

**Shearon Harris Nuclear Power Plant Units 2 and 3
COL Application
Part 3, Environmental Report**

**CHAPTER 8
NEED FOR POWER**

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ACRONYMS AND ABBREVIATIONS

CPCN	Certificate of Public Convenience and Necessity
Duke	Duke Energy Corporation
EIA	Energy Information Administration
ER	Environmental Report
ESRP	Environmental Standard Review Plan
FERC	Federal Energy Regulatory Commission
HAR	proposed Shearon Harris Nuclear Power Plant Units 2 and 3
IRP	Integrated Resource Plan
kWh	kilowatt hour
MW	megawatt
MWh	megawatt hour
NCUC	North Carolina Utilities Commission
NERC	North American Electric Reliability Corporation
NRC	U.S. Nuclear Regulatory Commission
PEC	Progress Energy Carolinas, Inc.
ROI	Region of Interest
REPS	Renewable Energy Portfolio Standard

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8.0 NEED FOR POWER

This chapter of the Environmental Report (ER) supports the overall cost-benefit analysis by describing the process for determining the need for the power generated by the proposed Shearon Harris Nuclear Power Plant Units 2 and 3 (HAR). This chapter also describes the Region of Interest (ROI) for determining the need for power that supports evaluating the practical alternatives to the proposed project. Integrated Resource Plans (IRPs) are fundamental to the state processes to determine need for power.

PEC prepares similar IRPs for both North Carolina and South Carolina. PEC is a regulated public utility whose territory consists of an area approximately 34,000 square miles (mi.²), and includes northeastern South Carolina, portions of the coastal plain, lower piedmont section, and a portion of western North Carolina. **Figure 8.0-1** shows the PEC service territory. The ROI for the HAR ER is PEC's service territory in both North Carolina and South Carolina. PEC's service territory and the ROI are also the relevant service area that will be served by the HAR.

As noted in NUREG-1555, Environmental Standard Review Plan (ESRP) 8.1:

Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

North Carolina provides a comprehensive and systematic process for evaluating power. It is subject to confirmation and responsive to forecasting uncertainty. It consists of two steps: (1) a North Carolina Utilities Commission (NCUC) annual report analyzing the long-range needs for electricity in North Carolina, with NCUC review and approval of IRPs submitted by utilities, and (2) NCUC review and approval of certificate applications submitted by utilities prior to construction of electricity generation facilities.

Because the proposed HAR is in the state of North Carolina, North Carolina is the affected state, responsible for conducting a need-for-power evaluation. The following sections show that the North Carolina need-for-power evaluation process meets these four criteria. The North Carolina process is informed by the similar IRP process conducted by South Carolina.

8.1 STATE NEED FOR POWER PLANNING

This section reviews the criteria described in NUREG-1555, ESRP 8.1:

Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is

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(1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities are expected to describe and assess the regional power system. The reviewer should evaluate the description, and determine if it is comprehensive and subject to confirmation. If it is found acceptable, no additional data collection by NRC should usually be needed. These data may be supplemented by information sources such as the Energy Information Administration (EIA), Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Council, and others.

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The following subsections explain North Carolina's power evaluation process and how it meets the four evaluation criteria provided in NUREG-1555. They explain how North Carolina assesses its need for and the economic feasibility of power generating facilities.

North Carolina's robust evaluation process culminates with the issuance of a "Certificate of Public Convenience and Necessity" (CPCN), which is granted only if the economic prerequisites to construction of the proposed power plant are met. While the current IRP shows a general trend of economic growth and associated need for future electricity generation facilities, the specific data that would support the basis to commit to construct HAR will not be submitted to the state until much later in North Carolina's planning process. See Progress Energy Carolinas Integrated Resource Plan, September 13, 2010, at 5 ([Reference 8.1-011](#)). Therefore, the NRC can rely on the state process because it is systematic, comprehensive, subject to confirmation, and considers uncertainty. Based on the rules and regulations pertaining to the issuance of a CPCN in North Carolina, a CPCN for HAR will not be issued unless Progress Energy demonstrates, amongst other things, a need for at least 2000 megawatts (MW) of power and that the HAR project is the most cost-effective means of meeting that need for power. While not required, it is reasonable to predict that an IRP filed in advance of the application for a CPCN would show the need for and cost effectiveness of 2000 MW of nuclear power. Accordingly, an independent review by the NRC should consider the reliability of the state process. An independent review at this relatively early stage of the planning process should consider reasonably foreseeable generalized predictions of need, as it is not practical to quantify data on power generation and consumption that far in the future.

8.1.1 OVERVIEW OF THE NORTH CAROLINA PROCESS

It is the policy of the state of North Carolina to "assure that resources necessary to meet future growth through the provision of adequate, reliable utility service include use of the entire spectrum of demand-side options" and to "require energy planning and fixing of rates in a manner to result in the least cost mix of

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generation and demand-reduction measures which is achievable . . .” N.C. Gen. Stat. § 62-2(a) (3a) (Reference 8.1-012). To meet this and other state policies, NCUC is vested with the authority to regulate public utilities, including their expansion in relation to statewide development requirements. *Id.* § 62-2(b).

