

Kritiska framgångsfaktorer och barriärer för cirkulära investeringar & affärsmodeller

Delad Energi är Dubbel Energi 2

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Critical success factors and barriers for circular investments and businesses

Through a combination of literature studies and empirical findings from actors in the Malmö area, a diverse range of inter-related factors were identified to play a critical role as barriers or enablers to new investments, or businesses, in circular or bio-based energy solutions and/or in energy efficiency (in the remainder, these will be collectively referred to as "more sustainable energy solutions"). These key determinants are summarised below, along with potential interventions that can create more favorable conditions for such investments and businesses.

Factor	Description/Implication	Suitable interventions
Organisational/motivational factors		
Lack of management interest & commitment	Sometimes management is solely focused on core business and has limited or no interest and commitment in circular energy solutions, as these are seen peripheral.	Trigger interest through information campaigns, peer pressure, and policy leverages
Awareness of opportunities	Decision makers are not aware of applicable opportunities and therefore do not give further consideration to implementation.	Identify and communicate applicable opportunities (e.g. through resource mapping or communication with relevant partners)
Strategic alignment	Partnerships that can provide a more sustainable energy use are not seen to carry strategic importance, thereby hindering action.	Identify and communicate wider set of benefits – true value of more sustainable energy
Organizational resources and capabilities	For some companies, even if they are interested in more sustainable energy solutions, it is difficult to allocate necessary financial, time and human resources because routine operations are too demanding and/or there are other projects on the agenda	Create relevant projects and engage companies so that they will have an incentive to allocate necessary resources for sustainable energy solutions
Familiarity and trust among actors	Particularly for cases where new investments with high specificity are needed, actors are reluctant to create a	Creating platforms and processes that regularly brings relevant actors together and provides them

	dependency on another actor, particularly if there is limited familiarity and trust among actors.	an opportunity to interact helps developing familiarity and trust and make actors more willing to consider investments that are otherwise considered too risky.
(Perceived) uncertainty about future	Even with adequate familiarity and trust, actors can be unwilling to make new investments if there are (perceived) uncertainties about either party's future prospects.	Having clear and properly communicated plans, both on the side of public and private actors, can help reduce (perceived) uncertainties.
Mutual acceptability of terms of partnership (e.g. regarding responsibilities, sanctions, pricing, and contract duration)	In some cases desirable developments are not pursued because actors perceive the terms for the partnership unfair—e.g. price or supply/demand obligations.	Improved transparency and open dialogue between the parties may eliminate the feeling of unfairness and increase interest in partnerships.
Timing in terms of investment cycles	Companies that are planning new investments are well-positioned to consider alternative energy solutions. On the other hand, companies, who have recently made relevant investments, exploring new alternatives is difficult to justify.	Maintain a close dialogue with companies and more closely engage with those that are planning new investments. This is particularly important for the new industrial actors considering developments in the area, but also for the existing actors.
Lack of local decision power	Multiple facilities in Malmö area belong to multi-national organisations and therefore dependent on distant headquarters for investment decisions. In cases where the collaborative energy investments do not meet their requirements, this may constitute a problem.	There is limited scope to influence this situation.

Factor	Description/Implication	Suitable interventions
Technical and spatial factors		
<p>There are incompatibilities between supply and demand in terms of quantities, qualities, or temporal aspects.</p>	<p>Due to mismatch between the quantitative and qualitative (including temporal) aspects of residual energy supply and energy demand, valorization of residual energy flows becomes technically or economically unfeasible (for example, temporal incompatibilities can be addressed with energy storage solutions, but this adds to the implementation costs). Generally, stable flows with high energy content and/or high temperature have higher utility. Exchanges via district heating system offers an advantage as the quantitative and qualitative demands can be more flexible. However, this requires case-by-case assessments taking into consideration locally prevailing operational conditions and demands</p>	<p>To the extent possible, actors can be incentivised to consider operational changes that can make their energy supply/demand profiles more suitable for integration. New industrial, commercial and residential development can be planned with a view of improved supply/demand compatibility (e.g. actors with seasonal energy demands could be co-located with other that have a matching profile (depending on the local circumstances, such match may require overlapping or non-overlapping demand profiles)</p>
<p>Distance (relative location of supply and demand)</p>	<p>Heat energy, particularly at lower temperatures, is not possible to transfer over large distances. Relatedly, for certain flows, point of supply and demand need to have sufficient proximity. In other cases, such as steam or hot water, although the energy could be physically possible to transfer, increasing distance would require higher capital and operational expenses, thereby negatively affecting economic feasibility.</p>	<p>This situation is not easy to influence for existing activities. However, for new activities, spatial planning can pay attention to locating compatible actors/entities close to one another.</p>
<p>Land availability</p>	<p>Closely related to the previous issue is the lack of land availability for new activities that could use residual energy produced by existing actors (e.g. greenhouses or fish farms that can make use of low-grade heat from existing plants)</p>	<p>For new developments, spatial planning may pay attention to reserving land around key actors (i.e. those with sufficiently large and stable residual flows) prioritized for compatible activities, whenever possible and feasible.</p>

