



Innovative Business Models: Unlocking New Opportunities in Renewable Cooling

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- 01.** **SETTING THE SCENE**
Challenges and opportunities for the cooling sector
- 02.** **FINANCING AND BUSINESS MODELS**
Collection and analysis of existing business models
- 03.** **UNLOCKING NEW OPPORTUNITIES**
Development of novel innovative business model



Setting the scene

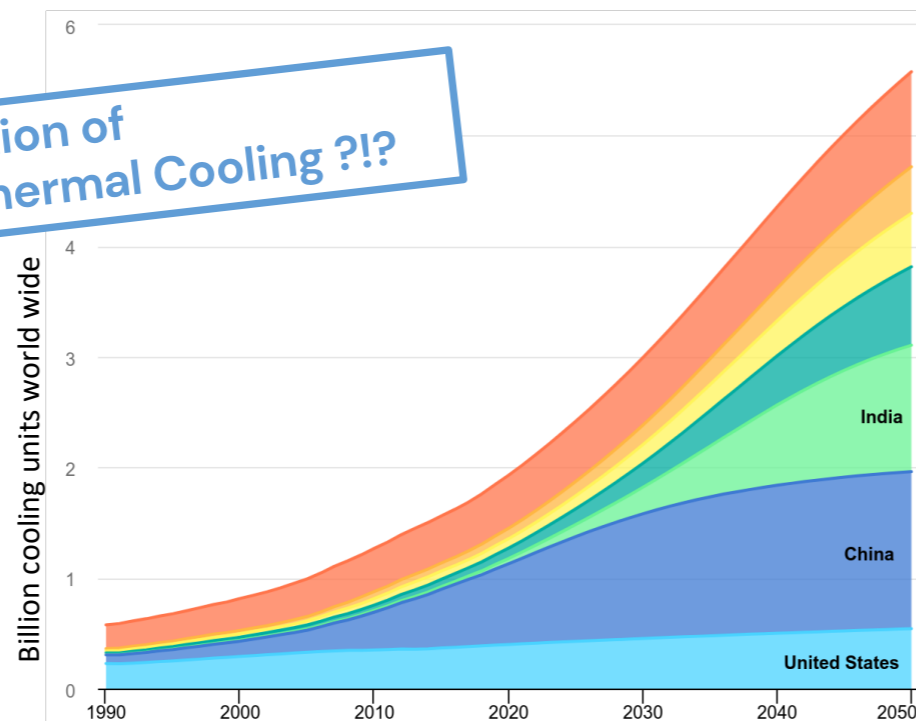
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What are the challenges for the cooling sector?

- The current trend shows, that **energy needs for space cooling** – almost entirely in the form of electricity – will **more than triple between 2016 and 2050** (IEA, 2018), **driven mainly by the residential sector** (2,000 TWh/a => 6,000 TWh/a).
- **Space cooling** is set to overtake appliances and plug loads to become the **single largest user of electricity in buildings** (2015: 10%; 2050: 30%).

→ Contribution of Geothermal / Solar Thermal Cooling ?!?



● United States ● China ● India ● Other Asia ● Latin America ● Africa & Middle East ● Rest of world