N.C. Gen. Stat. § 62-110.1 requires NCUC to “develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina. . . .” N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). This analysis includes:

- (1) NCUC’s estimate of the probable future growth of the use of electricity;
- (2) the probable needed generating reserves;
- (3) the extent, size, mix, and general location of generating plants; and
- (4) arrangements for pooling power to the extent not regulated by the Federal Energy Regulatory Commission (FERC).

Id.

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information. *Id.* NCUC also may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. *Id.* The NCUC Public Staff, an independent agency created in 1977 that reviews, investigates, and makes appropriate recommendations to NCUC, is also required to assist NCUC in developing the long-range analysis and plan. N.C. Gen. Stat. § 62-15(d) (Reference 8.1-014).

As part of NCUC’s need-for-power evaluation process, utilities are required to file IRP reports with NCUC. NCUC Rule R8-60 (Reference 8.1-015); see N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC Rule R8-60 sets forth requirements for utilities’ IRP reports and the process for review of such IRPs. NCUC Rule R8-60 (Reference 8.1-015). NCUC Rule R8-60 requires that utilities furnish NCUC with a biennial report, in even-numbered years, that contains both its IRP covering a two-year period and additional information. NCUC Rule R8-60(h),(i). *Id.* In odd-numbered years, each utility is required to file an annual report containing *inter alia* an updated 15-year forecast and significant amendments or revisions to the most recently filed biennial report. *Id.* IRPs submitted by utilities are reviewed publicly through (i) an evidentiary hearing that may be held at the discretion of NCUC and (ii) one or more hearings to receive testimony from the public. *Id.* at Rule R8-60(j). Within 150 days after the filing of each utility’s biennial report and within 60 days after the filing of each utility’s annual report, the Public Staff or any other intervenor may file its own plan or an evaluation of, or comments on, the utilities’ biennial and annual

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reports. *Id.* at R8-60(j) ([Reference 8.1-015](#)). Furthermore, the Public Staff or any other intervenor may identify any issue that it believes should be the subject of an evidentiary hearing. *Id.* The parties may file reply comments addressing any substantive or procedural issue raised by any other party. *Id.* A hearing to address issues raised by the Public Staff or other intervenors may be scheduled at the discretion of NCUC, limited to such issues as identified by NCUC. *Id.* In addition to an evidentiary hearing, NCUC is required to receive testimony from the public. *Id.* At the conclusion of this process, NCUC will approve or disapprove respective utilities' IRP reports.

Utilities may, in addition to submitting IRP reports, submit proposals regarding future needs for electricity to NCUC as it prepares its analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina. *Id.* In the course of developing its analysis, NCUC is required to hold one or more public hearings. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). To the extent practicable, utilities may attend or be represented at any formal conference conducted by NCUC in developing the long-range plan. *Id.* The Public Staff, which is not subject to the supervision, direction, or control of NCUC, assists NCUC in making the analysis and plan. *Id.* at § 62-15(b),(d)(5) ([Reference 8.1-014](#)).

After completing the analysis and hearing, NCUC is required to annually submit its report to the North Carolina Governor and to the appropriate committees of the General Assembly its report, consisting of: (1) NCUC's analysis and plan; (2) NCUC's progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with such plan. *Id.*

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A utility may not commence construction of any facility for the generation of electricity in North Carolina without first obtaining a certificate from NCUC that the "public convenience and necessity requires, or will require, such construction." N.C. Gen. Stat. § 62-110.1(a) ([Reference 8.1-013](#)). Accordingly, prior to construction, PEC is required to obtain a CPCN from NCUC prior to construction. *See id.* The purpose of requiring the CPCN before a generating facility can be built is to prevent costly overbuilding. NCUC Rule R8-61 outlines specific information that the applicant must include to NCUC, both prior to and at the time of filing its application. NCUC Rule R8-61 ([Reference 8.1-015](#)).

CPCN applicants must publish a notice of the application in a newspaper in the county where the facility is proposed to be constructed. N.C. Gen. Stat. § 62-82(a) ([Reference 8.1-016](#)). This notice is required at least once per week for four weeks. *Id.* Within three months following the application's filing, NCUC may commence a hearing to determine whether the certificate should be awarded. *Id.* NCUC is required to hold a hearing upon receiving a filed complaint or it may call a hearing on its own initiative. *Id.* It is the duty and responsibility of the Public Staff to intervene on behalf of the public in all certificate applications filed pursuant to N.C. Gen. Stat. § 62-110.1. N.C. Gen. Stat. § 62-15(d)(5) ([Reference 8.1-014](#)). In the event there is a hearing, NCUC will require that briefs

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and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* at § 62-82(a) (Reference 8.1-016). However, if NCUC does not receive a complaint within ten days after the last day of publication of the notice and does not, on its own initiative, order a hearing, NCUC shall enter an award awarding the certificate. *Id.*

North Carolina law requires NCUC to consider its analysis of the “long-range needs for the expansion of facilities for the generation of electricity in North Carolina” in acting upon any petition for the issuance of a CPCN of construction of a generating facility. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC shall also take into account the applicant's arrangements with other electric utilities for interchange of power, pooling of plants, purchase of power and other methods for providing reliable, efficient, and economical electric service, and approve the estimated construction costs and made a finding that construction will be consistent with NCUC’s plan for expansion of electric generating capacity. *Id.* at § 62-110.1(d),(e).

