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Energy for Resilient Cities Clinic

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City Resilience Program Financial Solutions for City Resilience: Cohort 2

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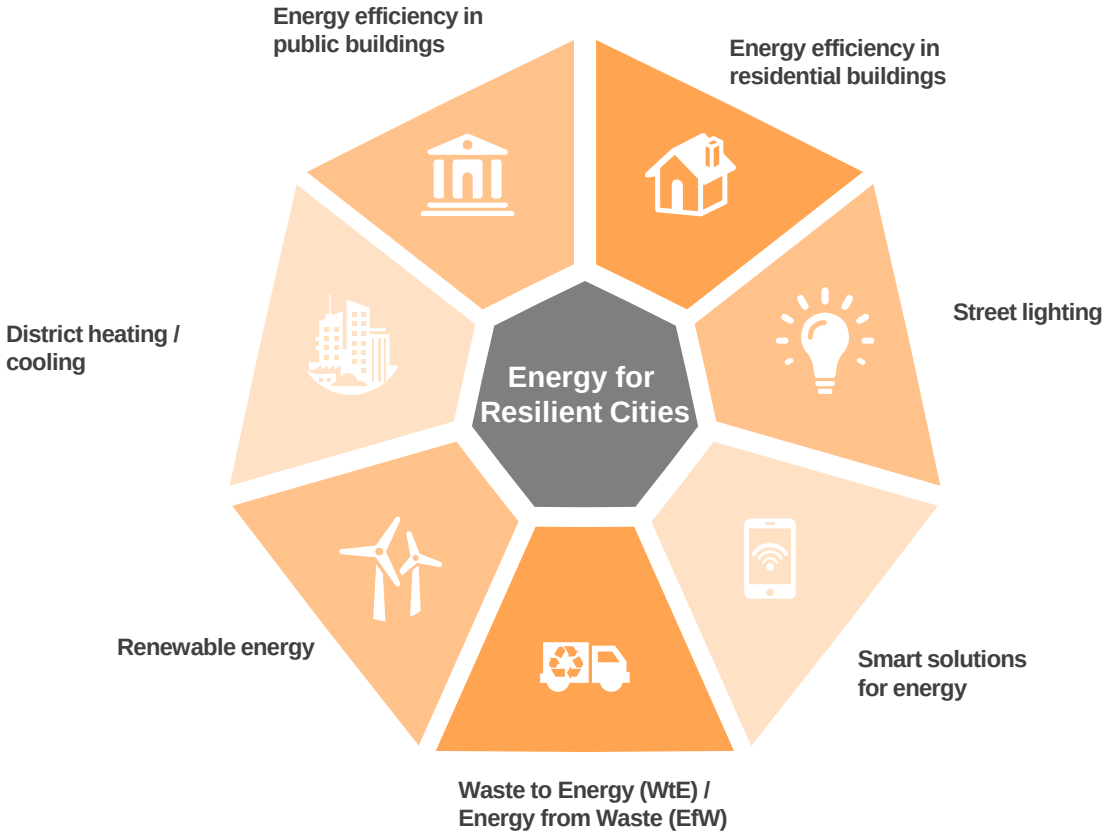
Key areas of consideration



Key areas to address to unlock private financing in the sector

Regulatory environment

1

- A stable and robust regulatory environment necessary to attract and incentivise private capital
- Role of the independent regulator – price setting system
- Regulatory setting up investment process
- Role of the independent regulator – price setting system
- Ambitious environmental objectives underpinned by legally binding targets

Affordability issues and environmental awareness – the city and end-users

2

- Potentially a serious barrier to projects energy efficiency (housing) / waste
- Mechanisms to address affordability limitations – e.g. municipal subsidies, combination of private financing and preferential financing
- Funding vs. financing concerns
- Recognition of potential benefits from investments (utility bills reduction, environmental benefits)

Commercial funding limitations

3

- Preference for short- to medium-term financing not corresponding to projects' payback periods
- High level of equity to be provided by the sponsors to meet debt-to equity-ratios acceptable to the banks
- Insufficient credit rating of certain borrowers' groups and insufficient collateral
- Risk aversion at the development and operational stage, incl. technology, revenue
- Often relatively small project value

Key risks in energy projects

1

Technology risk

Relates to the novelty level with no tested track record of the applied project technology and equipment

2

Risk of construction delays and budget overruns

Relates to possible failure or delays during construction phase and possible initial budget overruns during construction and commissioning phase

3

Environmental risks

Project failures or delays due to environment-related problems (incl. EIA, permitting, potential local protests)

