WORKSHOP

Accelerating the European district heating rollout: Unlocking the potential of financial markets

14 MAY 2024 14:00 - 17:30 CET BRUSSELS, BELGIUM

REGISTER NOW FOR FREE









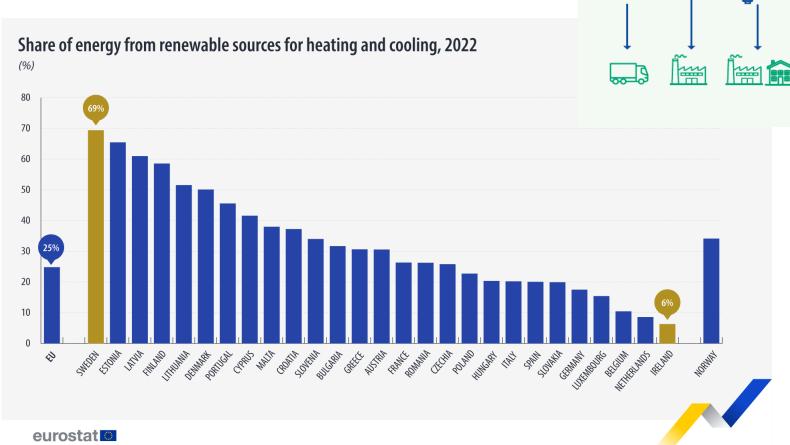
Decarbonisation of district heating: regulation, supportive policy and financial frameworks by EU

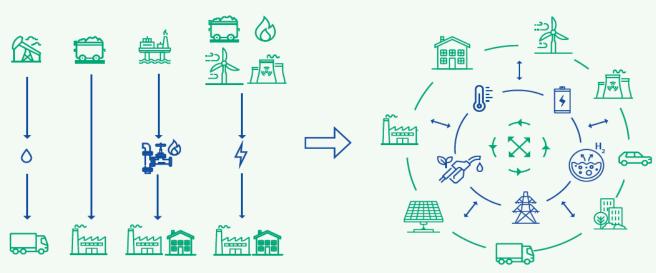
Workshop "Accelerating the European district heating (DH) rollout – Unlocking the potential of financial markets"

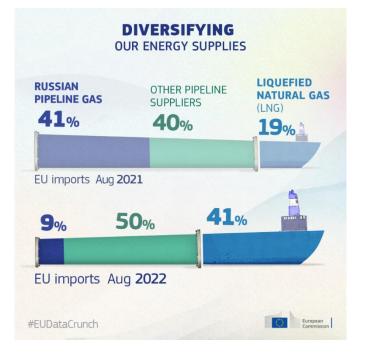
Madis Laaniste

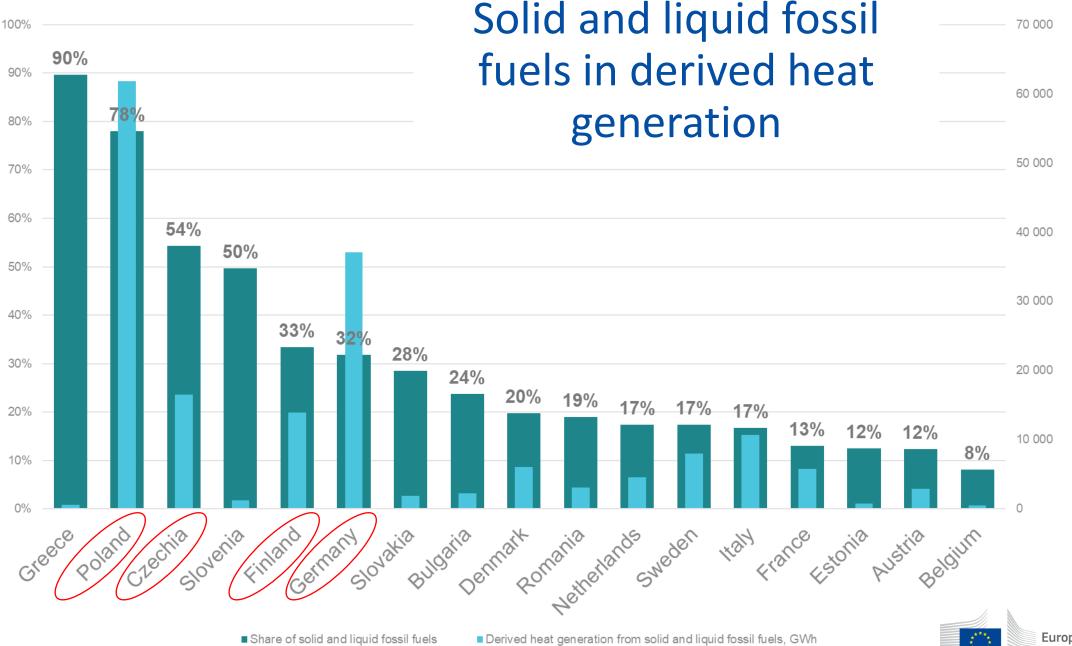
DG Energy

Transition in heating and cooling supply







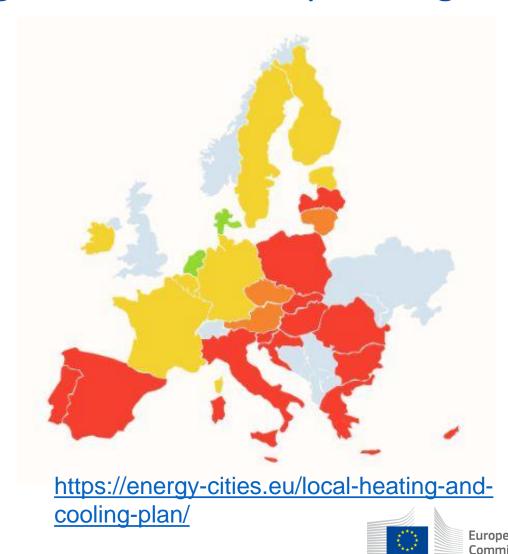




Directive (EU) 2023/1791

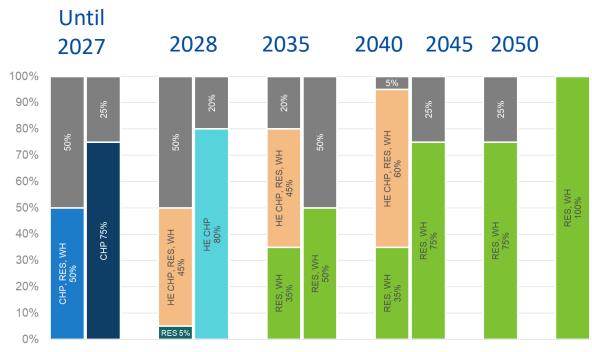
Article 25: Heating and cooling assessment and planning

- Comprehensive heating and cooling assessment in NECPs
- Regional and local authorities to prepare local heating and cooling plans
- at least in municipalities with a total population higher than 45.000



Directive (EU) 2023/1791 Article 26: Heating and cooling supply

- Progressive evolution of efficient district heating and cooling definition in view of the sector decarbonisation in 2050
- District Heating and Cooling conversion plans
- For systems having total heat and cold output ≥ 5 MW and not meeting the requirements for the EDHC



WH – waste heat; HE CHP – high-efficiency cogeneration



Actions to support the implementation of the EED







EED GUIDANCE DOCUMENTS

BILATERALS WITH MS AND EED EXPERT GROUP

CONCERTED ACTION ON EED



Financing initiatives



Article 30 EED: Financing energy efficiency

Facilitate the establishment of financing facilities, increase access to finance, and project development assistance to mobilise investments in energy efficiency in different sectors

Promote energy efficiency lending products (EE mortgages & green loans) by ensuring a wide and nondriscriminatory offer, and facilitate the implementation of on-bill and on-tax financing schemes Strengthen cooperation and dialogue with private and public financial institutions to mobilise private investments in energy efficiency measures and energy renovations

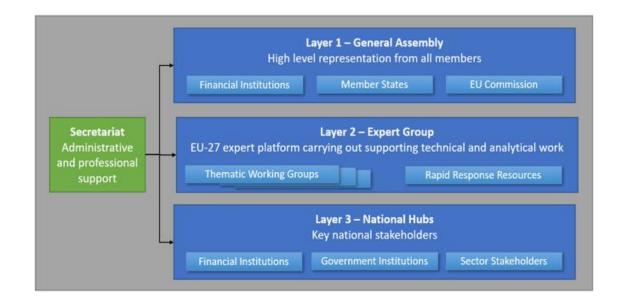
Regulate the voluntary National Energy Efficiency Fund set up by Member States

 Introduce reporting requirements on energy efficiency financing (volume, leverage factor, lending products)



European Energy Efficiency Financing Coalition

- facilitate the implementation of energy efficiency financial instruments and schemes under EU funding programmes
- foster or facilitate further private investment in energy efficiency projects





EU Taxonomy Regulation: Climate Delegated Act on District Heating

Annex I: Contributing substantially to CC mitigation

- Pipelines and associated infrastructure in EDHC (or where the conversion to EDHC starts after 3 years)
- Eligible activities
 - Lowering temperature regime
 - Advanced pilot systems

Annex II: Contributing substantially to CC adaptation

- Construction, refurbishment and operation of pipelines and associated infrastructure for DHC
- Interventions, where climate risk and vulnerability assessment provides justification
- Criteria for adaptation solutions



Thank you!



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Driving investments in DHCN – Lessons learnt from the REWARDHeat project

Prof. Dr. Tobias Popovic´

Investors' Conference on

"Accelerating the European district heating rollout: Unlocking the potential of financial markets"

Brussels, May 14th, 2024

Hochschule für Technik
Stuttgart

Driving investments in DHCN...



- 1. Introduction and Background Financing the "Great Transformation"
- 2. Regulatory Tailwind (and Confusions?)
- 3. Current DHCN-Financing Structures in Europe (Selection)
- 4. Innovative Financing Structures for a DHCN-Rollout
- 5. Conclusions, Outlook, Recommendations

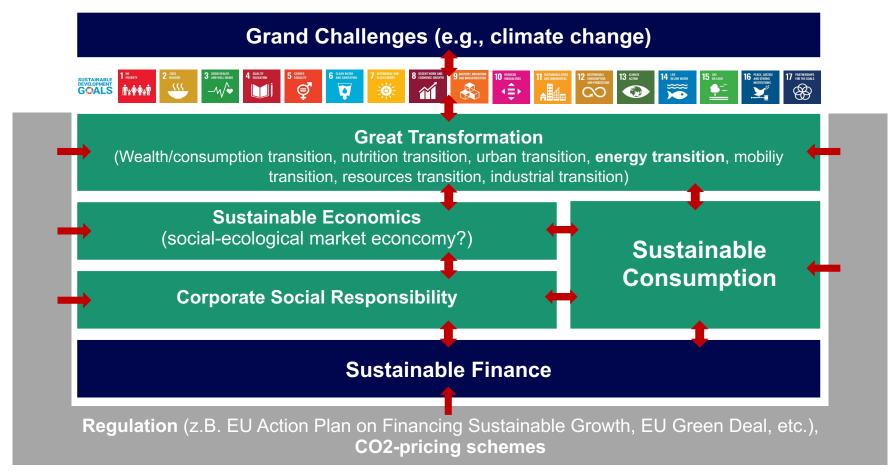
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Regulatory Actions aim at Rechanneling Capital Flows for a Sustainable Transformation

