CLIMATE RISK AND REAL ESTATE INVESTMENT

A Global ULI Study

Lisette van Doorn
CEO ULI Europe
Brussels, 16 May 2019

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HEITMAN
A REAL ESTATE INVESTMENT MANAGEMENT FIRM

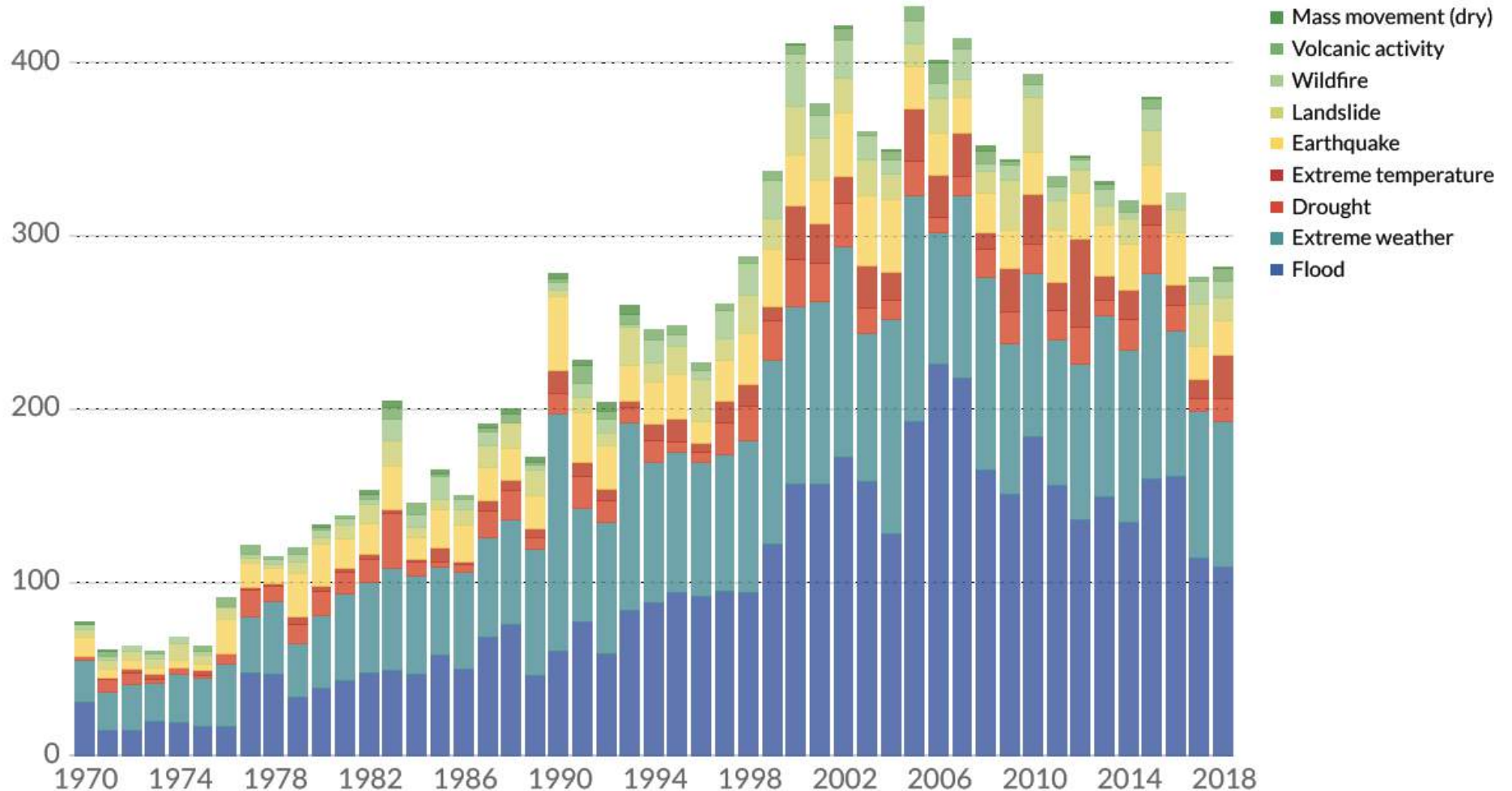**CLIMATE RISK AND REAL ESTATE INVESTMENT DECISION-MAKING**

What has happened so far?

More losses for real estate, insurance, and the public sector from natural disasters
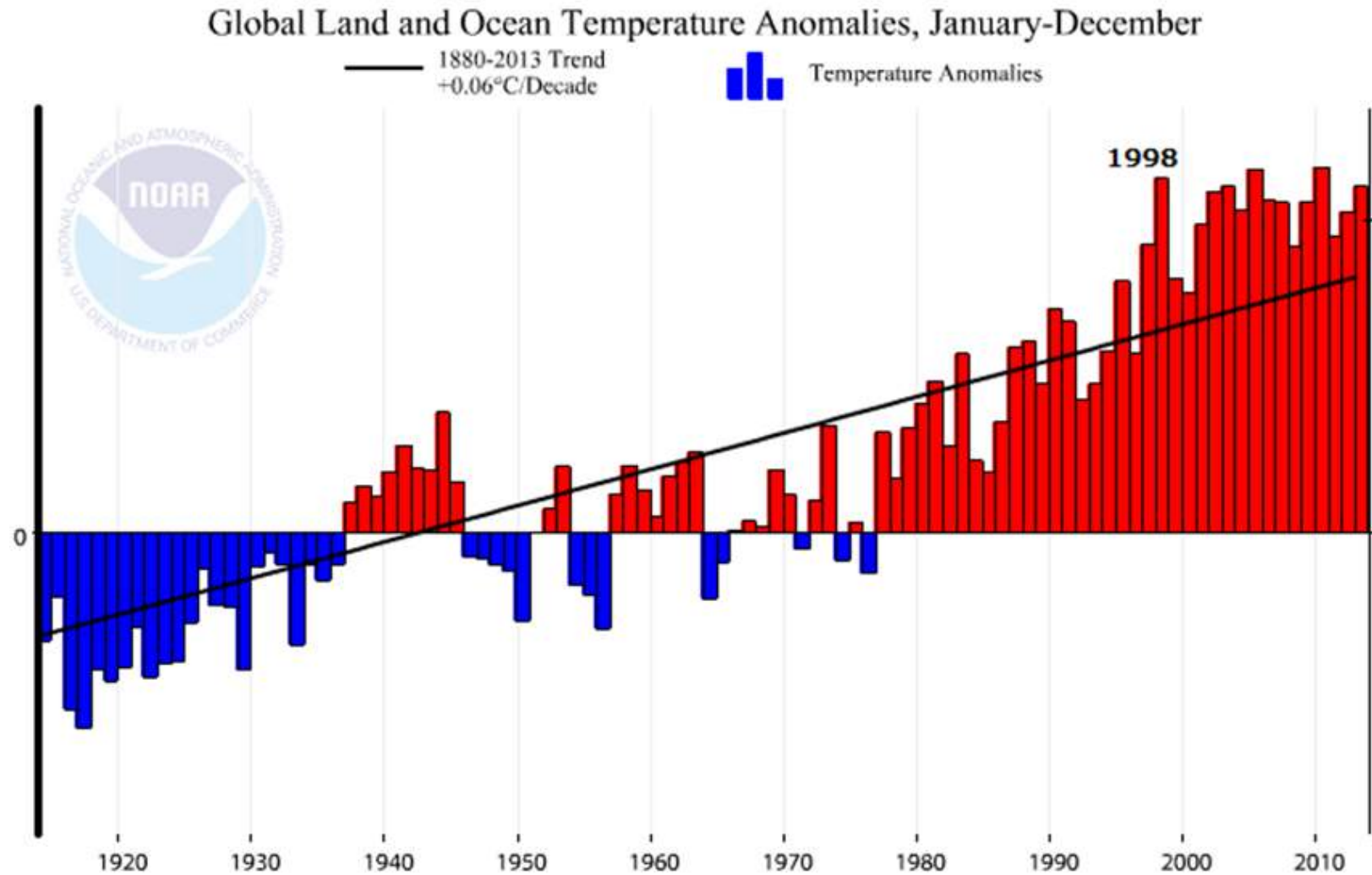

