

DO 326

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November 29, 2006

Donald W. Downes, Chairman  
Connecticut Energy Advisory Board  
c/o CERC  
805 Brook Street, Building 4  
Rocky Hill, CT 06067-3405

**RECEIVED**  
DEC - 5 2006

**CONNECTICUT  
SITING COUNCIL**

Re: Stepstone Substation

Dear Mr. Downes:

Enclosed are CL&P's responses to the questions posed in an email message dated October 30, 2006 that was sent by Mr. Richard Hahn of LaCapra Associates to Mr. Robert Carberry, NU's Manager of Transmission Siting and Permitting. Three paper copies and a CD-ROM are enclosed, and an electronic mailing of the responses has been sent to Mr. Hahn.

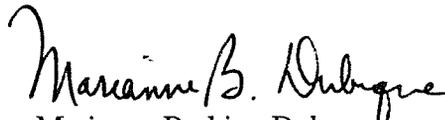
In addition, it is important to note that CL&P is preparing its application to the CSC for the Stepstone Substation in accordance with the CSC's Guidelines for Substations. Those Guidelines differ in some respects from the Preferential Criteria adopted by the CEAB. Keeping in mind that the CEAB's Preferential Criteria were adopted to facilitate a comparative analysis of alternatives presented by CSC applicants with those presented by third parties and that CL&P cannot predict the outcome of CEAB's RFP process, or if in fact, any proposals will be submitted by third parties, CL&P has not undertaken analyses of all conceivable proposals. Rather, CL&P has focused its efforts on a long-term solution to address reliability issues and to provide opportunities for load growth. That solution, the Stepstone Substation, has received the support of the First Selectman of the Town of Guilford as a method of addressing a critical need. Moreover, the site location in Guilford satisfies the Town's objectives for orderly development, as evidenced by the location approvals CL&P received from the Town's land use agencies.

Mr. Hahn posed these questions to assist LaCapra's preparation of CEAB's RFP for alternatives to CL&P's proposed Stepstone Substation. CL&P currently expects to file an application with the Connecticut Siting Council for this substation by December 15, 2006. Please note that the questions have been answered on the basis of

information in CL&P's possession. That is, CL&P has not undertaken any new studies or analyses for the purpose of responding to these questions.

As a courtesy to the Connecticut Siting Council, we are forwarding a copy of this letter and CL&P's responses to the Council so that the Council will have the same information as the CEAB.

Very truly yours,

  
Marianne Barbino Dubuque

MBD/pam  
Enclosures

cc: Connecticut Siting Council (w/encl)  
Mr. Robert E. Carberry

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-001  
Page 1 of 1

Witness: CL&P Panel  
Request from : Connecticut Energy Advisory Board

**Question:**

Are the Race Hill and existing Guilford substations currently fed from Branford? Are these loads included in the table on page G-5? If not, please describe where they are served from. If so, please separate those loads from other loads at Branford in the table on page G-5.

**Response:**

The Race Hill substation is fed solely from the Green Hill substation, via a 23-kV feeder circuit. The Guilford substation has two transformers: the 29F-1X fed from Branford substation, via a 23-kV feeder circuit, and the 29F-2X fed from Green Hill substation, via a 23-kV feeder circuit. The loads at the Race Hill and Guilford substations are therefore included within the Branford and Green Hill substation loads in the table on page G-5.

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

Question:  
Please describe and include in the table on page G-5 all other substations adjacent to Guilford.

Response:  
The table on page G-5 already includes the only two adjacent bulk substations, Branford Substation in Branford and Green Hill Substation in Madison. The next closest bulk substation to the east is Bokum Substation in Old Saybrook, which is the fourth town east of Guilford. The next closest bulk substation to the north is Dooley Substation in Middletown, which is the second town north of Guilford and approximately 15 miles to the north of the Guilford town line. To the west and north of Branford is the service territory of the United Illuminating Company. To the south is the Long Island Sound.