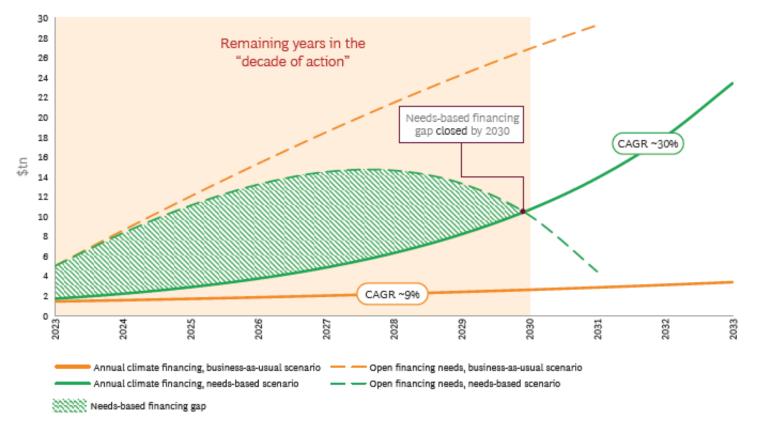




Source: own representation based on Popovic, T. (2021): Wird Nachhaltige Unternehmensführung zum Standard? Implikationen des EU Action Plan on Financing Sustainable Growth, in: Rogall, H. et al. (Hrsg.) (2021): 7. Jahrbuch Nachhaltige Ökonomie (2020/21) – Im Brennpunkt: Nachhaltiges Wirtschaften und Innovation, Marburg 2021, p. 94; Picture source for SDGs: https://sustainabledevelopment.un.org/?menu=1300

To Catch Up With Annual Needs, the Climate Finance Growth Rate Must Triple by 2030





Source: BCG and KfW analysis, using 2022 CPI/IRENA estimates. Chart compares annual private climate funding projection in a business-as-usual scenario in which climate financing continues growing at the 2015–2022 compound annual growth rate (CAGR) of approx. 9%, and a needs-based scenario in which financing grows by 30% every year. Open financing needs are obtained by adding the \$5 trillion financing need for a given year to the financing shortfalls of the previous years. (The 2022 estimate is projected to 2023 using CAGRs of the respective scenarios.)

- According to recent studies, for the next 30 years, globally, climate financing of \$3 - \$ 5 trillion p.a. over the next 30 years is needed (\$90 - \$150 trillion in total).
- This is significantly more than current public and private investments (approx. \$1.3 trillion in 2022).
- In theory, the money is there:

 Member institutions of the
 Glasgow Financial Alliance for Net
 Zero have \$ 150 trillion AuM.

Source: Benyad, A./Köhler,-Geib, F. et al. (2023), KfW/BCG (Eds.) (2023): The Climate Financing Roadmap - Joint Publication for COP28, Frankfurt, November 2023, pp. 5-6

How close the DCHN-Financing Gap?



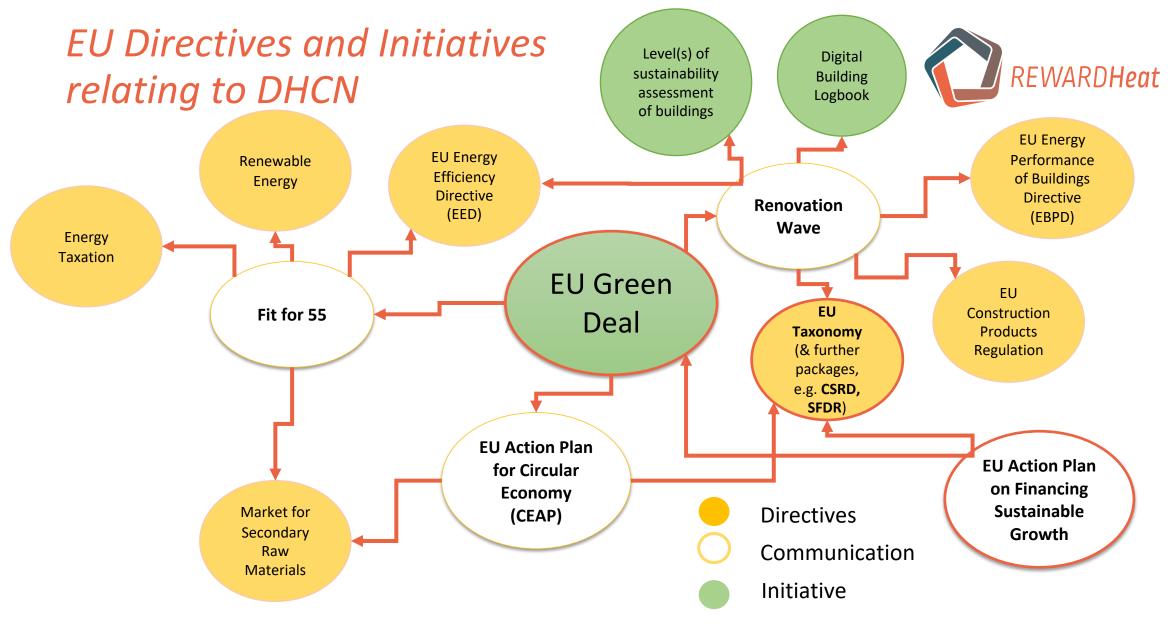
- Climate change as an increasingly relevant "Grand Challenge"
- "Great Transformation" of society and economy towards sustainability necessary
- **Decarbonization**, esp. of the building sector (approx. 35% of EU's carbon emissions) as a key issue
- In the context of the heat transition District Heating and Cooling Networks (**DHCN**) could provide **part of the solution**, but would require massive investments in the near future
- High investment requirements (EUR 30 100 billion in Germany alone by 2030, at least EUR 120 billion in the EU)
- Against the background of the high public debt levels governments probably will not be able to provide the funding needed
- E.g., in **Germany** either will the federal government's Climate and Transformation Fund (with EUR 750 million dedicated to the transformation of DCHN) provide sufficent funding!
- Key question, if and how financial markets could potentially fill the increasing funding gap

Source: Popovic, T./Lygnerud, K./Denk, I./Fransson, N./Unluturk, B. (2023), Blended Finance as a Catalyst for Accelerating the European Heat Transition?, Conference Paper and Presentation, SDEWES-Conference, Dubrovnik, September 25-29, 2023; Hamburg Institut/Prognos (2022): Perspektive der Fernwärme, Gutachten im Auftrag des AGFW, Hamburg 2020, S. 16f.; https://www.bundesregierung.de/breg-de/aktuelles/der-klima-und-transformationsfonds-2024-2250738

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Source: Denk, I./Popovic, T. (2024): Based on https://www.sustainablefinance.ch/upload/rm/ss/fp/ssf-pub-report-real-estate-de-final-1.pdf?_=1705408321654; https://www.construction-products.eu/publications/green-deal/

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DHCN-funding in practice – E.ON (Europe) REWARDHeat



Country / Organisation	How does the financial struture look like?	Which (sustainable) financial instruments are used?
e.on	Financing via the capital market	 Green Bonds Issuance of green bonds in the amount of €1.5 billion for the financing of "green" projects in 2024

Source: Denk, I./Popovic, T. (2023): Own Research Results REWARDHeat Project, based on desk research and interviews/workshops,; https://www.eon.com/content/dam/eon/eon-com-assets/documents/investor-relations/en/presentations/230315-facts-and-figures-2023final.pdf; https://w3.windmesse.de/windenergie/pm/45167-eon-vorfinanzierung-anleihe-grun-projekt-energiewende-deckelung-marktumfeld-anleihetranche-green-bonds

DHCN-funding in practice – A2A (Italy)



Country / Organisation	How does the financial struture look like?	Which (sustainable) financial instruments are used?
	 At A2A, all DH investments are on one balance sheet Financing is also provided by the European Investment Bank (EIB) subsidies (only to a small extent) Wide range of investors (e.g. pension funds etc.) Investments must reach certain target values in order to be continued 	 Green Bonds (Green Bonds start with €500 Mil.) Other "green" Investments

DHCN-funding in practice – EDF (France)



Country / Organisation	How does the financial struture look like?	Which (sustainable) financial instruments are used?
	 There is a public DH fund for renewable energies (incl. DHCN), which provides 20-30% of the financing. With the Chaleur @ADEME fund, financing is based on CO2-reduction If a project is worth more than €20 million, a third party investor is sought 	Green Bonds are used by EDF for the refinancing of investments

DHCN-funding in practice – Kommunekredit (Denmark) – a role model for other countries?



Country / Organisation	How does the financial struture look like?	Which (sustainable) financial instruments are used?		
KOMMUNEKREDIT	 Access to the capital market through EMTN program 1993 Maximum outstanding amount: € 30 billion Dealers in the programBNP PARIBAS Deutsche BankMorgan Stanley etc. Program is listed on the stock exchange in Luxembourg Main paying agent: Citibank ★ KommuneKredit serves as a financial platform that refinances itself with green bonds and other financial instruments 	 Green Bonds Green Loans Mortgage Funds Loans are granted for 30 to 40 years at fixed interest rates 		

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How to Attract Investors for Longterm-Financing of DHCN-Infrastructure?



Infrastructure

Business
Model

Investment
Story / Case

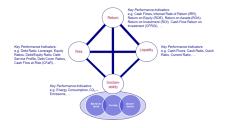
Attracting
Investors

Investors

Agreement on
Financing
Instruments











DHCN along the Infrastructure Finance Lifecycle – Investors and Financing Instruments



	Strategy / Development / (Re-)Investment	Construction / Refurbishment	Operation / Maintenance	Termination / Sale
Investors	 Equity sponsors, e.g. Utilities Governments/ municipalities/ multilateral institutions Infrastructure funds Private equity Pension funds? Debt investors: Promotional banks Multilateral institutions/ Development Finance Institutions (DFIs) (e.g. EIB) Bank syndicates 	 Equity sponsors, e.g. Utilities Governments/ municipalities/ multilateral institutions Infrastructure funds Private equity Pension funds? Debt investors: Promotional banks Multilateral institutions / Development Finance Institutions (DFIs) (e.g. EIB) Bank syndicates 	 Investment funds Infrastucture funds Pension funds Sovereign wealth funds (Re-)Insurance Companies 	 Investment funds Infrastructure funds Pension funds Sovereign wealth funds (Re-)Insurance Companies
Financing Instruments	 Subsidies Blended finance/PPP (Private) Equity Debt: Promotional loans (Syndicated) (Green) Loans (Green) Bonds? 	 Subsidies Blended finance/PPP (Private) Equity Mezzanine Debt: Promotional loans (Syndicated) (Green) Loans (Green) Bonds? 	(Green) Bonds (Green) Loans 2 Conference Paper and Presentation, SDEWES-Conference.	 Leveraged finance M&A-transaction Trade sale Initial public offering (IPO)

Source: Popovic, 1.7 Lygnerod, K./Denk, I./Fransson, N./Unluturk, B. (2023), Blended Finance as a Catalyst for Accelerating the European Heat Transition?, Conference Paper and Presentation, SDEWES-Conference, Dubrovnik, September 25-29, 2023, based on White & Case (2019, https://www.whitecase.com/publications/insight/virtuous-cycle-creativity-and-innovation-infrastructure-finance), Ehlers, Thorsten (2014): Understanding the challenges for infrastructure finance, BIS Working Papers, No 454, BIS, Monetary and Economic Department, Basel 2014, August 2014, p. 5 · OFCD (2015): Infrastructure Financing Instruments and Incentives and Incentive and Inc

