DOCKET NO. 60

AN APPLICATION SUBMITTED BY FLAGG ENERGY DEVELOPMENT CORPORATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF A 10,000 KW COGENERATION FACILITY LOCATED IN HARTFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	May 7, 1986

F I N D I N G S O F F A C T

1. Flagg Energy Development Corporation (FEDCO) of Meriden, Connecticut, in accordance with provisions of section 16-50k and 16-501 of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on March 3, 1986, for a certificate of environmental compatibility and public need to construct a 10 MW cogeneration facility at Hartford Hospital, Jefferson Street, Hartford, Connecticut. The project is known as the Hartford Hospital Cogeneration Facility. (Record)
2. The fee as prescribed by section 16-50v-1a of the Regulations of Connecticut State Agencies (RSA) accompanied the application. (Record)
3. The application was accompanied by proof of service as required by section 16-501(b) of the CGS. (Record)
4. Affidavits of newspaper notice as required by statute and section 16-501-1 of the RSA were filed with the application. (Record)
5. Pursuant to section 16-50j of the CGS, the Connecticut Office of Policy and Management (OPM) Energy Division and the Connecticut Department of Environmental Protection filed written comments with the Council. (Record)
6. The Council and its staff inspected the proposed site on April 3, 1986. (Record)

7. Pursuant to section 16-50m of the CGS, the Council, after giving due notice thereof, held a public hearing at 6:30 P.M., April 3, 1986, in the Hartford Municipal Building, 550 Main Street, Hartford, Connecticut. (Record)

8. The parties to the proceeding are the applicant and those persons and organizations listed in the Decision and Order which accompanies these findings. (Record)

9. The Council took administrative notice of the following documents:

   State of Connecticut Conservation and Development Policies Plan 1982-1985 (Connecticut Development Plan);

   Connecticut Siting Council Review of Connecticut Electric Utilities' 1985 Ten Year Forecasts of Loads and Resources (CSC 1985 Review);

   Connecticut Regulations: Abatement of Air Pollution;

   Cogeneration in Connecticut: Review of Obstacles, Forecasts, and Potential. A report to the Connecticut Siting Council from Energy and Resource Consultants, Inc., May 20, 1985;

   Northeast Utilities System 1986 Forecast of Loads and Resources for 1986-1995 and 1996-2005;

   Northeast Utilities Customer Assistance Conservation Programs, March 1983;

   Hartford City Zoning Code;

   Hartford City Building Code; and

   DPUC Investigation into Cogeneration and Small Power Production, "Going Back to the Future", Docket 85-04-16. 12/11/85.

10. The facility would provide a cost effective, environmentally-sound source of electric power and steam through a combined cycle gas turbine steam and electric cogeneration process. (HHCF-1, p. 1,8)

11. Cogeneration is the simultaneous production of useful heat and electrical or mechanical work from the combustion of fuels. This technique offers both thermodynamic and economic advantages over conventional processes for efficiently producing both forms of energy. (HHCF-2, Q. 32; Cogeneration in Connecticut 1-1, Connecticut Cogeneration Handbook 1-1-5)

12. Cogeneration technology is supported by Northeast Utilities (NU) as a proven technology used to generate electricity while allowing business, industry, and government to efficiently use heat that would otherwise be wasted; to save money; to help conserve the nation's limited fossil fuel resources; and to help reduce the large capital requirements of electric utilities. (HHCF-2, Q. 32; Connecticut Cogeneration Handbook 1-1; NU Customer Assistance Conservation Programs p. 22; The NU System 1986 Forecast of Loads and Resources for 1986-1995 and 1996-2005, Section II pp. 3-5)

13. The project would serve the needs of the public by providing a small, incremental electric supply that would help forestall the need for new baseload capacity facilities. (HHCF-2, Q. 32; CSC 1985 Review pp. iii, 16,17; OPM letter dated 3/24/86)

14. The provision of small, incremental electric supply facilities as opposed to baseload capacity facilities would help to reduce utility risks and provide additional time for consideration of new and improved generating technologies. (HHCF-2, Q. 32; CSC 1985 Review pp. iii, 16,17,21)