8.1.2 SYSTEMATIC PROCESS

North Carolina uses a detailed and systematic process for evaluating power, as shown in Figure 8.1-1. It consists of two interrelated steps.

First, state law requires NCUC to “develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina . . .” N.C. Gen. Stat. § 62-110.1 (Reference 8.1-013). NCUC’s implementing rules define an overall framework for reviewing and approving IRPs from the state’s utilities. See, e.g., NCUC Rule R8-60; Rule 8-61 (Reference 8.1-015).

As part of NCUC’s need-for-power evaluation process, utilities are required to file IRP reports to NCUC. Utilities are required to analyze and account for conservation, load management, and other demand-side options, along with new utility-owned generating plants, non-utility generation, and other supply-side options through the IRP process. *Id.* at Rule R8-60(b),(i). IRPs submitted by utilities are reviewed publicly and there may be (i) an evidentiary hearing that may be held at the discretion of NCUC and (ii) one or more hearings to receive testimony from the public. *Id.* at Rule R8-60(j). NCUC issues an order approving or disapproving the IRP report.

In addition to reviewing the IRP process, NCUC annually prepares a report of: (1) NCUC’s analysis and plan for the long-range needs for expansion of facilities for the generation of electricity in North Carolina; (2) NCUC’s progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with the plan. N.C. Gen. Stat. § 62-110.1 (Reference 8.1-013). The Public Staff, which is not subject to the supervision, direction, or control of NCUC, assists NCUC in making the analysis and plan. *Id.* at § 62-15(b),(d)(5) (Reference 8.1-014). Following a hearing, NCUC submits this report to the North

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Carolina Governor and to appropriate committees of the General Assembly. N.C. Gen. Stat. § 62-110.1 ([Reference 8.1-013](#)).

Second, North Carolina law requires that NCUC issue a CPCN that “public convenience and necessity” requires the construction of a facility for the generation of electricity prior to construction. N.C. Gen. Stat. § 62-110.1(a) ([Reference 8.1-013](#)). The purpose of requiring the certificate is to prevent costly overbuilding. NCUC, upon complaint shall, or upon its own initiative may, commence a hearing to determine whether the certificate should be awarded. *Id.* at § 62-82(a) ([Reference 8.1-016](#)). If an evidentiary hearing is conducted, NCUC will hear testimony from experts, the utilities, and interested parties. In acting on a utility’s application for a certificate for construction, NCUC “shall consider” its analysis regarding the long-range needs for the expansion of electricity generation facilities in North Carolina. *Id.* at § 62-110.1(c) ([Reference 8.1-013](#)). NCUC is also required to take into account the applicant’s arrangements with other electric utilities for interchange of power, pooling of plant, purchase of power and other methods for providing reliable, efficient, and economical electric service. *Id.* at § 62-110.1(d). Therefore, the North Carolina review process to determine the need for power is informed by the South Carolina process. NCUC must approve the estimated construction costs and make a finding that construction will be consistent with NCUC’s plan for expansion of electric generating capacity. *Id.* at § 62-110.1(e). A CPCN for a nuclear facility may only be granted if the applicant demonstrates and the Commission finds that “energy efficiency measures; demand-side management; renewable energy resource generation; combined heat and power generation; or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system and that the construction and operation of the facility is in the public interest.” *Id.*

8.1.3 COMPREHENSIVE PROCESS

The North Carolina power evaluation process consists of reporting detailed forecasting information by utilities through IRPs and an overall analysis by NCUC that examines long-range needs for electricity in North Carolina. The process is designed to incorporate probable future growth of the use of electricity, the probable needed generating reserves, the extent, size, mix and general location of generating plants and arrangements for pooling power to benefit of the people of North Carolina. See N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)).

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North Carolina requires each regulated utility to develop and keep current an IRP which incorporates *inter alia*, a 15-year forecast of native load requirements, supply-side and demand-side resources, and an updated comprehensive analysis of all resource options considered by the utility for satisfaction of native load requirements and other system obligations. NCUC Rule R8-60(c) ([Reference 8.1-015](#)). As required by state law, the IRP must include an assessment of demand-side management and energy efficiency, including alternative supply-side energy resources, and incorporate the utility’s obligation

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to comply with the Renewable Energy and Energy Efficiency Portfolio Standard (REPS). *Id.* As part of the IRP process, each utility is required to assess, on an ongoing basis: the potential benefits of soliciting proposals from wholesale power suppliers and power marketers to supply needed capacity, the potential benefits of reasonably available alternative supply-side energy resource options, and programs to promote demand-side management. *Id.* at Rule R8-60(d),(e),(f). Additionally, each utility is required to:

- Evaluate its comprehensive set of potential resource options, including both demand-side and supply-side options, to determine an IRP that offers the least cost combination (on a long-term basis) of reliable resource options;
- Analyze potential resource options and combinations of resource options to serve its system needs, taking into account variations in future estimates of peak load, energy requirements, and other significant assumptions; and
- Take into account, as applicable, system operations, environmental impacts, and other qualitative factors.