Channeling Funding into DHCN — Investor-Financial-Instruments Matrix

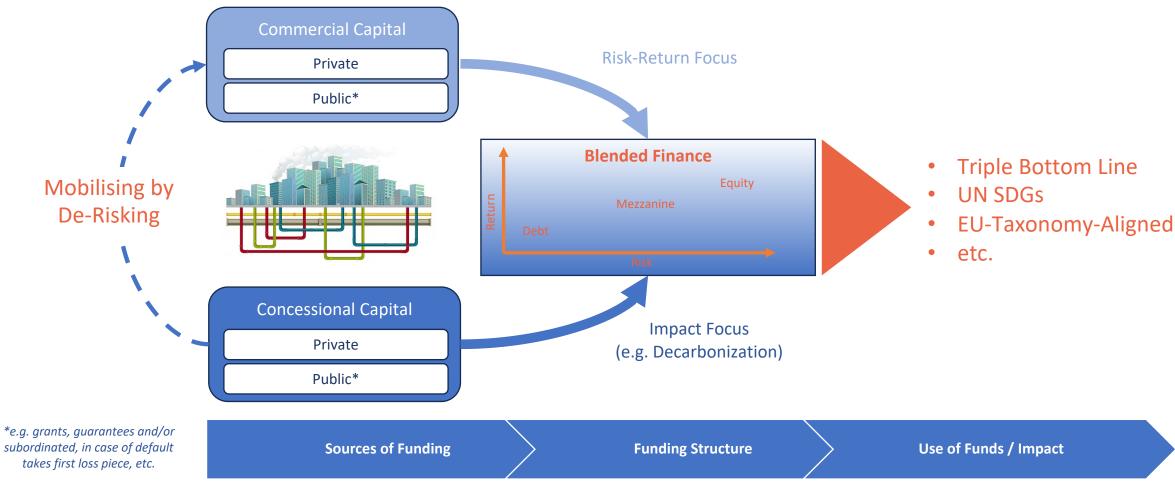


	Equity	Mezzanine	Debt (esp. Green-/ESG- Linked Bonds)	Structured and Cashflow Based Finance	Grants / Subsidies / Subsidized Funding	Blended Finance	Others, e.g., Contracting
Public Institutions	+	-	0	+	+	+	0
Banks	-	0	+	-	0	+	-
Investment Funds	+	0	+	-	-	+	-
Pension Funds	+	-	+	-	-	+	-
Insurance Companies	+	0	+	-	-	+	-
International/ Multilateral Financial Institutions	-	-	+	+	+	+	-
Industrial Investors (e.g. Utilities)	+	0	-	-	-	0	0

Source: : Own illustration (based on Popovic 2013, p. 56)

Blended Finance – A Conceptual Overview





Source: Popovic, T./Lygnerud, K./Denk, I./Fransson, N./Unluturk, B. (2023), Blended Finance as a Catalyst for Accelerating the European Heat Transition?, Conference Paper and Presentation, SDEWES-Conference, Dubrovnik, September 25-29, 2023, https://www.nesonsability.com/de/magazin/blended-finance-work-for-the-sustainable-development-goals-9789264288768-en.htm (2018); https://www.responsability.com/de/magazin/blended-finance-fur-mehr-nachhaltigkeit-im-portfolio (2023); https://caps.org/resources/glossary/ (2023).

Different vehicles and bundeling options – and their advantages

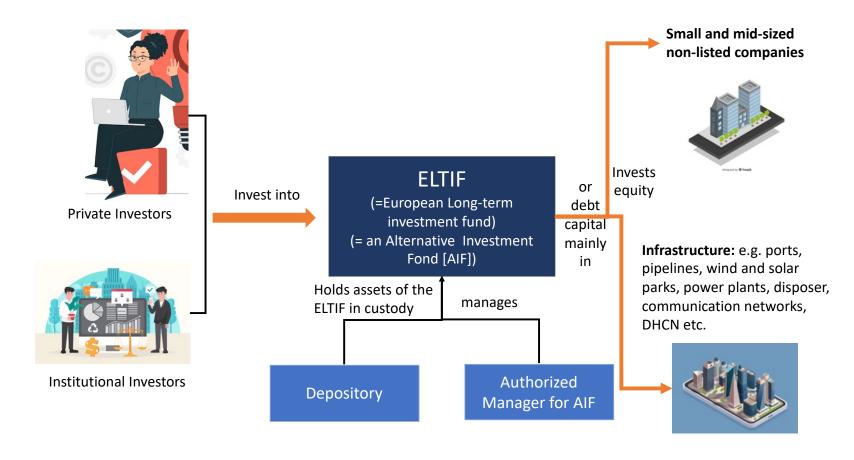


(Sustainable Finance Advisory Committee of the Federal Government)

Municipal loans bundled via banks	Fund structures (AIF etc.)	Infrastructure umbrella company (with public participation)	Infrastructure umbrella company (without public participation)
 Long-term business relationships in the regions, including with smaller municipalities, public customers and municipally owned companies (municipal utilities, etc.). Cost-efficient origination structure through existing sales channels in the regions. Two different channels via banks: off-balance (originate to distribute) and on-balance. 	 Existing and proven platform model. Efficient and professional investment process. Expertise mainly outsourced to specialised and incentivised fund managers. Bundling of usually relatively small amounts of equity per investment. Access for a wide range of investors (small/large). Generally high diversification effect for investors. (typically ensured via limits on individual borrowers, sector, etc.). 	 Dedicated set-up, e.g. focusing on municipal investments in electricity generation from renewable energies and electricity and district heating grids in Germany. A special group of investors focussing on German institutional investors could increase acceptance of private capital among municipalities. Public sector involvement could further increase acceptance. Blended Finance? 	 Dedicated set-up, e.g. focusing on municipal investments in electricity generation from renewable energies as well as electricity and district heating networks in Germany. A special group of investors focusing on German institutional investors could increase acceptance of private capital among municipalities.

ELTIFs – A promising Alternative, Targeting at Retail Investors?





Source: Own Illustration based on Union Investment (2023), https://unser-digital-service.de/vuero, www.freepik.com

DHCN Energy Cooperatives as an Alternative Option? Esp. for Municipal Utilities?



- Founding new DHCN Cooperatives Best Practices (Germany):
 - Nahwärme Heede eG
 - Venner Energie eG
 - Bürgerenergie Bohlsen eG
- Converting "Stadtwerke" into Energy Cooperatives?
 - Mobilisation of private capital locally
 - More equity as a basis for additional debt funding
 - -> higher overall funding capacity
 - Citizens as shareholders, identification with with "their own" company

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Conclusions, Outlook, Recommendations



- More holistic approaches than before (openness to technology, individual buildings and neighbourhoods/ districts, energy efficiency and renewable energy supply, etc.)
- View the neighbourhood/district as an innovation ecosystem and investment object
- **Prioritise area-wide "roll-out" of DHCN**, with measures at individual building level (e.g. energy efficiency, heat supply) only as a second step
- Inclusion of different regulatory frameworks, important: harmonisation of the EU Taxonomy with the EPBD, CEAP, EED, etc.
- Esp. in Germany a more flexible regulatory-(tax)-framework for investment funds needed
- Standardised, taxonomy-compliant DHCN-data and -digital tools, esp. for KPIs
- Municipalities and "Stadtwerke" should consider financial markets and financial institutions as
 powerful partners for mastering the heat transition
- Impact-orientated financing, insurance and subsidized financing
- Attract investors by utilizing **innovative finance instruments** (e.g., Blended Finance, Sustainable Finance)
- Setup of a **nation-wide financing agency/platforms for municipalities** needed (c. Denmark, France)?

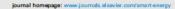
Recent publication





Contents lists available at ScienceDirect

Smart Energy





Blended finance as a catalyst for accelerating the European heat transition?

Tobias Popovic a, Kristina Lygnerud b, Ilka Denk a, Nathalie Fransson C, Bureu Unluturk b

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ARTICLEINFO

District heating and cooling networks (DHCN)

Against the background of accelerating climate change, this paper examines to which extent sustainable infrastructure finance can effectively contribute to the European heat transition as a part of a "Great Transformation" towards a climate neutral economy and society. Since the building sector is responsible for approximately 35% of the EU's carbon footprint, district heating and cooling networks can provide an efficient technology for decar-bonizing the energy supply of buildings. New district heating and cooling networks technology allows for heat and hot water generation that is combustion free. A large-scale role-out of this infrastructure would require hundreds of billions EUR of investments within the next few years. In view of the high public debt, the public sector will not be able to finance the required investment volumes. Against the background of regulatory changes, such as the EU Action Plan on Financing Sustainable Growth, this paper examines in which way financial markets participants might be able to fill the funding gap. A particular focus lies on blended finance, since related instruments reduce investors' risks, esp. in early stages of the infrastructure lifecycle. Due to an improved risk-return-relationship this makes the investment more attractive to private investors. It is also essential for investors to understand the kind of business model they invest in. Therefore, we discuss the importance of key performance indicators in the four dimensions that are relevant for the investors' decisionmaking process: return, risk, liquidity and sustainability. With respect to the sustainability dimension, we elaborate on the relevance of EU-Taxonomy-aligned district heating and cooling networks' construction and

Accelerating climate change has become an increasingly relevant "Grand Challenge" for society. Meanwhile, there is broad agreement that a "Great Transformation" towards a carbon neutral economy and society is needed [1]. The term "Great Transformation" was originally introduced by Austro-Hungarian economist Karl Polanyi [2] and served as a basis to the concept developed by the Advisory Council on Global Change to the German Government (WBGU) [3]. This concept outlines how different transitions (e.g. the energy transition) can contribute to a fundamental transformation of the society and the economy [3]. Due to their ability to decarbonise the heating supply for buildings District Heating and Cooling Networks (DHCNs) are a decisive part of this process, but they can only be realized by massive investments in the near future. This insight is contrasted by the fact that public institutions like cities and municipalities have to cope with high public deficits and debt

levels making them unable to provide the necessary funding. Conse quently, one key question is how this increasing funding gap can be filled by financial markets and investors. If investors' money shall function as a "game changer" in the heat transition, the European Union (EU) has to continue to create a favourable regulatory environment for financial markets and its institutions, as it already did with the EU Action Plan on Financing Sustainable Growth and the Green Deal etc. This paper tries to find out what measures are necessary to redirect capital flows into the realization of sustainable infrastructure projects. In spite of the District Heating (DH) sector being a sector that has been pointed out to be important for the European energy transition, there is limited information about how to unlock new, green systems by resorting to the funds that the EU are allocating to greening the EU economy. This gap is explicitly addressed in this paper. by the following questions: Can DH be an enabler in the energy transition? What regulatory changes can make financial markets more accessible? Which investor (groups) are willing

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Source: Popovic, T./ Lygnerud, K; Denk, I.; Fransson, N.; Unluturk, B. (2024): Blended finance as a catalyst for accelerating the European heat transition?, Smart Energy, Volume 14, 2024, 100136, ISSN 2666-9552, https://doi.org/10.1016/j.segy.2024.100136

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Invitation to provide feedback on how to improve regulation (either in the room or on Miro)



- Which KPIs along the "Magic Square" do you consider necessary/useful for your investment decision-making (e.g., ROI, IRR, CO2-emissions, etc.)?
- What obstacles/difficulties do you see in connection with the Taxonomy and the regulatory environment?
- **What chances** do you see in connection to the Taxonomy in accelerating the transition to a low-carbon and more sustainable economy?
- What would you identify as "drivers" and "barriers" of the Taxonomy?
- Do you think that the EU Taxonomy can promote greater accountability and consistency in reporting on environmental impacts, leading to better-informed decision-making by investors and companies?
- In what way would the **regulatory environment** (taxonomy, green deal, EED, RED, EPBD, etc.) **need to change** in order to accelerate channelling investments into DHCN?
- https://miro.com/welcomeonboard/bWJxeDlRek8yb3dKY2NJUlhudGx1bXNGM3JCWGZNeGZzUFFBTEs2VTJVZlNJSW13QzJ4RjFocWxCOU1lSmFXMHwzNDU4NzY0NTU0MDg4ODcxODU5fDl=?share_link_id=642892123432



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Thank you www.rewardheat.eu





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Joint and several liability

All of Denmark's municipalities and regions are members of KommuneKredit. They have joint and several liability for our obligations, and combined with our very secure business model this provides KommuneKredit with the highest possible credit rating - in line with that assigned to the Kingdom of Denmark.



