulatory requirements in the deployment of its technologies. Vertus is excited that the deployment of the first in the world commercial clean coal facility will be located in Ohio. Vertus supports Ohio's effort through SB 221 to promote a wider range of

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alternative energy sources, including Ohio's distinction as the first State in the country to include clean coal technologies in its alternative energy portfolio standard.

The AEPS is divided into two categories of alternative energy resources: 1) renewable energy resources; and 2) advanced energy resources. SB 221 requires that at least 12.5% of the mandate of 25% by 2025 come from renewable energy resources.

The provisions of SB 221 governing renewable energy resources contain more detailed and prescriptive requirements than the portion of the AEPS pertaining to advanced energy resources. These prescriptive requirements pertaining to renewable energy resources include: renewable energy credits (RECs), renewable and solar energy benchmarks, alternative compliance payments (ACP), as well as others.

The provisions of SB 221 governing the advanced energy resource provisions are far more open ended which grants the Commission far greater latitude in establishing requirements and specifying standards in rules. Unfortunately, the current proposed rules for new chapter: 4901:1-40 "Alternative Energy Portfolio Standard" lack the specificity necessary to ensure the advanced energy portion of the AEPS is implemented in a clear, balanced, and fair manner.

The rules governing the advanced energy portion of the AEPS must include specific standards and requirements in order to be successful in promoting the development of advanced energy resources, such as clean coal. Based upon its experience competing in various markets around the world, Vertus provides the following specific comments to encourage modification of the rules so that the Ohio can meet SB 221's goal of promoting a wide range of alternative energy resources.

SPECIFIC COMMENTS

I. 4901:1-40-01(E) Definition of "Biomass energy"

Under 4901:1-40-01(E), the Commission Staff defines the term "biomass energy" to include "energy produced from organic material derived from plants or animals and available on a renewable basis, including but not limited to: agricultural crops, tree crops, crop by-products and residues..." The Commission Staff's definition would allow the use of food products such as corn and soy beans to be used as a renewable resource. The proposed definition would also allow trees to be a source of renewable energy.

The definition of "biomass energy" should be modified to limit biomass energy to the use of waste or residues from agricultural or tree crops. Agricultural crops that can be a valuable source of food and trees which support the construction industry should be specifically excluded. If the definition of "biomass energy" does not exclude agricultural or tree crops, the AEPS will have the unintended consequence of contributing to higher food prices and encouraging tree cutting for the sole purpose of energy production.

Corn prices are up over 138 percent globally over the past three years and global food prices have increased 83 percent over that same time period. There has been recent controversy as to whether the Renewable Fuel Standard (RFS) that was adopted in the Energy Policy Act of 2005 and expanded in the energy and Independence Security Act of 2007, has contributed to the increase in food prices. The RFS includes an ethanol mandate and in the United States ethanol is produced using corn.

There is no reason that biomass energy promoted by the AEPS should create the possibility of contributing to increases in food prices. Unlike ethanol, existing technology allows biomass energy to be generated exclusively through waste, by products and non-food related items. Notably, the intent of utilizing biomass is to create energy through use of renewable resources that may not have any other useful purpose.

Additionally, the use of non-food producing energy crops should be promoted as a means to obtain biomass for energy use. Vertus is aware of crops which are available for the Ohio region and can be used in modern crop rotation strategies.

The definition of "biomass energy" should be modified as follows:

"means energy produced from organic waste or by-product material derived from plants or animals and available on a renewable basis, including but not limited to: agricultural waste including discarded organic materials produced from the raising of plants and animals as part of agronomic, horticultural or silvicultural operations, including, but not limited to, animal manure, bedding materials, plant stalks, leaves, other vegetative matter and discarded by-products from the on-farm processing of fruits and vegetables crops, tree crops, crop by-products and residues; wood and paper manufacturing waste, including nontreated by-products of the wood manufacturing or pulping process, such as bark, wood chips, sawdust, and lignin in spent pulping liquors; forestry waste and residues; other vegetation waste, including landscape and right-of-way trimmings; algae; food waste including source separated material produced from human food preparation and consumption activities at homes, restaurants, cafeterias, or dining halls which consists of fruits, vegetables and grains, fish and animal products and byproducts, and soiled paper unsuitable for recycling; animal wastes and by-products (including fats, oils, greases and manure); vegetative material including; biodegradable solid waste; and biologically-derived methane gas.