Id. at Rule R8-60(g).

Each utility is required to file a biennial report with NCUC containing its current IRP. *Id.* at Rule R8-60(h). In addition to the IRP, utilities are required to provide the following information:

- Forecasts of load requirements, supply-side resources, and demand resources, including the methods, models and assumptions used to prepare the peak load and energy sales forecasts and variables used in the models.
- The existing and planned generating facilities, including information regarding: (1) existing generation facilities, including the type of fuel used, location of each unit, and units expected to be retired from service; (2) planned generation additions, the rationale as to why each listed generation addition was selected, and a 15-year projection of each; and (3) a list of all non-utility electric generating facilities in its service areas by name, location, fuel type, and capacity.
- A calculation and analysis of winter and summer peak reserve margins over a projected 15-year period.
- A list of firm wholesale purchased power contracts by fuel type, capacity, location, expiration date, and volume of purchases, the results of any requests for proposals for purchased power since the last biennial IRP, and a list of wholesale power contracts for the sale of capacity or firm energy for which the utility has committed to sell power.

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- A list of transmission lines and other associated facilities, which are under construction or for which there are specific plans to be constructed during the planning horizon.
- An overall assessment of existing and potential demand-side management programs by type of resource, capacity, and energy available in the program.
- A current overall assessment of existing and potential alternative supply-side energy resources.
- A description and summary of the results of its analyses of potential resource options and combinations of resource options performed.
- Levelized busbar costs for various generation technologies.

NCUC Rule R8-60(h),(i) ([Reference 8.1-015](#)).

In each year in which a biennial report is not required to be filed, utilities are required to file an annual report. *Id.* at Rule R8-60(h). Annual reports must contain an updated 15-year forecast of native load, supply-side, and demand-side requirements (described in NCUC Rule R8-60(c)(1)), as well as significant amendments or revisions to the most recently filed biennial report. *Id.* at R8-60(h)(2). Additionally, each utility's biennial and annual report must be accompanied by a short-term action plan that discusses those specific actions currently being taken by the utility to implement the activities chosen as appropriate per the applicable biennial and annual reports and include the utility's REPS compliance plan. NCUC Rule R8-60(h)(3),(h)(4).

After the filing of a biennial or annual report, the Public Staff or any other intervenor may file a report, evaluation, or comments to a utility's report and identify issues that interested parties believe should be the subject of an evidentiary hearing. *Id.* at Rule R8-60(j). NCUC may hold an evidentiary hearing at its discretion. *Id.*

In turn, NCUC is required to "develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina. . . ." N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). This analysis is comprehensive, including: NCUC's estimate of the probable future growth of the use of electricity; the probable needed generating reserves; the extent, size, mix, and general location of generating plants; and arrangements for pooling power to the extent not regulated by the Federal Energy Regulatory Commission (FERC). *Id.*

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information. *Id.* NCUC also may participate as it deems useful in any joint boards investigating generating plant sites or the

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probable need for future generating facilities. *Id.* Utilities may, in addition to submitting IRP reports, submit proposals regarding future needs for electricity to NCUC as it prepares its analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina. *Id.* In the course of developing its analysis, NCUC is required to hold one or more public hearings. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). To the extent practicable, utilities may attend or be represented at any formal conference conducted by NCUC in developing the long-range plan. *Id.*

Following a public hearing, NCUC is required to submit annually to the North Carolina Governor and to the appropriate committees of the General Assembly a report of: (1) NCUC's analysis and plan; (2) NCUC's progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with such plan. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)).

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The process for approving construction of electricity-generating facilities is similarly comprehensive. For generating facilities with capacities of 300 MWe or more, at least 120 days before filing a CPCN application with NCUC, a utility is required to file, among other things, a "statement of need" for the facility, providing information on loads and generating capability. NCUC Rule R8-61(a)(3) ([Reference 8.1-015](#)). Information to be provided in the CPCN application itself, supported by relevant testimony, includes:

- The most recent biennial IRP report and the most recent annual IRP report of the utility, plus any proposals by the utility to update the report.
- The extent to which the proposed construction conforms to the utility's most recent biennial report and most recent annual report.
- Support for any utility proposals to update its most recent biennial report and its most recent annual report.
- Updates, if any, to the Rule R8-61(a) information that was provided at least 120 days prior to the application's filing.
- If the application is for a coal or nuclear generating facility, information demonstrating that energy efficiency measures; demand-side management; renewable energy resource generation; combined heat and power generation; or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system.

NCUC Rule R8-61(b)(1)-(4),(13) ([Reference 8.1-015](#)).

Therefore, an IRP report issued this year is not controlling to the state's decision regarding the CPCN because what is most relevant is the most recent IRP that is filed immediately preceding the filing of the CPCN. Ensuring the IRP evaluated

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during the CPCN proceeding is current and updated is one element relied on by the state to handle the uncertainty inherent in forecasting long-term need for power.