In the immediately adjacent towns of Branford and Madison, CL&P also has five distribution-class substations which are served by feeders from the bulk substations. A tabulation of these distribution-class substations in a similar format to the table on page G-5 follows:

	Permissible Load Rating (MVA)	2006	2007	2008	2009	2010	2011	2012
Race Hill (fed by Green Hill)	12.5	11.9	9.6	6.6	6.8	7.0	7.3	7.5
Madison (fed by Green Hill)	7.7	8.1	6.5	6.7	6.9	7.1	7.3	7.5
Meadow (fed by Branford)	24.5	14.5	14.9	15.4	15.8	16.3	16.8	17.3
Pine Orchard (fed by Branford)	3.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3
East River (fed by Green Hill)	4.1	2.1	2.1	2.2	2.2	2.3	2.4	2.5

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

Question:  
Regarding the table on page G-5, please provide the most recent five years of actual annual peak loads for all adjacent substations.

Response:  
The requested information for the adjacent distribution-class substations identified in the response to Data Request CEAB-01, Q-CEAB-003 is as follows:

	Permissible Load Rating (MVA)	2002	2003	2004	2005	2006
Branford	95	80	79.9	76.7	86	87.8
Green Hill	89 <sup>1</sup>	85	85	83.4	91.3	100.5
Race Hill (fed by Green Hill)	12.5	9.5	10.4	8.9	11.5	11.9
Madison (fed by Green Hill)	7.7	6.9	6.9	6.8	7.6	8.1
Meadow (fed from Branford)	24.5	11.1	12.4	11.6	12.9	14.5
Pine Orchard (fed from Branford)	3.1	0.8	0.8	0.8	0.8	1.1
East River (fed by Green Hill)	4.1	3.2	3.3	1.5	1.2	2.1

1 The rating after the third transformer is placed into service will be approximately 130 MVA. The majority of the new capacity (41 MVA) from the addition is dedicated to serving the growing needs of Madison and Clinton.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-004  
Page 1 of 5

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

For each primary circuit currently being served by each of the substations listed in the table on page G -5 and other adjacent substations, please provide the most recent peak loads. Also provide a map showing the geographic area served by each primary circuit.

**Response:**

See the attached spreadsheet for the most recent peak loads on each primary circuit currently being served by each of the substations. See the attached Pre-Stepstone Circuit Map of the geographic areas served by each primary distribution circuit in the Town of Guilford.



Feeder Loads 2006 Q4.xls



Pre-Stepstone Circuit Map.vsd

CL&P Docket No. Stepstone  
Substation

Data Request CEAB-01

Dated: 10/30/2006

Q-CEAB-004

Page 2 of 5

		<u>Limit</u>	<u>2006</u>
<b>Green Hill 30R-</b>			
<b>2X &amp; 3X</b>	MVA	<b>89.0</b>	100.5
	amps	2248	2538
23 kV 30R7	MVA	<b>17.5</b>	15.1
	amps	442	382
23 kV 30R8	MVA	<b>19.1</b>	17.3
	amps	483	437
23 kV 30R9	MVA	<b>25.1</b>	10.5
	amps	634	265
23 kV 30R10	MVA	<b>19.1</b>	14.4
	amps	483	364
23 kV 30R12	MVA	<b>25.1</b>	11.2
	amps	634	283
23 kV 30R13	MVA	<b>23.9</b>	17.0
	amps	604	430
23 kV 30R14	MVA	<b>14.9</b>	<b>15.7</b>
	amps	377	397
23 kV 30R15	MVA	<b>18.3</b>	10.4
	amps	462	263

A third transformer (30R-1X) will be added in 2007 increasing the rating of the station to approximately 130 MVA.