Global reported natural disasters by type

The annual reported number of natural disasters, categorised by type. This includes both weather and non-weather related disasters.

Legend:
- Mass movement (dry)
- Volcanic activity
- Wildfire
- Landslide
- Earthquake
- Extreme temperature
- Drought
- Extreme weather
- Flood

Source: EMDAT (2017): OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium

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Earth warms, sea levels rise…

Global Land and Ocean Temperature Anomalies, January-December

1880-2013 Trend +0.06°C/Decade — Temperature Anomalies

1998

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2015 ULI Research Europe: Climate Change Implications for Real Estate Portfolio Allocation

Level of climate change risk assessment undertaken for respondents' portfolios

Climate mitigation vs adaptation

Climate Mitigation

Definition

Climate mitigation measures focus on tackling the causes of climate change. Included are measures to reduce, prevent the emission of, or capture the greenhouse gases that cause climate change.

Examples
- Switching from fossil fuels to renewable energies.
- Improving energy efficiency of equipment or buildings.
- Changing practices or behavior to reduce energy use.
- Protecting natural carbon sinks like forests and oceans, or creating new sinks by planting trees.
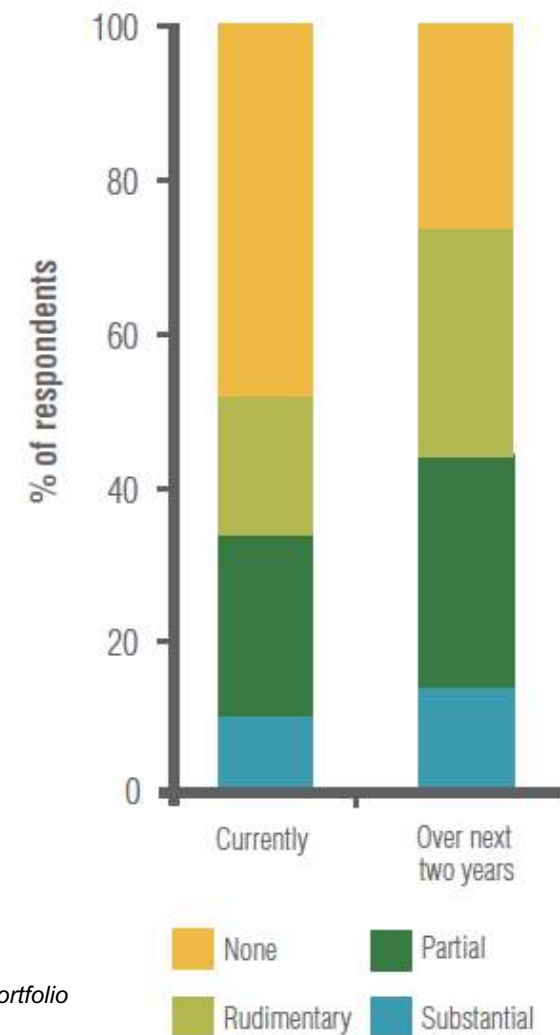
Climate Adaptation

Definition

Climate adaptation measures focus on tackling the actual or expected impacts of climate change, or taking advantage of the benefits it presents. They include adjustments to natural or human systems.

Examples
- Elevating buildings or roads to avoid flooding from sea-level rise and increasing coastal storms.
- Employing new, low-water technologies in areas anticipating drought.
- Adjusting agricultural growing seasons and crop varieties to match changes in temperature and precipitation.
- Installing cool roofs or cooling centers to address heat risk in cities.

L'ACCORD DE PARIS: A Potential Game Changer for the Global Real Estate Industry | Summary for decision makers

Climate Change Implications for Real Estate Portfolio Allocation: business as usual or game shift

