



Yale SCHOOL OF MANAGEMENT

SPRING 2024 ICF/CBEY REAL ESTATE COLLOQUIUM

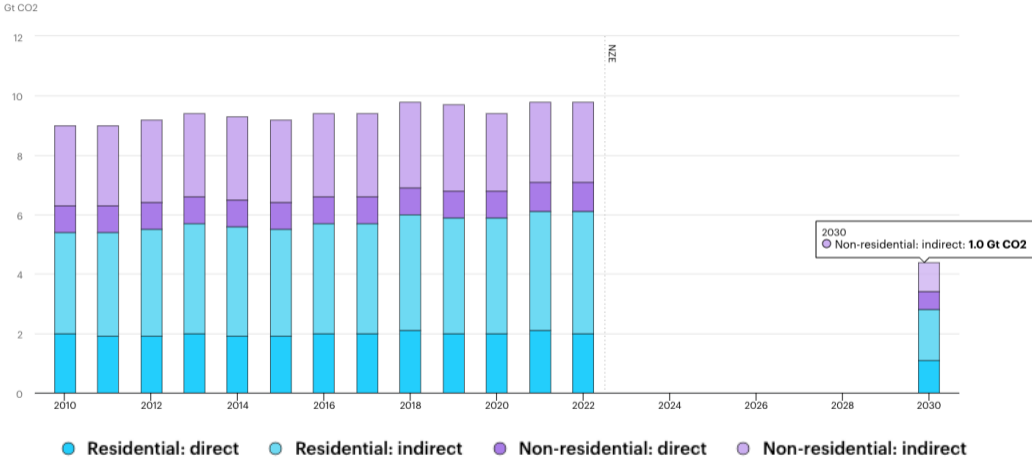
LOCKED-IN TO THE BUILT ENVIRONMENT?

OPPORTUNITIES FOR GREEN PROPERTY RETROFITTING IN A
POST-COVID WORLD

Opening Remarks by **Prof. Cameron LaPoint**

Wednesday, February 21st

BUILDING OPERATIONS ACCOUNTED FOR 26% OF 2022 GLOBAL ENERGY EMISSIONS



Source: International Energy Agency (IEA): <https://www.iea.org/energy-system/buildings> (June 15, 2023)



HOTEL
MARCEL



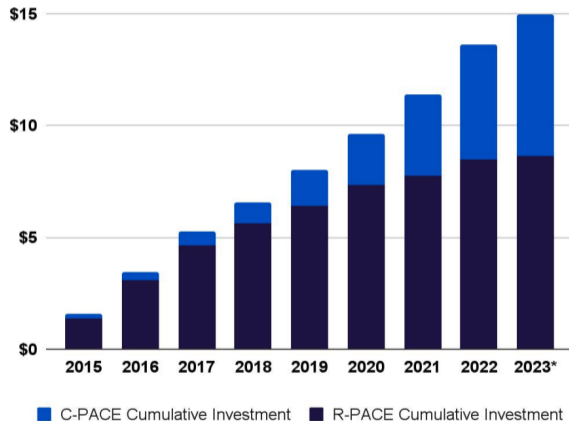
What was the cost-add to build a **net zero hotel** compared to a traditional hotel?

Phase One Solar, Batteries & Inverter:	\$3,500,000
30% federal tax credit	(\$1,050,000)
Net energy systems cost	\$2,450,000
Additional cost for laundry systems	-
Additional cost for kitchen systems	100,000
Additional cost of high-performance windows	250,000
Additional cost of high-performance insulation	100,000
Additional cost for high-performance ERVs and VRFs	250,000
Additional cost for heat pump hot water system	<u>250,000</u>
Total additional investment	\$3,400,000
CPACE funding	(6,000,000)
Utility grant	(400,000)
Net reduction in equity requirements	(\$3,000,000)

INNOVATIONS IN GREEN FINANCING – PACE LOANS

- **Property Assessed Clean Energy (PACE)** now available in 30 states + D.C.
- New type of lending used for green energy and climate resilient investments
- Loan paid back through the local property tax bill → **government backing + long payback period**

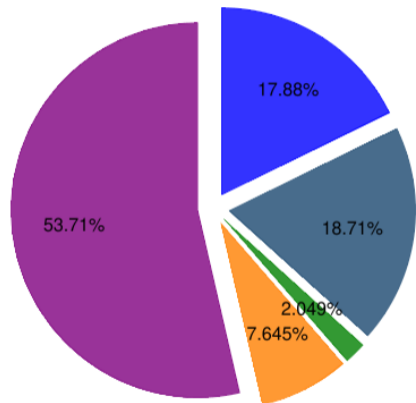
CUMULATIVE PACE FINANCING,
2015-2023 (\$, BILLIONS)