Condition and accessibility of existing technical infrastructure	Energy partnerships that can utilize, or built on, existing infrastructure assets are often cheaper and easier to operationalize.	
Technical difficulty of resource capture or integration	In certain cases, plant designs make the capture or residual heat, or integration of alternative heat sources, difficult or unfeasible (e.g. when heat is released from multiple sources, or gets diluted due to mixing).	For new establishments, involvement of energy experts in the design process can be encouraged in order to create more conducive conditions for energy recover and integration (most likely this is part of the tasks considered by the symbiosis function)
Technical complexity	Certain energy partnerships imply higher technical complexity and therefore require more human resources or operational oversight.	Not easy to influence externally.
Increased technical risk	Certain energy partnerships are perceived to entail higher technical risk, thereby hindering interest and commitment	Through open dialogue among partners, and particularly with the safeguards that can be provided by an actor like E.ON, risk perceptions can be reduced.
Technology maturity and accessibility	Certain circular solutions require application of new technologies with no or limited practical examples (e.g. use of heat pumps for the generation of industrial steam using district heating). This complicates reliable technical and economic performance assessments, and increases risk perception.	Public support for unique applications could be considered. Open and honest dialogue among parties, coupled with mutually acceptable terms of engagement (contracts) can reduce risk perception.

Factor	Description/Implication	Suitable interventions
Informational factors		
Lack of communication regarding necessary supply demand information between relevant actors	Information on residual energy capacities and energy needs of different actors need to be available to the relevant actors so that opportunities regarding energy partnerships can be identified and their feasibility can be assessed. The quality of information is important, as not only quantity of supply and demand, but also other information (e.g. temperature of flows, medium carrying the energy, process utilizing the energy, and temporal variations)	Coordinators can act as information brokers and can significantly improve information sharing by creating communication platforms and supplementing this with dedicated information collection and dissemination activities (already performed within DeladEnergi stage 2). Provided that regional actors agree with the sharing of the information, on-line tools can be created where compiled information will be accessible to all interested parties, and where parties can directly update information relating to their activities.
Parties are not willing to share information	In certain cases, parties may not be willing to share the required information due to commercial or regulatory concerns	Parties can be informed about how the information will be used and could possibly benefit themselves. They can also be assured that information will not be used in any other way than identifying and assessing potential synergies.
Necessary information is not available	In certain cases, the required information is not available even to the parties who are supposed to provide it	Coordinators can encourage relevant parties to generate required information. In the medium term, having a formal requirement for the provision of information can be effective. Coordinators can also help actors to produce informed approximations of various energy needs and residual energy generation (for example, heat that can be

		recovered from compressed air systems)
Lack of information regarding technical possibilities and/or details of novel technologies/applications	Actors may not be aware of the presence and applicability of relevant technologies that would enable residual heat utilization and/or more sustainable energy sources. In some cases, although the possibilities may be known, lack of technical and economic performance data can be a problem.	Closer collaboration with energy companies, universities and consultants would facilitate identification of applicable technical alternatives, as well as assisting access to technical and economic performance data.
Regular and effective information exchange	Residual energy partnerships create dependencies between actors. Good communication between cooperating partners is critical for the successful development of these kinds of relations, as it helps avoid potentially disruptive impact on the dependent parties in case of diversions from ordinary operations.	Actors can be encouraged to have an effective communication

