welcome.

During this session, you may submit questions via www.slido.com using event code # CMA
NYC Climate Mobilization Act
Local Laws 92 + 94 of 2019
Climate Mobilization Act

LOCAL LAWS 92 AND 94
requiring that the roofs of certain buildings be covered in green roofs or solar PV systems

LOCAL LAW 95
a building energy efficiency grade

LOCAL LAW 96
establishing a sustainable energy loan program (ie. PACE)

LOCAL LAW 97
the commitment to achieve certain reductions in greenhouse gas emissions by 2050
Local Law 92 + 94 of 2019

NYC requires green roofs or solar on all new rooftops.
Sustainable Skyline

- NYC now has the strongest sustainable roofing policy in North America.
- By 2030, the policy will result in:
  - 300 MW of new solar capacity
  - 15m gallons of new stormwater management capacity
  - 1m tons of greenhouse gas reductions
  - Hundreds of green jobs
Applicability

When do requirements apply?

• Starting Nov 15, 2019
  • New construction
  • Full “decking” or “assembly” replacement
  • Vertical or horizontal extensions
  • NOT required for roof membrane work

• All building types and sizes

• Alternative compliance for affordable housing for 5 years
Applicability

What does entire “roof assembly or deck” mean?

• ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof deck, substrate or thermal barrier, insulation, vapor retarder and roof covering.

• ROOF DECK. The flat or sloped surface not including its supporting members or vertical supports.
Applicability

5-year alternative for some affordable housing

- 5-year alternative compliance for:
  - Buildings with City/State subsidies
    - E.g., HPD/DHCR loans, HDFCs, Mitchell Lamas
    - 420-c tax incentives
  - Buildings in HPD’s AEP program
  - Buildings under HPD’s jurisdiction

- Some affordable housing must comply
  - Stand-alone 421-a, J-51 tax incentives
  - Buildings w/rent regulated units not subject to any of the above

- Cool Roofs still required
Requirements

What are building owners required to do?

- Choose green roof, solar, or both
- Use all available roof space
- Meet expanded cool roof requirements
  - Higher reflectance/emittance standards
  - Now applies to both pitched and flat roofs
  - Still required for affordable housing
Exemptions

What does “available” roof space mean?

- Excludes areas occupied by:
  - Rooftop structures
  - Mechanical equipment
  - Towers
  - Parapets
  - Guardrails
  - Solar thermal systems
  - Appurtenances
  - Cisterns
Exemptions

What does “available” roof space mean?

- FDNY access pathways
- Zoning setbacks
- Recreational spaces recorded on Certificate of Occupancy
Exemptions

When are solar/green roof not required?

- Not enough available roof space
  - <100 sqft of green roof for 1-5 story residential
  - <200 sqft of green roof for all others
  - <4kW of solar capacity
- Where a green roof is not feasible, solar is required and vice versa
Exemptions

Technology-specific exemptions

- Green roofs aren’t required on sloped roofs
- Solar isn’t required where shaded
- Other “site conditions” that may impact feasibility
Benefits: Cool Roofs

- Mitigates Urban Heat Island Effect
- Improves thermal comfort
- Saves on building energy costs
- Easy and affordable to install.
Benefits: Green Roofs

- Reduces heat, saving energy and lives
- Reduces flooding from rainstorms
- Provides wildlife habitat
- Serves as an amenity for building occupants
Benefits: Solar

- Saves on energy bills
- Often available at no up-front cost
- Helps building comply with LL97
- Pairs well with electric vehicles, batteries
Benefits: Integrated systems

Solar works best on top of a cool or green roof
- Increases panel efficiency
- Maximizes energy savings
- Provides shade for plants
Solar Incentives

- **Investment Tax Credit (Federal)**
  - 30% of costs applied against income tax

- **NY-Sun Incentive (State)**
  - Up-front capacity-based incentive
  - Current incentives
    - $0.30 / Watt (single family)
    - $0.60 / Watt (other)
  - Added incentives for certain affordable housing, canopies, others