Source: <https://www.pacenation.org/pace-market-data/>

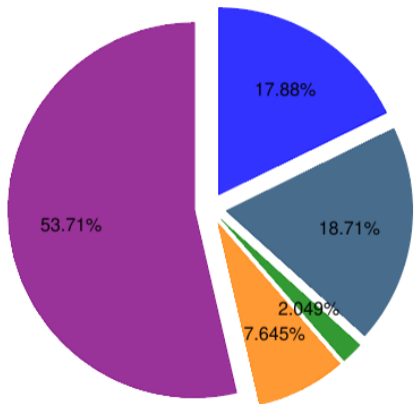
PACE ENCOURAGES HURRICANE-RESILIENT HOUSING IN FLORIDA

All FL Residential Permits

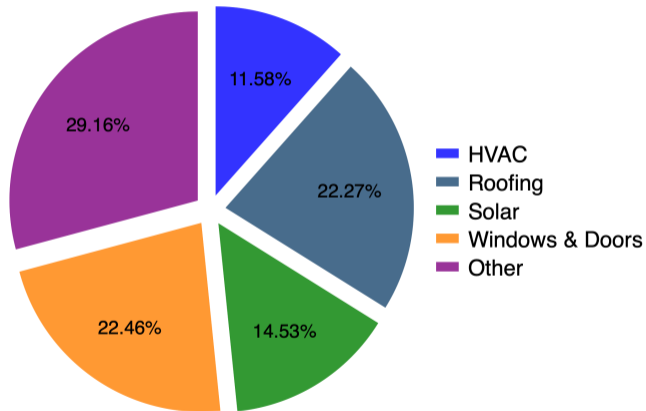


PACE ENCOURAGES HURRICANE-RESILIENT HOUSING IN FLORIDA

All FL Residential Permits



Permits Tied to FL R-PACE Properties

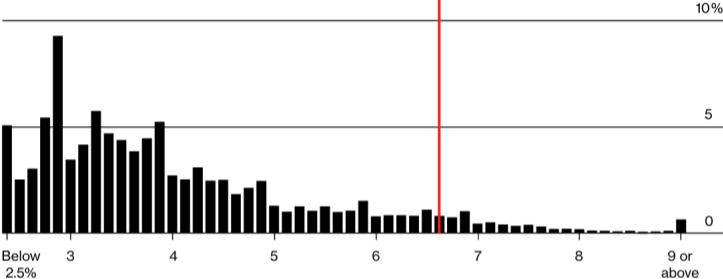


- HVAC
- Roofing
- Solar
- Windows & Doors
- Other

Source: Bellon, LaPoint, Mazzola, Xu (2024): "Picking Up the PACE: Nudges for Residential Climate-Proofing"

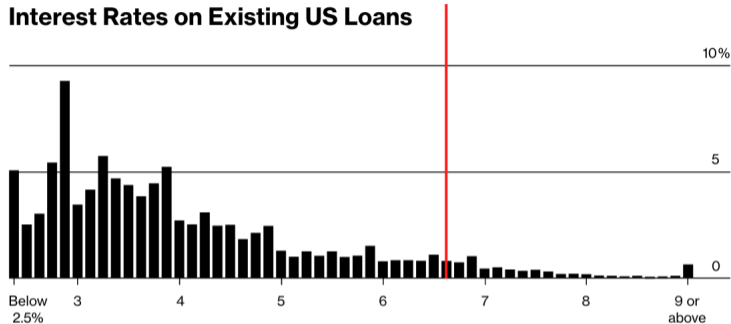
LOCK-IN EFFECTS AND THE POST-COVID WORLD

Interest Rates on Existing US Loans



Sources: Bloomberg (Nov. 2, 2023). Current average FRM rate from Freddie Mac Primary Mortgage Market Survey as of Feb. 15, 2024.

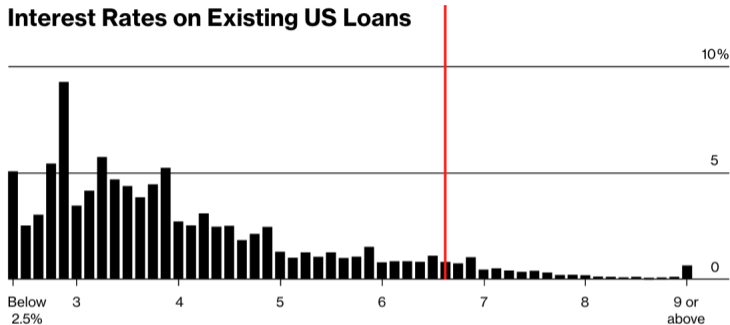
LOCK-IN EFFECTS AND THE POST-COVID WORLD



Sources: Bloomberg (Nov. 2, 2023). Current average FRM rate from Freddie Mac Primary Mortgage Market Survey as of Feb. 15, 2024.