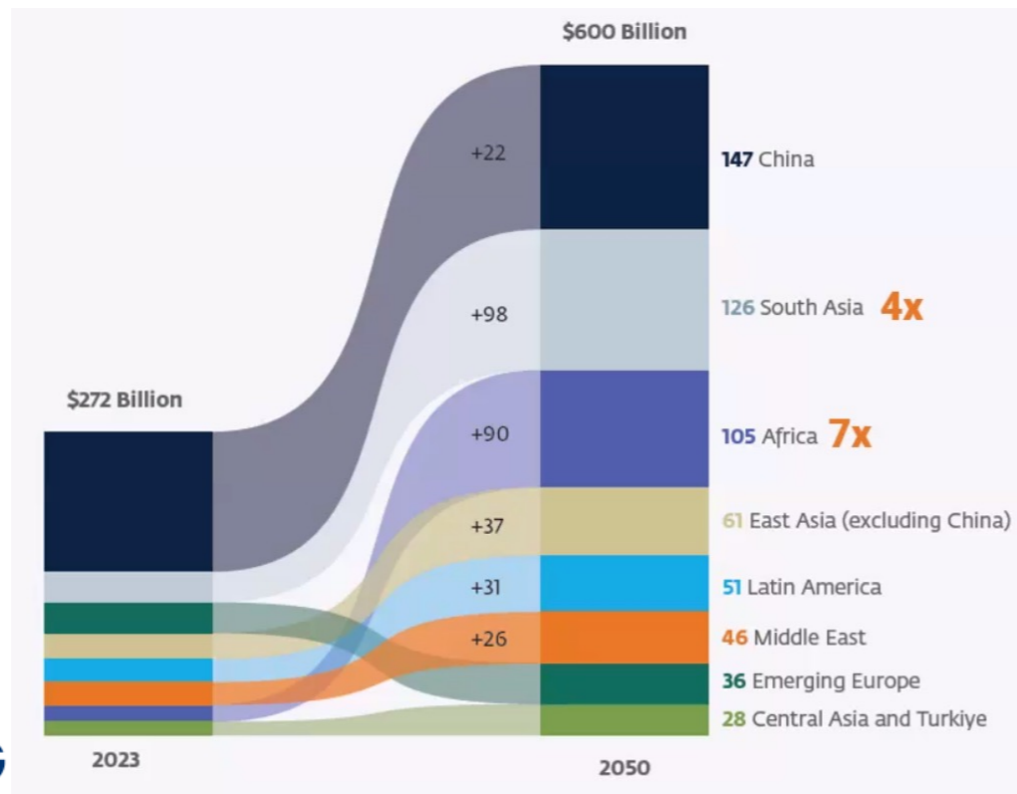


Source: IEA (2018)



Business opportunities in renewable cooling

- The **Cooling market** in developing economies is expected to **double from around 300 billion to 600 billion USD or more by 2050** (UNEP, 2023).
- **Billions of people** around the world need **sustainable cooling solutions** as they are affected by heatwaves exacerbated by the climate crisis.



Source: UNEP/IFC (2023)





Financing and business models

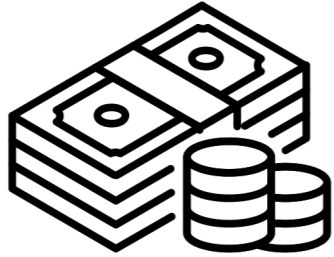
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Stakeholders/Target groups

- 👤 Energy users (private & companies): Energy costs [€/MWh]
- 👤 Energy provider: Profit (amortisation, ...)
- 👤 Public bodies: Qualitative analysis (participatory CET, ...)

Analysis of financing and business models



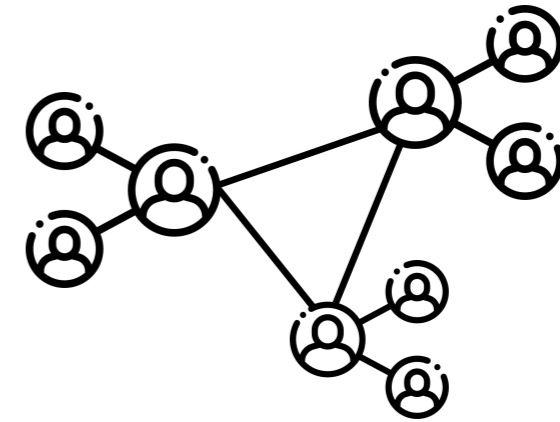
Profit-oriented financing options

- Seed funding
- Blended finance
- Private Equity
- Crowdfunding
- Bulk procurement
- Cash machine model
- Pay as you go

Profit-oriented business models

ESCO financing

- Leasing-financing
- Guaranteed availability
- Cooling as a Service
- Cooling Bonds



