GUARANTEES OF ORIGIN FOR GREEN DISTRICT HEATING

AN ANALYSIS OF LEGAL FRAMEWORK CONDITIONS AND SYSTEM DESIGN OPTIONS

7th International Conference on Smart Energy Systems
21-22 September 2021, #SESAAU2021

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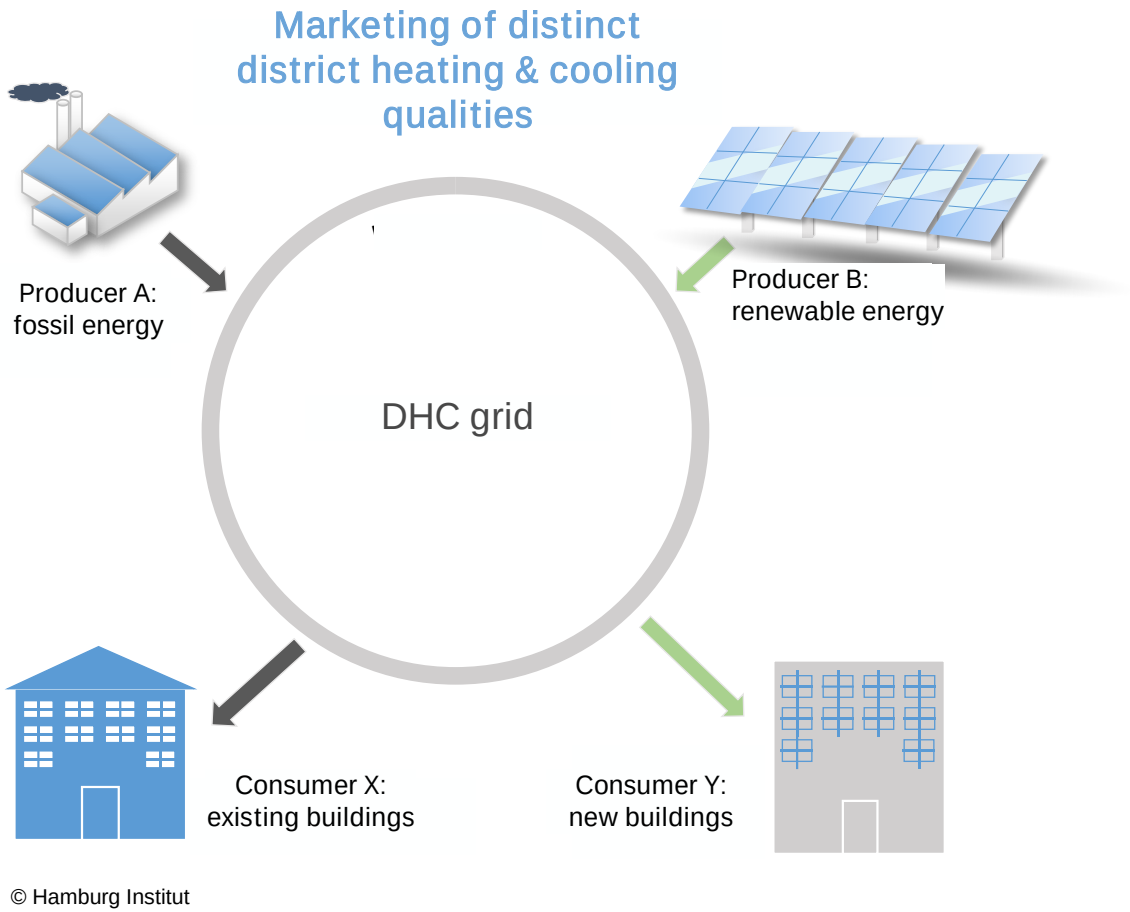
Gefördert durch:
Bundesministerium für Wirtschaft und Energie
aufgrund eines Beschlusses des Deutschen Bundestages