Green Hill 30R serves the 29F-2X (at Guilford sub), 27G-1X (Madison sub), 15D1-1X (Race Hill sub), and 11U-1X (East River sub)

<b>Guilford 29F-2X</b>	MVA	<b>12.5</b>	11.8
served by 30R13, see above	amps	523	494
13.8 kV 29F1	MVA	<b>10.5</b>	5.7
	amps	439	238
13.8 kV 29F4	MVA	<b>10.2</b>	7.3
	amps	427	305

**Race Hill**

<b>15D-1X</b>	MVA	<b>12.5</b>	11.9
served by 30R14, see above	amps	867	826
8.32 kV 15D1	MVA	<b>7.7</b>	7.4
	amps	534	514
8.32 kV 15D3	MVA	<b>7.7</b>	4.6
	amps	534	319

CL&P Docket No. Stepstone  
 Substation  
 Data Request CEAB-01  
 Dated: 10/30/2006  
 Q-CEAB-004  
 Page 3 of 5

**Madison**

**27G-1X** MVA **7.7** **8.1**

served by 30R15

see above amps 926 974

4.8 kV 27G1 MVA **3.0** 1.6

amps 361 192

4.8 kV 27G2 MVA **3.1** **3.5**

amps 373 421

4.8 kV 27G3 MVA **3.7** 3.2

amps 445 385

**East River**

**11U-1X** MVA **4.1** 2.1

served by 30R10,

see above amps 490 247

4.8 kV 11U1 MVA **4.1** 2.1

amps 490 247

Limit 2006

**Branford**

**11J-1X & 2X** MVA **95.0** 87.8

amps 2401 2219

23 kV 11J30 MVA **29.1** 21.4

amps 735 541

23 kV 11J40 MVA **28.7** 20.6

amps 725 521

23 kV 11J41 MVA **17.5** 9.1

amps 442 230

23 kV 11J43 MVA **23.1** 14.9

amps 584 377

23 kV 11J45 MVA **17.5** 14.5

amps 442 366

23 kV 11J58 MVA **28.7** 10.1

amps 725 255

**Branford 11J serves  
 the 29F-1X at  
 Guilford substation**

**Guilford**

**29F-1X** MVA **12.5** **12.9**

served by 11J40,