Social-oriented business and investment models

Citizen Cooperative

- Philanthropy
- Community cooling hubs

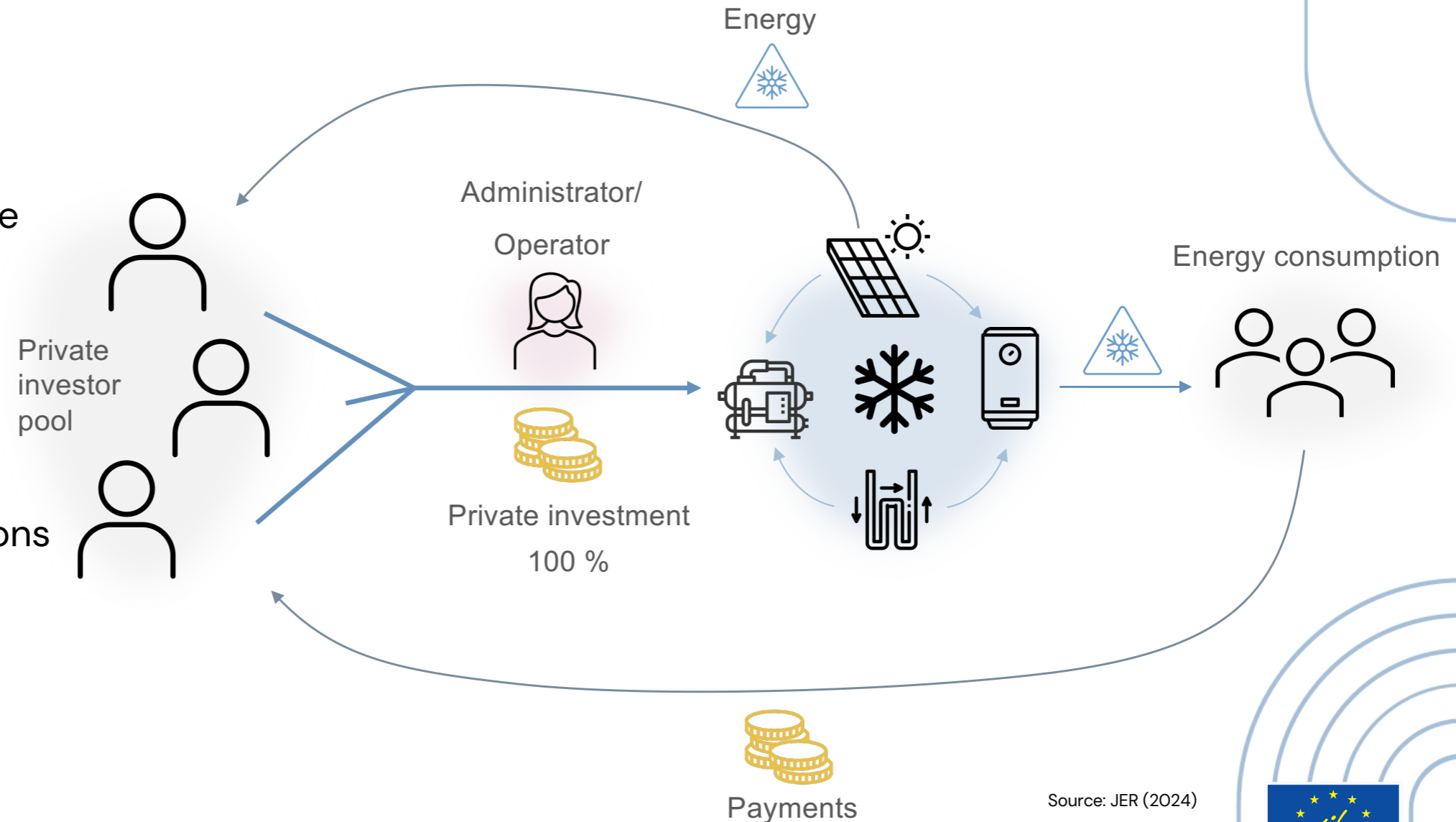
Innovative model: Citizen's cooperative

Private Investors

- + Cheap energy
- + Yield on capital
- + Participation on CET
- + No technical knowledge
- + Owner of technology
- High upfront invest

