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DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY
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Secretary's Order No. 2012-CZ-0013

Re: Application of Diamond State Generation Partners, LLC for a Coastal Zone Act Permit for the Red Lion Energy Center at 1592 River Road, New Castle, New Castle County. CZA Project No. 394P

Date of Issuance: **April 30, 2012**
Effective Date: **April 30, 2012**

This Order of the Secretary of the Department of Natural Resources and Environmental Control (Department) provides the following findings, reasons and conclusions following a public hearing on the Coastal Zone Act (CZA), *7 Del. C. Chap. 70*, permit application submitted by Diamond State Generation Partners, LLC (Applicant).[1]

Procedural History

On November 17, 2011, the Department received Applicant's CZA application to use land within the Coastal Zone at 1592 River Road, New Castle, New Castle County for the proposed 'Red Lion Energy Center' (Facility). The Department investigated the application and, in a February 10, 2012, Secretary's Assessment Report, determined that it was administratively complete. Accordingly, the Department provided public notice of the application and a March 6, 2012 public hearing, which was held in the Department's Lukens Drive office in New Castle. The public comment period remained open until March 7, 2012.

[1] A subsidiary of Bloom Energy.

The Department's presiding hearing officer requested assistance from the Department's Coastal Zone Act Program, which on April 4, 2012 provided a memorandum responding to the public comments and a draft permit. In the attached Hearing Officer's Report (Report), dated April 13, 2012, the presiding hearing officer recommends issuance of a CZA permit, subject to permit conditions, as drafted by the Department's Coastal Zone Act Program. I adopt the Report to the extent it is consistent with this Order.

Discussion of Findings and Reasons

The Facility would use 12.44 acres in the CZ to manufacture 47 Megawatts (MW) of electricity. The manufacturing would use 235 Bloomenergy ES-5700 Energy Servers (Bloom boxes), which use natural gas and air to generate electricity without any combustion, but as a result of an electrochemical oxidization reaction similar to producing electricity from batteries.

The Facility would generate electricity constantly, except for any maintenance and repair outages, to deliver 1,128 MWh per day for use by the Pennsylvania-Jersey-Maryland Power Pool (PJM). The Facility's electricity would be transmitted to the nearby Delmarva Power and Light Company's Red Lion substation, where it would enter the PJM grid. The Facility's electricity would be classified under Delaware law as a renewable source of energy.

The Department's review of the application in the Secretary's Assessment found that the proposed manufacturing use would have an environmental impact from air emissions, wastewater, stormwater, water supply, and solid wastes. The Applicant offered as an environmental offset to the negative impacts that the Facility would reduce

air emissions that otherwise would be emitted to produce the 47 MWs that PJM would require from other generating sources. This offset would reduce the discharge of 561,874 pounds of nitrogen oxide (NOx) and 2,227,639 million pounds of sulfur dioxide (SO2) based upon PJM's current average mix of generating capacity, of which fossil fuel sources represent approximately 59%. Applicant's built offset for air emissions would also reduce emissions of particulate matter (PM), volatile organic compounds (VOCs), metals, and hydrocarbons compared to these emissions from all other fossil fuel-fired generating sources. In addition, the Applicant offered a payment of $20,000 for the value of the conversion of 9.3 acres from an agricultural us to a manufacturing use. This amount was calculated by averaging the cost per acre paid by the Delaware Department of Agriculture for farmland within the CZ during recent farmland protection efforts through the Agricultural Lands Preservation Program. The Department will use the payment towards the cost of restoring marshland near the Facility and within the CZ.

The public comments as a result of the public hearing process were fully addressed by the CZA Program's memorandum. Indeed, many of the public comments were addressed at the public hearing by the Applicant. The Department finds that the Facility's negative environmental impacts would be minimal, and would be outweighed by the Facility's economic and environmental benefits. The CZA's purposes allow manufacturing to occur in the CZ if consistent with protecting the CZ for the primary uses, namely, recreation and tourism. The Facility represents the type of suitable manufacturing that should be approved in the CZ.

The proposed use would be manufacturing of electricity and is manufacturing as defined by the CZA. This manufacturing is consistent with allowing the growth of a new

industry, which is a purpose of the CZA. More importantly, the Facility's generation of electricity will be a far more cleaner method of generation than the other fossil fuel-fired sources of generation that represent the dominant type of generation that PJM uses, including coal and natural gas fired generation in the CZ. PJM's use of the Facility as a cleaner source of generation will result in reduced reliance on the other less clean sources, which will result in improved air quality in Delaware in general and in the CZ in particular.