Legend: None, Partial, Rudimentary, Substantial

2015 ULI Research Europe: Climate Change Implications for Real Estate Portfolio Allocation
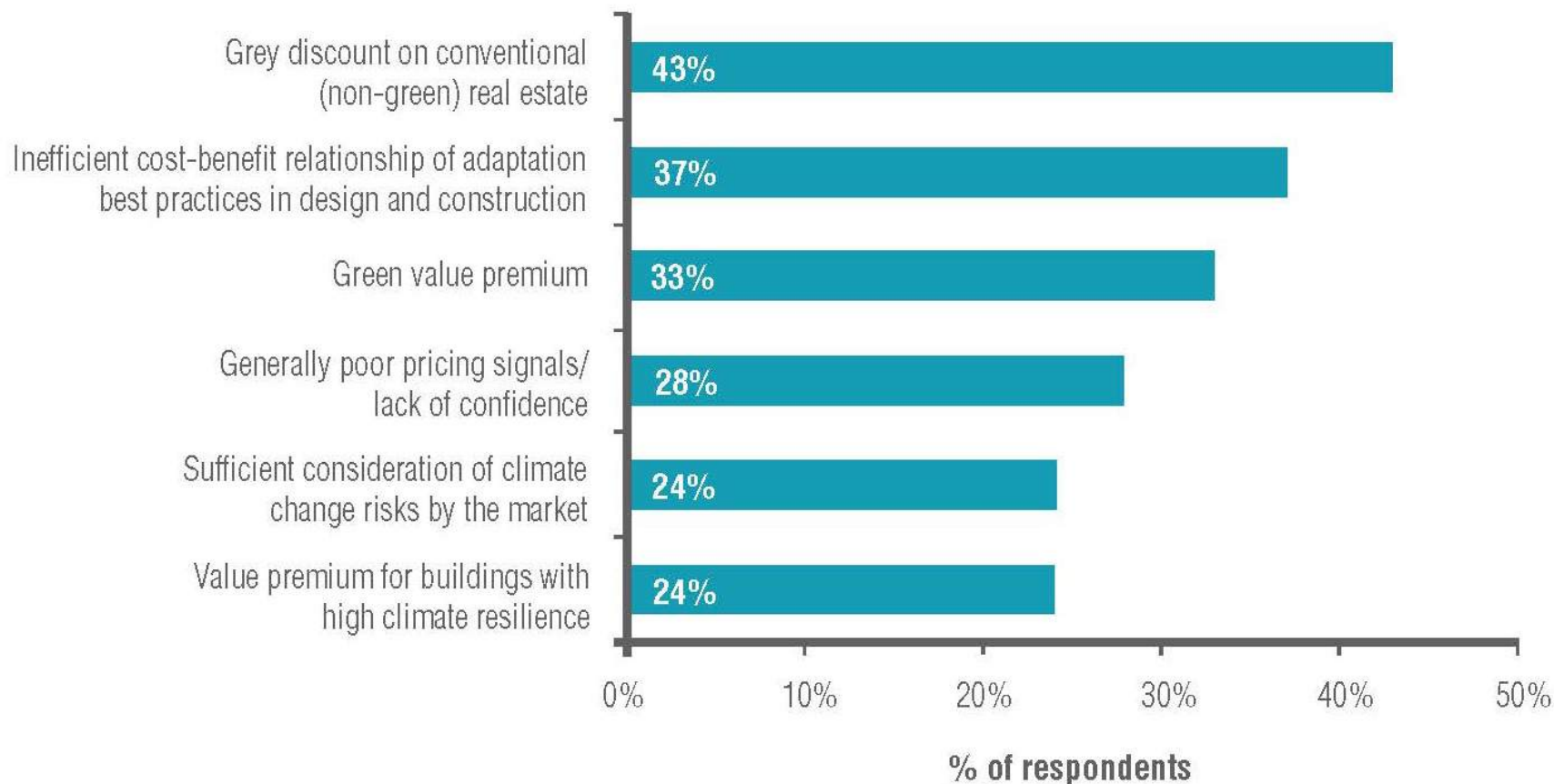
Improvement Measures Applied to Existing Properties in Portfolios
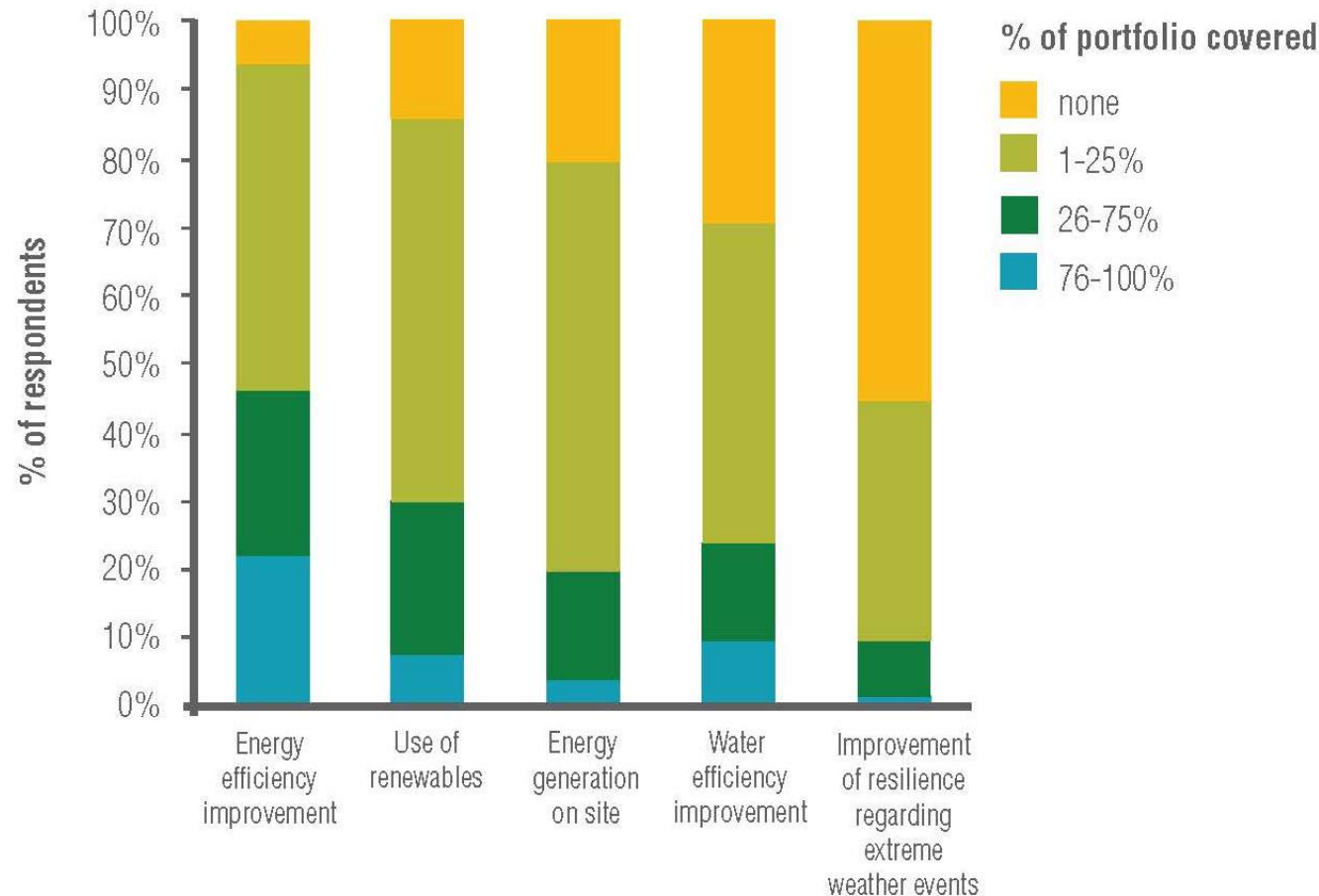
Over 90% of respondents are improving energy efficiency in at least some of their portfolios, but less than 50% are investing in resilience to extreme weather impacts
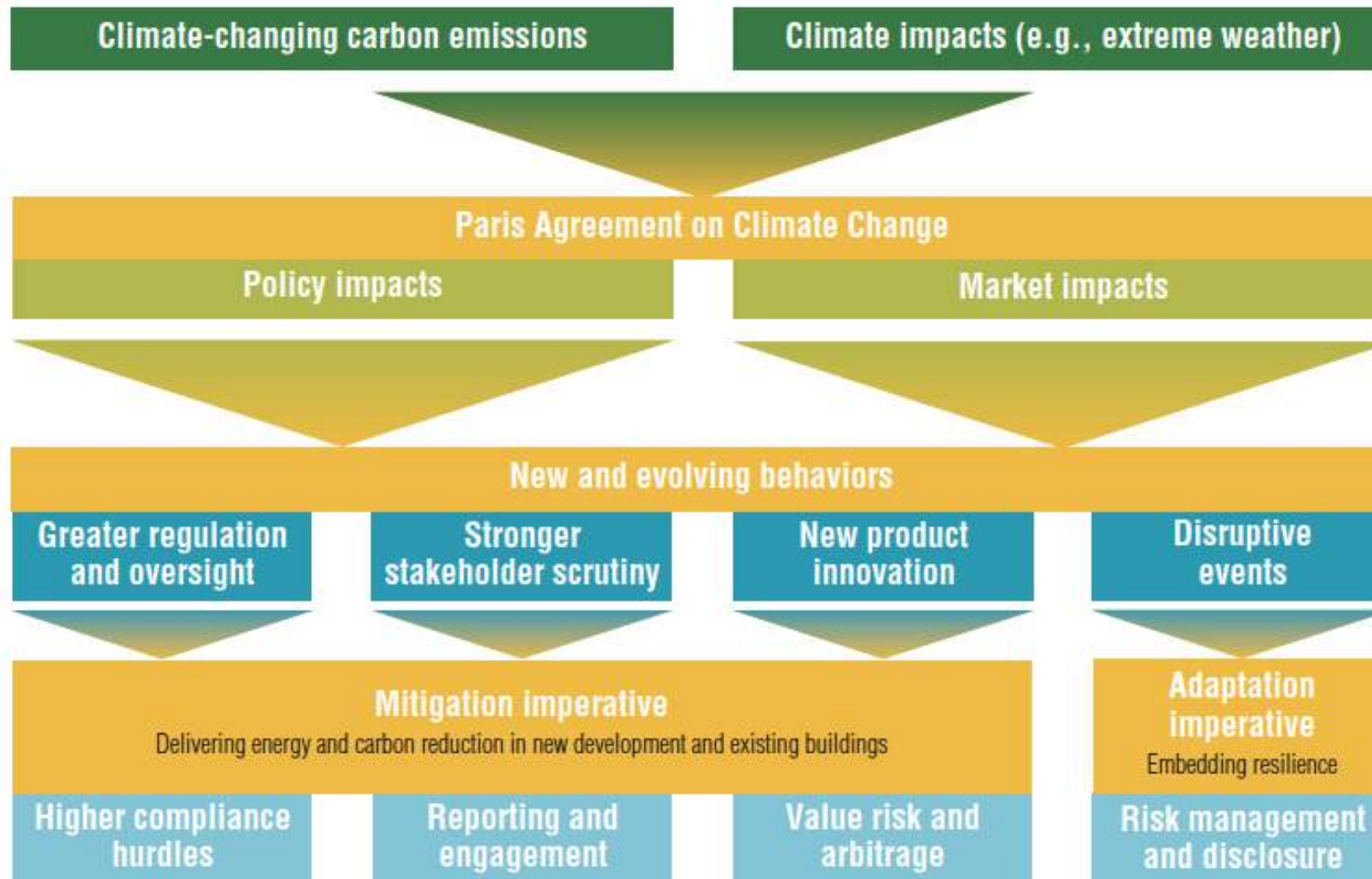
Climate Change Implications for Real Estate Portfolio Allocation: business as usual or game shift

