

What works for multi-stakeholder, multi sector collaborations for smart local energy systems?

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About EnergyREV

The Energy Revolution Research Consortium (EnergyREV) is part of the Government-funded [Prospering from the Energy Revolution](#) (PFER) Industrial Strategy Challenge Fund. The PFER programme is investigating opportunities and challenges around policy, regulation, user engagement and digitalisation of energy systems to unlock the benefits of SLES. The PFER programme has invested around £100 million, matched by industry, in a range of projects to help businesses, researchers and local communities develop, test and prove SLES.

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Executive summary

Successful collaboration between multiple stakeholders is likely to be a critical factor in the planning, setup, development and sustained operation of smart local energy systems (SLES). True SLES are complex projects combining social, technical, financial, legal, and other elements. The necessary expertise and capacity to meet these demands effectively is highly unlikely to be held in any single organisation. So, organisations must work together. This report aims to provide practical guidance on how they can do that successfully, based on a review of evidence on what works in multi-stakeholder collaboration across a range of sectors.

There have been many reviews of collaboration between organisations within the same sector, such as between businesses of different types, and within the public sector, such as between health and other social services providers.

There remains a gap in our knowledge about what works for collaboration between multiple stakeholders of diverse cross sectoral types, including non-profits, for-profits and the community, relevant to the SLES configurations and contexts. Cross sector, multiple stakeholders' collaborations need to consider the pitfalls and challenges as well as what works and the contexts, mechanisms and mediating factors that can influence the final outcomes.

A rapid realist review is a systematic review that considers the context-mechanisms-outcome configuration in a theory of change model, but is undertaken at pace, to a policy relevant timescale. We sought to achieve "rapidity" by reviewing and synthesising the systematic review literature on multisectoral, multi stakeholder collaborations.

Like previous reviews we did not find comparative research that could determine the strength of the evidence linking actions to outcomes on a causal pathway, but by creating logic models of the collaboration programme theory we devise strategies as to what should work and give practical guidance on how organisations can work together when trying to achieve similar aims under similar circumstances.

Nine reviews met the inclusion criteria. Five were reviews of collaborations between health and other sector organisations, three were of public private partnership (PPP) collaborations. And one review was about collaborations between universities and business for product development.

Mechanisms and strategies to activate and support collaboration, and that underpinned successful collaboration were:

- Mutual advantage or gain (five reviews): there had to be a problem to solve and there had to be more to gain from working together than any single organisation could achieve. Strategies to activate mutual advantage and mutual gain could include the help of a kind of "broker" who activated this mechanism by mediating between mutual interests. Also, mutual advantage and gain could be reinforced by regular updates against agreed milestones of success, demonstrating the continued success and value of collaboration as well as identifying risks and mitigations to the project early on.

- Communication (five reviews): communication was critical to the successful operation of the collaboration, and a breakdown in communication was often cited as a reason for collaboration failure. Co-location, proximity, and face-to-face meetings and learning together through joint training sessions were strategies used to enable communication. Strategies to enable communication for collaboration included working together to articulate a shared vision and a clear statement of aims, and developing a shared understanding of success that could be measured throughout the lifespan of the collaboration through milestones and performance indicators.
- Trust (five reviews): strategies to balance differences in power, resources and interests were found in stating goals and formalising them into agreements, sharing skills and knowledge and resources in shared meetings in diverse ways, sharing time and financial resources through pooled budgets and face-to-face meetings. Being clear about the roles and responsibilities of members in clear and transparent procedures for decision making and accountability ensured that skills and knowledge of members were utilised effectively and that members felt empowered to participate and their contribution valued.
- Legitimacy (two reviews): equitable funding and resourcing, staff, equipment and time were important supports to resolving tensions around fair sharing of risks and resources. A lack of equitable funding and resource sharing was identified as a common barrier to collaboration. Outreach activities had the potential for greater inclusion and participation for a diversity of membership and representation of the community. Decision making procedures that were transparent and responsive to change could resolve tensions through the legitimacy of process, ensuring that everyone feels that they get a “fair hearing” if not their desired outcome every time.
- Leadership (two reviews): one strategy to support leadership could be through a neutral convener. Another, or additional strategy would be to consider nominating a dedicated management team.

We identified several clusters of contexts that could influence the success or failure of collaborations:

- Political contexts, such as the regulatory environment and national policies that were aligned with local priorities, windows of opportunity for policy change
- Economic contexts of the available financial resources both within the collaboration and locally
- Social contexts were around the relationships and type and quality of interactions of the collaboration members. Social contexts also include local capacity and infrastructure
- Cultural contexts included the professional histories, cultures and ethos of the agencies involved.
- Demographic characteristics of the members were around the skills and capabilities of the members, the diversity of membership in the collaborations and the diversity of communities that were represented in the collaboration.