see above amps 523 540

13.8 kV 29F2 MVA **10.5** 8.6

amps 439 360

13.8 kV 29F3 MVA **10.5** 4.3

amps 439 180

**Meadow**

**28J-1X** MVA **12.5** 7.1

served by 11J43,

see above amps **523** 298

13.8 kV 28J1 MVA **13.7** 7.1

amps **575** 298

**CL&P Docket No. Stepstone**

**Substation**

**Data Request CEAB-01**

**Dated: 10/30/2006**

**Q-CEAB-004**

**Page 4 of 5**

**Meadow**

**28J-2X** MVA **12.0** 7.4

served by 11J43,

see above amps **502** 308

13.8 kV 28J2 MVA **10.5** 7.4

amps **439** 308

**Pine Orchard**

**36A-1X** MVA **3.1** 1.1

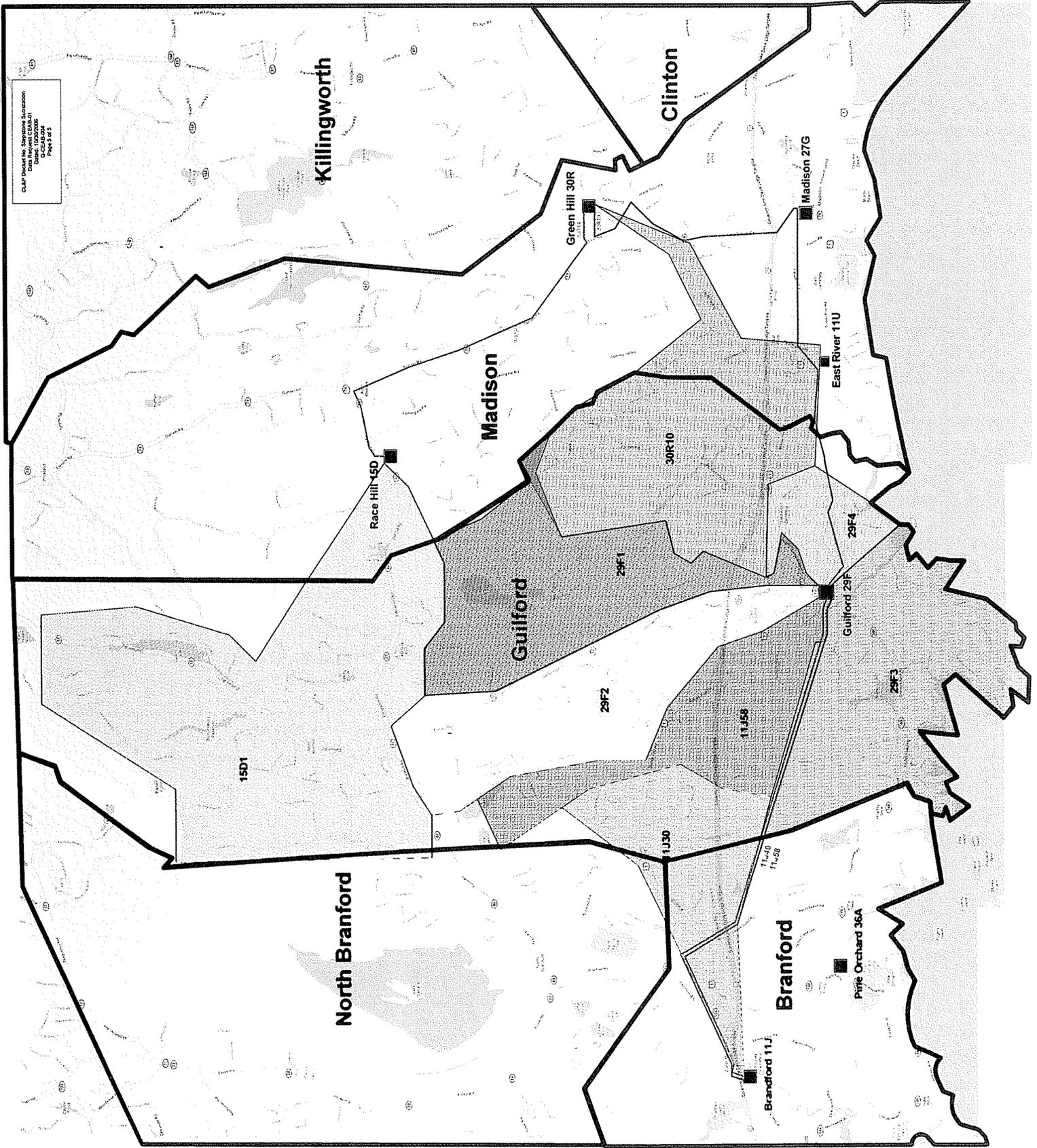
served by 11J58,

see above amps **375** 132

4.8 kV 36A1 MVA **3.1** 1.1

amps **375** 132

CLIP DATA FROM THE BRANFORD COMMISSION  
DATE: 10/20/2016  
DATE REVISION: 03/01/17  
PAGE 3 OF 8



The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-005  
Page 1 of 1

Witness: CL&P Panel  
Request from : Connecticut Energy Advisory Board

**Question:**

Do any other substations besides the two listed in the table on page G-5 serve a geographic area whose load will be transferred to the new Stepstone Substation? If so, please provide the information requested in the above questions for those additional substations.

**Response:**

There are no other bulk substations besides the two listed in the table on page G-5 which will have load transfers to the new Stepstone Substation.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