2015 ULI Research Europe

Market Impacts of Climate Change Observed by Respondents

Grey discount on conventional (non-green) real estate — 43%

Inefficient cost-benefit relationship of adaptation best practices in design and construction — 37%

Green value premium — 33%

Generally poor pricing signals/ lack of confidence — 28%

Sufficient consideration of climate change risks by the market — 24%

Value premium for buildings with high climate resilience — 24%

% of respondents

Respondents noted some market trends to encourage more sustainable buildings, but also areas where market signals are still weak (e.g. premiums for high climate resilience)

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Climate Change Implications for Real Estate Portfolio Allocation: business as usual or game shift

Implications of the Paris Agreement for the Real Estate Industry

| Climate-changing carbon emissions | Climate impacts (e.g., extreme weather) |

Paris Agreement on Climate Change

| Policy impacts | Market impacts |

New and evolving behaviors

| Greater regulation and oversight | Stronger stakeholder scrutiny | New product innovation | Disruptive events |

Mitigation imperative
Delivering energy and carbon reduction in new development and existing buildings

Adaptation imperative
Embedding resilience

| Higher compliance hurdles | Reporting and engagement | Value risk and arbitrage | Risk management and disclosure |

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And since then….

Biggest US pension funds 'must consider climate-related risks' [updated]

Sustainability leads to outperformance - EPRA

Dutch regulator warns of €97bn 'water scarcity' risk

Committee warns 'complacent' large schemes over climate change [updated]

Dutch roundup: ABP launches energy transition fund

FCA proposes climate risk reporting duty for asset managers

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ULI Europe Conference 2019 attendee polling

Report findings

What type of risks do real estate investors face?

Physical risks

- Catastrophic events
- Changes in weather patterns

Transition risks

- Market impact
- Policy and regulation
- Resource availability
- Reputation and market position

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Insurance has been the main focus so far….

"Rather than limiting investment in particular areas, it's been more a question of how to properly insure a property."

"The real estate investment industry as a whole is still early in its development of strategies to recognize, understand, and manage these [climate] risks."

"While we have a good supply of capital in insurance due to increased confidence in our modeling, long periods of price stability should not be assumed."

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…and some are still not convinced….