Several of the public comments at the public hearing raised concerns with the Facility's air emissions. The Department shares the public's concerns with air quality. Indeed, use of the Facility's 47 MWs of capacity should improve Delaware's air quality given its vastly cleaner form of generation when compared to PJM's average generating sources, which include zero emission sources. PJM's generating sources now cause much of the air pollution in Delaware and reducing the use of these sources will improve Delaware's air quality. PJM's air emissions from using 47 MWs of its existing generating capacity would discharge 562,739 lb/yr. of Nitrogen Oxide (NOx) and 2,227,652 lb/yr of Sulfur Dioxide (SO2). In contrast, the Facility would release 865 lb/yr of NOx and 14.0 lb/yr of SO2. Thus, the Facility will operate almost 100% cleaner based upon the reduction for these harmful air pollutants than if PJM used its other generation to supply the same amount of energy.

Comparing the Facility's emissions to PJM's average generation mix includes PJM's zero air emission sources, as nuclear, hydroelectric and solar, which makes the offset's use of the PJM average generation conservative. If the Facility displaces some of the 59% of PJM's coal-fired generation or even natural gas-fired generation, then the air

quality improvements would be even greater. Thus, the Facility's use will clearly and demonstrably improve Delaware's air quality as required by the Department's regulation.

The Department's experts found that the Facility's generation of electricity will provide a built in offset because of the significant air quality benefits from using cleaner generation from fuel cells than from PJM's other generating sources. The displacement of PJM's use of its other generating sources will result in better air quality in the CZ. The record contains support in the interstate air transport modeling, and the Department is well aware that much of its air pollution problems stem from PJM generating sources. Thus, Applicant's air modeling is consistent with the Department's own analysis, and supports the Facility's operation to reduce the use of fossil fuel fired generation by PJM.

Even without the PJM based offset, the Facility's air emissions will be lower than other types of manufacturing in the CZ, especially the emissions from electric generation. Without question the generation of electricity is a use needed in the CZ because it, like other utility services, is needed to support the CZ's primary use for recreation and tourism. The Hearing Officer's Report notes that the CZA Regulations provide electricity generation special treatment by exempting emergency generators and solar generation. Thus, on balance, the Department finds that the environmental impacts from the Facility have been addressed, and that the Facility's use for manufacturing is not contrary to the CZA and should be permitted.

The Department also will continue to monitor the Facility's operations pursuant to its other regulatory permit programs. The Facility's air emissions will be subject to the regulation under Department's Regulations Governing the Control of Air Pollution. Similarly, the Department will regulate the Facility's use of water supply under its

Regulations for wells and water supply. The Facility's wastewater treatment and disposal also will be subject to the Department's regulation and permitting. Finally, the Applicant will be installing three bioretention areas, which will reduce the amount of stormwater runoff from current levels. These regulated activities provide further support for issuance of a CZA permit to allow the Facility's use as an appropriate type of manufacturing by a new industry in the CZ consistent with the CZA's goals.

Conclusions

Accordingly, I direct that the permit be issued to the Applicant, subject to certain conditions, and enter following conclusions:

1. The Department has jurisdiction to issue a CZA Permit to the Applicant subject to reasonable permit conditions deemed appropriate and consistent with the CZA's purposes;

2. The Department provided adequate public notice of the proceeding and the public hearing in a manner required by the law and its regulations;

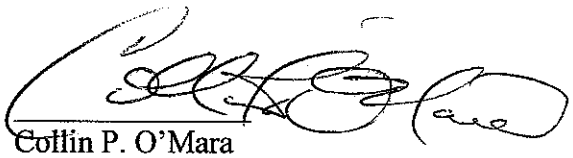
3. The Department held a public hearing in a manner required by the law and its regulations;

4. The Department considered all timely and relevant public comments in making its determination;

5. The Department carefully has considered all the statutory factors to be considered in making a decision on a CZA permit application under the CZA and its regulations; and

6. The Department shall publish legal notice this Order and otherwise provide notice as to all affected persons in a manner consistent with the public notice

required by the law and the Department regulations, and shall post on the Department's web site.



Collin P. O'Mara
Secretary

HEARING OFFICER'S REPORT

TO: The Honorable Collin P. O'Mara
Secretary, Department of Natural Resources and Environmental Control

FROM: Robert P. Haynes, Esquire
Senior Hearing Officer, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Application of Diamond State Generation Partners, LLC for a Coastal Zone Act Permit for the Red Lion Energy Center, 1593 River Road, New Castle, New Castle County (CZA Project No. 394P)

DATE: April 13, 2012

I. PROCEDURAL HISTORY

This Report makes recommendations to the Secretary of Department of Natural Resources and Environmental Control (Department) on Diamond State Generation Partners, LLC's (Applicant) Coastal Zone Act [1] (CZA) permit application. Applicant seeks permission to use the Coastal Zone[2] for manufacturing by constructing and operating the Red Lion Energy Center (Facility) at 1593 River Road, New Castle, New Castle County.