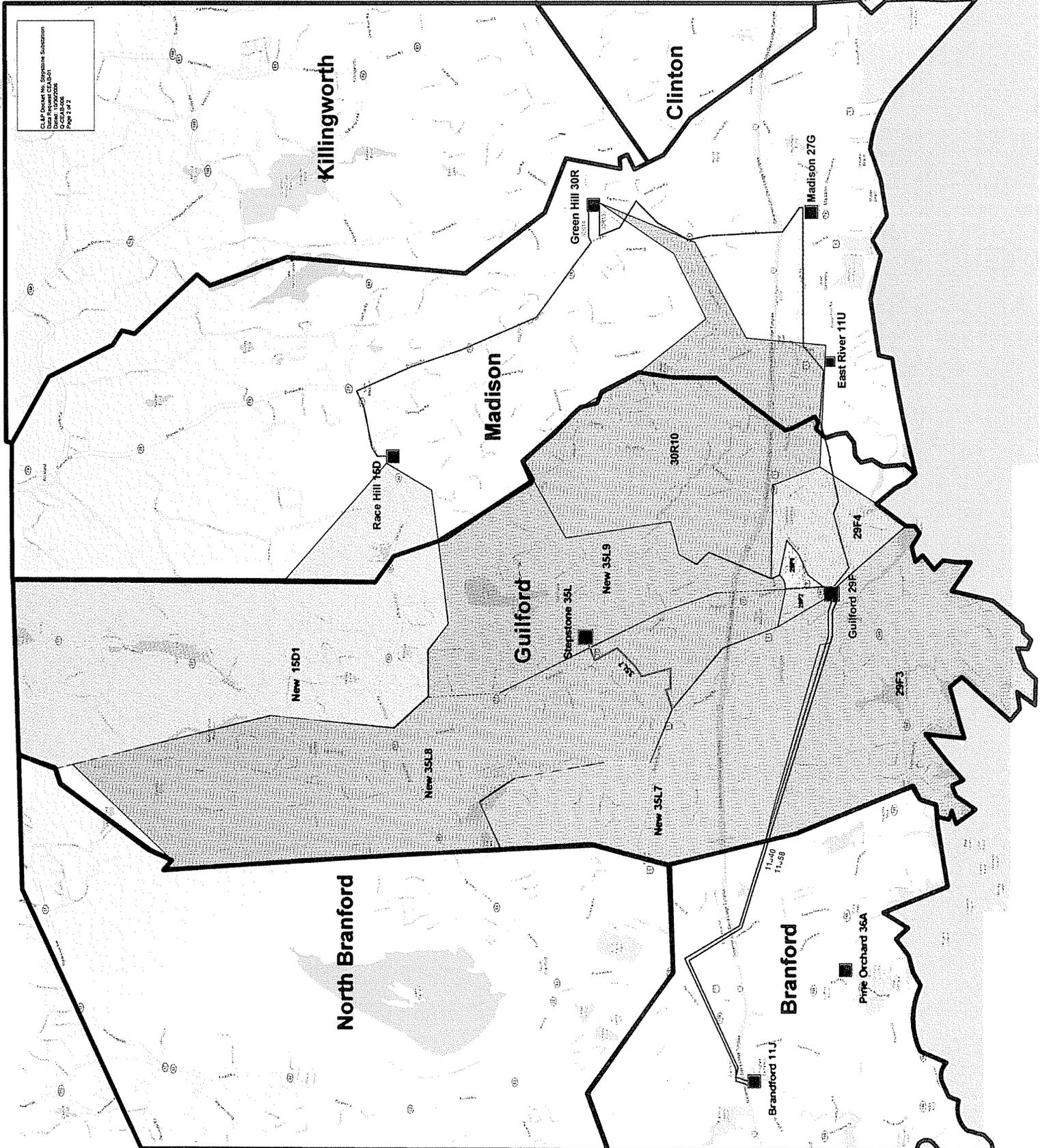
Data Request CEAB -01

Q-CEAB-006  
Page 1 of 2

Witness: CL&P Panel  
Request from : Connecticut Energy Advisory Board

**Question:**  
For the proposed Stepstone Hill Substation, please provide a map showing the geographic area served by each circuit that will be supplied by this substation.

**Response:**  
Please see the attached Post-Stepstone Circuit Map.



Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

Please provide a table similar to the table on page G-5 after assumed load transfers to the proposed Stepstone Hill Substation are made. The intent of this question is to determine how much load is being transferred and how much unused capacity will exist at each of these substations after installation of the Stepstone Hill Substation.