Like the IRP review process, CPCN applications are also subject to a hearing process. NCUC is required to hold a hearing upon receiving a filed complaint or may call a hearing on its own initiative. *Id.* It is the duty and responsibility of the Public Staff to intervene on behalf of the public in all certificate applications filed pursuant to N.C. Gen. Stat. § 62-110.1. N.C. Gen. Stat. § 62-15(d)(5) (Reference 8.1-014). In the event there is a hearing, NCUC will require that briefs and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* at § 62-82(a) (Reference 8.1-016).

North Carolina law requires NCUC to consider its analysis of the “long-range needs for the expansion of facilities for the generation of electricity in North Carolina” in acting upon any petition for the issuance of a Certificate for Public Convenience and Necessity (CPCN) of construction of a generating facility. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC shall also take into account the applicant's arrangements with other electric utilities for interchange of power, pooling of plants, purchase of power and other methods for providing reliable, efficient, and economical electric service, and approve the estimated construction costs and made a finding that construction will be consistent with NCUC's plan for expansion of electric generating capacity. *Id.* at § 62-110.1(d),(e).

8.1.4 PROCESS IS SUBJECT TO CONFIRMATION

Utilities' IRP reports are subject to confirmation through public comment and an opportunity to be heard. Within 150 days after the filing of each utility's biennial report, or within 60 days after the filing of a utility's annual report, the Public Staff or any other intervenor may file its own plan or an evaluation of, or comments on, the utilities' biennial and annual reports. NCUC Rule R8-60(j) (Reference 8.1-015). The Public Staff or any other intervenor may identify any issue that it believes should be the subject of an evidentiary hearing. *Id.* The parties may file reply comments addressing any substantive or procedural issue raised by any other party. *Id.* At the discretion of NCUC, a hearing to address issues raised by the Public Staff or other intervenors may be scheduled, which may be limited to issues identified by NCUC. *Id.* Additionally, NCUC, as required by law, shall set a time and place to receive testimony from the public. *Id.*

The following description provides an example of how the North Carolina IRP review process provides for confirmation. In late 2007, Duke Power Corporation (Duke) and PEC filed their IRP annual reports. NCUC Docket No. E-100, Sub. 114, Order Approving Integrated Resource Plans, September 19, 2008, at 5 (Reference 8.1-017). Several organizations, including the Public Staff, filed interventions and comments to these annual reports and requested an evidentiary hearing regarding the validity of the utilities' load forecasts, the effects of oversupply and overbuilding, and to review the impacts of demand-increasing

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programs on the load forecasts. *Id.* at 5-6. NCUC scheduled an evidentiary hearing on the limited issue of the validity of the load forecasts because “the load forecasts are the basic building blocks upon which the IRP rests” and “the issue of their reliability is of crucial importance.” *Id.* at 6. Before the public and evidentiary hearings, PEC and an intervenor filed testimony, Duke filed rebuttal testimony, and NCUC received letters and e-mails from the public. *Id.* NCUC held a public hearing in which 22 witnesses testified regarding issues such as energy conservation and energy efficiency. *Id.* A month after the public hearing, NCUC held the evidentiary hearing. *Id.* PEC, Duke and the intervenors presented direct and, in some cases, rebuttal testimony. *Id.* Following the evidentiary hearing, one intervenor filed proposed findings and a brief; the Public Staff, and PEC and Duke jointly, filed proposed orders. *Id.* at 7. Two months later, NCUC issued its order approving the Duke and PEC IRPs, finding that the energy and peak load forecasts were reasonable. *Id.* at 21-22.

NCUC’s analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina is subject to confirmation through public scrutiny and reporting to executive and legislative authorities. NCUC is required to annually submit its report to the North Carolina Governor and to the appropriate committees of the General Assembly. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). Additionally, the report’s viability is bolstered by public input through required public hearings, by the ability of public utilities to attend or be represented at any formal conference conducted by NCUC in developing the long-range plan, and input of the Public Staff. *Id.* at §§ 62-110.1(c) (Reference 8.1-013); 62-15(b),(d)(5) (Reference 8.1-014).

Like the IRP review process, utilities’ CPCN applications are subject to public confirmation through a hearing process. No later than three months following the application’s filing, NCUC, upon complaint shall, or upon its own initiative may, commence a hearing to determine whether the certificate should be awarded after providing reasonable notice. N.C. Gen. Stat. § 62-82(a) (Reference 8.1-016). NCUC will require that briefs and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* However, if NCUC does not receive a complaint and does not order a hearing on its own initiative, NCUC shall enter an award awarding the certificate. *Id.*

8.1.5 PROCESS CONSIDERS UNCERTAINTY

As part of the IRP process, each utility must take uncertainties into account in its analysis. For example, utilities must “analyze potential resource options and combinations of resource options to serve its system needs, taking into account the sensitivity of its analysis to variations in future estimates of peak load, energy requirements, and other significant assumptions, including, but not limited to, the risks associated with wholesale markets, fuel costs, construction/implementation costs, transmission and distribution costs, and costs of complying with environmental regulation.” NCUC Rule R8-60(g) (Reference 8.1-015). Similarly, when providing data for existing electric generating facilities, forecast for a 15-

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year period, the IRP analysis is to include changes to existing units that are “expected to increase or decrease generation capability of the unit in question by an amount that is plus or minus 10%, or 10 MW, whichever is greater.” *Id.* at Rule R8-60(i)(2)(i)(f).