Operator

- + Payment by contract
- + No risks
- No influence on decisions



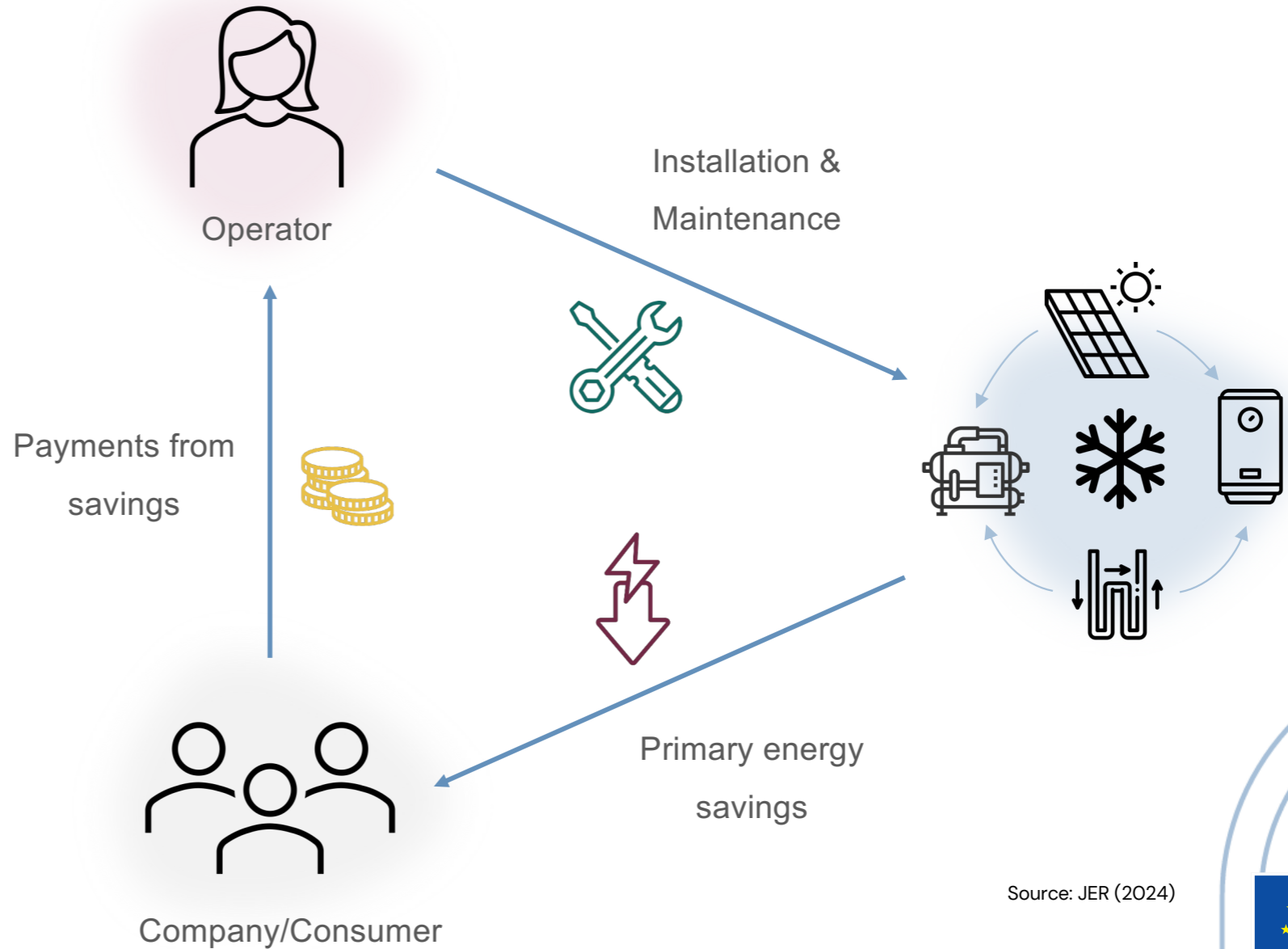
Innovative model: ESCO

Consumer

- + Energy savings (also after ESCO contract end)
- + No need of invest
- + Owner of technology