In a February 10, 2012, Secretary's Assessment, the Department determined that the application was administratively complete, and provided public notice of the application and a public hearing. I presided over the March 6, 2012 public hearing, and the public comment period was extended until March 7, 2012 based upon an unopposed request. On April 2, 2012, I requested the Department's CZA Program for assistance, which the CZA Program provided in the attached April 4, 2012 memorandum.

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[1] *7 Del. C. Chap. 70.*
[2] A geographic area defined by the CZA.

II. SUMMARY OF THE RECORD

This Report is based upon the following record: 1) the documents introduced as exhibits at the public hearing, 2) the verbatim transcript of the public hearing, and 3) the information in this Report and the documents identified herein.

At the public hearing, Kevin Coyle, the CZA Program's principal planner, submitted the following documents[3] from the Department's files: DNREC Ex 1-Applicant's November 17, 2011 CZA application; DNREC Ex. 2 & DNREC Ex 3-affadavits of publication of public notice of the receipt of the November 17, 2011 application; DNREC Ex. 4- Applicant's November 29, 2011 email to CZA Program on PJM air emissions; DNREC Ex. 5- Applicant's January 3, 2012 email on the farmland conversion offset; DNREC Ex. 6- Applicant's January 18, 2012 email to CZA Program on air emissions; DNREC Ex. 7-CZA Program's January 20, 2012 email to Applicant on air emissions; DNREC Ex. 8-the February 10, 2012 Secretary's Environmental Assessment Report; DNREC Ex. 9 & DNREC 10-affadavits of publication of public notice that the application was complete and the March 6, 2012 public hearing.

The Applicant's counsel, Shawn Tucker, Esquire, made introductory comments in which he indicated that Applicant was a wholly owned subsidiary of Bloom Energy. He also began a Powerpoint presentation, which was entered into the record. Diamond State Generation Partners Ex. 1. The presentation noted that the Facility would be located on a 42 acre parcel, but that the Facility would only lease 12.44 acres, of which only 9.3 acres would be used for manufacturing. He stated that the proposed use would disturb the existing young and mature forest and would result in the loss of farm land. He described the Applicant's proposed offset for the land use's conversion to manufacturing by a payment of $20,000 to the Department, which was calculated from a $2,118 average per acre price of farmland within the Coastal Zone. Finally, he explained

[3] The Department provides documents for the record at the public hearing solely to assist the public in making public comments. The Department does not have a burden of proof to develop a record during the public hearing.

that the electric generation of 47 MW would occur in two phases from 235 Bloom boxes, and the initial installation would generate 27 Megawatts (MWs).

The Applicant's Vice-President, Bill Brockenborough, continued the Powerpoint presentation by describing the Bloom boxes as each having a capacity of 200 kilowatts. He described the size of each box as 25' long, 8' wide, and 6.5' high. He pointed out that the Bloom boxes only moving parts are circulating fans for moving air and were very quiet when operating. He explained how electricity is generated by electrochemical reaction between the fuel cells, air and natural gas, and that no combustion occurs. He stated that the principal emissions were water and sulfur dioxide (SO2).

Jeff Bross of Duffield Associates, Applicant's consulting engineers, explained the offset proposed for the air emissions. This offset is based upon the cleaner form of electrical generation from the Bloom boxes compared to the other generating sources that use fossil fuels and sell electricity to the PJM Power Pool (PJM). He described how the generation from Bloom boxes would displace the use of the other fossil fuel sources that sell to PJM and that the use of Bloom boxes would result in an almost 100% reduction of SO2 and NOx emissions compared to the PJM average generating emissions, which includes nuclear, hydro, and wind power that like Bloom boxes also generate electricity with little emissions. He mentioned the release of CO2, which he stated is not regulated. Nevertheless, he indicated that Bloom boxes released far less CO2 than other generating sources that use fossil fuel fired combustion.

The Powerpoint presentation provided information previously in the application on emissions showing the 99.99% reduction in SO2 emissions, the 99.8% reduction in NOx emissions, and the far lower emissions for 14 other regulated air emissions compared to oil, natural gas or coal fuel fired generating units that PJM otherwise would use. The presentation provided air transport information on how the fossil fuel fired generating stations that would be

subject to displacement adversely impact the air quality within the CZ. Applicant's presentation ended by noting the Bloom boxes' clean exterior appearance.