15. The State of Connecticut encourages cogeneration and district heating by both utilities and industries where economically practical. (HHCF-2, Q. 32; Connecticut Development Plan, p. 26)
16. The project would meet the State Energy Policy by conserving energy resources and displacing fuel oil. (Connecticut General Statutes, Section 16a-35K; OPM letter dated 3/24/86)
17. The Hartford Hospital Cogeneration Facility (CCF-1) would be a wholly owned subsidiary of FEDCO. (HHCF-2, Q. 7)
18. CCF-1 would own, operate, maintain, and be completely responsible for the project. (HHCF-1, p. 11; HHCF-2, Q. 7)
19. The site, located on an existing parking lot owned by Hartford Hospital just west of the Retreat Avenue and Jefferson Street intersection, would be leased by CCF-1 from Hartford Hospital under the terms of a long-term agreement. (HHCF-1, p. 1,21; HHCF-2, Q. 7; Tr. pp. 20-21)
20. The facility would replace the need to operate existing hospital boilers to produce steam except during facility outages. (HHCF-1, p. 8)
21. Steam would be sold exclusively to Hartford Hospital. Hartford Hospital would use the steam to heat their buildings and to produce chilled water for air conditioning. (HHCF-2, Q. 5)
22. The facility would include two gas turbines, each driving a site-rated 4054 kilowatt (KW) synchronous generator, two duct burners, two heat recovery boilers, one extraction/condensing steam turbine generator site rated at 1950 KW, and one back pressure steam turbine generator site rated at 1369 KW. (HHCF-1, pp. 9-10; Appendix E)

23. The average electrical output from the generators would be 11,750 KW, 9250 KW from gas turbines and 2500 KW from steam turbines. (HHCF-2, Q. 1)

24. The facility would serve the full electrical requirements of the Hartford Hospital Complex with approximately 2000 KW of electricity. Approximately 500 KW of output would be taken for plant use. (HHCF-1, p. 10; HHCF-2, Q. 1)

25. A total output of 9250 KW, 78 million kilowatt hours (KWh) annually, would be available to NU. (HHCF-1, p. 10,27; HHCF-2, Q. 1; Tr. p. 26)

26. Based on anticipated operation conditions, the facility would produce an average of 10516 KWH on peak power and 7710 KWH off-peak power. (HHCF-2, Q. 4)

27. The electrical equipment would include a new circuit breaker to be added to the existing switchgear. Existing transformers and switchgear would be upgraded to accept power safely from the facility. The design of electrical and protective relay systems would be coordinated with NU. (HHCF-1, p. 7; HHCF-2, Q. 3)

28. The electrical interconnection for the facility would be through underground 23 KV lines to existing transformers owned by NU and located on hospital property on Retreat Avenue. (HHCF-1, p. 7; HHCF-2, Q. 3)

29. The facility would operate primarily on natural gas. When natural gas is not available, #2 fuel oil would be used. (HHCF-1, pp. 1,21; Appendix E; Tr. p. 25)

30. The amount of energy needed to heat and fuel Hartford Hospital would be reduced by the proposed facility. (HHCF-1, pp. 8,27; HHCF-2, Q. 6)

31. Natural gas would arrive through an existing dedicated 70 PSIG gas pipeline. (HHCF-1, p. 7; Tr. p. 13)

32. Natural gas would be boosted to 350 pounds per square inch gauge pressure (PSIG) by an electric motor driven compressor located within the facility. (HHCF-1, pp. 7-8; HHCF-2, Q. 6)

33. A 36-hour emergency supply of fuel oil would be stored on site. (HHCF-1, p. 8)

34. A long-term supply contract would be used to supply natural gas to the facility. (HHCF-4; Tr. p. 12)

35. About 976,000,000 cu. ft/yr. of natural gas and 1,089,700 gal./yr. of No. 2 fuel oil would be used. (Tr. p. 12; HHCF-3)

36. The facility would use existing underground fuel tanks owned by the hospital and two new underground fuel tanks, 35,000 gallons each, to be placed on the north side of the building, under the parking lot. (HHCF-1, p. 8; Tr. p. 10)

37. The construction of two 35,000 gallon #2 fuel oil tanks would meet the State of Connecticut Regulations for "Control of Non-Residential Underground Storage and Handling of Oil and Petroleum Liquids." Design data would be submitted for review by the Hartford Fire Marshall, the Hartford Building Department, and the State Department of Environmental Protection (DEP). (HHCF-2, Q. 25; Tr. p. 10)