Joint and several liability

KommuneKredit is an association. The members -Denmark's 98 municipalities and 5 regions represent the entire Danish population and are jointly and severally liable for our liabilities.

Safe link

Acting as a safe link between global funding and local lending, KommuneKredit provides a financial foundation for developing the Danish welfare society.

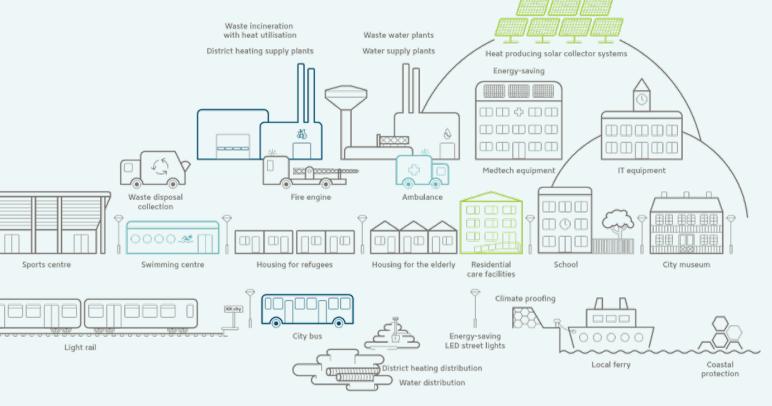
Funding of lending

KommuneKredit funds its lending by issuing securities in the Danish and international capital markets

Financing growth and development

KommuneKredit funds public undertakings

KommuneKredit's lending covers many different local projects in Danish society, including many green investments as well as an expansion and improvement of the infrastructure.



KommuneKredit's lending and leasing

Nominal amounts per 31 December 2023

	DKKbn	EURbn
Lending	187	25,1
Leasing	11	1,5
Total	198	26,6

Lending by loan category	DKKbn	EURbn
Municipalities	73	9,8
Regions	23	3,1
District heating	38	5,1
Water and waste water	26	3,5
Waste incineration	4	0,5
Other categories	23	3,1
Total lending	187	25,1

Outstanding debt amount

The original disbursed loan amounts are higher as the loans are amortizing.

KommuneKredit's lending to district heating projects





Construction credits are established with an agreed maximum loan amount and are a temporary financing with variable interest rates, which can be drawn on an ongoing basis during the construction phase.

After the construction period, the final financing is established, in accordance with the Executive Loan Order, i.e. provisions regarding maturity of loans, etc.

The final financing is typically a 30-year amortizing loan with fixed or floating interest rate.

KommuneKredit's lending framework



The Danish Act on KommuneKredit

KommuneKredit's purpose is to provide loans in Denmark exclusively

- to Danish local governments
- to certain other Danish enterprises, where such enterprises fulfill **public tasks**, and where the loan is fully guaranteed by one or more local governments
- KommuneKredit does not take on a credit risk.
- E.g., when financing a DH project, we do not make a credit assessment of the DH company, nor do we make a business case assessment.



EU state aid rules

With every loan from KommuneKredit, there is an inherent element of subsidy – the favorable interest rate:

- The Danish local governments (members of KommuneKredit) are jointly and severally liable for all of KommuneKredit's obligations ->access to funding on favorable terms.
- KommuneKredit channels this 'advantage' to its borrowers.

KommuneKredit is a so-called **special credit** institution; entails that all loans must comply with the FU state aid rules. KommuneKredit 6

Special credit institutions

According to the European Commission's decisions, special credit institutions are allowed to grant two types of financing:

"Special credit institutions may be granted state guarantees for the execution of **public tasks**

- to finance entities of the State sphere (e.g., municipalities) without restrictions, or
- to generate and distribute subsidies to **other beneficiaries** at the request of the public authorities but only if this is in line with the state aid rules vis-à-vis the final beneficiaries'.
 - Includes loans to **other beneficiaries**, whose activities are on a market with competition:

`[The special credit institution offers] cheaper housing conditions, through rents and construction loans, to certain consumers and are in doing so in competition with other operators in the housing market."

Application of the Commission's principles on special credit institutions -4 conditions:

- The loan is issued at the request of a Danish local government.
- The loan proceeds are used to fulfill a public task (clear legal basis).
- 3) KommuneKredit channels its funding advantage to the borrowers (does not compete with commercial credit institutions).
- 4) Each loan shall be in line with the state aid rules, i.e.
 - either it's not defined as state aid
 - or it is state aid exempted from notification (or authorised by the Commission).

District heatinga public task

The Danish legislation on collective heating:

- Provides the legal basis for the Danish municipalities to issue an unconditional and irrevocable loan guarantee to a DH company (publicly or privately owned), covering 100% of the capital investment.
- The municipality has the local heat planning competence and shall approve new collective heating projects.
- Cost-based prices (however with a maximum price*) a non-profit activity.

Conclusion

KommuneKredit's loans to district heating companies fulfill a public task in Denmark.



Local monopoly or competition?

Loans to different kinds of district heating projects and different types of district heating investments across the country

- An assessment as to whether the DH infrastructure in question faces no direct competition.
- In the light of the Danish legislation of collective heating:
 - The district heating sector has not been liberalized.
 - The DH company has a de facto monopoly in a given area, approved by the authorities to be a DH area (the DH company then has the heat supply obligation).

Conclusion

If no direct competition in a given area, 'distortion of competition' is excluded as to a given loan.

However ...

Recent regulatory changes could imply changes in the competition situation in relation to competition from individual heat pumps:

- The abolishment of the obligation of the consumers to connect to the network.
- Changes in electricity taxes.
- Aid schemes for individual heat pumps (if no municipal heat plan to roll out DH).

Revised and more flexible EU state aid rules - aid for energy efficient DH

Two new EU regulations:

'To create a flexible, fit-for-purpose enabling framework to help member states provide the necessary support to reach the **Green Deal objectives'**

- include state aid to district heating systems.

- The EU Commission's 2022 Guidelines on State aid for climate, environmental protection and energy, adopted in January 2022.
- The EU Commission's revised General Block Exemption Regulation (GBER), adopted in June 2023.
 - Lays down ex ante compatibility conditions on the basis of which member states can implement state aid measures without prior notification to the Commission.
 - Includes a wider and more flexible scope for investment aid for energy efficient DH systems (art. 46):

'District heating and cooling systems' consist of **heat generation facilities** (heating/cooling production plants), the heating/cooling **storage** and **distribution network** (both 'primary' - or transmission- and 'secondary' network of pipelines to supply heat to consumers)'.

'Energy efficient district heating and cooling' means a district heating or cooling system using at least 50% renewable energy, 50% waste heat, 75% cogenerated heat or 50% of a combination of such energy and heat'.

REWARDHeat

Investment and trading platforms for transition finance with focus on district heating and cooling networks



CHALLENGE TRANSITION FINANCE



Investment need

 Financing energy transition necessitates immense investments in infrastructure, supply and networks



Forecast Germany

- Forecast for Germany until 2030: EUR 600 billion investment need
 - out of which EUR 100 billion is needed for decarbonizing heat production, network infrastructure and power plants
- Forecast for Germany until 2045: EUR 1,2 trillion to EUR 5 trillion investment need
- 2022 investments in Germany of EUR 22.1 billion in energy transition – EUR 100 billion would be required to achieve 2030 goals



Private sector contribution

- Approx. 90 per cent. of funding volume needs to come from private sector/capital markets
 - Standardisation, efficiency, market access and speed are of essence





MAJOR TRENDS IN FINANCING MARKETS



High regulatory requirements

- High costs relating to processes and regulatory compliance increase financing costs
- Increased requirements regarding transparency affect margins
- Own funds requirements limit lending capacity of energy suppliers and network operators



Changing investor universe

- New international investors access the market
- Regulatory privileges for individual investor groups
- Low spread and interest levels increased the risk appetite of institutional investors – now different interest environment



Digital "revolution"

- Digitalization and automation as efficiency drivers
- State-of-the-art technologies reduce funding costs and accelerate processes

Platformization



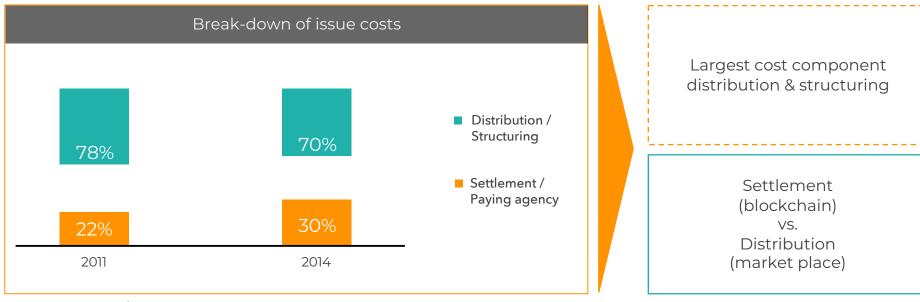


SCHULDSCHEIN: CLASSIFICATION BETWEEN LOAN AND CAPITAL MARKETS INSTRUMENT

	Loan Marke	et	Capital Markets Instrument	
	Bank Loan bilateral / syndicated	Schuldscheindarlehen	Bond	
External Rating	Not required	Not required	required / recommended	
Publicity	non	low (§ 18 KWG)	high	
Information Requirements	Low	Manageable	high, prospectus (english/german) Usually listed	
Contract Scale	Manageable	Manageable	Extensive	
Workload/ Preparation	medium: 5-6 weeks	medium: 2-3 weeks (preparation), 3-4 weeks (placement period)	high: several weeks (preparation of prospectus, clearance); short placement period (usually 1 day)	
Guarantees	Usually mortgages	Usually non-secured	Usually non-secured	
Covenants	Casewise	Yes	Yes	
Volume	Negotiable	> EUR 30 Mio.	> EUR 100 Mio.	
Maturities	Up to 10 years, If necessary up to 20 years	Usually 3-10 years with bullet repayment > 10–30 years Namensschuldverschreibung (Registered Bond)	From 2 years, usually with bullet repayment, occasionally special termination rights	
Investors	Savings Banks, Development Banks, Cooperative Banks, Private Banks, Insurance Companies, Pension Funds Known by name	Savings Banks, Development Banks, Cooperative Banks, Private Banks, Insurance Companies, Pension Funds Known by name	Asset Manager (Fonds), Banks, Insurance Companies, Private Investors Anonymous	

COST ANALYSIS IN THE SCHULDSCHEIN BUSINESS





Source: Bain-FICC 11/15

High issue costs make capital markets access more expensive for issuers and affect the profitability of credit institutions