The suggested modifications to the definition are based upon the definition of qualifying biomass energy resources set forth in the rules governing the Massachusetts Renewable Portfolio Standard. The suggested modifications will ensure that consumable food and agricultural products cannot qualify as "biomass energy" resources.

II. 4901:1-40-01(F) Definition of "Clean Coal Technology"

Under 4901:1-40-01(F), the Commission Staff defines the term "clean coal technology" to mean:

any technology that removes or has the design capability to remove criteria pollutants and carbon dioxide from an electric generating facility that uses coal as a fuel or feedstock consistent with paragraph (C) of rule 4901:1-41-02 of the Administrative Code.

The Commission Staff's definition of "clean coal technology" in the proposed rule does not provide the specificity set forth in SB 221, R.C. 4928.01(A)(34)(c) defines "clean coal technology" as follows:

Clean coal technology that includes a carbon-based product that is chemically altered before combustion to demonstrate a reduction, as expressed as ash, in emissions of nitrous oxide, mercury, arsenic, chlorine, sulfur dioxide, or sulfur trioxide in accordance with the American society of testing and materials standard D1757A or a reduction of metal oxide emissions in accordance with standard D5142 of that society, or clean coal technology that includes the design capability to control or prevent the emission of carbon dioxide, which design capability the commission shall adopt by rule and shall be based on economically feasible best available technology or, in the absence of a determined best available technology, shall be of the highest level of economically feasible design capability for which there exists generally accepted scientific opinion;

a. 4901:1-41-01(F) is inconsistent with SB 221

The Commission's rules must be consistent with SB 221. However, the current definition of "clean coal technology" in 4901:1-41-02 is, in fact, inconsistent with SB 221. The definition in rule includes technology that "*removes or has the design capability to remove criteria pollutants and carbon dioxide* from an electric generating facility" (emphasis added).

The proposed rule is too general and lumps technologies under a single standard, whereas the definition in SB 221 creates two categories of clean coal technologies:

- a) pre-combustion technologies that demonstrate actual reduction of criteria pollutants and the reduction is verified through testing; and
- b) technologies that have the design capability to control or prevent emission of carbon dioxide, which the design capability must be specified in rule.

Under the proposed definition in rule, a technology that does not actually successfully remove any criteria pollutant would qualify as clean coal technology, as long as the

technology is designed (i.e. intends) to reduce emission of pollutants. SB 221's definition of "clean coal technology" includes a requirement for technologies removing criteria pollutants to "demonstrate a reduction...in accordance with American society of testing materials [standards]." Therefore, the statute requires actual verification through testing that pollutants were removed before the technology qualifies as a "clean coal technology." The Commission Staff's proposed definition should be modified to be consistent with SB 221.

SB 221's states that clean coal technologies also include technologies with the design capability to control or prevent emission of carbon dioxide. SB 221 requires the Commission to specify in rule the design capability that must be met in order to qualify as a clean coal technology for purpose of carbon dioxide reduction.

While the rules includes section 4901:1-40-04(B)(1) that states a qualified advanced energy resource includes modifications that increase output without increase carbon emission rates, this section is separate and distinct from the "clean coal technology" category of advanced energy resources. The proposed rules in Chapter 4901:1-40 fail to include any specific design capability for carbon dioxide reduction associated with "clean coal technology." This leaves the door open that any unproven technology could qualify as long as there is a belief the technology might be able to reduce carbon dioxide emissions.

Due to the time restraints placed the Commission for development of these rules, the Commission has not had sufficient time to develop a standard for carbon dioxide reduction that can be incorporated in these rules. However, the Legislature was clear in its intent to have the Commission develop specific design capabilities for carbon reductions in rules before a technology could be deemed to qualify as a clean coal advanced energy resource.