FROM GREEN ELECTRICITY TO GREEN DISTRICT HEATING

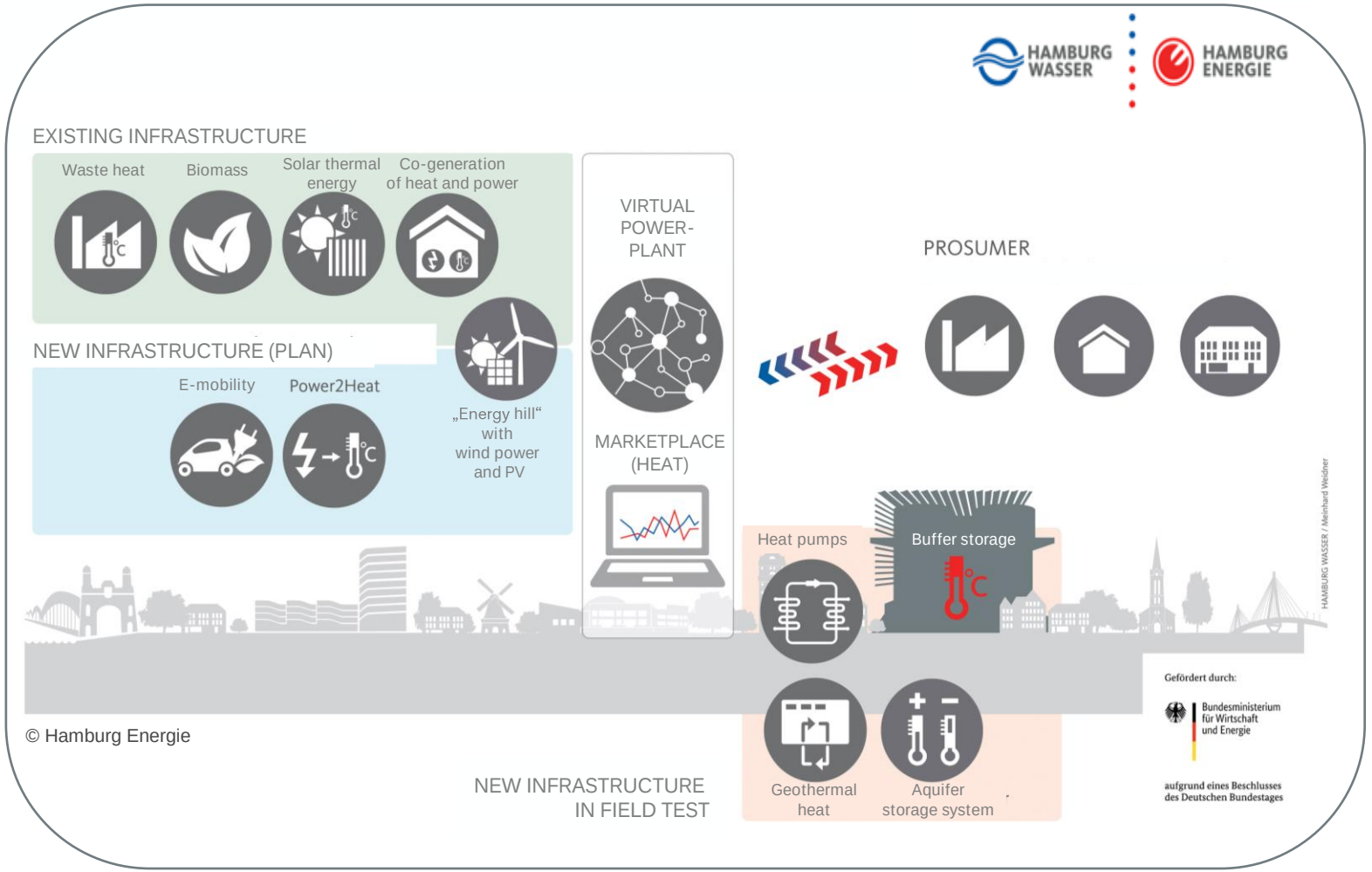
- **European law requires member states to ensure that the origin of energy from renewable sources can be guaranteed and demonstrated to energy consumers**
  - RED I (Directive 2009/28/EC) introduced this obligation for electricity ⇨ Establishment of Guarantee of Origin (GO) systems to track renewable energy attributes from production to consumption
  - RED II (Directive (EU) 2018/2001) extends the obligation to heating, cooling and gases (including hydrogen)
  - Requirements for GO schemes will be specified in the norm CEN – EN 16325 (under revision)
- **Established markets for green electricity**: Suppliers market “100 % renewable” electricity products by cancelling GOs on behalf of consumers – GOs ensure that every “green” MWh is only marketed once
- **Dedicated products for green district heating and cooling (DHC) as a perspective:**
  - Green price premiums could improve the business case of integrating renewable energy sources into DHC grids
  - In the absence of tracking and disclosure rules, legal uncertainties act as a barrier
  - Design and implementation of DHC GO schemes: limited practical experience to date