- **Property Tax Abatement (City)**
  - 20% of costs over 4 years up to $250k
Green Roof Incentives

- Green Roof Property Tax Abatement (City)
  - $5.23 per square foot tax abatement for green roof installation
  - $15 per square foot abatement in priority community districts, to be announced
  - Tax abatement capped at $200k per year for 5 years
Free, personalized advisory services to streamline the process of energy efficiency improvements

- Trusted advisor to buildings
- Insights into building needs
- Custom approach
- Simplified process
- Ongoing assistance

https://retrofitaccelerator.cityofnewyork.us/
info@nycretrofit.org
Thank You

Nate Kimball
nkimball@sustainability.nyc.gov

Ellie Kahn
ekahn@sustainability.nyc.gov
WHAT IS A GREEN ROOF? - INTENSIVE

INTENSIVE ROOF

• Greater than 6 inches deep

• Higher maintenance: Irrigation and fertilizer is recommended

• Plants usually include:
  • Trees
  • Shrubs
  • Grasses and groundcover

• Heavier - These can weigh as much as 50-100 pounds per square foot

• Water retention rates can be 2-5 gal/sf
WHAT IS A GREEN ROOF? - EXTENSIVE

EXTENSIVE ROOF

• Shallow substrate/ soil depth, 2.4 in- 6 in

• Lower maintenance with no to low irrigation

• Plants usually include:
  • Mosses
  • Sedums
  • Succulents
  • Few grasses

• Lightweight- 19 to 30 lbs of additional weight on roof

• Water retention rates can be
  • .5- 1.5 gal/sf
WHAT IS A GREEN ROOF? - HYBRID

HYBRID ROOF

• Soil depth of 4.7 in- 10 in
• Periodic Irrigation and maintenance

• Plants usually include:
  • Grass
  • Shrubs
  • Likely can't support trees

• Weight can be 30-40 lbs/ sf

• Water retention can be 1-2.5 gal/sf
WHAT IS A GREEN ROOF? - BLUE ROOF GREEN ROOF

BLUE ROOF GREEN ROOF

• Captures water on the roof and controls the amount of water released

• Can be used with both intensive and extensive roofs and can make up a drainage and support layer for green roofs

Osborne Center Blue Green Roof

Blue Green Roof Diagram
GREEN ROOF BENEFITS

Benefits

• Reduce the amount of stormwater runoff which impacts the CSO

• Mitigate urban heat island effect

• Extend the service life of roofs

• Reduce the energy required for heating and cooling due to insulating properties

• Remove CO2 from the atmosphere and air pollutants

• Create wildlife habitats and create green space

• If occupiable, can connect users to natural systems and reinforce biophilia
Sustainable Roofing Zone

• The project must define its “sustainable roofing zone”

Exceptions:

• Terraces on setbacks comprising less than 2% of the area of the largest floor plate in the building

• Any portion of a roof covered by a green roof system, including a system with agricultural plantings

• Any portion of a roof used as outdoor recreation space by occupants

• Ballasted roofs, provided that the ballast has a minimum initial solar reflectance of 0.2

• Any portion of a roof composed of glass, metal, clay or concrete tile, wood, or slate

• Any space required by FDNY

• Any space occupied by mech equipment

• Any roof, if the amount of rooftop space not subject to exceptions is in the aggregate less than 100 sf
THANK YOU
Design and deliver innovative education, training, and technical assistance that fosters sustainability and resiliency in diverse urban environments.
Solar feasibility assessment

Knowledge building

Financing and incentive consultation

Bulk procurement and solar installer selection

Consumer advocacy during installation
How Does Solar Work?