The first member of the public to speak was John Nichols, who presented a California study that compared energy savings and emissions from Bloom boxes with the energy and emissions from a gas-fired co-generation boiler. Nichols Ex. 1. Mr. Nichols questioned the application's use of average PJM electric generating sources for the air emissions reductions. He suggested that a weighted average should be used, which he said would reduce the PJM's average emissions. He also questioned whether the Applicant disclosed all materials that may be hazardous substances in the application, and cited various materials as possibly hazardous. He also questioned whether the payment of $20,000 for the conversion of farmland to industrial use was an appropriate amount. He also raised an issue with possible sea level rise and inundation of the area to be used. Representatives of the Applicant provided answers to Mr. Nichols's questions. Mr. Nichols provided the following documents for the record: Nichols Ex. 1-Discussion paper (Issues on Carbon Footprint and Public Expenditures for Bloom Energy Fuel Cell v Natural Gas Fired Co-Generation; Nichols Ex 2-Article (Market Impacts of Rare Earth Element Use in Solid Oxide Fuel Cells); Nichols Ex. 3 Article (Effect of cerium nanoparticles on inflammation in vascular endothelial cells); Nichols Ex 4 Material Safety data Sheet for Cerium Oxide; and Nichols Ex. 4 (Occupational Safety and Health Administration's Guidance for Identification and Control of Safety and Health Hazards in Metal Scrap Recycling).

Elizabeth Brown spoke as director of strategic initiative and counsel with the Delaware Riverkeeper. She indicated that the Delaware Riverkeeper organization does not oppose or support the permit application. She was concerned with the proposed use of fossil fuel from natural gas. She cited the CZA Regulation for environmental impacts and the requirement to offset negative impacts, which she suggested should include natural gas facilities. She

questioned whether the Applicant properly evaluated the environmental impact from water usage and discharge of process water. She indicated that the application should disclose the natural gas sources. In response, the Applicant indicated that the Facility would use gas from Delmarva Power & Light's gas utility facilities. She asked about the life cycle of the facility and the Applicant replied that the life cycle was 22 years. She also asked about the repair and maintenance of the facility, and Applicant replied that it would occur in a small building at the site..

Brenna Goggin from the Delaware Nature Society provided comments that questioned the use of the Bloom boxes as an offset that is required by the CZA Regulations. Her written comments were admitted as DNS Ex. 1.

Simon Hahn provided comments that asked whether there had been any consideration of an alternative location that would reuse a brownfields site. He also questioned the Facility's use of groundwater because of possible contamination from the nearby Metachem site. He also asked about the stormwater impact and the offset for farmland conversion, and Applicant replied stating the stormwater management proposed would properly control all stormwater.

Mr. Nichols provided an additional comment that claimed a missing letter from the Department's Natural Heritage program required that the application be rejected. He also requested one day extension of time to submit additional comments, which was granted.

Mr. Nichols provided an additional comment by email on March 7, 2012 that requested the application be denied because of the missing letter from the Natural Heritage Program and possible adverse impact to wildlife. This will be in the record as Nichols Ex. 6. In addition, Richard Fleming submitted by e-mail comments that question the offset for farmland loss and for air emissions, and this comment shall be in the record as Fleming Ex. 1.

I requested assistance from the Department's experts, and the CZA Program provided the attached memorandum that comprehensively responds to all the public comments. It notes the offset would occur from the generation, which would release emissions that could be considered negligible in terms of environmental impact. It notes that the release of carbon dioxide, while currently not regulated by the Department's air pollution control regulation, nevertheless should be considered an environmental impact under the CZA Regulation. The memo finds that this impact, however, would be more than offset by the Bloom boxes' operation, which also produce far less CO2 than use of other forms of fossil fuel-fired generation.

III. DISCUSSION OF FINDINGS AND REASONS

I find that the record supports the issuance of a CZA permit, submit to the conditions recommended by the CZA Program in its draft permit.

The Facility's location will be on Delmarva Power & Light Company's New Castle County tax parcel No. 100.50.00011 within the CZ.[4] Applicant has leased 12.44 acres. The parcel was leased to a farmer for use for farming.

New Castle County has zoned the land 'Suburban,' but Applicant's proposed use "of power cells to generate electricity without combustion via chemical reaction between natural gas and certain metals as a minor utility and permitted as a limited use" was approved for use in the Suburban zoning district. The area to be developed is outside the 100 year floodplain and will not disturb any wetlands and stormwater management will use green technology with 3 bio retention areas that should reduce the current conditions' stormwater runoff.

Applicant proposes to install 235 Bloom boxes[5] on 9.3 acres and build support facilities on 3.1 acres. Bloom boxes are fuel cells that will use natural gas, water, and air to generate electricity by electrochemical reaction similar to the generation of electricity from batteries. The

[4] This is a 42 acre parcel.
[5] Bloomenergy ES -5700 Energy Servers

Bloom boxes will produce a maximum of 47 Megawatts of electricity, which will be transmitted to the nearby existing Delmarva Power & Light Company electric utility substation where the electricity will be purchased by the PJM Power Pool. The natural gas will be from Delmarva Power & Light Company's existing natural gas lines that are located adjacent to the Facility's site along River Road. The Facility will install a Department approved on-site wastewater treatment and disposal system for the small amount of use from the process water used and from use by employees. The Facility's water supply for domestic and process use will be from a Department approved well to ensure environmental concerns are satisfied, including any possible contamination in the groundwater.