4

Risk of inadequate management

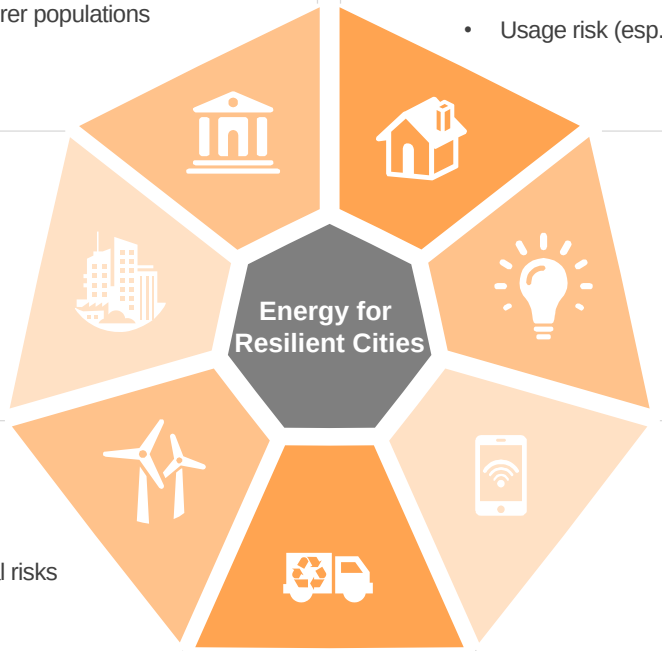
Developer's experience, expertise and capacity to deliver the specified infrastructure and manage the project implementation to a high industry standard

5

Productivity risk and risk of feedstock supply

Certainty and predictability of the level of production and of the level of the feedstock supply (availability and cost level)

Key challenges for private sector



Energy efficiency in public buildings

- Payment risk, especially poorer populations
- Small project unitary values

Energy efficiency in residential buildings

- Usage risk (esp. for ESCO structures)

District heating / cooling

- City planning
- Colliding underground infrastructure
- Access to transmission infrastructure

Street lighting

- Small project unitary values
- Cooperation with municipal agencies

Renewable energy

- Stability of support system
- Development / environmental risks
- Limited access to grid infrastructure

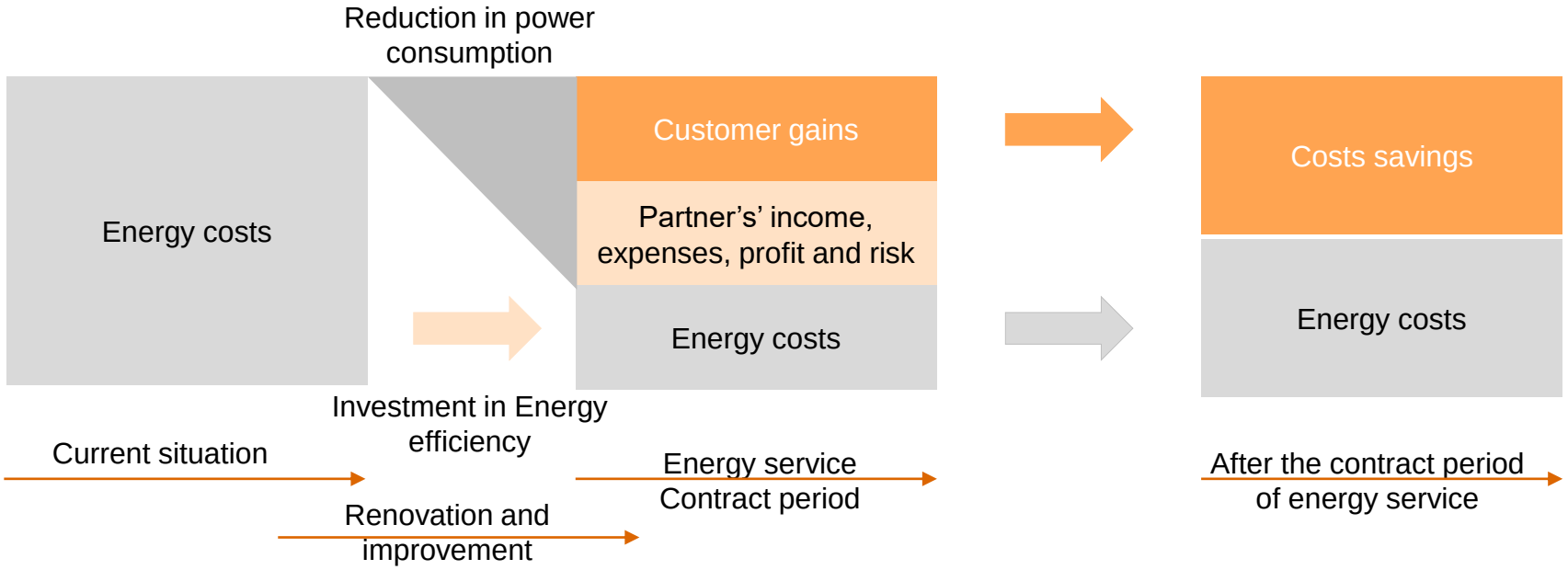
Smart solutions for energy

- Technology obsoleteness risk
- Unproven revenue streams
- Slow adaptation of regulatory environment

