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Carbon neutral buildings: combined electricity and natural gas vectors

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Transformation of the energy sector

Lignite and Oil are phased out

Natural Gas as transition fuel (despite?) decarbonisation being the focus of European (EU) policy

Renewable Energy projects compete on equal grounds

Previously "niche" technologies are now mainstream: storage, EVs, hydrogen

Prosumption, flexibility, collaborative movements: data-driven innovation

Energy prices at historical high levels

Energy Poverty a reality affecting alarming levels of the population alienates public from green transition

Competing forces: nations and sectors offering different solutions and some "solutions"

Old wounds surfacing up: the role of nuclear power, market interference, energy autarky vs interconnections

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HERON R&D&I domains

DigiBUILD, InEExS and 11 more Research Projects

● Demand Response & Flexibility

● Smart, Carbon Neutral Solutions

● Data spaces & interoperability

● Energy Communities

● Power Plant Energy storage solutions

● Natural Gas efficiency

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Decarbonisation: electricity flexibility

DigiBUILD in a nutshell: digitally driven decarbonisation of the building stock

GR Pilot : Portfolio / Cluster Energy Management / Flexibility Recommendations

"Reduce consumption / Schedule EV charging on specific hours"

An ecosystem of services based on home consumption and EV charging monitoring that rely on standard (commercial) IoT equipment (smart meters, smart plugs & air quality):

- Data interoperability and scalability

- Short-term forecasting of consumption & renewable generation (local and system wide)

- Consumption optimisation algorithms at multiple levels (individual / cluster) with multiple objectives (local / grid renewable generation)

- Development of Digital Twins for Cluster / Portfolio managers (i.e. ESCO, Aggregator / Utility)

Decarbonisation: natural gas efficiency

InEExS in a nutshell: integrated energy services across sectors and carriers and the tokenisation of energy saving data

GR Pilot : Efficiency and flexibility services for legacy natural gas boilers (and heat pumps)

"Reduce consumption without compromising comfort"

Optimal tuning of based on smart heating controllers offering advantages to consumers and energy suppliers:

- Improve energy efficiency (up to 35%)

- Provide real-time flexibility services to suppliers

- Deliver remote maintenance support of technicians

- Contribute towards suppliers Energy Efficiency Obligation Scheme (EEOS) ~ for now

Decarbonisation: multiple vectors

Bundled products: telecommunications v energy

Telecommunications (telcos): a mature consolidated market following more that 20 yrs of competition in which bundled services (broadband, mobile, cable TV) are offered by default

Telcos offer premium services on top of price (€/min, €/MB) competition:

- Access to specific channels and platforms (reason to switch provider depending on sport package)

- Access to unique technology: internet speed

- Mobile services tailored on use habits (data vs minutes)

- Special prices on "niche" services: roaming access / costs

Energy Suppliers offer bundled products (electricity + natural gas) focusing on price reduction and one-off offers