**Response:**

Load on the "bulk" substations once Stepstone (2008) is in service:

	<b>Permissible Load Rating (MVA)</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>Stepstone</b>	44			31.6	32.5	33.5	34.5	35.6
<b>Branford</b>	95	87.8	90.4	72.9	75.1	77.4	79.7	82.1
<b>Green Hill</b>	89*	100.5	103.5	95.2	98.1	101.0	104.0	107.2

\* The permissible load rating for Green Hill will increase to approximately 130 MVA once the third transformer is placed into service in early 2007.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-008  
Page 1 of 2

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

The load forecasts for the table on page G-5 is stated as 3%. Please provide the basis for that assumed growth rate. Does CL&P have estimates of specific projects or new customers, as was provided for the Town of Oxford? If so, please provide those details.

**Response:**

CL&P does not have estimates of specific projects or new customers for the area including and surrounding Guilford. The data that acts as the basis for the assumed growth rate is included in the attached spreadsheet. Historical data supports a growth rate even higher than the base 3% we have assumed for our forecast tables.

Growth Rate Calculation Based on Annual  
 Bulk Substation Summer Peak Loads in MW

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Branford 11J	79.7	78.0	86.0	79.0	78.4	78.1	78.3	76.0	85.0	86.9
Green Hill 30R	57.1	57.0	57.0	62.3	84.4	82.9	74.2	76.7	89.8	98.2
<b>Total MW</b>	<b>136.8</b>	<b>135.0</b>	<b>143.0</b>	<b>141.3</b>	<b>162.8</b>	<b>161.0</b>	<b>152.5</b>	<b>152.7</b>	<b>174.8</b>	<b>185.1</b>

Yearly Increases

2 year =	+6.7% from 1999 to 2001	1.0670
3 year =	+4.0% from 1999 to 2002	1.0403
4 year =	+1.6% from 1999 to 2003	1.0162
5 year =	+1.3% from 1999 to 2004	1.0132
6 year =	+3.4% from 1999 to 2005	1.0340
7 year =	+3.7% from 1999 to 2006	1.0375

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-009  
Page 1 of 1

**Witness:** CL&P Panel  
**Request from :** Connecticut Energy Advisory Board

**Question:**  
Does CL&P have a forecast of load growth after 2012 for this area? If so, please provide the forecast or assumed growth rate.

**Response:**  
No, the load growth was determined by applying a constant growth rate of 3%, based on past data.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-010  
Page 1 of 3

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

Please provide a map of the transmission system to which the Stepstone Hill Substations and all existing adjacent substations connect or will connect to.