- Interest rate **lock-in**: most home mortgages locked in at a much lower fixed rate than the rate for new mortgages today

LOCK-IN EFFECTS AND THE POST-COVID WORLD

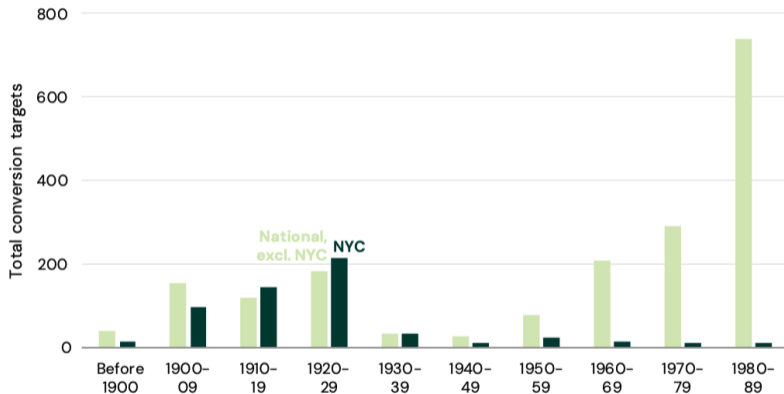


Sources: Bloomberg (Nov. 2, 2023). Current average FRM rate from Freddie Mac Primary Mortgage Market Survey as of Feb. 15, 2024.

- Interest rate **lock-in**: most home mortgages locked in at a much lower fixed rate than the rate for new mortgages today
- **WFH “doom loops”**: payments on short-term CRE loans going up at the same time that office rents are declining → **delinquency + foreclosures**

BUT ALSO, OPPORTUNITIES TO CONVERT OFFICE TO RESIDENTIAL

Conversion targets by decade of construction



Source: CompStak; authors' calculations.

Notes: The figure plots total properties suitable for conversions, after applying all the filters in table 1, across decades of construction for the national sample, excluding NYC, as well as for NYC.

THE HAMILTON PROJECT

BROOKINGS

Notes: Gupta, Martinez, Van Nieuwerburgh (2023): "Converting Brown Offices to Green Apartments," Hamilton-Brookings Policy Proposal



Yale SCHOOL OF MANAGEMENT
International Center for Finance



Yale Center for Business
and the Environment

INTRODUCING OUR PANELISTS

BRUCE REDMAN BECKER ('85 MBA/M.ARCH)



- **President of Becker + Becker Architects in Westport, CT**
- **Key LEED Platinum projects:**
 - ▶ 360 State Street in New Haven
 - ▶ Hotel Marcel
 - ▶ 777 Main in Hartford
- LEED Accredited Professional
- Founding director of CT Renewable Energy and Efficiency Business Association

JESSICA BAILEY ('04 GSAS)



- **President & CEO of Nuveen Green Capital**
- **Co-founded Greenworks Lending, largest provider of C-PACE**
- Prior to Greenworks, with CT Green Bank where designed the CT PACE program
- Nationally recognized for contributions to sustainability finance:
 - ▶ Ranked #30 in Commercial Observer's 2022 Power Finance List
 - ▶ Crain's Chicago Business 2022 Notable Leaders in Sustainability

BRIAN MURRAY ('09 MBA)



- **CEO of SHIFT Capital, impact real estate group based in Philadelphia**
 - ▶ \$330 million in urban investments in Philly, D.C., and Newark
 - ▶ Recent office-to-residential project at 10 Commerce in Newark
- National leader in creating more inclusive neighborhoods through SHIFT's two funds
- SHIFT-launched equitable initiatives:
 - ▶ Kensington Corridor Trust – nation's first Neighborhood Trust
 - ▶ Good Neighbor Program



Yale SCHOOL OF MANAGEMENT
International Center for Finance



Yale Center for Business
and the Environment

Submit questions here ↓



INTERDISCIPLINARY GREEN PROPERTY COURSES AT YALE

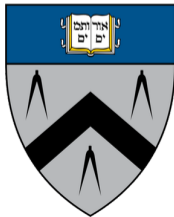
School of Management

- MGT 536 Urban Poverty & Economic Development (Cooney)
- MGT 883 Housing Markets (LaPoint)
- MGT 885 CRE Investing (LaPoint)



School of Architecture

- ARCH 4221 Intro to CRE (Gray)
- ARCH 4293 Housing Connecticut (Cooney)
- ARCH 4296 Intro to Planning/Development (Rose + Kober)



School of Environment

- ENV 635b Renewable Energy Project Finance (Gross)
- ENV 894a Green Building (Kops)
- ENV 960 Urban Climate Solutions (Seto)