- *"I don't think this will impact MY investment cycle."*

- *"If it was material, it would show up in underwriting"*

- *"I believe you, but the coastal markets are hot right now – I'll take my chances"*
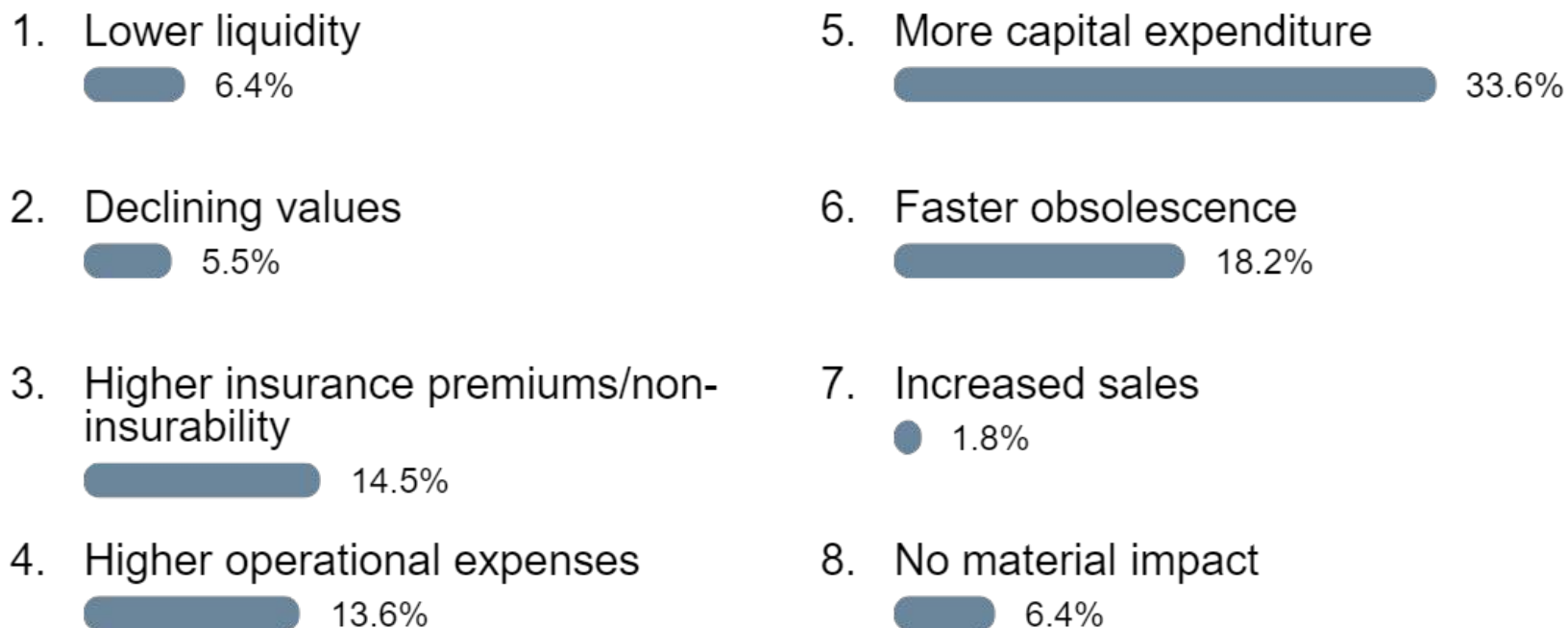

Impact of Super Typhoon Mangkhut on a Hong Kong building.
(istockphoto © winhorse)

12
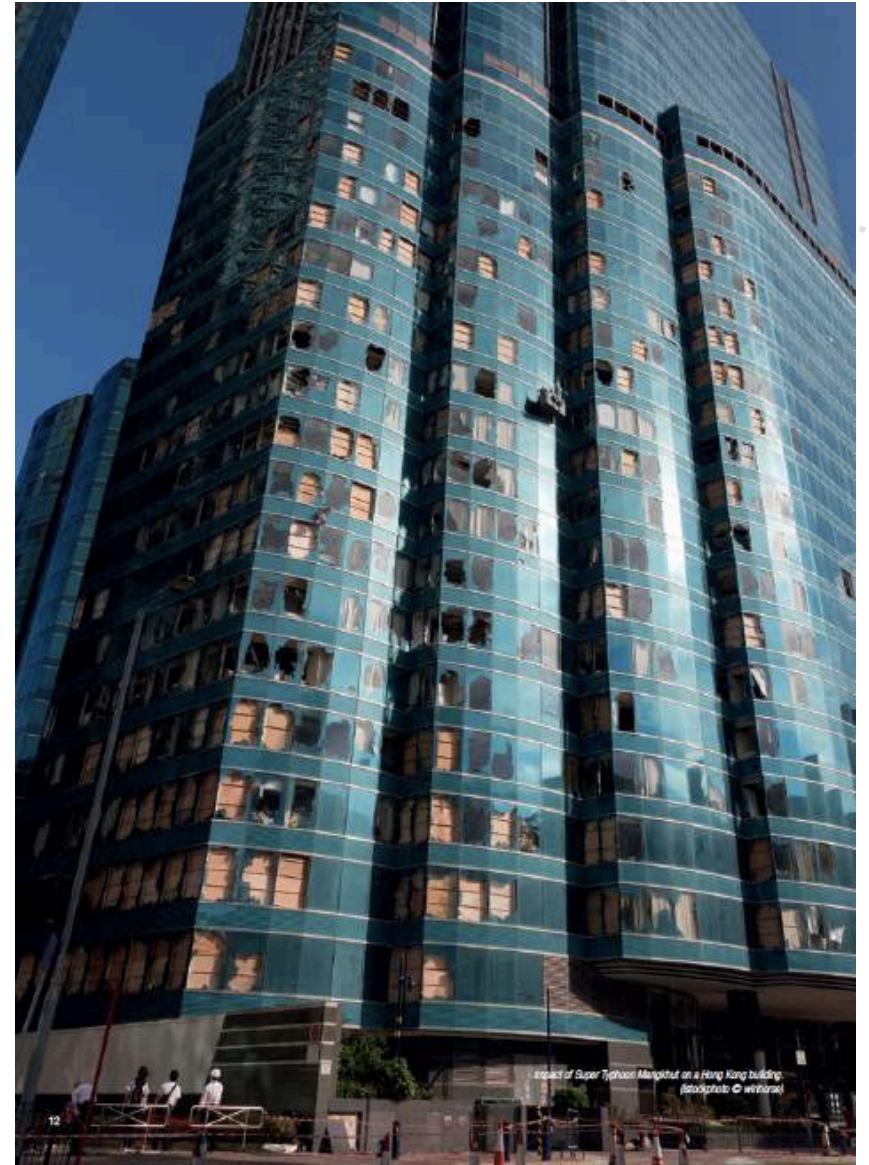
"A plus-4-degree world is not insurable."

Global Investor

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And portfolio impact is starting to be felt

What is the main impact of climate change on your portfolio currently?

1. Lower liquidity
   6.4%

2. Declining values
   5.5%

3. Higher insurance premiums/non-insurability
   14.5%

4. Higher operational expenses
   13.6%

5. More capital expenditure
   33.6%

6. Faster obsolescence
   18.2%

7. Increased sales
   1.8%

8. No material impact
   6.4%

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Therefore approaches are starting to change

- Starting with the assets – what is your climate risk and how are you mitigating it?

- Turning to tech and science – can we develop better risk models?

- Asking insurance – what do your models tell us?

- Building global reporting standards – can transparency save us?

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Currently, most focus on qualitative assessment exposure

- **What geographic locations present the highest risk?**

- **Risk is physical and transitional**
  - Financial impact of extreme weather event
  - Ability to sell asset at end of hold cycle

- **What else is in my risk assessment?**
  - Ability and cost of asset to reduce risk through resilient design/retrofit
  - Likelihood public sector will invest in resilience to reduce my event risk
  - Likelihood that insurance will change during my hold cycle

1. Identify risks
2. Risk assessment
3. Risk response
4. Monitor and control

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Geophy/427 REIT Physical Climate Risk

Grosvenor City risk and resilience

Next steps

- Improve reporting on climate risk in annual and quarterly Resilience reports.

- Use big data to better understand patterns around changes in asset liquidity, valuations, and weather forecasting.

- Work with the insurance industry to understand data and gain knowledge on how climate change is affecting premiums and coverage.

- Engage with city leadership in vulnerable areas to support city-level commitment to and implementation of mitigating physical and transitional risks.