Until the Commission has sufficient time to develop such a standard, the rules should not be written so broadly to allow virtually any technology to qualify as a carbon reduction clean coal technology. Rather, the proposed rules should include a placeholder that will preserve this option until the Commission has sufficient time to develop appropriate standards.

b. 4901:1-40-01(F) should include specific standards for reduction of criteria pollutants

The Commission should take the opportunity to build upon the definition in SB 221 to provide more specific standards for what types of technologies will qualify as a "clean coal technology." Those standards should include a specified minimum removal standard of criteria pollutants. Without specific standards, a technology that removes a very minor amount of criteria pollutants would qualify as a "clean coal technology."

As an example, the simple process of drying coal pre-combustion could qualify as a "clean coal technology" despite the fact the drying process does not remove pollutants

pre-combustion, rather it is a simple technology that increases the efficiency of the boiler. While increases in efficiency are beneficial, the Legislative intent of SB 221 is clearly to promote clean coal technologies that successfully treat coal pre-combustion and remove criteria pollutants, such removal must be verified by sampling.

Vertus recommends one of two approaches:

- 1) Include a standard in rule for removal of pollutants that would require the technology must produce coal that allows the facility to be compliant with air emission regulations when combusted without the use of flue gas cleaning technology.
- 2) Require all technologies to be certified in accordance with 4901:1-40-04(E) as clean coal technology based upon verified sampling the demonstrates sufficient removal of pollutants pre-combustion. The certification shall also include a determination as what percentage of electric output can be used for purposes of complying with the AEPS.

III. 4901:1-40-04(B) Modifications to qualified advanced energy resources to specify what portion of generation can be used to meet the AEPS

The Commission Staff's rules should recognize the inherent difference between renewable energy resources and advanced energy resources for purposes of meeting the AEPS. It is logical that every megawatt of electricity generated from a renewable resource should qualify for purposes of meeting the renewable energy benchmarks. Renewable energy sources represent separate sources of generating capacity. However, many of the qualifying advanced energy technologies represent modifications or enhancements to existing sources of power.

The Commission Staff's proposed rule 4901:1-40-04 should be significantly modified to specify what portion of the power generated from a source that incorporates advanced energy technologies will qualify as an "advanced energy resource" for purposes of meeting the AEPS. Suggested changes are included for all of the qualified resources specified in 4901:1-40-04(B) [rule language appears in bold italics]:

- (1) Any modification to an electric generating facility that increases its generation output without increasing the facility's carbon dioxide emission rate (pounds of carbon dioxide per megawatt hour).***

-under this qualified resource only the increased output should be eligible to qualify as an advanced energy resource for purposes of meeting the AEPS. Otherwise, a 500 mw generation facility could have its entire generation be deemed to qualify as "advanced energy resource" after only a minor increase in output.

- (2) Any distributed generation system, designed primarily to meet the energy needs of the customer's facility that utilizes co-generation of electricity and thermal output simultaneously.**

-All output from a distributed generation system should qualify as an "advanced energy resource" for purposes of AEPS compliance.

- (3) Clean coal technology**

-Required reduction levels should be included to determine what percentage of electric generation output would be eligible for purposes of AEPS compliance. Similar to category (1) above, without incorporation of minimum reduction levels the entire output from a 500 mw generation facility could be used for AEPS compliance even though only a very minor amount of reductions occurred. Such a large loophole in the AEPS standard would effectively render it meaningless and not further the Legislature's intent of fostering development and deployment of advanced energy technologies.

-As set forth above, the Commission should either: 1) require the technology generate coal that allows the facility to be in compliance with applicable technologies without post-combustion controls; or 2) require each technology be certified in accordance with 4901:1-40-04(E) as detailed below.

- (4) Nuclear enhancements, including:**

- a. Advanced nuclear energy technology consisting of generation III technology as defined by the nuclear regulatory commission or other later technology.**
- b. Significant improvements to existing facilities.**

-Category (4)b needs much more specificity otherwise it represents another large loophole that could render the AEPS meaningless. There is no specification as to which types of improvements would qualify. There is also no specification for how much output from an existing nuclear facility could qualify as an advanced energy resource if an improvement is made. Additional specificity should be included to target specific types of enhancements. Furthermore, these projects should be required to be certified under 4901:1-40-04(E).