Waste to Energy (WtE) / Energy from Waste (EfW)

- Development / environmental risks
- Stability of feedstock (cooperation with municipal waste company)
- Energy off-take (electric energy / heating)

Financial structures for municipal energy projects



Public

- Transmission grids
- Untested smart city solutions

Public - Private

- EE residence buildings
- EE public buildings
- District heating / cooling
- WtE / EfW

Private

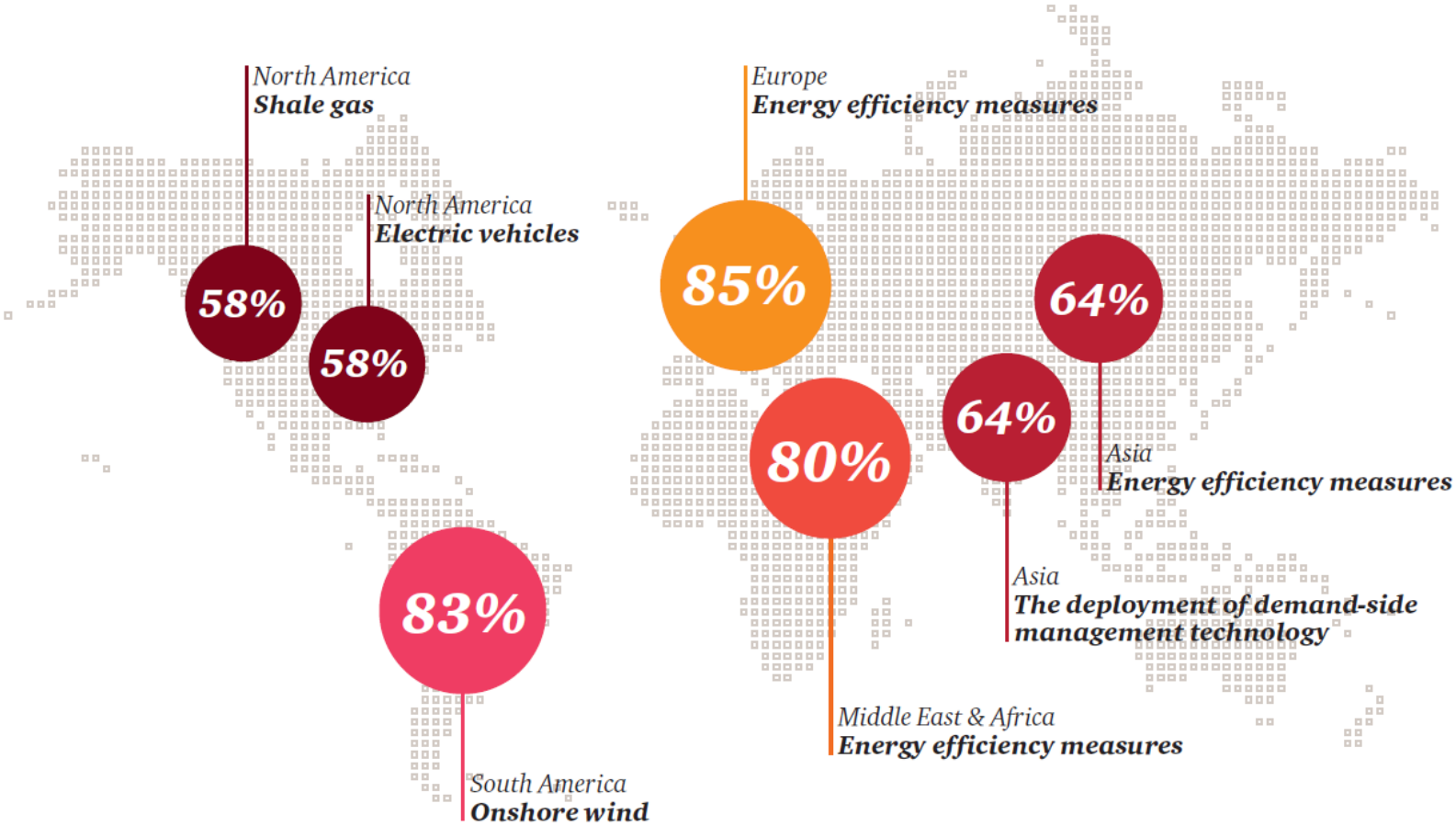
- RES commercial
- EE residence building
- Smart city solutions