Based upon the description of the equipment to be used, its potential to pollute and the overall appearance of the proposed manufacturing, I find that the proposed manufacturing use will not be a CZA prohibited "heavy industrial use" because the amount of land used for manufacturing is less than 20 acres, and more importantly, the manufacturing process will lack the CZA's characteristics of a "heavy industrial use."[6]

The Facility will operate constantly to generate electricity except for scheduled or unscheduled outages for maintenance and repair. The Facility will require approximately 50 workers for its construction, and will require 15 employees for its operation. The total estimated construction cost is $2.5 million, and the estimated annual wages and salaries of the operations employees will all exceed $50,000. In sum, the Facility will result in the creation of new jobs

[6] The CZA defines heavy industrial use as "a use characteristically involving more than 20 acres, and characteristically employing some but not necessarily all of such equipment such as, but not limited to, smokestacks, tanks, distillation or reaction columns, chemical processing equipment, scrubbing towers, pickling equipment and waste-treatment lagoons; which industry, although conceivably operable without polluting the environment, has the potential to pollute when equipment malfunction or human error occurs."

and the type of industry that the CZA encourages,[7] and the Facility represents the type of manufacturing use in the CZ that the Department should permit under the CZA.

The Applicant sets forth the possible negative impacts from the proposed use. The Department's experts reviewed the negative impacts and found nothing to warrant a permit denial. Indeed, the Department's expert view the negative impacts as somewhat negligible. The record supports finding that the proposed use will, after the offsets, have no overall negative environmental impact on the CZ. I agree that the Bloom boxes represent a cleaner method to generate electricity than if coal, oil or natural gas were used, which are the predominate methods that the PJM relies upon for its generating supply sources. Thus, to the extent the Bloom boxes operate, they will displace these other less clean generating sources.

The Applicant estimates the annual electrical output of 411, 720 MWh will result in the displacement of PJM sources that emit at least 1113.8 tons of SO2, 280.9 tons of NOx, and 6115.8 tons of carbon dioxide. In addition, the Facility's CO and VOC emissions would be far lower than PJM's other fossil fuel fired generating sources.

The possible negative impacts from the Facility were fully examined by the Department, including the consequences of any accident or malfunction. The Bloom boxes' release of air emissions in particular was the subject of the Department's extensive analysis even though the releases are relatively small compared to other industrial uses in the CZ. The Secretary's Assessment determined that air modeling provided sufficient support that the reduced emissions from other less clean PJM generating sources would result in cleaner air in the Coastal Zone. Department's experts accepted the Applicant's analysis that any additional air emissions from

[7] While it is the declared public policy of the State to **encourage the introduction of new industry into Delaware**, the protection of the environment, natural beauty and recreation potential of the State is also of great concern. **In order to strike the correct balance between these 2 policies, careful planning based upon a thorough understanding of Delaware's potential and her needs is required. Therefore, control of industrial development other than that type of heavy industry in the coastal zone of Delaware through a permit system at the state level is called for.** *7 Del. C. §7001(emphasis supplied).*

the Bloom boxes would be offset by the reduced air emissions from PJM's other fossil fuel fired generating sources. In effect, the operation of the Bloom boxes provide a cleaner source of electricity than if PJM used other fossil fuel fired generation. Hence, the cleaner source of generation compared to PJM's other fossil fuel-fired sources means that the Bloom boxes will provide a "built in" offset whenever they operate.

I agree with the analysis and the underlying assumptions and facts in this record support a finding that when the Bloom boxes generate electricity, they automatically will displace PJM's use of far less clean generating sources, particularly from coal, oil and natural gas. This assumption was supported in the record by the present PJM's generating sources, which show a majority are from coal, oil and natural gas generating stations. I find the record supports the "built in" offset as consistent with the nature and type of offset that will clearly and demonstrably more beneficial to the CZ environment, as required by the CZA Regulation 9.1.1.

> Any application for a Coastal Zone permit for an activity or facility that will result in any negative environmental impact shall contain an offset proposal. Offset proposals must proposals must more than offset the negative environmental impacts associated with the proposed project or activity requiring a permit. It is the responsibility of the applicant to choose an offset project that is clearly and demonstrably more beneficial to the environment in the Coastal Zone than the harm done by the negative impacts associated with the permitting activities themselves.

Section 9.1.1 of CZA Regulations.