Operator

- + Payment by contract
- Covers invest





Unlocking new opportunities

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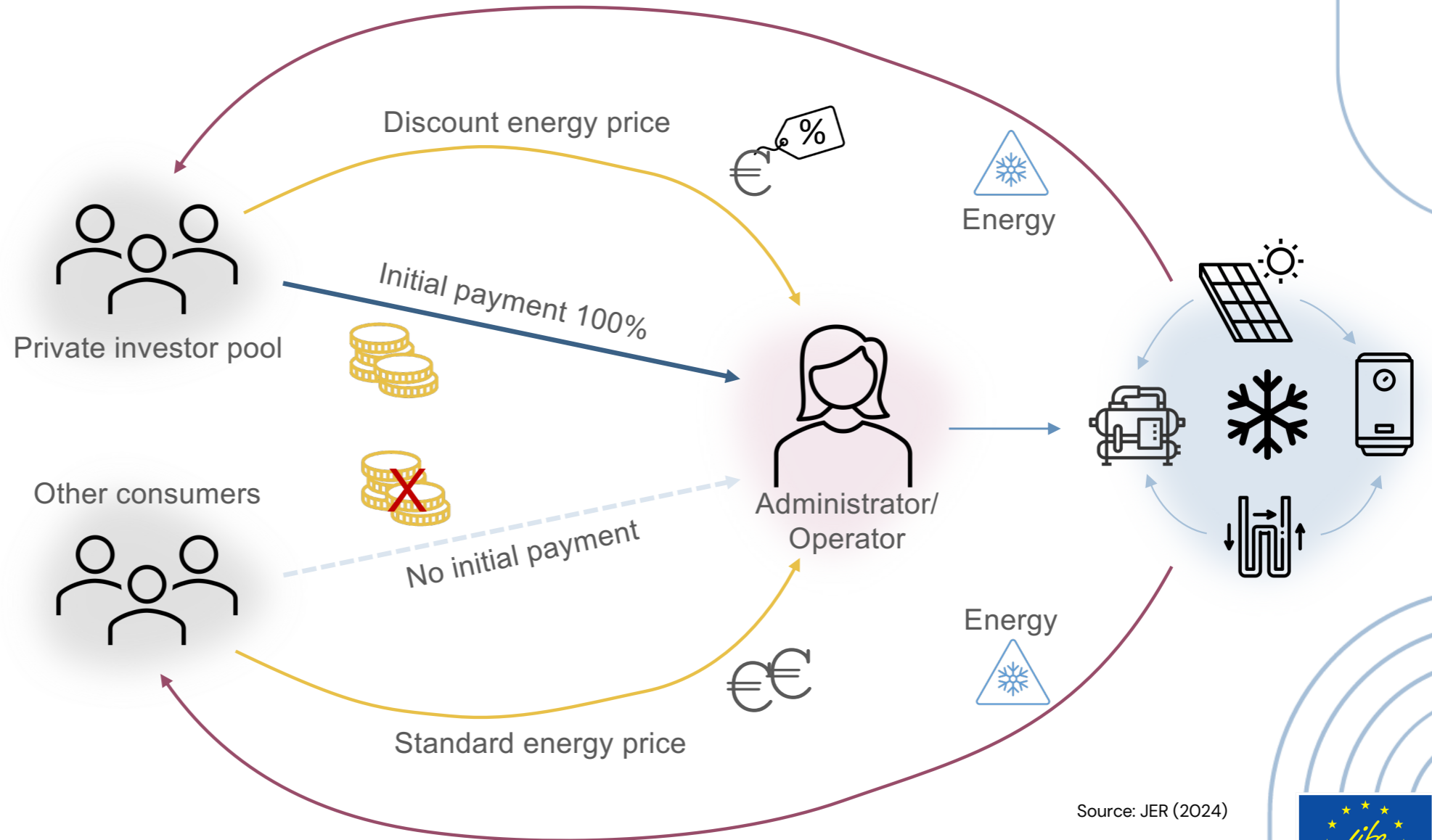
New model: Initial-aid cashback model (new)