Energy Suppliers do not offer premium services in bundled products

Decarbonisation: multiple vectors
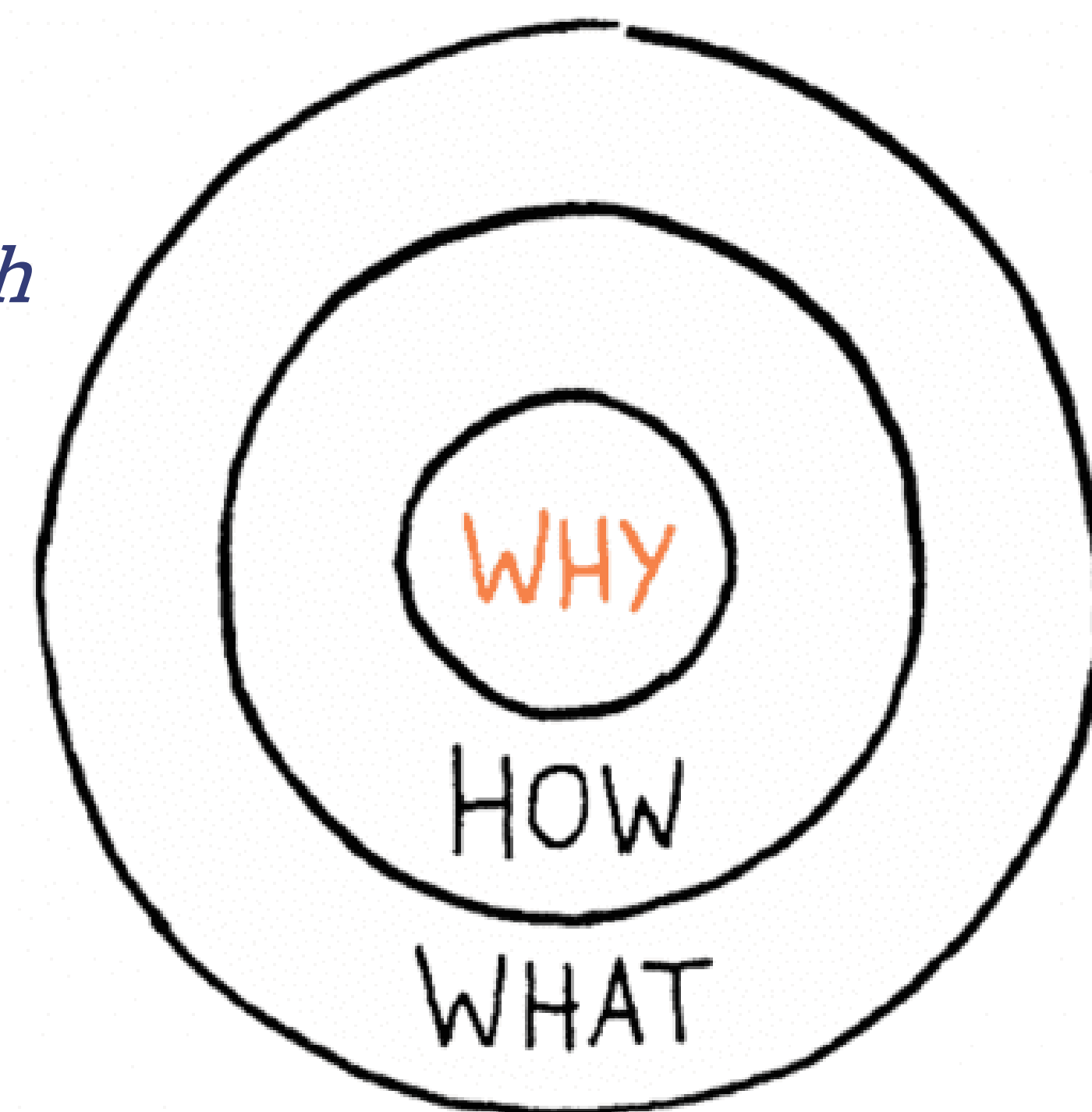
Bundled products: sustainability driven innovation

WHAT?

Offer premium services on top of energy bundled products that promote energy efficiency and reduce carbon impact ~ *reduce energy costs through responsible consumption.*

HOW?

A household as a combined – carbon footprint – minimiser: *natural gas HVAC always has carbon footprint – what about not charging the EV?*