66 The ultimate objective is to understand how climate will affect asset liquidity and, as a result, returns, in terms of both income and capital growth. 99

Urban Challenge: Digitalisation, Big Data and AI Impacts on Cities and Real Estate

Frederic Pivetta, Managing Partner, Dalberg Data Insights

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Big Data and AI for cities

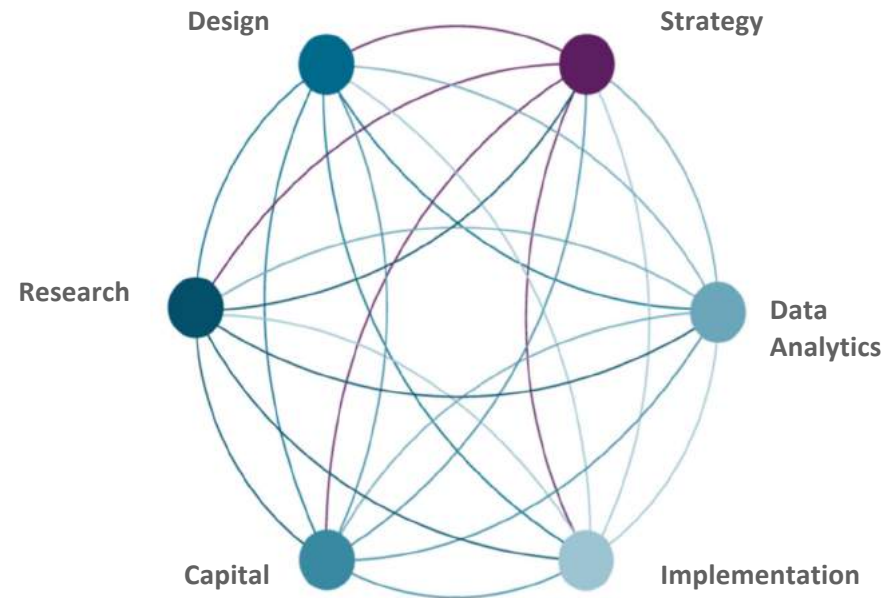PRESENTATION DOCUMENT

BRUSSELS, MAY 2019

The Dalberg Group covers 4 continents

GOBAL FACTS

- Founded in 2001
- Experience in 90+ countries

- 500+ professionals, 40+ nationalities
- 50+ languages spoken

- More than 400 clients
- >90% repeat clients

What do we do?

Design • Strategy • Research • Data Analytics • Capital • Implementation

Dalberg

We consider data as a commodity, but value privacy and trust

Telecom data

Satellite data

IoT data

Transaction data

MIND THE GAP

Dalberg

We create social and economic value by combining Big Data and AI insights

SMART CITIES
Where are the strategic areas to build a new hospital in
Port au Prince?
Impact Assessment
based on traffic patterns

AGRITECH
What would be the yield mapping in Karamoja this year vs others?
Food Crisis early stage Prediction
and Agri recommendations

MOBILE/GENDER INCLUSION
How to give access to financial markets for women
in Uganda?
Local Communities/ Minorities Empowerment
through digital payment

PUBLIC HEALTH
Which districts of Sao Paulo have the highest Zika's export/import risk?
Outbreaks Prevention
**based on population mobility**

Dalberg

Architecture of the solution

The Platform **aggregates and anonymizes multiple data source**s and **allows development of analytics tools** that can be shared in a secure manner with 3rd parties

We aim to **redesign the Platform to better communicate its value** to external stakeholders and raise awareness about the value of new data sources to support data driven decisions

Our objective is to **sustain the Platform by designing a Business Plan** covering cost structure and revenue streams, hosting and maintenance, data access, privacy and security, etc.

Telco data

Satellite data

Bank data
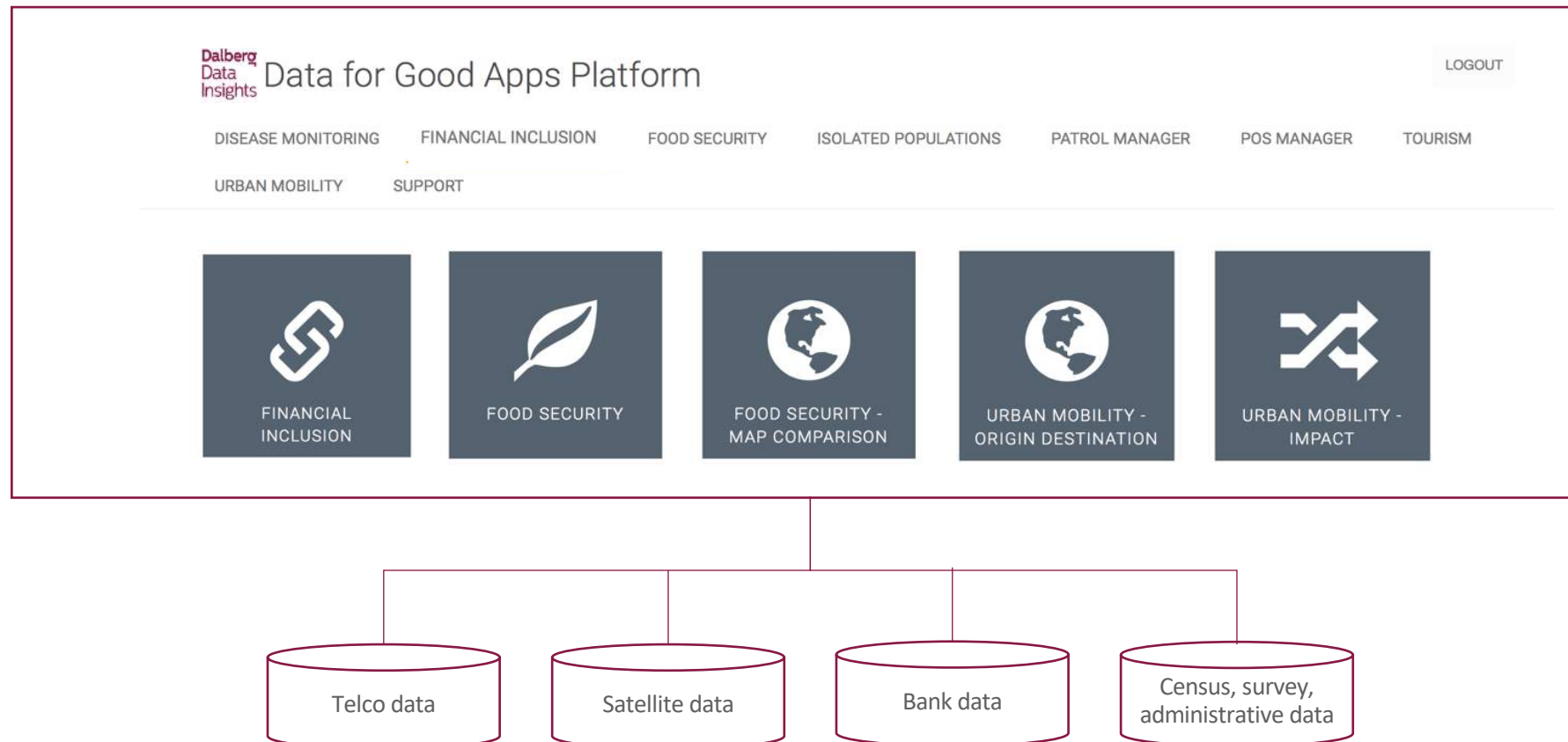
Census, survey, administrative data