Private Investors

- + Yield on capital by discounted energy
- + Participation on CET
- Other models may bring higher ROI

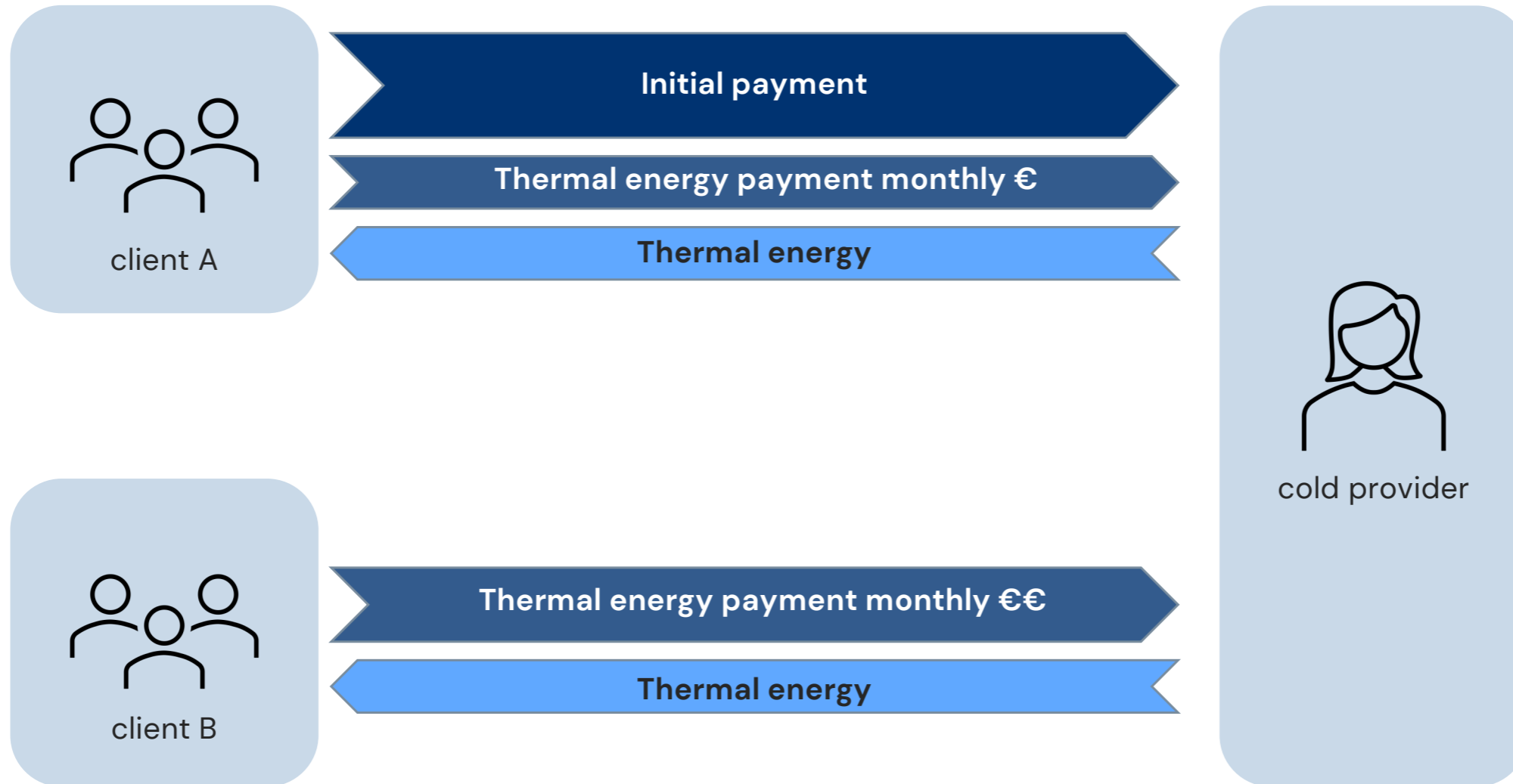
Operator

- + Owner of technology
- + "Convenient credit"