Bloom boxes' cleaner generation of electricity for use by PJM will cause PJM to reduce its reliance on other generating sources. The record indicates that in 2010 PJM relied upon 48% from coal fired generation and 11 % from natural gas fired generation. Both of these sources emit far greater emissions than Bloom boxes. The Bloom boxes' operation will displace PJM's use of other fossil fuel-fired sources and provide cleaner air emissions than these sources. I find that Applicant's use of average PJM generating sources to measure the air quality benefit is conservative because the PJM average emissions includes PJM's essentially zero air emission

sources such as hydro, wind, solar and nuclear sources. If the Bloom boxes displace only fossil fuel-fired sources, based upon PJM's 59% usage of fossil fuel-fired generation, then the Bloom boxes relative air emission benefit to the CZ would increase. I find that using PJM's weighted average generation would not change the Bloom boxes environmental benefit, particularly when compared to coal and natural gas. Moreover, the use of nuclear power for generation, while 'clean' in its air emissions, poses other environmental problems from its waste disposal and hydroelectric generation also poses water quality concerns. I find ample support in the record that the use of Bloom boxes by PJM as a source of generation will result in far lower air emissions than from 59% of PJM generation sources. Thus, the lower air emissions from Bloom boxes, as compared to other fossil fuel-fired generation, will improve the air quality in the CZ based upon sound interstate air transport models, which establish that PJM's use of fossil fuel-fired generation adversely impacts Delaware's and the CZ's air quality.

The issuance of a CZA permit for the Bloom boxes also is supported by Delaware's classification of this form of generation as a "renewable." This classification supports the deployment of Bloom boxes as consistent with the Delaware policies to encourage the use of renewable energy sources. I note that the CZA Regulation recognize the need for new sources of electricity generation in the CZ by exempting emergency generators and solar generation from the need to obtain any CZA permit. I find that these exemptions support the Facility's issuance of a CZA permit as consistent with the recognition that electricity is needed and renewable energy in particular poses benefits that should be encouraged. To the extent that more cleaner energy generation in the CZ is approved, then Delaware will have less need to rely upon fossil fuel fired generation, including the reliance on the two older large coal fired generating stations that operate under the CZA's exemption for existing heavy industrial uses because they began operation prior to when the CZA went into effect.

I find that the Facility's operation will dramatically reduce PJM's air emissions from coal and natural gas-fired generation that now adversely impacts the CZ's air quality, particularly from SO2 and NOx. Delaware's air quality for New Castle County is impaired and Delaware is required to take such regulatory actions to improve air quality. The approval of Bloom boxes will reduce the operation of PJM coal and natural gas fired generating stations, including reduced use of coal fired generation in the CZ, and this reduction will result in clean air quality in the CZ.

In the interest of furthering the Department's review, the Applicant added an environmental impact for the conversion of farmland to industrial use. As noted by the CZA Program, the possible negative environmental harm from the conversion of farmland to industrial use has not been subject to an offset before in CZA permits. Indeed, the application cites the water quality benefits from the conversion, which may protect the water from harmful agricultural application of chemicals. I agree the land development for industrial use could be considered as a negative impact. While I agree that use of a brownfield site would be preferable location, the site selected nevertheless satisfies the CZA for a manufacturing use, particularly given the low environmental impact from the proposed manufacturing. The CZA allows the Applicant to select a site, and the record provides no support for intruding upon Applicant's managerial discretion in selecting the site. Indeed, the Facility's location near the electric substation and on land that Delmarva Power and Light owns, presumably for use in its public utility operations, supports the approval of the site as a reasonable use. I find the offset for farmland conversion provides an ample environmental benefit to supplement the vast air quality benefit provided by the Bloom boxes displacement of less clean generation. The CZA Program investigated the valuation with the assistance of the Department of Agriculture and found that the valuation was appropriate. I agree. In sum, the Department will use the farmland conversion

offset in the CZ for projects that will improve the natural habitat, which, in turn, will improve the water quality, air quality and overall environment within the CZ.

The CZA's second consideration is the proposed economic effect and the Facility will have a positive economic impact by its construction activity and ongoing employment. I find the positive economic benefit, as described herein, provides justification for a permit as consistent with the CZA's purpose to encourage appropriate industrial development in Delaware. The creation of a fuel cell generating facility will provide good jobs during the construction and during the operation over more than twenty years.

The third CZA consideration is the number and type of supporting facilities required and their impacts on all other factors. The Facility will require little support facilities. In addition, the site's close proximity of the gas and electric utility infrastructure will reduce the need for construction of these facilities to reach the site. Thus, the support facilities will not cause any undue adverse impact on the environment.

The fourth CZA consideration is aesthetic. The Facility will be visible from the street, but the Bloom boxes are not conspicuous or even appear like any traditional method of manufacturing, particularly the generation of electricity. Instead, the Bloom boxes will look more like heating and air conditioning units often located next to commercial buildings. The Facility will have landscaping to provide a less industrial appearance than most industrial use sites in the CZ. Thus, the Facility satisfies this CZA consideration.