Measure the time spent for commuting from and to any neighborhoods
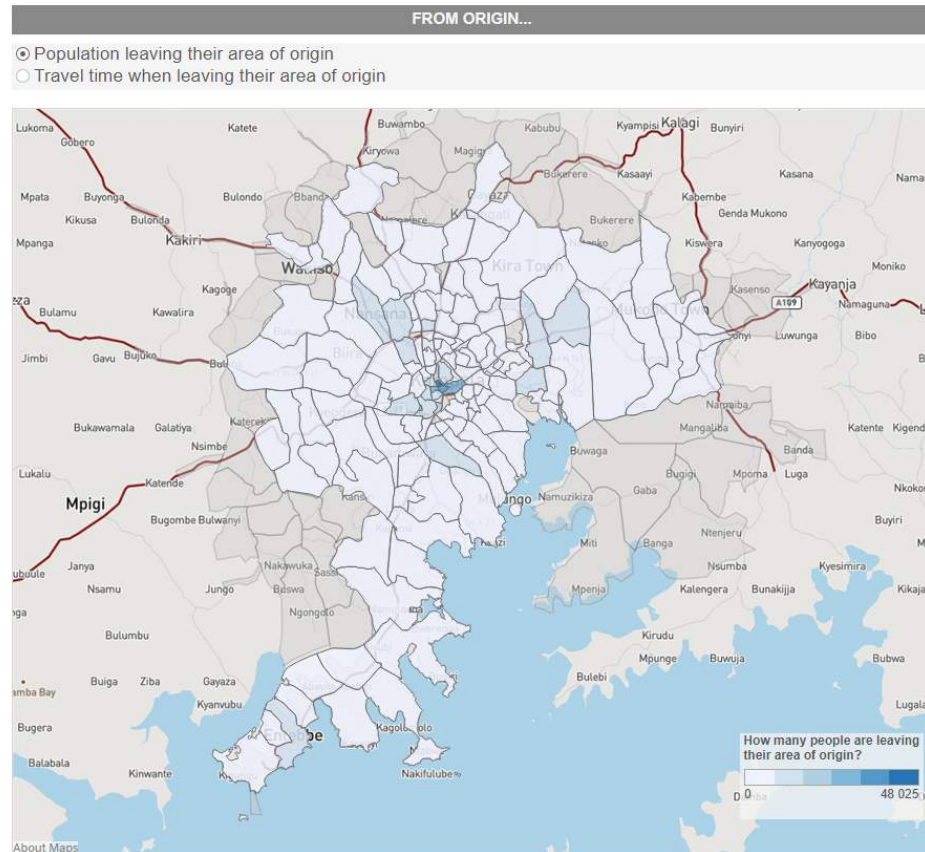

Figure 1: Understand the travel time from/to a specific neighborhood to every other part of the city
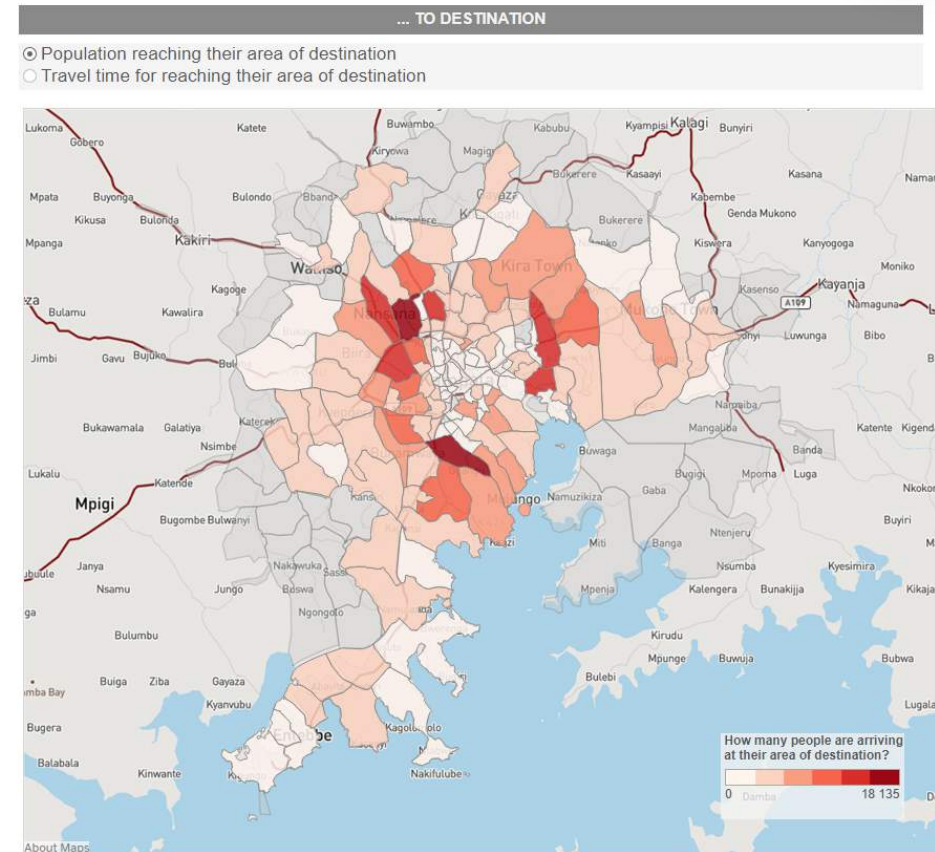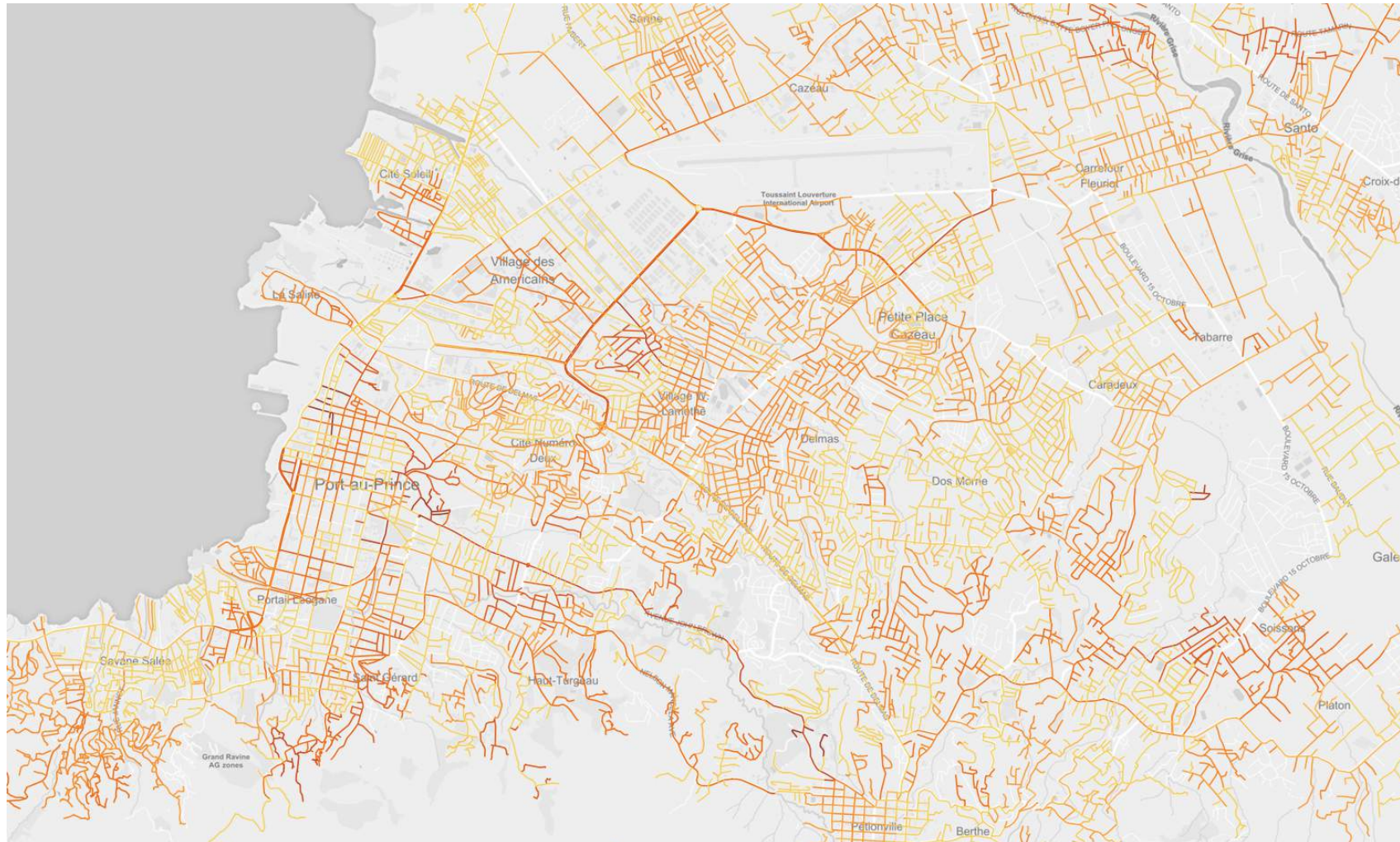