Source: JER (2024)

New model: Initial-aid cashback model (new)



Source: JER (2024)

Advantages and Disadvantages

Advantages	Disadvantages
<ul style="list-style-type: none">+ Possible opportunity for public dwellings+ Could help against energy poverty+ Good for private users+ Investor incentivized+ Flexibility is given+ Easily expandable+ Good for diverse consumer+ Good for small consumer+ Housing associations	<ul style="list-style-type: none">– Minimum number of investors needed– Discount definition can be difficult– Where is efficiency– No help energy– Who will invest?– Only for energy-generation – what about efficiency?– Complicated contract

Initial-aid cashback model: Case study application

Case study general information

Building

- Three-story office building with Interior Volume: 1,571 m³
- Construction and Insulation
 - Walls: brick masonry mineral wool insulation
 - Windows: Triple-glazed < 0.9 W/(m²·K)
 - Roof: Flat concrete roof with 400 mm thermal insulation

Climatic Conditions

- Heating Degree Days (HDD): 3,434
- Cooling Degree Days (CDD): 137

Heating and Cooling Systems

- Heating: Central system with a geothermal source heat pump
- Cooling: Passive system transferring ground temperature, Thermal Activated Building Structure (TABS)
- Geothermal Probes: Five probes
- Passive Cooling System: Seasonal regeneration of ground temperature

