Building Energy Exchange and NRDC welcome a panel of industry experts to demystify the policy and technical conditions regarding envelope upgrades, when they are advisable, how to get them done, and their importance for sustainability and safety.

**Presenters**
- Gabrielle Brainard, Associate Principal, Enclosure Design Specialist, SOM

**Moderator**
- Todd Kimmel, US Senior Manager of Sustainable Solutions, Rockwool

**Panelists**
- Gabrielle Brainard, Associate Principal, SOM
- Bill Edwards, Executive Vice President, Core Holdings, Rockefeller Group
- Jack Jenkins, Director of Energy and Sustainability, Robert Dermoter Associates
- Alissa Bucher, Partner, Rogers Partners

Climate Mobilization Act Series: If, How, When — NYC Building Envelopes

31 Chambers Street
New York, NY
July 27, 2023
9:30 to 11:00am

1.5 AIA LU | HSW
Envelope Retrofits: If, How, When?

Climate Mobilization Act Series

Building Energy Exchange

July 27, 2023
Envelope Retrofits: If, How, When?
DIVE BRIEF

NYC could face up to 446 MW power deficit in 2025, due to electrification and peaker retirements: ISO

Completion of the Champlain Hudson Power Express transmission line, which will bring power to New York City from Quebec, is expected to improve reliability margins beginning in 2026.

Published July 19, 2023

Dive Brief:

- New York City faces a 446 MW deficit in its reliability margin beginning in the summer of 2025 due to rising demand and the retirement of peaker plants facing new limits on nitrogen oxide emissions, according to a quarterly report released Friday by the state's grid operator.

Efficiency Drivers for Building Envelopes
Passive House Principles

1. Continuous Insulation
2. Airtightness
   \( n_{50} \leq 0.6 \text{ ACH@50} \)
3. Thermal Bridge Free
4. High Performance Windows
5. Mechanical Ventilation with Heat Recovery
How Does Envelope Impact Energy Use?
It Depends…

Source: The Passive House Network

**Surface Area to Floor (SAR) ratio** = Total of all ext. envelope areas (floor, walls, windows and roof) / Treated Floor Area (TFA)

Source: The Passive House Network
Why Upgrade Envelopes?
Performance Issues

- Occupant Discomfort
- Air / Water Leaks, Condensation
- Material Degradation / Failure
Why Upgrade Envelopes?

Compliance

- LL11 Compliance
- LL97 Compliance
Why Upgrade Envelopes?
Commercial Considerations

- Building Repositioning
  - Class B to Class A Office Space
  - Commercial to Residential Conversion
  - Aesthetics, Amenities, etc.

5 Manhattan West (Brookfield / REX)
Envelope Retrofits: If, How, When?
Masonry + Punched Windows
Interior Insulation

- 475 High Performance Building Supply
  “Smart Enclosure System” masonry retrofit

Brooklyn Townhouse (Baxt Ingui)
Masonry + Punched Windows
Exterior Insulation

- 211 East 70th Street - Overclad, No Window Replacement
Masonry + Punched Windows
Window Replacement

- Waldorf Astoria - Landmark, Window Replacement
388 and 390 Greenwich (Citigroup) - Reclad with tenants in place
Curtainwall
Reclad

390 RECLAD FACADE - PHASING

1 Existing Condition

- Spandrel Glazing
- Vision Glazing
- Precast Column Cover
- Precast Spandrel Panel

2 Temporary Weather Wall

- Spandrel Glazing
- Vision Glazing
- Precast Column Cover
- Precast Spandrel Panel
- Weather Wall
- Constructive Zone
Curtainwall
Reclad

390 RECLAD FACADE - PHASING

3 Demolish Existing Facade

1. Spandrel Glazing
2. Vision Glazing
3. Precast Column Cover
4. Precast Spandrel Panel
5. Weather Wall
6. Construction Zone

4 Install New Curtain Wall

1. Spandrel Glazing
2. Vision Glazing
3. Precast Column Cover
4. Precast Spandrel Panel
5. Weather Wall
6. Construction Zone
7. New Curtain Wall Unit
Curtainwall
Overclad

- 1801 K Street - Overclad with tenants in place
Curtainwall Overclad

1: Reinforce Structural Mullions
2: Install Clips to Attach New Facade
3: Install New Curtain Wall Over Existing Facade
4: Leases Expire and Tenants Move
5: Remove Old Curtain Wall Panels
6: After Complete Removal of Old Facade
Envelope Retrofits: If, How, When?
Major Renovation vs Retrofit Over Time

**Major Renovation**
- Address all systems holistically at the same time
- Phasing, occupants in place is possible
- Best outcome, but expensive and invasive

**Retrofit Over Time**
- Address one system at a time as part of a long-term capital improvement plan
- Less capital-intensive (in the short term)
- Replacement can be planned for end-of-life of building elements
- Consider order of steps carefully! Systems impact each other (i.e.: airtightness / ventilation, envelope improvements and HVAC sizing

---

**Phases**

1. **Year 0**
   - Envelope 1: windows + roof insulation

2. **Year 4**
   - Ventilation system (balanced ERV system + exhaust)

3. **Year 8**
   - Envelope 2: wall insulation & airtightness

4. **Year 12**
   - Replace heating/cooling systems with VRF system

5. **Year 16**
   - Replace domestic hot water boiler with high efficiency model

6. **Anytime**
   - Upgrade lighting to LED, upgrade elevators, install energy efficient appliances
201 E 79TH STREET
“New York’s ultimate skin building”  
Ada Louise Huxtable (NYT Architecture Critic), 1968.

“SOM’s “best” work in New York City”  

“An acclaimed example of mid-20th century modernism… the building’s smooth mullion-less skin was singled out for its remarkable simplicity and color”  
Calibrated Building Energy Modeling Simulation.

1) REDUCE LOADS  
   (fewer Btu to treat)

2) IMPROVE PERFROMANCE  
   (less energy to treat each Btu)

3) REDUCE CARBON EMISSIONS  
   (less GHG per unit energy used)
CONDUCTION HEAT LOSS: Impact of Low-E Film

Baseline

~35% reduction

w/ Low-E Film

REDUCE LOADS

3M Low-E window film provided by EPD and installed by Layr:

➢ 35% reduction in conduction heat loss at perimeter
➢ 20% reduction in annual space heating energy use
discuss.

**Moderator**
- Todd Kimmel, US Senior Manager of Sustainable Solutions, Rockwool

**Speakers**
- Gabrielle Brainard, Associate Principal, SOM
- Bill Edwards, Executive Vice President, Core Holdings, Rockefeller Group
- Jack Jenkins, Director of Energy and Sustainability, Robert Derector Associates
- Alissa Bucher, Partner, Rogers Partners
thank you.