TARGETING ALL LENDING MARKETS

PRIMARY MARKET

- Unsecured lending
 - Schuldscheindarlehen (SSD)
 - Registered bond (NSV)
 - Syndicated loan
 - Private placement / club deal
 - Leasing
 - Bilateral loans
- Secured lending
 - Asset-based
 - · Cashflow-based
 - Real estate

SECONDARY MARKET

• All types of private debt

TRANSACTIONS FUNCTIONS

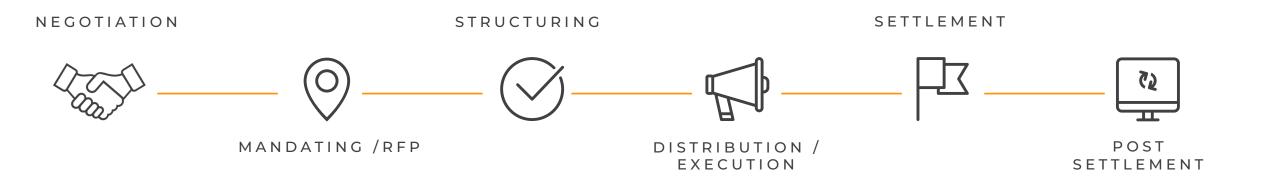
- Online Termsheet
- Transaction access
- Data room
- Message board
- Negotiation and collaboration tool
- Order book
- Document automation & e-signature
- legally binding transaction conclusion
- Settlement & life cycle management

GENERAL FUNCTIONS

- KYC area
- Largest investor network
- State-of-the-art technology & security
- Live support
- Individual user profiles



COVERING ENTIRE VALUE CHAIN IN ONE VENUE



- Documents are negotiated in parallel with all parties in real time
- Time-consuming paper documentation processes are replaced digitally
- Mandating of arranging bank for the issuance
- Pre-structuring through issuer / borrower possible
- Quick and lean onboarding of new arrangers

- Structuring of the term sheet
- Online collaboration and negotiation of documents
- Inviting suitable investors

- Electronic and legally binding commitment submission directly by the lender
- Transparent commitment overview

- · Pricing and settlement
- Automatically generated settlement documentation
- Interface to core banking systems
- · Digital proof of record

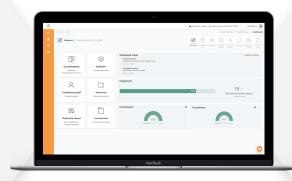
- Support through the entire lifecycle with separate agency function
- Provision of information (reports, compliance reports)



COMBINING MARKETPLACE AND INFRASTRUCTURE

MARKETPLACE

- Flexibility
 all private debt products covered
- Enhanced syndication largest digital network (>1,400 inst. investors)
- Improved client focus borrower access and real time updates
- Completely paperless digital and legally binding deal execution
- User-friendly modern technology and client support
- Rapid onboarding
 of transaction partners within mouse-clicks
- Price efficient flat syndication pricing



INFRASTRUCTURE

- Maximum efficiency end-to-end digitalization of agency functions
- Settlement in minutes documentation automation (incl. e-signature)
- **High connectivity** with core bank systems
- Compliance proof archiving and communication monitoring
- Collaboration & negotiation of loan documentation, waivers etc.
- Transfer / assignment secondary market of loans
- Price efficient flat agency pricing





THE LEADING PLATFORM FOR PRIVATE DEBT

>350 deals @ €48Mrd. ~70% of SSD/registered bond in 2023

20 Arrangers incl. EMEA Top 15 arrangers/bookrunners >1,400 inst. Investors Largest investor network spanning **EMEA** and APAC



















DSW2I

Verbund









ING

BNP PARIBAS



UniCredit



60% DACH REGION 40% INTERNATIONAL



65% BANKS 35% INSTITUTIONALS



> 14,000 individual users



...it's all about Blockchain





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Capital and transformation

What's Polhem Infra?



Polhem Infra

The Swedish AP-funds (pension funds) role is to generate a steady presictable yield and returns to the future pensioners. In doing so Polhem shall balance risk and reward carefully so that a long term return can be achived.

The first, third and forth AP-fund founded and established Polhem Infra in the spring of 2019.

- The three AP funds allocated about 900 MEuro + 900 MEuro. The first batch is allocated in different investments.
- Polhem Infra shall focus on non-listed companies and assets in the Nordic countries
- Polhem Infra's ambition is to invest together with other parties, both private and public (municipalities
- Polhem infra's investment horison is long, Polhem Infra has no exit-strategy



FÖRSTA AP3 Tredje AP-fonden APJÄRDE AP-FONDEN





Investment areas for Polhem Infra

Energy production

- Wind farms
- Hydro electric



Solar PV farms

Energy distribution

- Electric grid
- DH / DC
- Energy storage



Digital infra

- **Towers**
- Server centers
- Fiber networks



- Ferries
- Rail traffic
- Ports
- Air ports





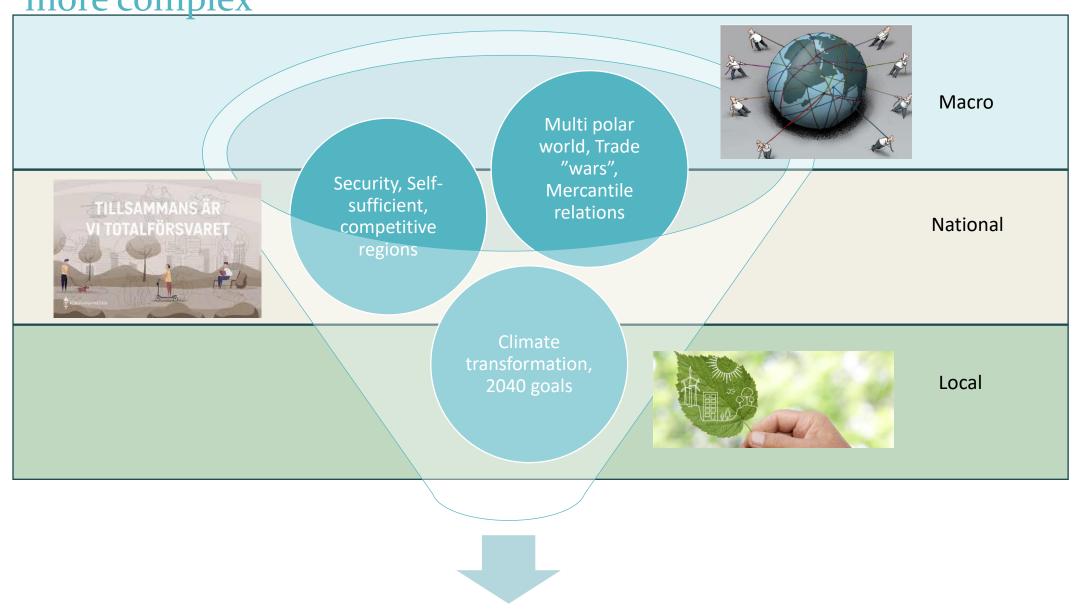


Getting down to the challenge!



The reality for infrastructure and energy companies is becoming

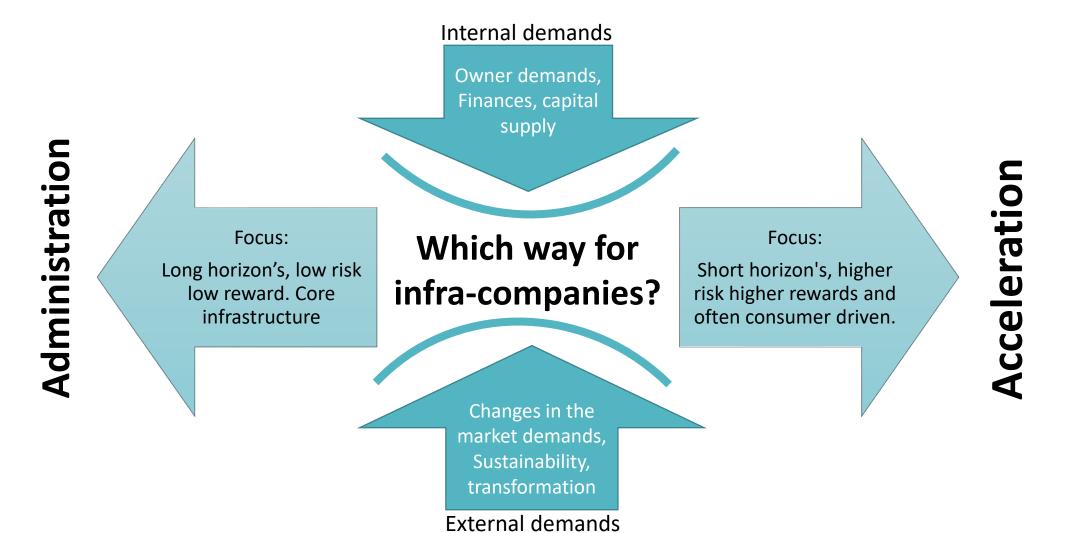
more complex





The reality for energy/infrastructure companies is changing





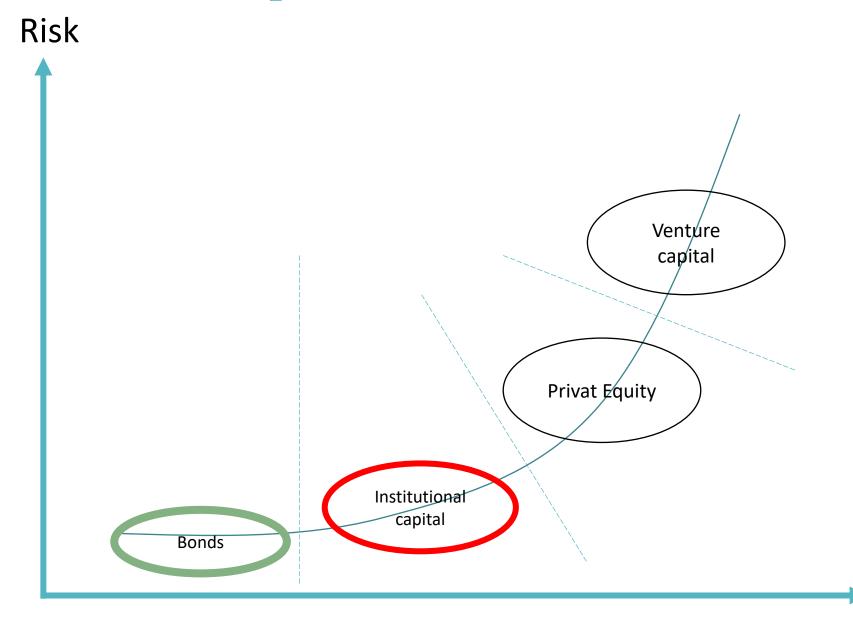


Can investors adapt?