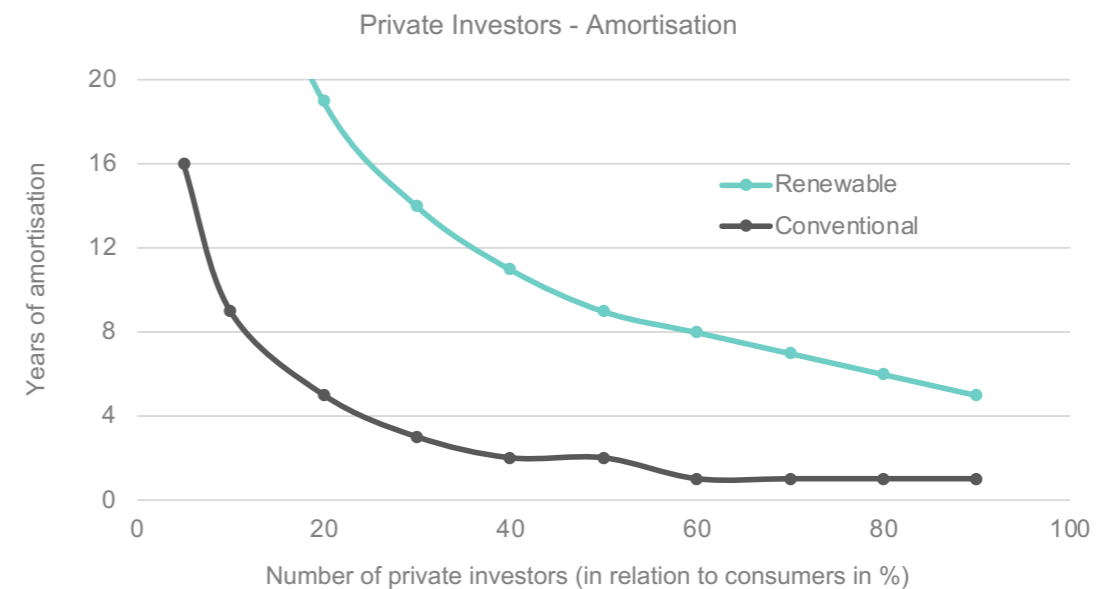
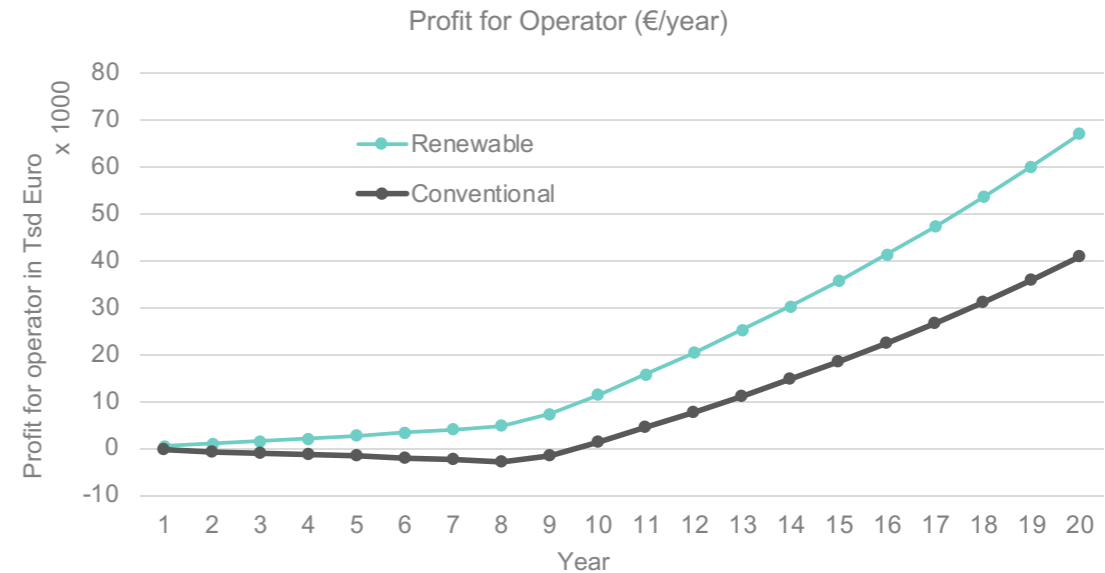
Parameter	Value	Unit
General information		
Annual cooling demand	17,530	kWh/a
Annual increase of cooling demand	2	%
Price of energy for consumer	0.22	€/kWh
Conventional energy price	0.09	€/kWh
Electric energy price	0.202	€/kWh
Bank interest rate	1.5	%
Inflation	2	%
Timeframe	10	years
Number of consumers	3	c
Number of investors	66	% (of consumers)
EER	4	
Renewable		
Purchase and Installation costs	19,886	€
Maintenance costs	199	€/a
Energy costs	885	€/a
Funding total	0	€
Conventional		
Purchase and Installation costs	4,000	€
Maintenance costs	300	€/a
Energy costs	1,578	€/a
Initial-Aid Cashback model specifications		
Price discount	90	%
Discounted energy (annual demand * x)	6	



Initial-aid cashback model: Case study application

Results of the calculation

- Interesting for operators in nearly any case
- Increased number of investors
 - Decreased amortisation timeframe for investors
- Increased annual energy demand
 - Increased profitability for energy provider
 - Decreased amortisation timeframe for investors



Conclusion

Demand for sustainable cooling will further increase in the upcoming years

→ Need for financing sustainable cooling keeps growing

→ Existing financing and business models need to be adapted & extended

→ Functionality depending on stakeholder groups and specific case

→ Business-Solutions tailored for Cooling are required



Conclusion

The Initial-aid cashback model can fill a gap:

- Increased interest of operators as they are owners.
- Application if different consumers are participating in centralised cooling solution.
- Process: Offer from operator → Agreement if ROI is agreeable for consumers

Outlook

Work to be continued ...

- Further best practices are needed.
- Publication about the IAC business model to increase the outreach.
- Development of funding programs specifically for sustainable cooling.
- Policy adaptation to simplify installation of sustainable cooling technologies.





Thank you



Q & A

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