Future energy trends

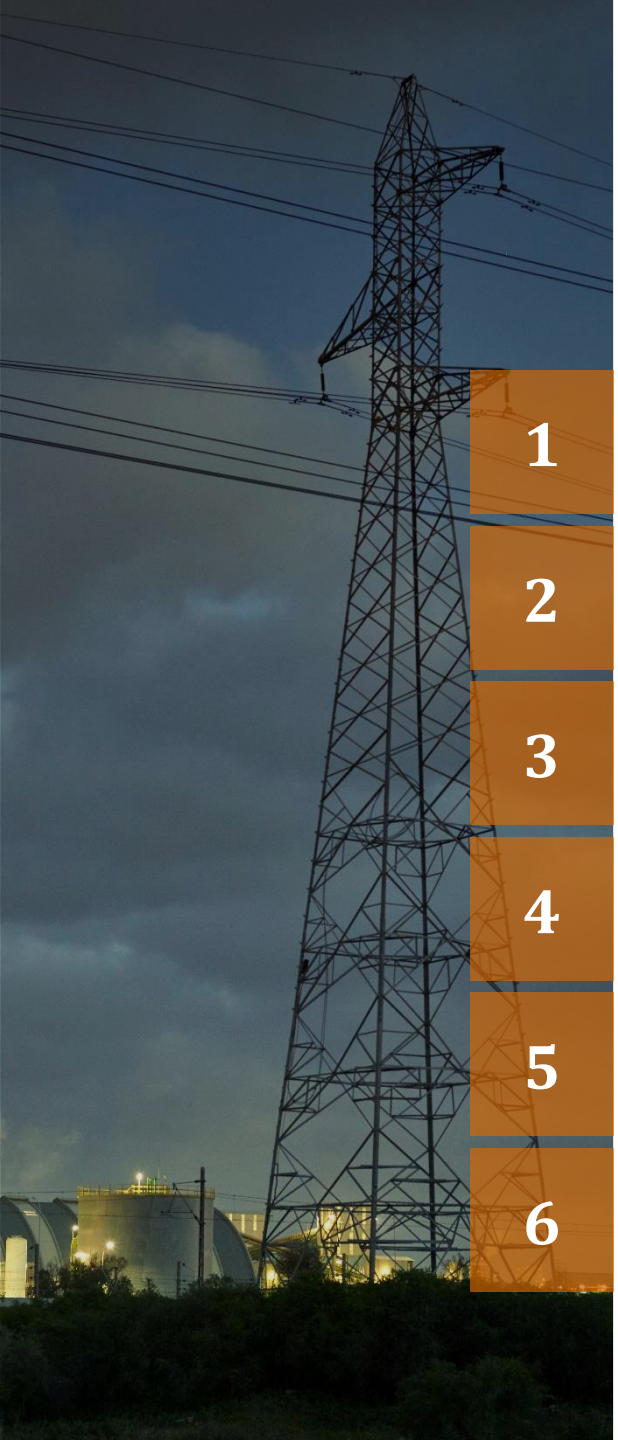
Rising investment demand levels	The falling cost of solar PV	Technologies - proven track record
USD48 trillion of investment in energy infrastructure is needed **in the next 20 years**: the bulk of it in non-OECD countries	**Prices for solar PV** modules have **fallen over 80%** since 2008	Industrial applications of **energy efficiency can deliver 100% payback** in five years
More than **50% of investment in new generation capacity worldwide** is in renewables	Solar PV will be at **grid parity in 80% of countries** in the next 2 years	**Modern wind turbines** produce **x15 more electricity** than the type of wind turbine in 1990
USD260 billion a year has been invested in renewable energy technologies worldwide for the **past five years**	Solar PV is already **cheaper than grid electricity** in 42 of the 50 **largest cities**	The **cost of energy storage** is expected **to drop to USD100 per kWh** in the next five years, against USD250 now

Source: University of Cambridge, PwC. *Financing the future of energy*. Match 2015

Top technological impacts by region



* % of respondents rating it as high or very high impact.
Source: 13th PwC Annual Global Power & Utilities Survey



Lessons learnt

1. Building sectors significantly contributes to energy consumption and CO2 emissions so addressing so implementing EE measures might have a great impact on city resilience
2. There is still a significant saving potential in both residential and public buildings
3. Good regulatory environment is needed to attract private players
4. Public support is needed to address affordability issues and address market gaps (e.g. lack of long-term financing, risk mitigation)
5. Public support may gradually be reduced (incentives to develop market, with more market-driven solutions at the later stage)
6. EE in buildings is scalable and benefit local contractors and creates local jobs (EU estimation - 19 net jobs generated per €1 million investment in energy efficiency in the buildings sector)