BEYOND CARBON MITIGATION:

THE NECESSITY OF RESILIENCE FOR COMMERCIAL BUILDINGS IN DISASTER-PRONE REGIONS

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Buildings in Changing Climate

Carbon Mitigation
- 33% of the national carbon emissions
- 2,711 million MT reduction potential

Climate Adaptation
- $22 billion damage in East Coast
- Four times payback on adaptation
Markets for Carbon Mitigation

Compliance Market

Voluntary Market

Purchase

Sale + Utility Savings

Excess GHG

Emission cap

Baseline

Carbon Market

Reduced GHG
Mckeldin Library

Carbon mitigation measures
- Roof insulation
- Wall insulation
- Windows
- Daylight control

Open Studio

EnergyPlus
Carbon Mitigation Produces Profits

Emission reduced: 21.2 kg/sq.ft

Profit earned: $12 / sq.ft
Climate Risk Matters!

- Annual revenues
- Building’s life cycle
- Probability of hazards
- Total budget
- Carbon mitigation
- Climate adaptation
- Failure costs

Climate risks raise the need of investing in adaptation
Miami-Dade County, FL

- High hurricane risk
  (1-min average 35m/s)
- Medium building values

Washington, DC

- Medium hurricane risk
  (1-min average 21m/s)
- High building values
  ($285/sq.ft office space)
Hurricane adaptation measures

- Roof covering
- Roof-to-wall connection
- Shutters
- Water resistance

Wind Speed Distribution

- Washington, DC
- Miami-Dade County

Hurricane Insurance

1. Building value
2. Damage rate
3. Adaptation measures

Pay Premium
Adaptation Investment Produces Values

Mitigation Investment:
- Miami-Dade Country:
  - $0.25/sq.ft
- Washington DC:
  - $0.46/sq.ft

Adaptation Investment:
- Miami-Dade Country:
  - $19.03/sq.ft (99%)
- Washington DC:
  - $4.31/sq.ft (96%)
Conclusion

• Carbon mitigation produces profits (₵12/sq.ft)

• The merits of carbon mitigation diminish with increasing climate risks

• A mixed investment is much more profitable than pure mitigation investment in disaster-prone regions
Questions?

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