38. Design, construction, and testing of the facility would be in accordance with all applicable safety and engineering standards, as listed in the application. (HHCF-1, pp. 14-15)

39. The facility would have an automatic fuel and turbine shut-down system triggered by over-temperature, over-speed, flame failure, and gas leak. (Tr. pp. 16-17)

40. All electric devices in the gas turbine enclosure would be sealed to prevent entry of explosive gases from the turbine enclosures. (HHCF-1, p. 16)

41. Over 2,200 similar Model LM-500 engines have been produced for aircraft and industrial uses. (HHCF-6)

42. The facility would be available at least 95% of the time annually. (HHCF-1, p. 17)

43. The gas turbines are expected to be shut-down for maintenance at 8-12 week intervals for 1-2 hours. Semi-annual boroscope inspections would be performed if warranted by performance degradation. Scheduled maintenance on steam turbines would consist of an annual bearing and boroscope inspection during one of the scheduled down-time periods. Major overhaul work on steam turbines is typically scheduled on a five-year cycle. The waste heat steam generator would be visually inspected annually at the same time as the gas turbine inspection. (HHCF-1, p. 18)

44. In the event of a shut-down of the gas turbine generators, an existing hospital boiler on unfired standby would be fired up to produce the required hospital steam flow. (HHCF-1, p. 17; Tr. p. 16)

45. Full back-up power to the facility would be provided by NU through the existing 11 KV lines to the hospital. (HHCF-2, Q. 2; Tr. p. 16)

46. The facility is expected to operate with an energy efficiency rate averaging over 70%. (HHCF-1, p. 27; Tr. p. 29)

47. The facility would have a plant service life of at least 20 years. (HHCF-1, p. 19)

48. Plant equipment, generating capacity, and operating costs have been optimized, based on negotiated electric and thermal sales. (HHCF-1, p. 19)

49. It is anticipated that site preparation would begin August, 1986, with construction commencing by December 1, 1986. Commercial operation would be targeted for the end of July, 1987. (HHCF-1, p. 19)

50. The facility would be surrounded by existing hospital buildings 47'-48' high and two existing 150' high brick stacks at the existing power plant. (HHCF-2, Q. 12; Tr. p. 15)

51. The proposed exhaust stacks for the facility would be 70' high, the minimum height technically feasible for proper plant operation. Cooling towers for the facility would be approximately 50' high. (HHCF-1, Appendix E; HHCF-2, Q. 11; Tr. p. 15)

52. The architectural design would continue the hospital building exterior around the proposed facility. The height of the facility would match that of the existing hospital roof line at 47' to 48' above grade. (Tr. pp. 15-16)

53. Excess steam would be condensed in the steam turbine to avoid steam venting. (HHCF-2, Q. 15)

54. The site is zoned as a residential office district by the City of Hartford and is surrounded by an urban mix of commercial and residential uses. (HHCF-1, p. 25)

55. The nearest residence is 160' southwest of the facility on Maple Avenue. (HHCF-1, p. 25)

56. The facility would require the relocation of approximately 15 Hartford Hospital employee parking spaces. (HHCF-1, p. 25)

57. A parking garage for the hospital now under construction should mitigate the loss of existing spaces. (HHCF-1, p. 25)

58. The proposed site is almost entirely paved, with no vegetation or known wildlife resources. (HHCF-1, p. 21)

59. The project would have no effect on historical, architectural, or archaeological resources listed or eligible for the National Register of Historic Places. (HHCF-1, p. 27; HHCF-5)

60. No significant traffic, economic, or social impacts to the area or city are expected, because only a small number of workers would be expected to be employed at the facility during operation. (HHCF-1, p. 26)

61. Construction access to the facility would be from Jefferson Street, a major arterial route to the hospital. Minor, short-term traffic congestion might occur as construction equipment was moved to and from the site. (HHCF-1, p. 26)

62. Potable water would be supplied to the facility by an existing Metropolitan District Commission (MDC) water supply pipeline. (HHCF-1, p. 24; HHCF-2, Q. 16; Tr. p. 13)