AIMS OF THE PROJECT GREEN DISTRICT HEATING (PART OF „REALLABOR“-PROJECT IW³)

- **Project aim:** Development and implementation of a Guarantee of Origin registry for sustainable district heating and cooling
- **Marketing of green DHC** as a distinct product can attract consumers and provide extra revenue, which can be used to refinance renewable and waste DHC projects
- **Accounting and transparent allocation of green DHC** to buildings und districts
- Analysis of **application options**:
  - Proving fulfilment of **legal requirements** (e.g. on primary energy consumption of buildings)
  - Provide evidence for funding programmes
- **Pilot project** for Germany



IW³ – INTEGRIERTE WÄRMEWENDE WILHELMSBURG (INTEGRATED HEATING TRANSITION WILHELMSBURG)



- **Aim:** Implementation of a sustainable, affordable and sectorally integrated heating supply
- **Partners:** HAMBURG ENERGIE GmbH (Lead), Hamburg Energie Geothermie GmbH (HEGeo), CONSULAQUA mbH, Hochschule für Angewandte Wissenschaften (HAW) Hamburg, Christian-Albrechts-Universität (CAU) zu Kiel, HIR Hamburg Institut Research gGmbH
- **Funding:** Reallabore der Energiewende (Regulatory sandboxes – testing environments for innovation and regulation)
- **Duration:** August 2020 – July 2024

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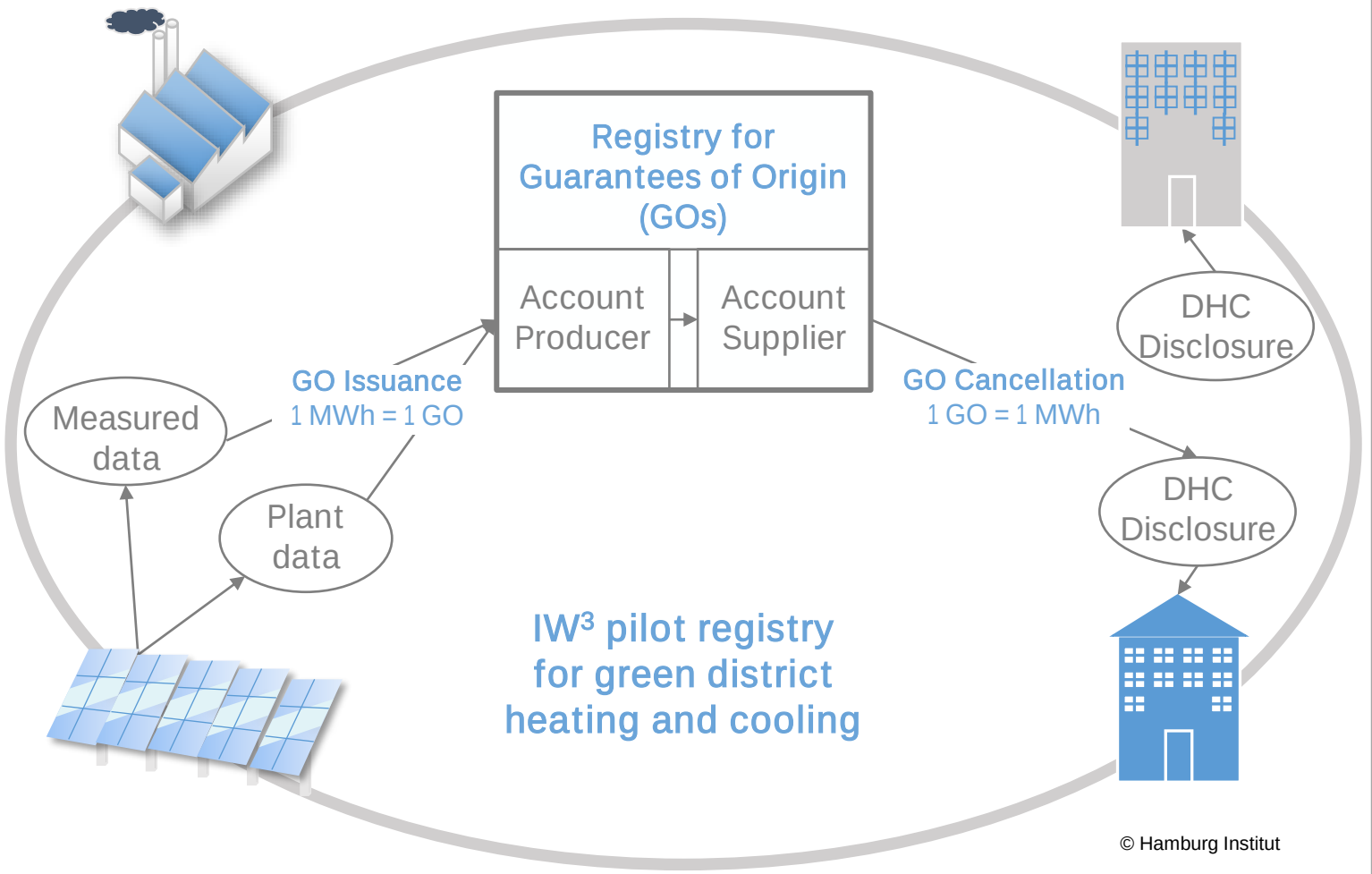
DESIGNING A GO SYSTEM FOR DISTRICT HEATING AND COOLING: DESIGN PRINCIPLES