The fifth consideration is the effects on neighboring land uses, and the Applicant states that there would be no adverse impacts on the closest residential property. I agree based upon the overall negligible impacts and appearance..

The sixth consideration is that Facility will be consistent with county and municipal comprehensive plans, which Applicant satisfied by proof of New Castle County's approval of the Facility's use consistent with local planning authority.

I find that the Department should issue Applicant the permit because the Facility will be consistent with the type of manufacturing that the CZA allows. The Facility is also consistent with the Department's efforts to permit responsible industrial manufacturing uses within the CZ in a way that will provide good employment opportunities and safeguard the CZ for recreation and tourism uses. More importantly, the Facility will promote the type of electricity generation that is consistent with Delaware's energy policies and the use of a renewable resource as defined by Delaware law. Based upon the record, I find that a CZA permit should be issued, subject to such reasonable permit conditions to ensure that the permit is consistent with the CZA, the Department's regulations and policies, and the Department's statutory purposes and policies.

IV. CONCLUSIONS

I find and conclude that the record supports approval of the permit, and recommend that the Secretary adopt the following conclusions:

1. The Department has jurisdiction to issue a CZA Permit to the Applicant subject to reasonable permit conditions deemed appropriate and consistent with the CZA's purposes;

2. The Department provided adequate public notice of the proceeding and the public hearing in a manner required by the law and its regulations;

3. The Department held a public hearing in a manner required by the law and its regulations;

4. The Department considered all timely and relevant public comments in making its determination;

5. The Department shall issue a permit to the Applicant in the form and manner proposed by the CZA Program in its draft permit;

6. The Department carefully has considered all the statutory factors to be considered in making a decision on a CZA permit application under the CZA and its regulations; and

7. The Department shall publish legal notice this Order and otherwise provide notice as to all affected persons in a manner consistent with the public notice required by the law and the Department regulations, and shall post on the Department's web site.

Robert P. Haynes, Esquire
Senior Hearing Officer

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April 4, 2012

TO: Mr. Robert P. Haynes, Esq.

FROM: Lee Ann Walling, AICP
Kevin Coyle, AICP CEP

RE: Coastal Zone Act Program response to Bloom hearing

This memo attempts to answer questions and comments raised during Diamond State Generation Partners' (Bloom Energy) Coastal Zone permit hearing on March 6, 2012. Before delving into individual issues presented during the hearing, we believe it is important to make several introductory points:

- Before determining that Bloom's Coastal Zone permit application was "preliminarily administratively complete" on February 10, 2012, we conducted meetings, phone conversations and exchanged information electronically with Bloom. The meetings included, in particular, representatives of the Division of Air Quality.

  The conversations and information exchanges resulted in validation by DNREC of Bloom's emissions estimates and the additional proposal of $20,000 to offset the loss of 9 acres of farmland. There is some debate about the appropriate value of this farmland (to be addressed later in this document). However, to our knowledge, such an offer is unique; no Coastal Zone applicant has ever been expected or has offered to offset the loss of agricultural lands. In addition, Bloom points out that its proposed use and intention to use green stormwater best management practices are a likely environmental improvement over traditional agricultural practices at the site.

- In that determination of February 10, 2012, DNREC essentially accepted Bloom's assertion that the 47 MW of "clean" energy generated at the Red Lion site represented a built-in offset, displacing dirtier (fossil fuel)

electricity generation on the PJM grid. Bloom was asked to provide more scientific backup at the March 6 hearing, and the company attempted to do so. Its presentation has been posted to the Coastal Zone program website, http://1.usa.gov/wzHF70.

- Bloom's "built-in" offset proposal prompted questions at the hearing. Even if an individual rejects Bloom's offset logic, the company's emissions of regulated air pollutants can be considered negligible in terms of environmental impact. There will be no emissions of particulates. Estimates for NOx and sulfur dioxide are 1.4 and 0.02 pounds per day, respectively. Volatile organic compounds (VOCs) are 13 pounds per day and carbon monoxide emissions are 65 pounds per day, according to the Division of Air Quality. There are no emissions of Hazardous Air Pollutants (toxics or carcinogenics). Bloom clearly presents a technology with exponentially better environmental results than conventional fossil fuel generating plants.

- We also note that the offset requirements in the Coastal Zone Act regulations do not distinguish between regulated and unregulated environmental impacts. Section 9.1.1. states: *"Any application for a Coastal Zone permit for an activity or facility that will result in any negative environmental impact shall contain an offset proposal."* For example, past Coastal Zone permits have imposed conditions relating to certain ecological impacts that are not regulated.

  In addition, carbon dioxide currently may not be regulated but still presents an environmental impact. However, in accepting Bloom's "built-in" offset argument, DNREC has determined that the project's CO_2 emissions are being more than offset.