63. An average water draw of 52 gallons per minute (GPM) on the MDC system from the existing hospital steam plant would remain essentially the same when the hospital steam plant was replaced by the facility. (HHCF-2, Q. 16; Tr. p. 14)

64. The facility would increase the average draw of water of approximately 52 GPM to 77 GPM during periods of peak use. (HHCF-2, Q. 16; Tr. p. 14)

65. Water conservation measures would include full use of cooling towers for recirculation of condenser cooling water and reclamation of approximately 20% of boiler blow down. (HHCF-2, Q. 16)

66. A State Discharge Permit would be required for waste water discharge entering the MDC sewer system. Discharge to the sewer would be approximately 20 GPM less than the existing hospital power plant discharge. (HHCF-2, Q. 17; Tr. p. 13)

67. The facility would be built in a Zone C flood area, an area of minimal flood potential outside of the 100 year floodplain. (HHCF-2, Q. 18)

68. The primary air pollutants from the facility would include nitrogen oxides (NO_x), hydrocarbons (HC), carbon monoxide (CO), total suspended particulates (TSP), and sulfur dioxide (SO_2). (HHCF-1, pp. 23-24; Appendix E; HHCF-2, Q. 9)

69. Air pollution emissions would be controlled by using low sulfur fuel and a steam injection system to reduce NO_x emissions. (HHCF-1, pp. 23-24; Appendix E)

70. The facility would result in a reduction of TSP and SO_2 and an increase of CO, HC, and NO_x emissions when compared to the current emission rates for Hartford Hospital. (HHCF-2, Q. 9)

71. A DEP Air Compliance Permit to construct has been issued for the project, with provisions for operation and compliance. (HHCF-1, Appendix E)

72. The Connecticut DEP Air Compliance Unit would probably require continuous stack monitoring of NO_x as part of its permit to operate. (HHCF-1, Appendix E; HHCF-2, Q. 10)

73. Solid waste from the facility would include general trash to be collected by a licensed hauler and taken to a licensed Class II or Class III disposal site. Used lubricants would also be collected and sent to a licensed oil reclaimer or approved incinerator for disposal. (HHCF-1, p. 27)

74. A preliminary noise survey conducted at the site found that the ambient sound levels were dominated by the existing cooling towers on the roof of the Hartford Hospital utilities building. (HHCF-2, Q. 14)

75. Noise attenuation equipment including acoustical enclosures, air inlet and exhaust silencers, and barrier walls would be planned for the facility to reduce noise emission levels to conform to the State Noise Regulations. (HHCF-1, p. 25; HHCF-2, Q. 14)

76. The facility is not expected to change ambient noise levels. (HHCF-2, Q. 14)

77. A final daytime/nightime sound level survey would be conducted with the facility in full operation to ensure that State Noise Regulations have been met. (HHCF-1, p. 25)

78. If necessary, additional noise control equipment would be added to the facility after completion to further reduce noise levels and meet State Noise Regulations. (HHCF-2, Q. 14)

79. The electric purchase agreement between NU and CCF-1 would be a floor and formula front-loaded contract. (HHCF-2, Q. 8; Tr. p. 18)

80. Electricity sold to NU would be based on 9.25¢ per KWh on peak power and 6.25¢ per KWh off peak power. (HHCF-2, Q. 8,29)

81. The estimated percent of total profit would be 70% from power sale and 30% from steam sale. (HHCF-2, Q. 30)

82. The estimated cost per KWh for a twenty year period would be 5.787¢ per KWh, based on an initial cost of 3.5¢ per KWh escalating at five percent per year for 20 years. (HHCF-2, Q. 28)

83. The estimated installed facility cost would be $12,606.000 for construction and $1,500,000 for interest. (HHCF-2, Q. 27; HHCF-1, p. 19)

84. Project financing is based on a 15 year term at 12% interest with base year calculations made for 1986. (HHCF-2, Q. 27)

85. The construction cost for the electrical interconnection to the NU system would be insignificant when compared to the total facility cost. (Tr. p. 20)

86. All construction, maintenance, and repair costs associated with the electrical interconnection to the NU system would be paid for by CCF-1. (Tr. p. 20)

87. The average annual cost to maintain the facility would be $850,000, increasing +4% annually. (HHCF-2, Q. 31)