1. Photons from the sun are turned into electricity by Solar Panels.

2. DC current is turned into AC current for use in the home.

3. A meter measures the amount of electricity your Solar System produces.

4. Any unused AC power is sent back to the grid and used by the utility company.
Saving/Making Money with Solar

1. Save money on utility bill through generation of solar energy
Saving/Making Money with Solar

2. Claim tax incentives
# Solar Incentive Eligibility

<table>
<thead>
<tr>
<th>Building Type</th>
<th>NY-SUN Incentive</th>
<th>26% Federal Tax Credit</th>
<th>25% State Tax Credit</th>
<th>Accelerated Depreciation</th>
<th>20% Property Tax Abatement</th>
<th>Historic Tax Credit</th>
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Solar for New Construction

• Design considerations
• Capturing value
• Financing
Solar for New Construction: Design Considerations

Ballasted Array
- Low profile
- No roof penetrations
- Cheaper and easier

Planar Array
- Mechanically Integrated
- More solar production
- Best for space-constrained roofs

Canopy Array
- Raised 9’ high
- Can cover entire roof area with room below
- Most expensive option
Solar for New Construction: Design Considerations

• Unshaded space
  • Maintain open space south of obstructions such as bulkheads and HVAC equipment
  • Plan for walkways and fire paths to be located in shaded areas

• Electric
  • Conduit for running electric
  • Space for inverter in electrical room
**Scenario 1:** Size system for anticipated common area consumption

- One common area meter and multiple residential meters
- Offset some or all of common area utility bill
- Residential electricity bills are unaffected
**Scenario 2:** Size system based on maximum roof capacity and utilize onsite community shared solar

- Generate more solar than common area scenario
- Solar energy credits are allocated to common area and residential accounts
- Good for co-ops and condos
Solar for New Construction: Capturing Value

**Scenario 3:** Size system based on maximum roof capacity and master meter building

- Generate more solar than common area scenario
- Owner(s) pays electricity bill for the whole building and is the full beneficiary of solar
- Submeter residences and bill them for their portion of consumption
Solar for New Construction: Capturing Value

Bulk procurement across building portfolio

- Secure competitive pricing by bidding out multiple buildings at once
Other Considerations: Lease your roof to a solar developer

- No investment
- Revenue from lease payments
- Claim fewer tax credits
Financing Solar: Direct Purchase

Building owner owns the system and receives the full benefit of the tax credits and electricity savings

- Pay for system upfront
- Highest financial return
- Sole beneficiary of tax incentives
- Responsible for O&M

![20 Year Cashflow Graph]

- Year 1: $-176,045
- Year 2: $-100,000
- Year 3: $-50,000
- Year 4: $0
- Year 5: $50,000
- Year 6: $100,000
- Year 7: $150,000
- Year 8: $200,000

Note: The graph shows the cashflow over 20 years, with the building owner owning the system and receiving the full benefit of the tax credits and electricity savings.
Direct Purchase Case Study

- 122 unit rental property in Queens
- 66 kW system
- Upfront cost: $1.6 million
- 5 year payback
- Lifetime net savings: $2 million
Financing Solar: Power Purchase Agreement

- Little to no upfront cost
- The solar company passes on a portion of the benefit of the tax credits
- The solar company is responsible for the system for 20 years
- You can buy out the system for a reduced rate after 10 years

*Solar company owns the system and you pay for the electricity it generates at a discount*
Financing Solar: Other Considerations

• Loans customized for solar
• Prepaid Power Purchase Agreement
Takeaways

• Solar is a smart investment for new and existing buildings
• There are many ways to finance solar and to capture value
• Building developers should be aware of key solar principles as they move forward with projects
• Reach out to Solar One!

Marigo Farr
Multifamily Solar Program Manager
marigo@solar1.org
646-515-7871
Santa Monica City Services Building

- First Composting Toilet System in SoCal
- First Potable Rainwater System in SoCal
- First Municipal Living Building in US
- Largest Living Building Project in US
BUILDING SYSTEMS

NZW STRATEGY: REDUCE

- All sanitary waste treated in composting toilets
- Composting toilets save approx. 270,000 gals/year

Worked with LA County of Health and CSM B&S to permit.
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