Dispatch Limiting Schedule Investigation

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NG Dispatch Limiting Schedule (DLS) Investigation

National Grid's Current Dispatch Limiting Schedule:

- Two seasonally varying time blocks, allowing **either charge or discharge within available capacity**

Table 5.1.5-1: National Grid BESS Import/Export Schedule

BESS Season/Operation	Charging (Import) Hours	Discharging (Export) Hours
Spring (03/01-05/14)	11PM-5PM	5PM-11PM
Summer (05/15-09/14)	11PM-3PM	3PM-11PM
Fall (09/15-11/30)	11PM-4PM	4PM-11PM
Winter (12/01-02/28)	11PM-3PM	3PM-11PM

- Available capacity identified to avoid **all identified thermal overloads**
- Curtailment in **increments of 100 kW**

The DLS construct is designed to limit the impact of ESS to the EPS's ability to safely and reliably accommodate end use load. Any grid services offerings would be incremental to this baseline construct.

NG Dispatch Limiting Schedule (DLS) Investigation

Purpose: explore the implications of adopting a modified DLS with the following characteristics:

- Four seasonally varying time blocks, each allowing both **charge and discharge within available capacity**

Discharge Limit Schedule (DLS)	**07:00 - 12:00**	**12:00 - 15:00**	**15:00 - 19:00**	**19:00 - 07:00**
Charge Limit Schedule (CLS)	**06:00 - 11:00**	**11:00 - 15:00**	**15:00 - 22:00**	**22:00 - 06:00**

- Available capacity identified to avoid **thermal overload of the substation transformer**
- Curtailment in defined intervals (**25% nameplate** or comparable)

Timeline

Month(s)	Action
June	Develop alternative DLS and supporting deliverables with the above characteristics
July-September	Develop illustrative examples of the outcome of analysis in National Grid territory
September	Present alternative DLS and illustrative examples at September TSRG, and receive feedback on preferred approach
October	Internal review and determination of any changes that will be made
November-December	Prepare implementation materials as required
Early 2026	Implement DLS decision

Example Development

National Grid selected 6 examples from among ESS studies conducted across its service territory:

- **2 examples from BSN (North Shore, Merrimack Valley)**
- **2 examples from BSW[1] (Central, Western)**
- **2 examples from BSS (South Shore, Southeast)**

1 the appendix provides a 7th example from BSW, not included in summary slide

Summary of Results

	Current DLS	Alternative DLS	
1	**0 charge all seasons** No additional system modifications	**Curtailed charge 2 seasons** **0 charge 2 seasons** New feeder required	*Feeders more constrained than transformer*
2	**0 charge all seasons** No additional system modifications	**0 charge all seasons** No additional system modifications	
3	**Curtailed charge 1 season** No additional system modifications	**Uncurtailed charge all seasons** New feeder and transformer required	*Feeders more constrained than transformer*
4	**Curtailed charge 1 season** No additional system modifications	**Uncurtailed charge all seasons** Full substation rebuild required	*Feeders more constrained than transformer*
5	**0 charge all seasons** No additional system modifications	**Curtailed charge 2 seasons** **0 charge 2 seasons** New feeder required	*Feeders more constrained than transformer*
6	**0 charge all seasons** No additional system modifications	**Curtailed charge 2 seasons** **0 charge 2 seasons** New feeder required	*Feeders more constrained than transformer*

Bold text denotes capacity available under a DLS, communicated at Preliminary Assessment

Non-bold text denotes system modifications required *when operating under the DLS*, communicated at SIS completion

Observations

- **Alternative DLS offers more capacity allocation to ESS**
  - More viable for ESS to operate without substation modifications
  - Less capacity for end use, particularly in overnight hours targeted by EV (including managed charging) and EH
- **Illustrative examples show that often, issue is capacity constrained systems aggravated by ESS charging rather than the DLS construct itself**
  - 4 examples have at least one season with no charging capacity under either DLS construct)
  - Capacity constraints at feeder level not addressed by alternative DLS
- **Operational (not scheduled) flexibility ultimately allows the greatest potential for ESS in a capacity-constrained system**

Illustrative Examples

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Example 1: (2) 4.992 MW ESS's

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- Upgrade Substation or New Substation
- New Feeder

DLS to avoid thermal substation/feeder upgrades:

Season	Charge	Discharge
Spring	0 MW	-9.984 MW
Summer	0 MW	-9.500 MW
Fall	0 MW	-9.984 MW
Winter	0 MW	-9.984 MW

Final SIS

Thermal upgrades required when adopting DLS above:

- None.

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- Upgrade Substation or New Substation

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	0.00	5.00	7.50	5.00
Summer	5.00	5.00	7.50	10.00
Fall	0.00	0.00	0.00	0.00
Winter	0.00	0.00	0.00	0.00

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	-9.984	-9.984	-9.984	-9.984
Summer	-9.984	-9.984	-9.984	-9.984
Fall	-9.984	-9.984	-9.984	-9.984
Winter	-9.984	-9.984	-9.984	-9.984

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- Station: No work is required because spare feeder position is available along with protection relays.
- Feeder: New feeder with 0.24 miles underground cable, 0.38 miles of overhead construction, and 0.04 miles of civil work

Example 2: 5 MW ESS W/ 2 MW Max Charge

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- New Transformer and Metal-Clad Switchgear
- New Feeder Position

DLS to avoid thermal substation/feeder upgrades:

Season	Charge	Discharge
Spring	0 MW	- 5 MW
Summer	0 MW	- 5 MW
Fall	0 MW	- 5 MW
Winter	0 MW	- 5 MW

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- New Transformer and Metal-Clad Switchgear

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	0	0	0	0
Summer	0	0	0	0
Fall	0	0	0	0
Winter	0	0	0	0

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	-5	-5	-5	-5
Summer	-5	-5	-5	-5
Fall	-5	-5	-5	-5
Winter	-5	-5	-5	-5

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- None

Example 3: Two 5 MW ESS

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- New feeder position: 4th substation feeder
- New transformer: (second) transformer triggered by installation of 4th feeder
- Install 600 feet of UG and 500 feet of OH line extension for new feeder.