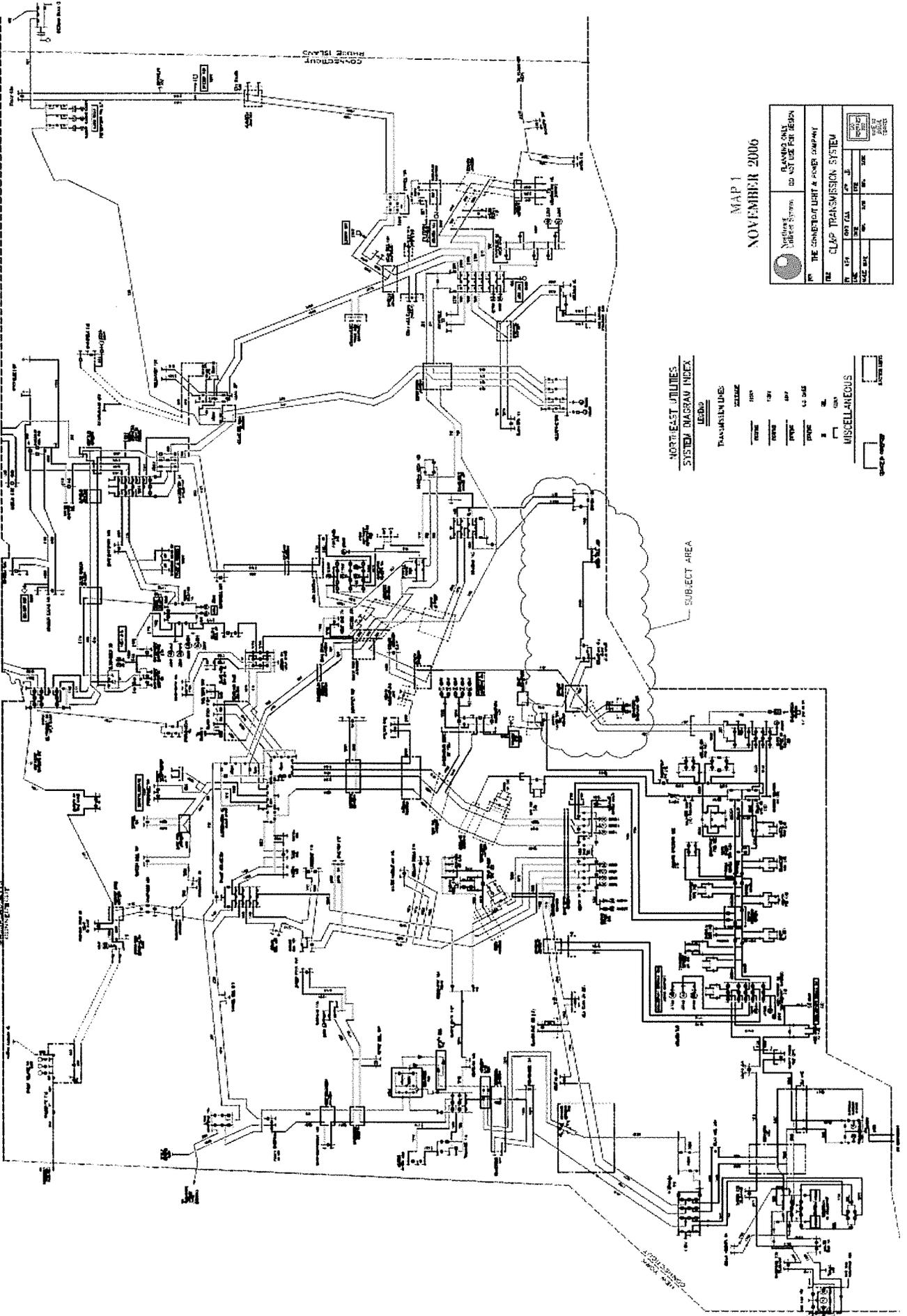
**Response:**

Attached are two maps showing the transmission system to which the Branford, Green Hill, and Stepstone substations connect or will connect to.



T System Maps.ppt

# EXISTING CONNECTICUT TRANSMISSION SYSTEM



 CONNECTICUT LIGHT & POWER COMPANY THE CONNECTICUT LIGHT & POWER COMPANY	DRAWING NO. 10-010-010-010
	PROJECT CL&P TRANSMISSION SYSTEM
DATE 10/30/06	DRAWN BY J. J. [unreadable]
CHECKED BY [unreadable]	SCALE AS SHOWN



Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

The existing CL&P easement through the Stepstone Hill site contains a single 115 kV circuit. What was the rating and current loading of this circuit at the time of the most recent annual peak load? What will the loadings be after the Stepstone Hill Substation is installed and load is transferred to it?

**Response:**

The following table contains the requested rating and current loading data at the time of the most recent annual peak load in Connecticut.

<b>Circuit Number</b>	<b>Summer Normal Rating, Amperes</b>	<b>Current During CT Peak Load, August 3, 2006, Amperes</b>
1508	1,145	251

The Stepstone Substation will be looped into the 1508 circuit, splitting that circuit into two circuits . This configuration received ISO-NE's Proposed Plan Application ("1.3.9") approval on November 8, 2005. Under normal transmission system conditions and reasonable generation dispatches during peak loads in the years immediately following the interconnecton of Stepstone Substation, the peak current on either circuit section is not expected to exceed 400 amperes.

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

Will the existing Race Hill and Guilford substations be retired after the Stepstone Hill substation is completed and load transferred to it.