Figure 2: Visualise the average commuting time at specific times per specific neighborhood

Evaluation of the impact on traffic
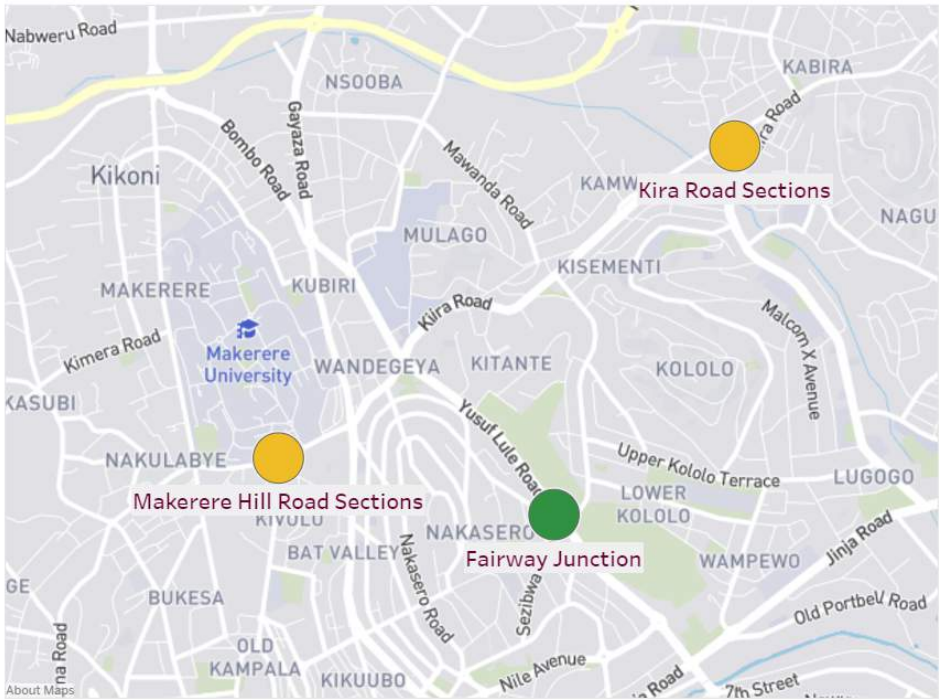
TRAFFIC DIRECTION

- ⦿ Only Traffic entering Junction or Road Sections
- ○ Only Traffic exiting Junction or Road Sections

DAY TYPE

| Business Day | Saturday | Sunday |

TIME PERIOD

| AM Peak | Inter Peak | PM Peak |

Junction / Road Section	Hourly Traffic (ppl/h)	Average Speed (km/h)	Total Time Lost (hours)
Kira Road Sections	+ 68%	- 13%	+ 151%
Fairway Junction	+ 12%	+ 16%	- 15%
Makerere Hill Road Sections	+ 23%	- 13%	+ 147%

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What might be key questions for the sector?

Real Estate

- How to improve the **management of the buildings, e.g. reducing cost of utilities, smart windows**?
- Where to develop **additional real estate projects**? **Next optimal / high value locations?**
- Where to invest in **urban infrastructure**?
- How to improve the **economic valuation** of real estate assets?
- How to increase the economic value by **optimizing advertising**?

Mobility

- How to improve the **multi-modal mobility**?
- How and where to invest in **mobility infrastructure**?
- Where to invest in terms of **new assets**, e.g. recharge stations, shared cars/bikes?

HR

- How to improve the **management of the teams**?
- How to optimize the **HR packages**?

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How can we move forward?

Create a real data ecosystem

- Develop a **dialogue between end-users and key data holders** on data and use cases
- Identify **key leaders** owning the data in Belgium
- Develop **processes** to access and use the data, including comercia model
- Understand **the key regulations and rules**

Develop use cases

- There already exist use cases – Move to the **next level and integrate multiple data sources**, e.g. use data from Proximus on energy and alarm systems
- Focus on **scalable use cases**, e.g. reduce the consumption of energy for large buildings

Engage with the sector/industry

- Identify **key questions of the industry** – develop a strategy for real estate development, e.g. identify use cases
- How to promote digital solutions and approaches

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DALBERG DATA INSIGHTS

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Data Insights

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KAMPALA, UGANDA