Factor	Description/Implication	Suitable interventions
Economic factors		
A clear business case	Options where all involved parties see a clear business case are most easily implemented	Parties can be encouraged to take into consideration multiple benefits of energy partnerships that can strengthen the business case.
Energy costs are seen peripheral	For certain companies, direct energy costs are considered too low to prioritise energy investments or administrative burdens to change energy sources	Actors can be encouraged to take a wider set of benefits linked to more sustainable energy use solutions (e.g. green image, price stability, operational improvements, product quality). They can also be provided with image incentives – e.g. through the development of local energy performance recognition schemes.
Fossil based fuels or linear energy flows are cheaper	In a context where alternative energy sources are cheaper, it is difficult for the parties to utilize recovered or recycled energy. This is particularly valid in recent times where natural gas and electricity prices are low.	Not easy to influence at the local level.
Low cost of energy derived with waste incineration	There is a perception that certain residual heat utilization possibilities are not realised because the low cost of energy produced by waste incineration (with negative fuel costs) makes them uncompetitive.	One alternative could be to assess residual heat utilization possibilities considering a wider set of factors (not only price), such as environmental and social performance; competitive implications on the local industry, etc., and give priority access to sources with superior performance in dist heating network.
Required investments are too high	In certain cases, circular energy solutions require too high investments and extend the expected payback times beyond acceptable limits.	Not easy to influence.
Opportunity costs are too high	As also mentioned earlier, in certain cases actors have other options where investments can	Creating institutional dynamics (e.g. awards or recognition for sustainable

	bring higher economic returns. In such cases, circular energy solutions are difficult to justify.	energy use) may help actors to give higher priority to relevant investments.
Reliable cost-benefit assessments are difficult to perform	In some cases, the actors are not able to perform reliable cost-benefit assessments which makes them risk averse and less interested in new investments. The problem can be amplified if there are regulatory uncertainties (e.g. if gains are contingent on taxes with uncertain future prospects)	Assistance can be provided to actors to provide more reliable cost-benefit assessments (e.g. through providing statistical data, future projections, or information from comparable cases). Long term political certainty may also be helpful, but is hard to influence at the local capacity.
Transaction costs are too high	Parties may find the transaction costs (arising, among others, due to partner identification, feasibility assessment, permit acquisition, governance, monitoring and communication) too high.	Some of the transaction costs can be reduced – for example, through information and relationship brokering, providing guarantees, assistance with contracting, and efficient permitting processes.
Synergy partners are able to mobilise necessary finance among themselves	At least one of the parties are able to make the necessary investments.	
Lack of finance with good terms	In certain cases, the central actors may not have access to finance with good terms	Alternative financing approaches can be considered. For example, actors that have access to finance with better terms could take the investment responsibility (supported by appropriate contractual agreements among parties). It could also be possible that public authorities help secure more attractive finance.

Factor	Description/Implication	Suitable interventions
Political and regulatory factors		
Political incentives	This is a double edged sword. On one hand, certain policy elements provide a meaningful support for renewable and circular energy solutions (such as investment programs like KLIMP, Klimat Klivet; or CO2 taxation). Alongside, other policy elements make fossil based, or linear, energy alternatives more attractive (e.g. tax exemptions to industry). Also, policies in other domains may have a negative impact on circular/renewable energy solutions (such as the waste management policies supporting incineration, as mentioned earlier)	Further policy innovations could be considered, Additional policy incentives for renewable/circular energy solutions can be considered (such as tax reliefs or investment support that enable/prioritise local energy usage.
Stronger policy support through planning and guidelines	Local development plans, visions and actions could incentivize and support more circular and renewable energy solutions in numerous ways.	It should be noted that there are some very promising political elements already in place (such as climate neutrality commitments, or the new development vision formulated for the harbor area). But these need to be translated into more operational tools. For example, reasonable demands could be placed for new developments. For example, new buildings can be designed to have heating systems suitable for low-temperature heating networks. New industrial establishments could also be incentivized and assisted to consider circular energy solutions Adjusting public procurement practices in a way to give priority to recovered/renewable energy in public buildings can be another alternative.

		<p>Other interventions mentioned earlier, such as spatial planning, or infrastructure planning in the new industrial area can also make a meaningful difference.</p> <p>Last, but not least, the recently proposed Symbios Funktion could provide significant support (through coordination, knowledge and information brokering, and through providing more supportive bureaucratic routines.</p>
<p>Permitting processes</p>	<p>In certain cases parties are unable to pursue more sustainable energy solutions as this may entail a breach of their existing permit or the necessary permitting process can be un-supportive.</p>	<p>Public authorities can adjust the permitting processes to make it more supportive of more sustainable energy solutions.</p>