DLS to avoid thermal substation/feeder upgrades:
Combined total for both 5MW ESS sites.

Season	Charge (MW)	Discharge (MW)
Spring	0	- 5.0
Summer	0.50	0
Fall	0	- 3.5
Winter	0	- 3.5

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- None

DLS to avoid thermal substation upgrades:
Combined total for both 5MW ESS sites.

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	10	10	10	10
Summer	10	10	10	10
Fall	10	10	10	10
Winter	10	10	10	10

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	- 10	- 10	- 10	- 10
Summer	- 10	- 10	- 10	- 10
Fall	- 10	- 10	- 10	- 10
Winter	- 10	- 10	- 10	- 10

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- New feeder position: 4th substation feeder
- New transformer: (second) transformer triggered by installation of 4th feeder
- Install 600 feet of UG and 500 feet of OH line extension for new feeder.

Example 4: One 5 MW ESS

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- Transformer upgrade and third feeder addition
- 6,000 feet of overhead line extension for new feeder.

DLS to avoid thermal substation/feeder upgrades:

Season	Charge (MW)	Discharge (MW)
Spring	0	- 4.4
Summer	0	- 2.0
Fall	0.40	- 4.0
Winter	0	- 5.0

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- None

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	5	5	5	5
Summer	5	5	5	5
Fall	5	5	5	5
Winter	5	5	5	5

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	- 5	- 5	- 5	- 5
Summer	- 5	- 5	- 5	- 5
Fall	- 5	- 5	- 5	- 5
Winter	- 5	- 5	- 5	- 5

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- Substation Rebuild:
  - Triggered by need for transformer replacement and new feeder.
  - Due to small footprint of existing substation and surrounding wetlands a new greenfield substation is required.
- 6,000 feet of overhead line extension for new feeder.

Example 5: 5 MW ESS

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- Upgrade two (2) substation transformers
- Install a new feeder

DLS to avoid thermal substation/feeder upgrades:

Season	Charge	Discharge
Spring	0 MW	4.99 MW
Summer	0 MW	4.99 MW
Fall	0 MW	4.99 MW
Winter	0 MW	4.99 MW

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- Upgrade two (2) substation transformers

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	0	0	0	1.25
Summer	0	0	0	0
Fall	0	1.25	0	3.75
Winter	0	0	0	0

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	-4.99	-4.99	-4.99	-4.99
Summer	-4.99	-4.99	-4.99	-4.99
Fall	-4.99	-4.99	-4.99	-4.99
Winter	-4.99	-4.99	-4.99	-4.99

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- Install a new feeder with 750' underground section and 9300' of overhead section and area feeder reconfiguration.

Example 6: 5 MW ESS

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- Install a new feeder position at nearby substation
- Install a new feeder double circuiting the existing feeder to serve the battery

DLS to avoid thermal substation/feeder upgrades:

Season	Charge	Discharge
Spring	0 MW	4.99 MW
Summer	0 MW	4.99 MW
Fall	0 MW	4.99 MW
Winter	0 MW	4.99 MW

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

- Install a new feeder position at nearby substation

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	0	0	0	1.25
Summer	0	0	0	0
Fall	0	2.5	0	5.00
Winter	0	0	0	0

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	-4.99	-4.99	-4.99	-4.99
Summer	-4.99	-4.99	-4.99	-4.99
Fall	-4.99	-4.99	-4.99	-4.99
Winter	-4.99	-4.99	-4.99	-4.99

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- Install a new feeder position at nearby substation
- Install a new feeder double circuiting the existing feeder to serve the battery.

Example 7: One 5 MW ESS

Current DLS

Preliminary Assessment

Thermal upgrades for nameplate:

- New feeder position with 1,700 feet of UG extension.

DLS to avoid thermal substation/feeder upgrades:

Season	Charge (MW)	Discharge (MW)
Spring	2.0	- 5.0
Summer	0	- 5.0
Fall	3.24	- 5.0
Winter	0	- 5.0

Final SIS

Thermal upgrades required when adopting DLS above:

- None

Alternative DLS

Preliminary Assessment

Thermal substation upgrades for nameplate:

Thermal upgrades for nameplate:

- New feeder position with 1,700 feet of UG extension.

DLS to avoid thermal substation upgrades:

Season	CLS-1 06-11:00	CLS-2 11-15:00	CLS-3 15-22:00	CLS-4 22-06:00
Spring	5	5	5	5
Summer	5	5	5	5
Fall	5	5	5	5
Winter	5	5	5	5

Season	DLS-1 07-12:00	DLS-2 12-15:00	DLS-3 15-19:00	DLS-4 22-06:00
Spring	- 5	- 5	- 5	- 5
Summer	- 5	- 5	- 5	- 5
Fall	- 5	- 5	- 5	- 5
Winter	- 5	- 5	- 5	- 5

Final SIS when adopting DLS

Thermal upgrades required when adopting DLS above:

- New feeder position 1,700 feet of UG extension