Two scenarios

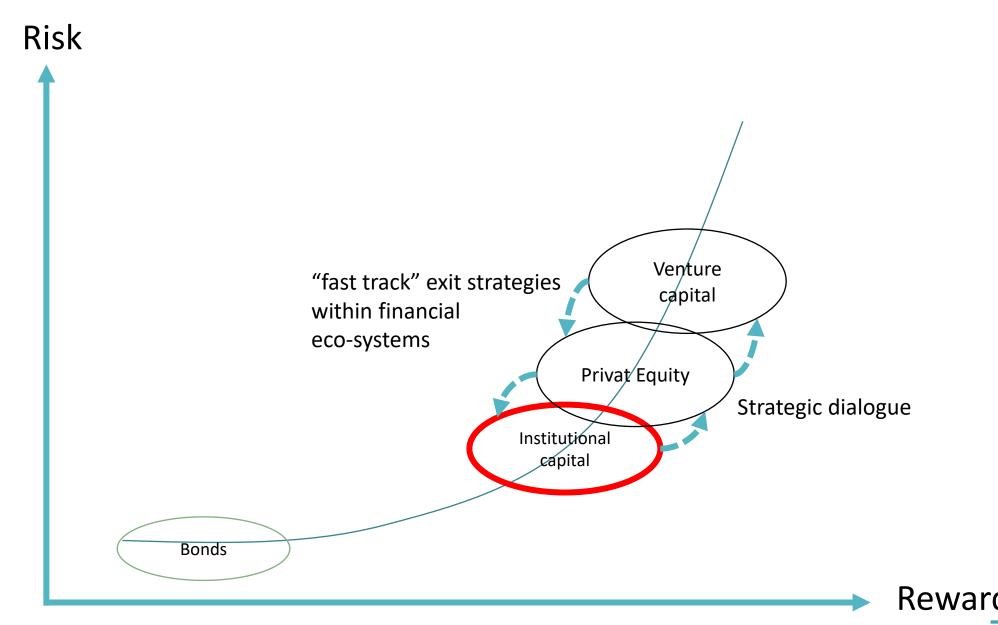


Handling risk in an accelerating environment – **traditional setup**

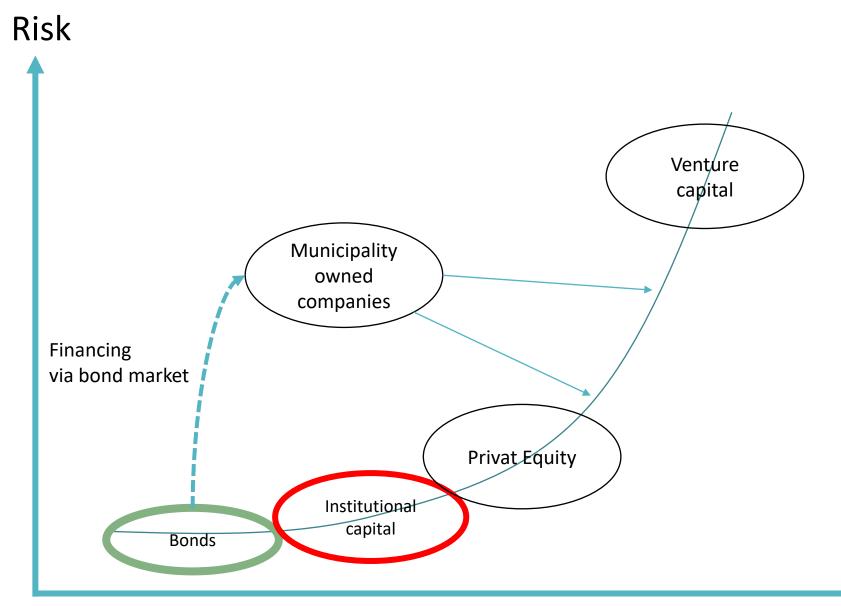


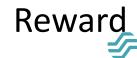
Reward

Handling risk in an accelerating environment – **fast track in the financial markets?**

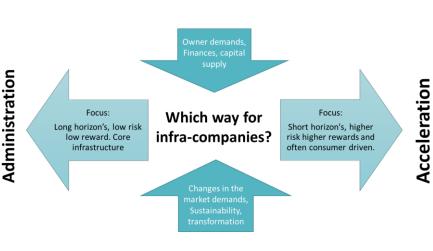


Handling risk in an accelerating environment – **borrowing from future generations?**





Polhem Infra – How we aim to work with energy and infra companies in the Nordic countries



Polhem Infra is;

- An investment company (not a fund)
- A long-term investor (ever green)

Polhem Infra needs;

- Predictable cash flow
- To invest in existing structures (green field can be acceptable in some cases)

Polhem Infra wants to;

- Own companies or assets together with municipalities
- Be an active part in the financial eco-system to bridge the gap and make transition possible
- Be a part of the future sustainable society



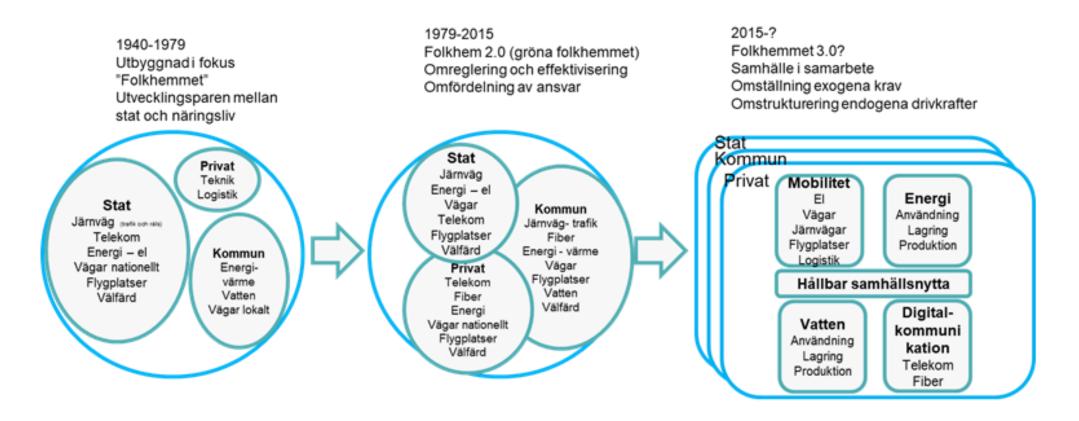
Thank you for listening!

Peter Dahl Polhem Infra

Peter.dahl@polheminfra.se



Är den nya världen verklig ny?



Källa: KUTA-projektet





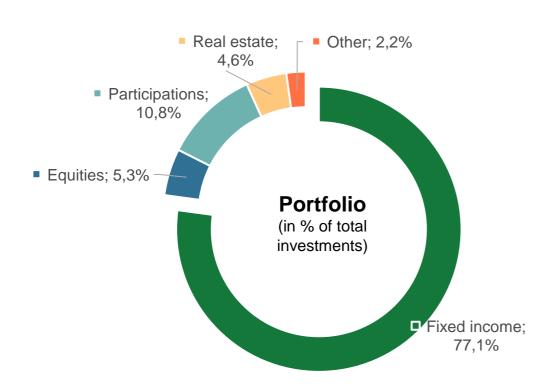
Insurance Companies as Important Investors for the European Heat Transition

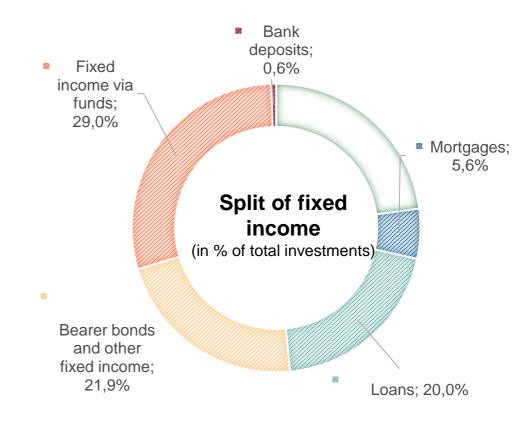
Tim Ockenga

14. May 2024 | Brussels

Split of Assets of German Primary Insurers

High Portion of Fixed Income





Total investments (book values): 1,590 bn Euro*



General Requirements for Insurers' Investments

Investment Allocation Driven by Different Factors



Returns of 10yr government bonds in Germany and the US

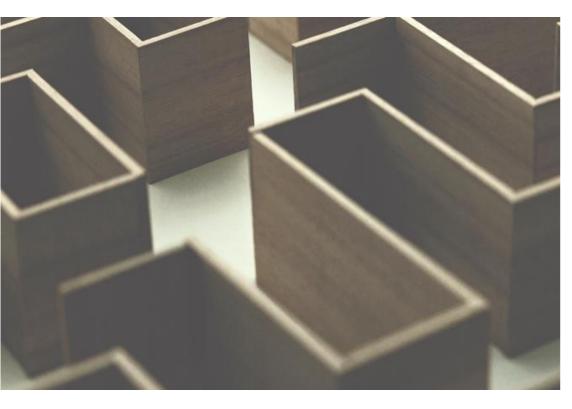
REQUIREMENTS FOR ASSET ALLOCATION

- Financial Markets: volatility; interest rates
- Liability side long-term duration of contracts with fixed guarantees
- Regulatory requirements under Solvency II: capital requirements, business organisation, reporting. Considering the Prudent Person Principles (PPP):
 - security, quality liquidity and profitability
 - Risks stemming from investments must be identified, assessed, monitored, managed, controlled and reported (§ 124 VAG)



Requirements from the Liability Side

Life Insurance Products



LIFE INSURANCE TRIGGERS INVESTMENTS

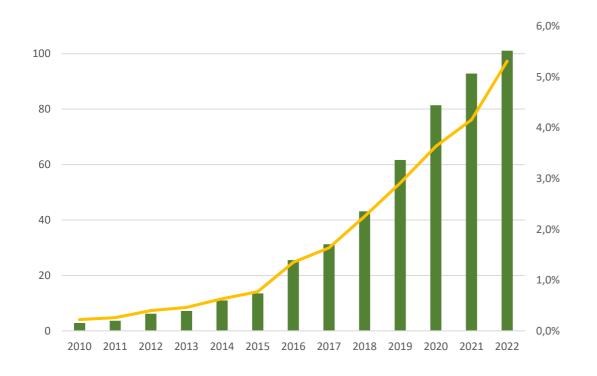
- 2/3 of primary insurers' investments are attributed to life insurance business (1 trillion Euro)
- Main part of life insurance business has significant nominal guarantees. Secure fulfillment of guarantees is the primary goal of the investments
- Duration of life liabilities is longer than duration of assets. The aim is to keep the duration gap as small as possible or even close it
- Regulatory requirements require coverage of insurance obligations at all times
- New life insurance products have fewer or no guarantees.
 Increasing flexibility in capital investments



Insurers Investments in Infrastructure

Strong Increase in the Past 10 Years

Allocation in Infrastructure (Primary Insurers)



ADVANTAGES

- Attractive returns
- Stable cashflows
- Diversification of investments
- Long duration of infrastructure = duration matching
- Mostly adequate capital requirements under Solvency II; "Qualified Infrastructure" and "Long-Term Equity", LTE

Consequences of Rising Interest Rates on Investments

What does Insurers new Investments look like?