We will now address the additional issues raised at the March 6, 2012 public hearing:

Thermal energy. Mr. John Nichols asserted that the Bloom proposal does not account for the need for thermal energy, the heating and cooling of buildings, and therefore underestimates carbon dioxide emissions. The Coastal Zone Act is focused only on electricity generation as a manufacturing process. Homes and offices will need to be heated and cooled, whether with electricity provided by a coal-fired plant or by Bloom. Homes and offices are not covered by the Coastal Zone Act.

Weighted average. Mr. Nichols notes that Bloom, in comparing its emissions to other types of generation – fossil fuels, nuclear, wind – should have used a "weighted average" to determine its relative environmental benefit. Bloom clearly stated that they were including nuclear and wind generation, which do not generate SOx and NOx emissions, in the PJM average. If the company did use a weighted

average, Bloom would look comparatively even better since coal-fired plants comprise 50 percent of the PJM grid generation, and wind provides only a small percentage (1.3 percent in 2010).

Rare earth elements. Mr. Nichols also expressed a concern, and provided several reports, about the presence of rare earth elements in Bloom's fuel cells – specifically, yttrium and cerium dioxide. He called yttrium a "hazardous material you are injecting into a Coastal Zone environment" and asked the company to disclose the contents of its fuel cells. If Bloom were manufacturing the fuel cells in the Coastal Zone, the program probably would require the company to disclose their contents and provide details of "the raw materials, intermediate products, byproducts and final products and their characteristics from material safety data sheets (MSDS's)," according to Coastal Zone Act Regulation 8.2.10. In 2011, the Coastal Zone program refused to waive confidentiality for another applicant and required disclosure of raw materials.

However, the fuel cells are being manufactured elsewhere, and this Coastal Zone permit application deals with the generation of electricity. The fuel cells are encased in the Bloom energy servers.

Upon review, the Division of Air Quality agreed that the contents of the fuel cells are not hazardous; in the event of a mishap regarding these cells – a natural disaster, explosion or human error – the contents of these units will not pose a hazard.

Note: *The most prevalent use of yttrium, according to several scientific websites, is in color television sets. Cerium dioxide is present in self-cleaning ovens.*

Natural Heritage report. Bloom submitted the report from DNREC's Natural Heritage and Endangered Species program as an early addendum (November 17, 2011) to its Coastal Zone application. The Coastal Zone program inadvertently omitted the report from the exhibits. Bloom did not respond to the report, which did not express any serious concerns about the project.

Farmland value. Based on data obtained from the Delaware Department of Agriculture, twenty-two parcels (3,922.4 acres) in New Castle County's portion of the Coastal Zone have had their development rights purchased for $7,013,545.72, or $1,788.08/acre. The land, while currently being used for agriculture, is not zoned for industry but is zoned residential Suburban (S) under the New Castle County Unified Development Code. Bloom offered $2,118 an acre.

Sea Level Rise. A review of DNREC's Sea Level Rise Inundation Maps (http://www.dnrec.delaware.gov/Pages/SLRMaps.aspx) indicate that the project site, located at 1593 River Road, New Castle, would not be adversely affected by the 0.5, 1.0, and 1.5 meter sea level rise scenarios (as described at http://www.dnrec.delaware.gov/coastal/Documents/SeaLevelRise/Final%20and%20Signed%20DNREC%20SLR%20scenarios.pdf).

Natural gas. The representative from the Delaware Riverkeeper Network expressed concern about using natural gas, which will be piped to the Bloom facility via Delmarva Power's distribution line. She referred to natural gas an "extreme fossil fuel," tying it to the Marcellus shale "fracking" controversy. The Delaware General Assembly determined in 2011 that fuel cells powered by natural gas are considered a renewable source of electrical generation for purposes of meeting the state's Renewable Portfolio Standards.

Offset to Coastal Zone. Bloom's offset proposal was generally addressed in the introduction. The Coastal Zone Act regulations indicate a hierarchy of preference for offsets, although many variations to that hierarchy have been accepted since the regulations were adopted in 1999:

> 9.1.3 The Secretary shall give preference to offset projects that are within the Coastal Zone,that occur in the same environmental medium as the source of degradation of the environment, that occur at the same site as the proposed activity requiring a permit and that occur simultaneously with the implementation of the proposed activity needing an offset.

Bloom used National Oceanic and Atmospheric Administration (NOAA) meteorological studies to demonstrate that air pollutants wind up in Delaware's Coastal Zone from points west – Pennsylvania, Ohio, Kentucky and West Virginia. Bloom's assertion is that it is offsetting dirtier generation in places that have been sending us their particulates, NOx and other emissions. Granted, one can question whether 47MW of Bloom generation here automatically results in 47 fewer megawatts of coal generation in Ohio or somewhere else. Such a theory is almost impossible to prove or disprove beyond a doubt. However, the bottom line is Bloom's own emissions are considered minimal.