- (5) Energy from fuel cell, regardless of feedstock.**

-all output from a fuel cell should qualify for purposes of AEPS compliance.

- (6) Advanced solid waste or construction and demolition debris conversion technology that results in measurable greenhouse gas emission reductions.**

-A standard for how much reduction is necessary should be included. SB 221 includes the requirement reductions in greenhouse gas emissions be calculated

pursuant to the United States environmental protection agency's waste reduction model (WARM) for certain technologies. However, SB 221 allows for more conversion technologies to qualify as advanced energy resources. For other technologies, a standard must be established for measuring greenhouse gas emission reductions. Also, the rules should specify what portion of electricity output from these types of sources can be use for AEPS compliance.

(7) Demand-side management and energy efficiency, above and beyond that used to comply with any other regulatory standard or program.

-All reductions should qualify for purposes of AEPS compliance.

If the Commission is concerned that time restraints prevent development of specific standards for determining qualifying generation electric output for the various advanced energy technologies, another possibility would be to modify the rules to make it mandatory that all advanced energy resources be certified in accordance with 4901:1-40-04(E). As part of the certification, the Commission would decide on a case by case basis what portion of a generation source's output would qualify for purposes of complying with the AEPS.

While establishment of specific standards in rule is the preferred methodology for addressing the issues identified above, the case by case method could be used as a stop gap measure until standards can be developed. To effectuate this change, this section 4901:1-40-04(E) should be modified as follows:

(E) An entity may seek certification of a renewable energy resource or technology to ensure that the renewable energy resource or technology would count as a qualified resource. An entity must obtain certification of an advanced energy resource or technology as a qualified resource. All certifications of advanced energy resources shall include a determination as to the portion of electricity output that shall be eligible for purposes of complying with the alternative energy portfolio standard.

The proposed language will still make it optional to seek pre-certification of renewable energy resources. However, the proposed language would mandate all advanced energy resources be certified and the certification would include a Commission determination as to the amount of electricity output from the project that can be used for AEPS compliance.

IV. 4901:1-40-04(C)(2) Advanced energy resources from mercantile customers should include a requirement that they be certified.

As with section 4901:1-40-04(B), section 4901:1-40-04(C)(2) is completely lacking of any established standards to as to minimum requirements for advanced energy resources from mercantile customers. Subsections (a), (b) and (c) of 4901:1-40-04(C)(2) all create new categories of potential advanced energy resources. These subsections do not provide

any clear standards for determine how much output or reduction in usage can be used toward meeting the AEPS.

Furthermore, unlike the provisions governing renewable sources that allows the used of RECs to satisfy renewable energy resource benchmarks, this section lacks any method for verification of mercantile projects or a method for sale of the benefits of mercantile projects. Without verification or certification, the effectiveness of the AEPS in promoting advanced energy resources will likely be severely diluted.

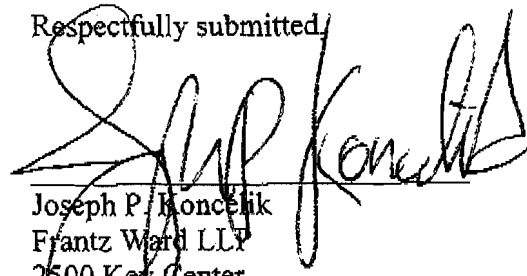
Once again, inclusion of specific standards in rule is preferable to case by case determinations. However, time constraints on the Commission may make it impossible to include meaningful standards in this initial rulemaking. As a stop gap measure, the Commission should require all projects in subsections (a), (b) and (c) go through certification in accordance with 4901:1-40-04(E).

If the proposed changes to 4901:1-40-04(E) set forth above were adopted by the Commission, the language is broad enough to capture advanced energy resources from mercantile customers.

CONCLUSION

Vertus respectfully requests that the Commission consider the revisions suggested in these comments. With these changes incorporated, Ohio will lead the nation in promoting the widest range of alternative energy resources. Vertus looks forward to further involvement in this rulemaking and would welcome discussion of the issues raised herein.

Respectfully submitted,



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