DEVELOPMENT OF NEW INVESTMENTS

- Strong solvency ratios according to Solvency II
- Attractive returns on new investments in fixed income segment
- Focus on liquidity management
- Move towards listed government bonds and covered bonds with strong credit ratings
- Changing product portfolio: long-term trend towards alternative assets with long duration remains real: infrastructure



Sustainable Finance Beirat (SFB)

Advisory Board for the Government





COMPOSITION

- Agreed in the coalition agreement as an expert advisory board. 34 representatives from the real and financial industry, science and civil society
- Additional representatives from associations, civil society and science as permanent observers

TASKS

- Advises the Government on sustainable finance issues
- Develop Germany to a leading sustainable finance destination



SFB – PG Financing Sustainable Transformation

Financing of the Transformation is a SFB Core Topic



4 Project Groups

- Industrial Companies
- Mittelstand
- Start-ups
- Sustainable Infrastructure

APPROACH

- Interdisciplinary working groups made up of members of the SFB and observers as well as external experts
- March December 2023



Discussion Paper on Sustainable Infrastructure

SFB Paper Published in December 2023

Sustainable Finance-Beirat



Diskussionspapier

zum Ausbau nachhaltiger Infrastruktur in Deutschland: Ein Beitrag des SFB zum "Deutschland-Pakt"

Arbeitsgruppe: Zukunftsfähige Transformationsfinanzierung

Unterarbeitsgruppe: Infrastruktur

AutorInnen: Matthias Kopp, Mica Valdivia, Tim Ockenga

RECOMMENDATIONS

- Improving legal and procedural framework conditions
- Improving equipment and funding for local authorities
- Improving investment conditions for private capital



Legal and Procedural Framework Conditions

Important Role of the Central Government in Setting the Right Framework Conditions



RECOMMENDATIONS

- Reset for administrative effort with respect to application and approval processes
- Reduction of possibilities for objections and the risk of lawsuits
- Consistently aligning infrastructure procurement with the life cycle concept



Equipment and Funding for Local Authorities

Achieving "LNG Speed" in the Municipal Area



RECOMMENDATIONS

- Improving personnel capacities at the level of municipals and service providers
- Stronger consideration of federal structures in achieving climate goals
- Expansion of the competence and consulting services on the level of Länder and municipals
- Introduction of uniform and simple sustainability standards (e.g. contracts, KPIs)
- Increased use of bundling options
- Better financial resources for municipals / transformation fund



Investment Conditions for Private Capital

Systematically Involve Private Capital



RECOMMENDATIONS

- Greater use of cooperative partnership models (PPP)
- Continuous deal flow
- Further development of the use of funding and guarantee instruments / credit enhancements
- More research on how to trigger investments and avoid misallocations



Overview of Recommendations for Action

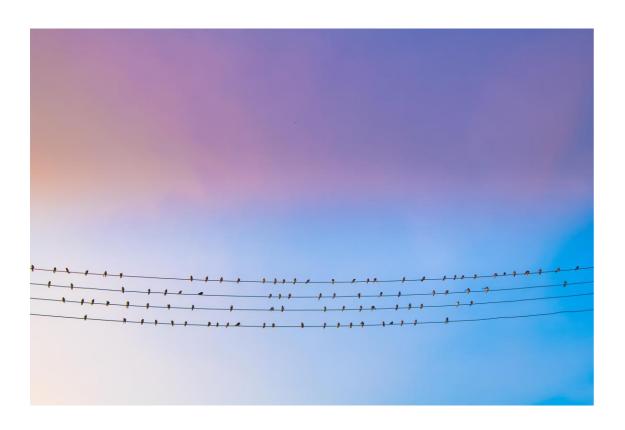
Further Discussions in 2024 and Beyond...

Zie	el	Handlungsempfehlung	Adressat der Empfehlung
i.	Institutionalisierter Dialog zum Ausbau nachhaltiger Infrastrukturen auf Ebene von Bund, Ländern und Kommunen, um Anpassungen der Rahmenbedingungen sowie Unterstützung durch Bund/ Länder abzustimmen	 Prüfung der Potentiale eines solchen institutionalisierten Dialogs. Regelmäßige Information und Austausch über Herangehensweisen zur Umsetzung europäischer und nationaler Gesetzgebung im Zusammenhang mit Klimaschutz (Best Practices). 	Kommunale Spitzenverbände. Landesförderinstitute. Insbesondere BMWK, BMUV, BMF, BMWSB, BMDV. BMF Koordinatorenrolle.
ii.	Erweiterung und Finanzierung der in den auf Ebene der Länder bestehenden Kompetenz- und Beratungsangebote mit niedrigschwelligem Zugang bei Fragen nachhaltiger Infrastrukturrealisierung und - finanzierung.	 z. B. Durchführung von Wirtschaftlichkeitsuntersuchungen, Technologie-Auswahl und Projektierung Förderung Standardisierung und Skalierung der Projekte, u.a. durch Kompetenz-Zentren wie "Partnerschaften Deutschland". Auswahl der jeweils besten Umsetzungsvarianten mit höchster Effizienz über den Lebenszyklus. 	BMWK, BMF. Kommunale Spitzenverbände. Partnerschaften Deutschland. Energieagenturen und Landesförderinstitute.
	Vermehrte Nutzung von Bündelungsoptionen bei der Finanzierung. Transformationsfonds mit einzelnen, auch kleineren Projekten, aus dem Kredite an Kommunen bzw. kommunalnahe Unternehmen vergeben werden; ggf. Einführung einer Teilabsicherung durch die Öffentliche	 Voraussetzung hierfür ist eine vorangegangene stärkere Standardisierung von Projekten. Einerseits Komplexität und Bürokratieaufwand auf Seiten der Kommunen reduzieren und andererseits zusätzliche Investorengruppen durch Schaffung von attraktiven Losgrößen für die Finanzierung von kommunaler Infrastruktur gewinnen. 	• BMF, BMWK, Länder.
V.	Hand, um Risiken zu reduzieren. Infrastrukturbeschaffung konsequent am Lebenszyklusansatz ausrichten zur Verbesserung der ökologischen und ökonomischen Nachhaltigkeit.	 Weiterentwicklung der Methodik für die Wirtschaftlichkeitsuntersuchung von ÖPP-Projekten. Standardisierte Rahmenbedingungen und Vertragswerke für transparente ÖPP-Modelle für Transformationsinfrastrukturprojekte aufsetzen. Stärkerer Einsatz von kooperativen Partnerschaftsmodellen bei der Realisierung von nachhaltigen Infrastrukturprojekten. 	Für Anpassung Wirtschaftlichkeitsunter- suchung: BMDV, BMF, BMWK. Für Lebenszyklusansatz: BMJ, BMWK, Länderebene für Ausschreibungen/Ver- gabevorgaben.
vi.	Weiterentwicklung des Einsatzes von Förder- und Garantieinstrumenten. (Siehe Fußnote 7)	 Öffentliche Garantieinstrumente zur Verbesserung der Kreditqualität für Infrastrukturprojekte mit schwächerer Bonität bzw. bei hohen technologischen Risiken als Anschub. Neue Garantiestrukturen des Bundes, angelehnt an das europäische InvestEU-Programm. 	BMF, BMWK. Landesförderinstitute.
	Reset bei administrativem Aufwand im Zuge von Antragsprozessen.	Verbesserung der Personalkapazitäten bei Behörden und Dienstleistern, um eine schnellere und qualitativ bessere Bearbeitung von Genehmigungsverfahren zu erreichen.	Bundesministerien (insbesondere BMJ, BMUV, BMWK), BMDV, Landesminis- terien.
viii.	"Deutschland-Tempo" nicht nur bei Leuchtturmprojekten, sondern auch auf kommunaler Ebene.	 Beschleunigung von Zulassungsverfahren durch Digitalisierung; Reduzierung von Einspruchsmöglichkeiten und Klagerisiken. 	EU-Kommission (Ggf. Anpassung von EU- Recht notwendig).



Example and Outlook for Sustainable Infrastructure Investments

Participation in Transnet BW



5 German Insurers and 30 Savings Banks of Land Baden-Württemberg

- 24,9 % stake in the transmission system operator **TransnetBW**
- TransnetBW: Investment needs of c. 10 bn Euro (SuedLink, Ultranet)
- Germany: Investment needs of c. 126 bn Euro for new energy grids and modernisation
- **Investments in the European heat transition** can be equally attractive investments for insurers!

14.05.2024



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Thank you for your Attention!

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facebook.com/DieVERSiCHERER.de

Twitter: @gdv_de

www.youtube.com/user/GDVBerlin



Update on the relevance of the EU taxonomy for investors in DHC networks

Kristina Lygnerud

Professor at Lund University, Sweden



Kristina Lygnerud Professor at University of Lund, Sweden Senior Energy Expert, Swedish Environmental Research Institute (IVL)

- In DHC since 2004
- PhD on the topic of risk management; case study Swedish DHC sector (2010)
- Risk Manager and Strategy developer at Multi Utility Company, Sweden (Borås Energy) (2010-15)
- Department Manager Team Energy (IVL) (2015-2021)
- EU Project Leader and Participant (80 MEUR), (IVL), (2015- ongoing)
- DHC+ Board member and Chair (2018-2023)









Previous work on DHC



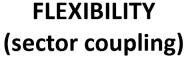


WASTE HEAT
RECOVERY
(high and low
temperature +
cooling from
heating)























INTERNATIONAL ENERGY AGENCY TECHNOLOGY COLLABORATION PROGRAMME ON

DISTRICT HEATING AND COOLING



Business models in district heating- future (2050)

ADVISORY

- UK government
- Irish Climate Council
- EU Urban Agenda
- EU Investor dialogue
- ٠...





Agenda

EU Taxonomy implications for DHC networks

02 Key investor takeaways

Research project

Background

- District heating assets: are they EU Taxonomy aligned?
- Important to know in the context of Green City Bonds
- Case study: district heating system of Göteborg, Sweden

Biomass
Waste heat from waste incineration
Waste heat from refineries

Stakeholders

DH companies
DH industry associations
Cities
Investors in DHC







Research project

Project activities

EU Taxonomy literature review



Interviews with relevant stakeholders



• EU Taxonomy Article Review & establishment of tool to enable technical screening of the infrastructure

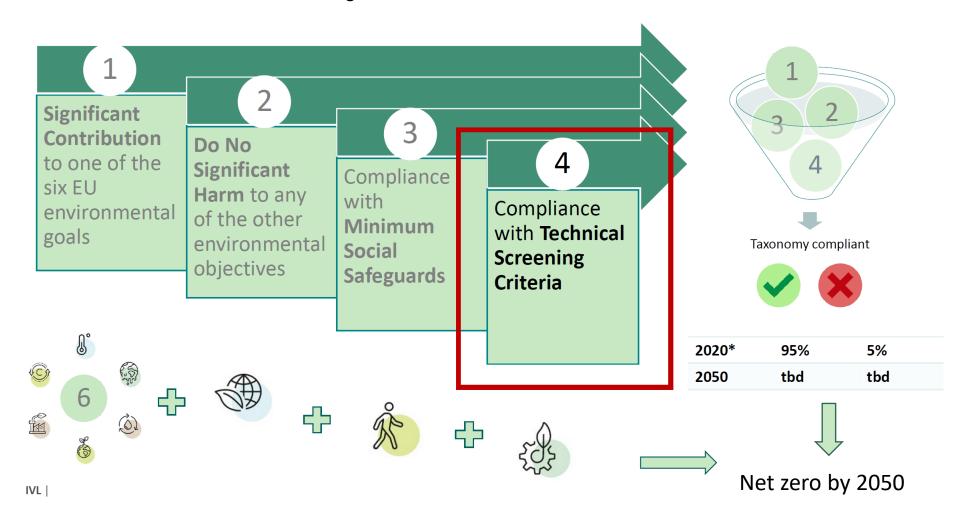


Production Distribution Storage...