NCUC’s analysis of the long-range needs for expansion of facilities for generation of electricity in North Carolina must include probabilities involving uncertainties: an estimate of the “probable future growth of the use of electricity” and the “probable needed generating reserves.” N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). Additionally NCUC may participate in any joint boards investigating generating plant sites or the probable need for future generating facilities. *Id.*

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In determining whether to grant a utility’s CPCN application, NCUC is required to consider a current long-range needs analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina, thereby incorporating the uncertainties considered in its annual report. See N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013).

8.2 POWER DEMAND

This section describes the need-for-power evaluation process used by North Carolina with respect to power demand.

8.2.1 POWER AND ENERGY REQUIREMENTS

This section describes the need-for-power evaluation process used by North Carolina with respect to the historic and projected electricity consumption and peakload demands in the relevant service area or market.

NUREG-1555 provides the following guidance in ESRP 8.2.1:

Affected States and/or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Forecasts should include demand scenarios for midrange, high, low, 75th percentile, and 25th percentile conditions. If the need for power evaluation is found acceptable, no additional independent review by the NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

Under NCUC Rule R8-60, utilities are required to examine multiple scenarios in providing their 15-year forecast for power demand. IRP reports are required to include peak load (MW) and energy sales (MWh) forecasts, including descriptions of the methods, models, and assumptions used. NCUC Rule R8-60(i)(1) (Reference 8.1-015). At a minimum, utilities’ forecasts must include:

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(i) the most recent ten-year history and a forecast of customers by each customer class, the most recent ten-year history and a forecast of energy sales (kWh) by each customer class;

(ii) A tabulation of the utility's forecast for at least a 15-year period, including peak loads for summer and winter seasons of each year, annual energy forecasts, reserve margins, and load duration curves, with and without projected supply- or demand-side resource additions. The tabulation shall also indicate the projected effects of demand response and energy efficiency programs and activities on the forecasted annual energy and peak loads on an annual basis for a 15-year period, and these effects also may be reported as an equivalent generation capacity impact; and

(iii) Where future supply-side resources are required, a description of the type of capacity/resource (base, intermediate, or peaking) that the utility proposes to use to address the forecasted need.

Id.

Additionally, IRP reports are required to provide a calculation and analysis of winter and summer peak reserve margins over a projected 15-year period, and provide information on levelized busbar costs for various generation technologies. *Id.* at Rule R8-60(i)(4),(9). Utilities are also required to provide a description and a summary of the results of analyses of potential resource options and combinations of resource options performed. *Id.* at Rule R8-60(i)(8).

Similarly, NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including NCUC's estimate of the probable future growth of the use of electricity, the probable needed generating reserves, the extent, size, mix, and general location of generating plants, and arrangements for pooling power to the extent not regulated by FERC. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the long-term energy evaluation process set forth in NCUC Rule R8-60. See N.C. Gen. Stat. § 62-110.1(c).

8.2.2 FACTORS AFFECTING POWER GROWTH AND DEMAND

This section describes the need-for-power evaluation process used by North Carolina with respect to the rate of growth of electricity demand in the applicant's service area.

NUREG-1555 provides the following guidance in ESRP 8.2.2:

Affected States and/or regions continue to prepare a need-for-power evaluation for proposed energy facilities. The NRC will review the evaluation for the proposed facility, if available, and determine if it is (1)

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systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State/regional need-for-power evaluation is found to be acceptable, no additional independent review by NRC is needed, and the State or regional analysis can be the basis for ESRPs 8.2 through 8.4.

Under NCUC Rule R8-60, utilities are required to forecast rate of growth of electricity demand in their IRPs for 15 years. NCUC Rule R8-60(i)(1) ([Reference 8.1-015](#)). These tabulations include peak loads for summer and winter seasons of each year, annual energy forecasts, reserve margins, and load duration curves, with and without projected supply- or demand-side resource additions, and indicate the projected effects of demand response and energy efficiency programs and activities on the forecasted annual energy and peak loads on an annual basis for a 15-year period. *Id.* at Rule R8-60(i)(1)(ii).

Utilities are also required to provide the results of their overall assessment of existing and potential demand-side management programs, including a descriptive summary of each analysis performed or used by the utility in the assessment. *Id.* at Rule R8-60(i)(6) ([Reference 8.1-015](#)). For demand-side programs available at the time of the report, utilities are required to provide the type of resource, the capacity and energy available in the program, the number of customers enrolled in each program, the number of times the utility has called upon the resource, and, where applicable, the capacity reduction realized each time since the previous biennial report. *Id.* at Rule R8-60(i)(6)(i). Utilities are also required to list any demand-side resource they have discontinued since the previous biennial report and the reasons for that discontinuance. *Id.* For demand-side management programs utilities propose to implement within the next two years, NCUC Rule R8-60 requires the type of resource, a description of the new program and the target customer segment, the capacity and energy expected to be available from the program, projected customer acceptance, the date the program will be launched, and the rationale as to why the program was selected. *Id.* at Rule R8-60(i)(6)(ii). For programs evaluated but rejected, utilities are required to provide the following information for each resource considered: the type of resource, a description of the program and the target customer segment, the capacity and energy available from the program, projected customer acceptance, and reasons for the program's rejection. *Id.* at Rule R8-60(i)(6)(iii).