- **Basic principle:** Green characteristics must be 100% traceable to final consumption, avoiding multiple consumption claims
- **How to guarantee the renewable origin of energy?**
  - Issuance of 1 Guarantee of Origin (GO) for 1 MWh of energy produced
  - Supervise the issuance, transfer and cancellation of GOs – electronically, accurate, reliable and fraud-resistant
  - Ensure that the same unit of energy from renewable sources is taken into account only once
- **Focus IW³ pilot registry:** Registry for renewable energy sources as well as waste heat and cold (with optional full disclosure)
- **Technical implementation** in cooperation with Grexel Systems Ltd.



DESIGNING A GO SYSTEM FOR DISTRICT HEATING AND COOLING: DESIGN OPTIONS

- **Basic design decisions are defined by Article 19 RED II and EN 16325** (under revision), for instance:
  - Unit (1 MWh)
  - Lifetime of GOs (transferable for 12 months, expiry after max. 18 months)
  - Obligatory information fields (e.g. energy source, technology, production device location, financial support)
  - Requirements on monitoring and verification of production device and measurement data
- **Significant scope for design choices** remains, e.g. with regard to:
  - Cancellation of GOs from non-interconnected grids for disclosure purposes
  - Integration of final consumers into the GO registry
  - Treatment of storage and grid losses
  - Tracking of renewable energy attributes in the case of energy carrier conversion (e.g. Power to Heat)
  - Rules for disclosure of heating and cooling attributes
- **Basis for assessment of design options**: GO system design literature, legal framework conditions, lessons from existing heating GO schemes (in the Netherlands and Flanders), exchange with project partners and stakeholders

EXAMPLE: CANCELLATION OF GUARANTEES OF ORIGIN FROM NON-INTERCONNECTED GRIDS

- **Definition of system boundaries as a fundamental choice:**
  - **Electricity GOs:** European internal market, GOs can be transferred independently of energy deliveries and grid connections
  - **Heating and cooling GOs:** DHC grids are local, closed systems, unlike electricity and gas grids
- **Arguments for cancellation of GOs from non-interconnected grids:**
  - Higher GO market liquidity and resilience against unplanned production device outages
  - Incentives for investments in renewable DHC projects are decoupled from green DHC demand in a given grid
  - Most cost-efficient projects are realised first
- **Arguments against cancellation of GOs from non-interconnected grids:**
  - Credibility for consumers is uncertain
  - Incentives for local decarbonisation of DHC grids could be weakened
  - Exclusion of multiple consumption claims on renewable attributes requires binding, harmonised DHC disclosure rules

IW³ pilot registry: Grid connection between production devices and consumers as prerequisite for GO cancellation

OUTLOOK

- Potential **applications of GOs** affect the advantageousness of alternative design options:
  - Consumer information
  - Market-driven support for renewable energy expansion
  - Facilitating the enforcement of regulatory requirements
  - Support of renewable energy statistics and monitoring processes
- **Focus of the IW³ pilot registry:** activating the consumer market's potential to support the transformation of local DHC grids; moreover, potential applications for proving fulfilment of regulatory requirements are assessed
- **Outlook on next steps:**
  - Currently: technical implementation of design decisions in registry software
  - Pilot phase with DHC grids in the city of Hamburg
  - Assessment of experiences from using and operating the registry
  - Generation of lessons for the implementation of Article 19 RED II

Thank you for your interest!

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