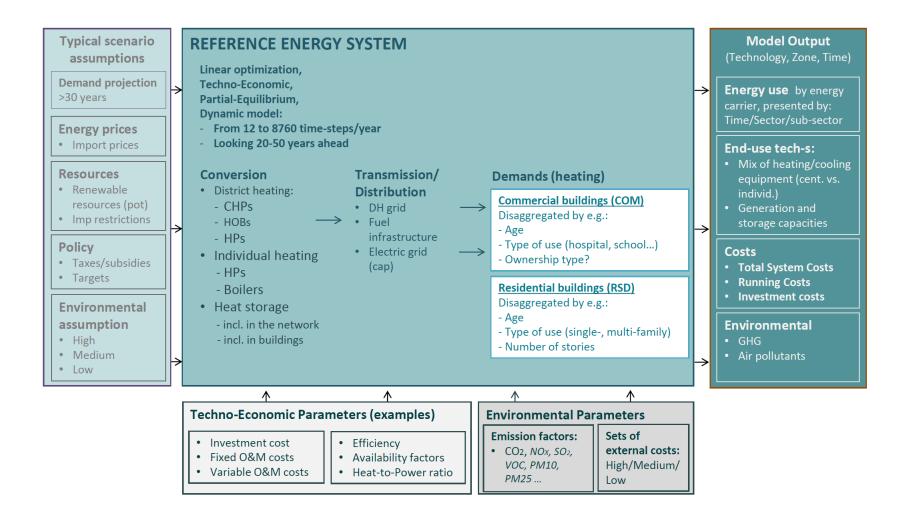


EU Taxonomy Policy implications

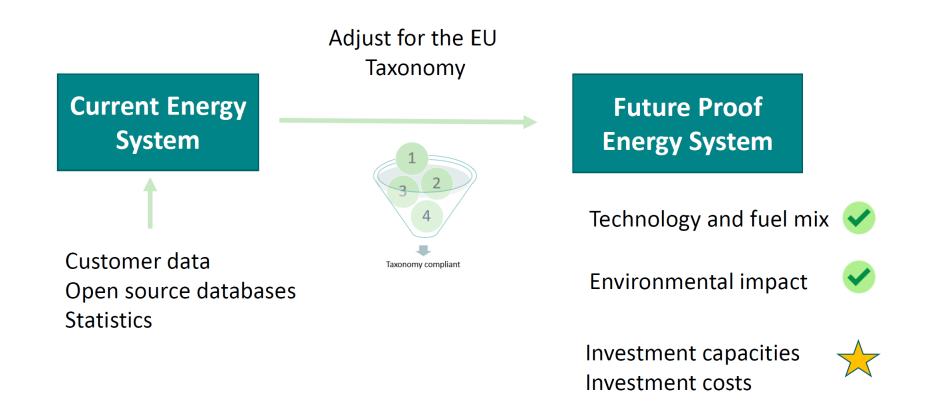
Tool to enable technical screening of infrastructure:



Tool to enable technical screening of infrastructure: ENERGY SYSTEMS MODELING



Tool to enable technical screening of infrastructure: ENERGY SYSTEMS MODELING



Tool to enable technical screening of infrastructure: CONCLUSIONS

Taxonomy indicators do not impact investment strategy and operation for Göteborg Energi under current policies and regulations: the assets are EU Taxonomy Aligned

Changing regulations can make taxonomy decisive for the development of the local DH system

- status of biomass
- status of combustion of waste
- status of waste heat from different sources
- other

2 Key investor takeaways

2. Key investor takeaways

The EU Taxonomy supports the phase out of fossil fuels in DHC

The framework is shaping and additional requirements are likely over time-triggers investment risk (including DHC)

Likely, the EU Taxonomy will become mandatory (including DHC)

For article 9 (SDFR)
funds- a screening of
underlying
infrastructure
is needed
(including DHC)

Constant review of EU Taxonomy updates is important for assisning DHC investments



THANK YOU

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Accelerating sustainable DHC investments: Policy Recommendations

Chris Garside



My Background





Heat Network Lawyer, Finance and Commercialisation Expert



Advisor to UK Government Heat Network Development Unit and to a number of Low Temperature DH projects (UK and Ireland)

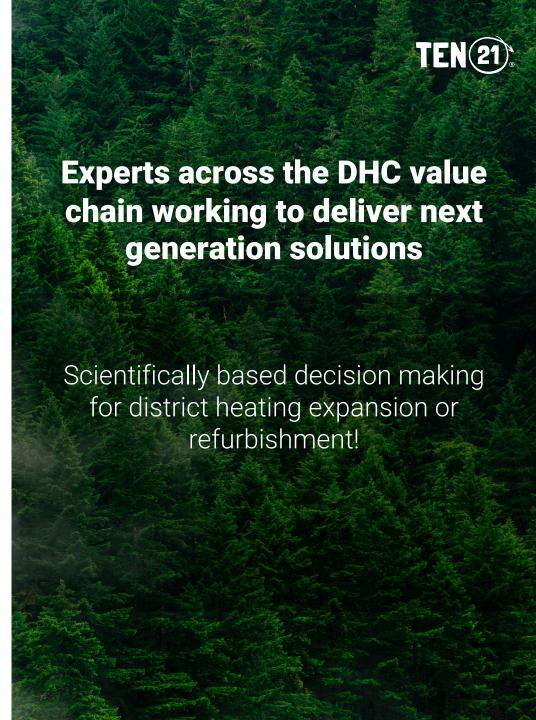


Co-Founder of TEN21 collaboration to accelerate deployment of European DH and export European expertise globally



1. TEN21a collaboration platform





Programme



1 Policy Objectives

Policy vs Support

3 Key Accelerating Actions



1 Policy Objectives

Nature of the Asset



Lower Temperature DH is a system. It interacts with multiple facilities, buildings and the wider urban fabric.

Policy must act to simplify entry points and reduce real and perceived risk to encourage market participants.

1. Overriding Policy Objective



To provide a framework within which public and private investors feel confident to invest €billions in new lower temperature district heating and cooling within the next 20 years.



City-Scale Projects

Pilot Projects

Confidence to Invest

1. Policy Objectives



- Clear Market Framework Policy makers need to be clear why and how they are encouraging lower temperature networks.
- Clear on the role of Government Policy makers need to make an offer to potential market participants how will we incentivize you to participate through policy, fiscal support, tax nudges and other support?
- **Joined-up thinking through Policy levels** Policy makers need to make the interaction between EU, National, Regional and Municipal level policy and support clear and accessible.
- **Stable** DH is a high capex, long term asset. Instability in policy frameworks will cause market participants to look elsewhere.
- **Well-informed** Policy should be designed and road-tested on real lower temperature DH scenarios and best practice

1. Key Stakeholders



Heat Sources

Project Sponsor

Local Government

Existing Heat Networks

Primary Stakeholder

END-USE DEMAND

Public and Private Funders

Local Electricity Grids

Builders and Operators

Supporting professional services







2 Policy vs Support

3. Risks that may require policy intervention



Availability of well priced Heat

Strong End-User Demand Construction

– as easy as

possible

Availability of well priced power

Availability of well priced Finance

Viable
Operational Cost
Base

Building
Capacity from a
low starting
point

2. Value Chain – key areas of focus



1. Encourage Heat Sources to provide heat

2. Encourage Networks to adopt lower temperature designs

3. Remove real or perceived barriers to connection to lower temp. systems

4. Improve the economics of lower temp. systems vis a viz other options

5. Ensure pool of investors confident to invest

2. How much carrot, how much stick, how much practical support?



Potential Carrots

Favourable planning and permitting for heat recovery

Link Gov fiscal support to lower temperature choices

Tax incentives to encourage HS to connect

Potential Sticks

Prohibit certain tech (Gas CHP, biomass)

Increase Decarbonisation Requirement

Prescribe technical parameters

Potential Support

Establish Heat Authorities with specialist knowledge

Find and remove ancilliary barriers

Identify and share best practice

2. How policy build-up might look



Input	HEAT INPUT		Encourage/Mandate Existin Heat Sources to connect		Require new heat sources to connect		Set national pricing for heat inputs			
	POWER INPUT		Require local networks to prioritise capacity to DH		Direct funding to required grid upgrades		Arrange well priced power input			
End-User demand		En	ncourage/Require DH choice		Grants to reduce of and connection					
	Funding/ Ge Finance		nerous grant funding for early projects	Bespo	oke public finance products		r Direction on vate Finance		Gov Guarantees	
Construction		n	Seamless planning and permitting	Ac	cess to construct	_		n with new pment		
Building Capacity			Clear Market Framework		ong support for early projects		Modelling and wledge transfer		er	

2. Importance of Highly Visible Pilot Projects



This is how to connect a waste water treatment plant into DH

This is how to model heat output from this facility



This is how to negotiate with a water company

This is a good heat source – it is stable and available

This is how you model mixing this heat source with other heat sources



3 Key Accelerating Actions

3. Key Accelerating Actions – structured build-up



- 1. Learn, share, model, scenario test, be playful, embrace innovation, find the balance points, test with investors. PILOT PROJECTS.
- 2. Ensure identify viable, replicable economic model for lower temp. projects

3. Settle, pass and advertise policy framework/adjustments

4. Create or arrange vehicles for practical support

5. Ensure pool of investors (public/private) available to projects

3. Example policies



Mandate Heat
Sources to connect
to DH and supply
at a 'reasonable
price'

Ensure well-priced power to DH in return for grid balancing capability

Infrastructure
Banks to design
and offer bespoke
products to lower
temp DH projects

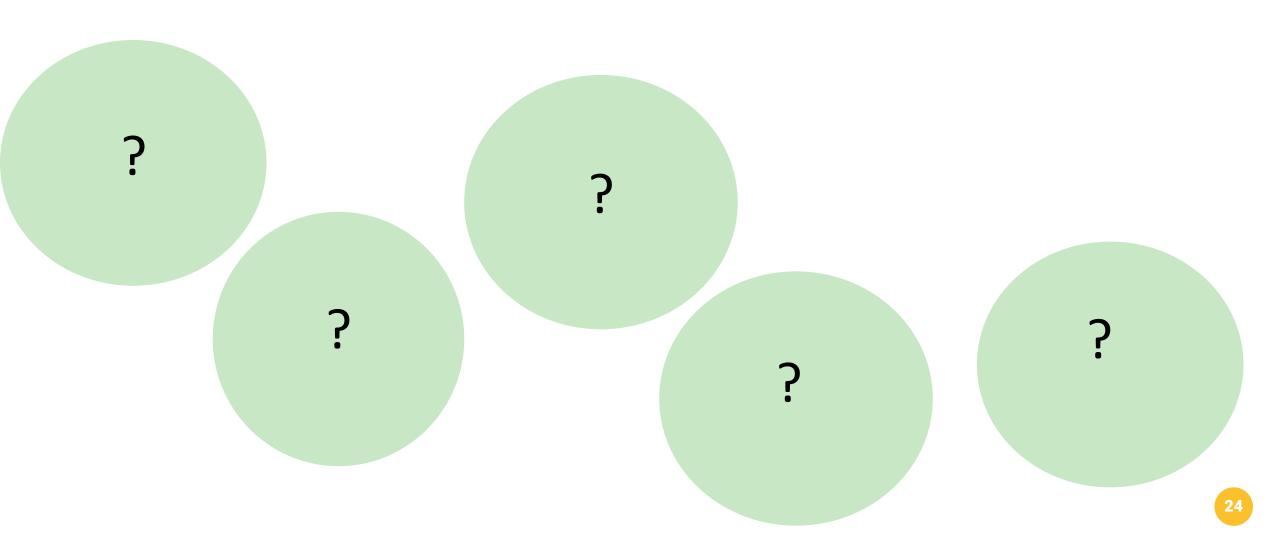
Provide enhanced
Gov Guarantees
for lower
temperature DH

Provide
Connection
funding to
buildings requiring
connection works

Develop minimum technical standards for lower temp. DH schemes

3. Is there an ideal EU/Europe wide minimum base set of policies? Which policies are most/least important?







THANK YOU

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