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, the utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information and may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). This enables NCUC to assess factors external to North Carolina in determining growth of electricity demand.

NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including an estimate of the

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probable future growth of the use of electricity and arrangements for pooling power to the extent not regulated by FERC. *Id.* at § 62-110.1(c) (Reference 8.1-013). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the process set forth in NCUC Rule R8-60. See *id.* Additionally, after a CPCN is granted, NCUC may review the certificate to determine whether changes in the probable future growth of the use of electricity indicate that the public convenience and necessity require modification or revocation of the certificate. *Id.* at § 62-110.1(e1).

Past IRPs do not control whether the NCUC will approve a CPCN application; what is most relevant is the information in the CPCN filing. It is reasonable to expect that the most recent IRP that is filed immediately preceding the filing of the CPCN application will contain the most recent information that will form the basis for the CPCN application. Past data provides a reliable indicator of what a future IRP will contain; hence what will likely be in a CPCN application for HAR.

Based on the rules and regulations pertaining to the issuance of a CPCN in North Carolina, Progress Energy will be required to demonstrate a need for at least 2000 MW of power and that the HAR project is the most cost-effective means of meeting that need for power. PEC's 2010 IRP assumes that the ROI has an adjusted demand growth of 1.1% per year. Progress Energy Carolinas Integrated Resource Plan, September 13, 2010, at 5 (Reference 8.1-011). The trend shows an average increase in demand sufficient aggregated over about 10 years of at least 2000 MW. Therefore, it is reasonable to predict that an IRP filed in advance of the application for a CPCN would show the need for 2000 MW of nuclear power. See *id.*

8.3 POWER SUPPLY

This section describes the need-for-power evaluation process used by North Carolina with respect to present and planned generating capability and the present and planned purchases and sales of power and energy.

The NRC's NUREG-1555 guidance allows an applicant to rely on a state's regulatory power planning structure:

Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities are expected to describe and assess the regional power system. The reviewer should evaluate the description, determine if it is comprehensive, and subject to confirmation. If it is found acceptable, no

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additional data collection by NRC should usually be needed. These data may be supplemented by information from sources such as the EIA, FERC, NERC, and others.

In their IRP reports, utilities are required to provide information regarding their existing and planned electric generating facilities, including planned additions and retirements, but excluding cogeneration and small power production facilities. NCUC Rule R8-60(i)(2) ([Reference 8.1-015](#)). With respect to existing generation facilities, utilities are required to provide a list of existing units in service by type of fuel(s) used, type of unit (e.g., base, intermediate, or peaking), the location of each existing unit, a list of units to be retired from service with location, capacity, and expected date of retirement from the system, and a list of units for which there are specific plans for life extension, refurbishment or upgrading. *Id.* at Rule R8-60(i)(2)(i). Utilities are also required to provide the expected or actual date removed from service, location, capacity rating upon return to service, expected return to service date, and a general description of work to be performed. *Id.* With respect to planned generation additions, utilities are required to provide a list of planned generation additions, the rationale as to why each listed generation addition was selected, and a 15-year projection of the following for each listed addition by type of fuel used, type of unit, the location of each planned unit to the extent such location has been determined, and summaries of the analyses supporting any new generation additions included in the 15-year forecast, including designation as base, intermediate, or peaking capacity. *Id.* at Rule R8-60(i)(2)(ii). With respect to non-utility generation, utilities are required to provide a separate and updated list of all non-utility electric generating facilities in their respective service areas, including customer-owned and stand-by generating facilities by facility name, location, primary fuel type, and capacity, including designation as base, intermediate, or peaking capacity. Utilities are also required to indicate which facilities are included in the total supply of resources. *Id.* at Rule R8-60(i)(2)(iii). Utilities must include a calculation and analysis of winter and summer peak reserve margins over a projected 15-year period, and provide information on levelized busbar costs for various generation technologies. *Id.* at Rule R8-60(i)(4),(9).

Utilities are also required to provide an assessment of existing and potential alternative supply-side energy resources, including a descriptive summary of each analysis performed or used by the utility in the assessment. *Id.* at Rule R8-60(i)(7) ([Reference 8.1-015](#)). For currently operational or potential future alternative supply-side energy resources, utilities are required to provide information on the capacity and energy actually available or projected to be available, as applicable, from the resource. *Id.* Utilities are required to provide this information for any actual or potential alternative supply-side energy resources that have been discontinued since the last biennial report and the reasons for discontinuance. *Id.* For alternative supply-side energy resources evaluated but rejected, utilities shall provide the following information for each resource considered: a description of the resource, the potential capacity and energy associated with the resource, and the reasons for the rejection of the resource. *Id.*

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In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, the utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information and may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). This enables NCUC to assess factors external to North Carolina in determining sources of supply.

NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including the probable needed generating reserves, the extent, size, mix, and general location of generating plants, and arrangements for pooling power to the extent not regulated by FERC. N.C. Gen. Stat. § 62-110.1(c) ([Reference 8.1-013](#)). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the process set forth in NCUC Rule R8-60. See *id.* The purpose of this certificate is to determine whether there is a need for a new electric generating plant to meet the electricity needs of PEC's customers. A CPCN for the construction of a nuclear facility may only be granted if the applicant demonstrates, and NCUC finds, that energy efficiency measures, demand-side management, renewable energy resource generation, combined heat and power generation, or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system and that the construction and operation of the facility is in the public interest. *Id.* at § 62-110.1(e).

8.4 ASSESSMENT OF NEED FOR POWER

The state process will evaluate the economic appropriateness of viable generation alternatives and will consider any economic impact from regulation of emissions, including greenhouse gases by electric generators. ER [Section 9.2](#) discusses the environmental impact of various baseload energy alternatives. ER [Section 10.4](#) compares the overall costs and benefits of the HAR. This data shows it is reasonable to predict that a future CPCN for HAR would be granted to compensate for increasingly aging and costly fossil generators, particularly coal. Power demand in the ROI is generally increasing as discussed in [Section 8.2](#) above. Power generation assets, particularly those that are fossil-fueled, are aging and can be expected to become relatively more costly in the future. Increased generation within the ROI will be needed to meet state objectives for system reliability. It is reasonable to predict that at least 2000 MW of nuclear power will be needed to provide an adequate mix of nuclear and fossil-fueled baseload generation at a reasonable price.

Throughout the Carolinas region, utilities and state regulators are considering the possible advantages of regional partnerships for new nuclear construction. In practice, the exact timing and amount ownership of an eventual regional partnership would depend on the specific project resulting in potential adjustments of both timing and volume of available generation. Under the current assumptions for future carbon legislation, carbon dioxide limits would continue to

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ramp down significantly beyond 2025. Such an outcome would likely require an increasing fraction of nuclear generation in the mix of baseload generation in the ROI after 2025 to meet declining greenhouse gas reduction targets further supporting a predicted need for at least 2000 MW of nuclear power generation in the ROI after 2025.

8.5 REFERENCES

8.0-001 NOT USED.

8.0-002 NOT USED.

8.0-003 NOT USED.

8.0-004 NOT USED.

8.0-005 NOT USED.

8.1-001 NOT USED.

8.1-002 NOT USED.

8.1-003 NOT USED.

8.1-004 NOT USED.

8.1-005 NOT USED.

8.1-006 NOT USED.

8.1-007 NOT USED.

8.1-008 NOT USED.

8.1-009 NOT USED.

8.1-010 NOT USED.

8.1-011 Progress Energy Carolinas, Inc., "Progress Energy Carolinas Integrated Resource Plan," North Carolina Utilities Commission Docket No. E-100, Sub 128, Public Service Commission of South Carolina Docket No. 2010-8-E, September 13, 2010. Website, <http://ncuc.commerce.state.nc.us/docksrch.html>, accessed November 15, 2010.

8.1-012 North Carolina General Assembly, "North Carolina General Statute 62-2. Declaration of policy," 2007.

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- 8.1-013 North Carolina General Statutes, Title 62, Chapter 110.1, "Certificate for construction of generating facility; analysis of long-range needs for expansion of facilities," Website, www.ncga.s3ta3t8e.8n8c.4us/gascripts/statutes/Statutes.asp, accessed March 8, 2007.
- 8.1-014 North Carolina General Assembly, "North Carolina General Statute 62-15. Office of executive director; public staff, structure and function," 1999.
- 8.1-015 North Carolina Utilities Commission, "Chapter 8 Electric Light and Power," Articles 1-11, NCUC Docket E-100, Sub 113, (02/28/08), NCUC Docket E-100, Sub 113, (03/13/08).
- 8.1-016 North Carolina General Assembly, "North Carolina General Statute 62-82. Special procedure on application for certificate for generating facility; appeal from award order," 2004.
- 8.1-017 North Carolina Utilities Commission, NCUC Docket No. E-100, Sub. 114, Order Approving Integrated Resource Plans, September 19, 2008. Website, <http://ncuc.commerce.state.nc.us/docksrch.html>, accessed November 15, 2010.
- 8.2-001 NOT USED.
- 8.2-002 NOT USED.
- 8.2-003 NOT USED.
- 8.2-004 NOT USED.
- 8.3-001 NOT USED.
- 8.4-001 NOT USED.
- 8.4-002 NOT USED.
- 8.4-003 NOT USED.
- 8.4-004 NOT USED.
- 8.4-005 NOT USED.
- 8.4-006 NOT USED.
- 8.4-007 NOT USED.
- 8.4-008 NOT USED.
- 8.4-009 NOT USED.