**Response:**

No. While the load on the Guilford substation will be reduced following the addition of the Stepstone substation, the Guilford substation will provide an alternate supply source to the 13.8-kV load served by the Stepstone substation. The town of Guilford will continue to have areas serviced by 13.8-kV distribution and areas serviced by 23-kV distribution. Furthermore, the permissible load limits on the Branford and the Green Hill substations are increased by the designed switching capability at the Guilford substation to quickly shift the load served by one of the 12.5-MVA transformers at Guilford substation between the two bulk substations. A portion of the existing Race Hill load area will be converted to either 13.8 or 23 kV so that it can be supplied directly by feeders from the Green Hill and Stepstone substations, thus relieving potential overloads of the Race Hill substation. Even so, the Race Hill substation will still be needed to serve the northeastern section of Guilford that will continue to be fed by the 8.32-kV distribution system.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-013  
Page 1 of 1

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

Will the average length of the primary circuits served from the Branford, Green Hill, Race Hill, Guilford, and any other adjacent substation change with the installation of the Stepstone Hill Substation? If possible please quantify the change.

**Response:**

The 13.8-kV feeder circuits from Guilford substation will be shorter because the two 13.8-kV circuits from Stepstone Substation will acquire portions of those circuits. Also the 23-kV Branford 11J30 and 11J58 circuits will be shorter for the same reason, i.e., portions of those circuits will be acquired by the 23-kV circuit from Stepstone Substation.

The Connecticut Light and Power Company  
Docket No. Stepstone Substation

Data Request CEAB -01

Q-CEAB-014  
Page 1 of 1

Witness: CL&P Panel  
Request from : Connecticut Energy Advisory Board

**Question:**

Has CL&P implemented any Demand Side Management (either energy efficiency or demand response) programs with customers in the area served by any of the above substations? If so, please describe these efforts and an estimate of the KW and KWH saved.

**Response:**

The Company offers an array of Connecticut Energy Efficiency Fund ("CEEF") programs to its residential, commercial and industrial customers statewide. Since 2005, CL&P estimates that through participation in these CEEF programs, customers in the towns of Guilford, Branford, Madison, Clinton and Killingworth have achieved peak-demand savings of approximately 3.3 MW and will save approximately 111,202,820 kWh of energy over the life of the installed measures.

Witness: CL&P Panel  
Request from : Connecticut Energy Advisory Board

**Question:**

Has CL&P performed assessments of the technical potential for additional DSM programs, distributed generation (DG), or combined heat and power (CHP) in the area served by any of the above substation? If so, please provide.

**Response:**

As part of Public Act 05-01 efforts to support the development of DG, CL&P has contacted a number of customers in the area to determine if they will consider installing DG or CHP projects. To date two parties are considering emergency diesel generators rated 170 kW and 1,350 kW respectively. These generators will not operate in parallel with the CL&P system. No other customers have expressed interest in installing DG or CHP in Guilford. CL&P continues to pursue conservation and load management programs throughout its system and offers those programs to customers located in the area served by these substations.

Witness: CL&P Panel  
Request from: Connecticut Energy Advisory Board

**Question:**

Has CL&P estimated the amount of load reduction that would be necessary to defer or eliminate the need for the proposed Stepstone Hill Substation? If so, please provide the estimate and the basis for it.

**Response:**

Demand response resources, if available, may slightly delay, but not eliminate the need for the Stepstone Substation and, in any event, would not fully accomplish the Project's objectives. CL&P has not conducted studies to determine the cost effectiveness of demand-response resources as an alternative to the Stepstone Substation because such resources would not fully meet the need which this project is designed to address.

CL&P estimates that a minimum of 20 MVA of new and firm distributed resource capacity, distributed to the Race Hill, Guilford and Branford service areas would be required to justify a short-term delay in the construction of the Stepstone Substation. "Distributed resources" are demand-side and supply-side resources, typically small in scale and distributed throughout a network, close to customers and load centers.