Utilise consumer owned smart metering equipment across multiple energy vectors and systems enables flexibility across multiple vectors e.g. electricity **and** natural gas HVAC.
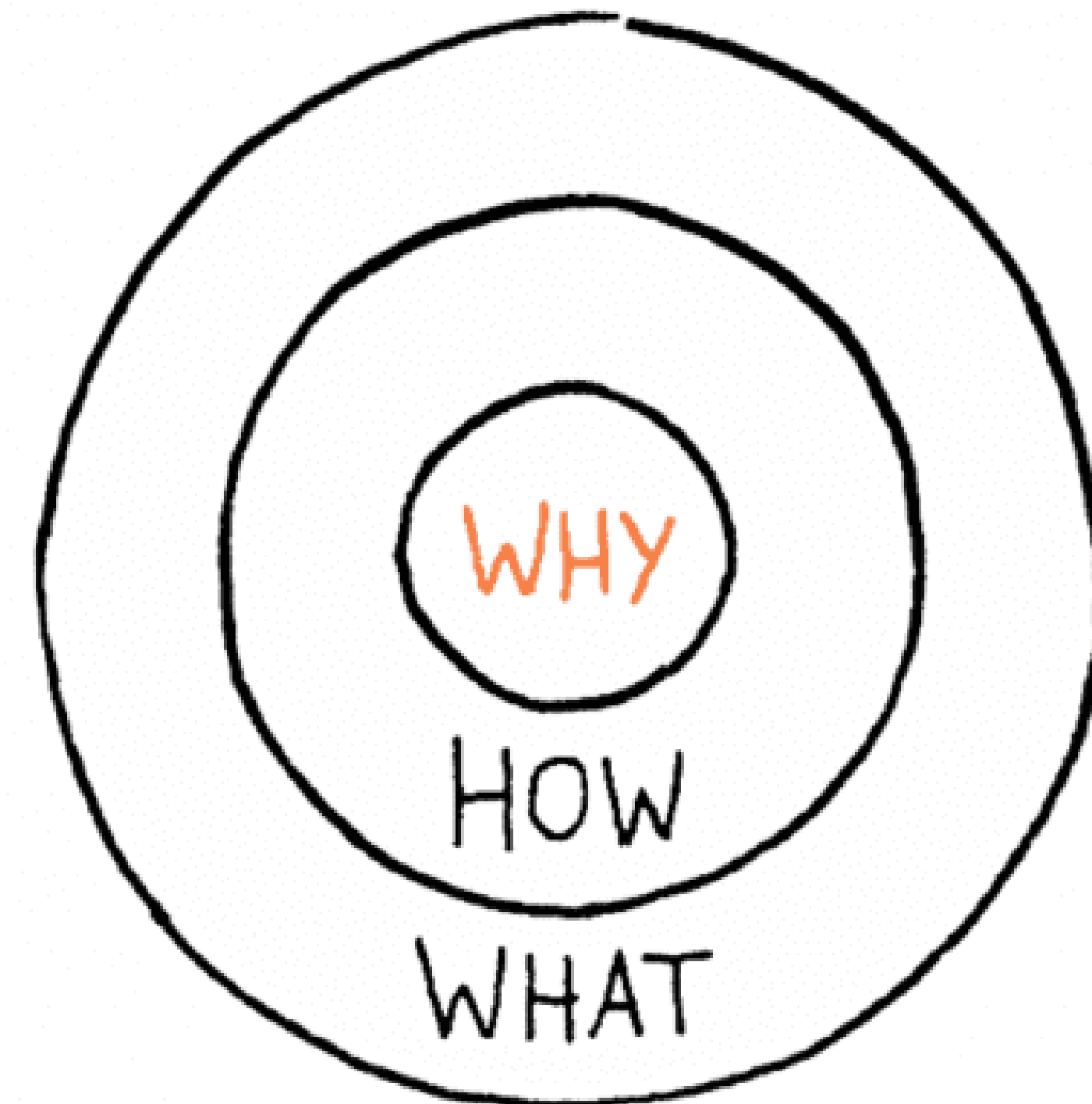
Decarbonisation: multiple vectors

Bundled products: sustainability driven innovation

WHY?

- Premium offerings on top of bundled services create loyalty: loyal customers of multiple products generate more revenue (short and long term) and reduce energy procurement costs

- Reduced marketing costs (retention and acquisition) for bundles

- Mass deployment reduces operation and installation costs (smart metering equipment) for premium services

- Electricity markets: optimise demand side flexibility based on specialised products (for heat pumps, EVs) ~ optimise natural gas procurement

- Additional markets: democratize ESCO services ~ link with retail consumers ~ massive energy efficiency potential (green / sustainability supplier – meet EEOS demands)

Thank you!