Conclusions

Tensions between aims and goals and organisational values are to be expected where differences in perspectives and purpose offer the advantages of collaboration, and it a breakdown in communication was often cited as a reason for collaboration failure. Resolving disagreements by preventing misunderstandings and being realistic and open about divergent goals needs clear and fair processes, spaces and means for open and honest communication of aims and goals, and ways to measure progress against these. This suggests that collaboration itself is an ongoing process rather than a single state or entity.

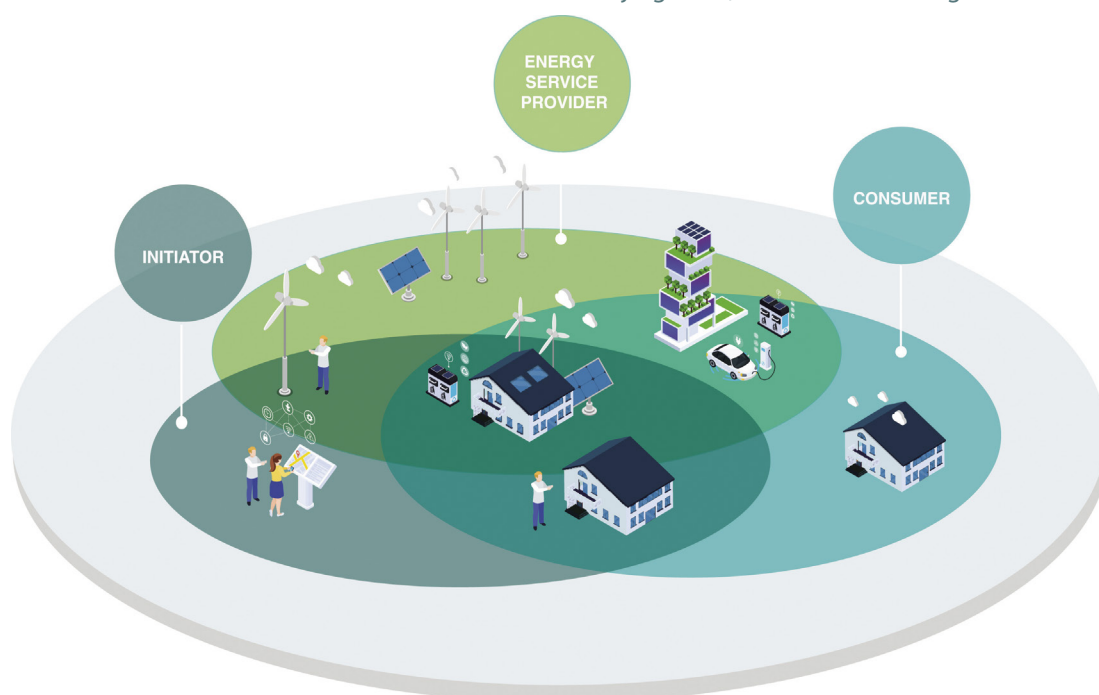
Background

Collaboration for SLES

Successful collaboration between multiple stakeholders is likely to be a critical factor in the planning, setup, development and sustained operation of smart local energy systems (SLES). True SLES are complex projects combining social, technical, financial, legal, and other elements. The necessary expertise and capacity to meet these demands effectively is highly unlikely to be held in any single organisation. So, organisations must work together. This report aims to provide practical guidance on how they can do that successfully, based on a review of evidence on what works in multi-stakeholder collaboration across a range of sectors.

Members of SLES collaborations could include Distribution Network Operators (DNOs)/energy suppliers, universities and community interest groups (Gupta 2020), as well as social landlords, small and large investors, social enterprises, and commercial enterprises. Other important actors involved in the energy systems collaboration could be the prosumer, who is both a producer and consumer of electricity; the initiator who sets in motion the idea of the SLES and the consumer, and who may or may not be directly involved in the collaboration itself but has an interest in the SLES as the beneficiary or user of an energy commodity or service (Gjorgievski, Cundeve and Georghiou 2021).

Figure 1: Members of an energy community. (The initiator may be in any of these sectors) from Gjorgievski, Cundeve and Georghiou 2021



In addition to the diversity of collaboration members and the contexts in which they form, the motivation to collaborate can also vary according to sector. Not-for-profit social or community enterprise participation can have a primary interest in reducing energy inequalities, increasing local decision making and democratic participation. For profit organisations may seek to increase local market demand, enhance their reputation and their social legitimacy.

Multiple stakeholder collaborations for SLES may include stakeholder involvement as “energy citizenship”, where the local public is engaged in participatory and democratic energy systems (Devine-Wright 2007) and stakeholder involvement goes far beyond merely providing information about SLES to the local community. Prosumers, who are both consumers and producers of energy, will be active participants in this local energy community (São José, Faria and Vale 2021).

In the UK there is a mix of public, private and third-sector actors in energy businesses working towards a transition to decarbonisation, decentralisation, digitalisation, and democratisation of energy (Gonzales et al 2020). The current state of SLES shows variation in stages of development towards a smarter and more local energy sector. Increased civic engagement in developing and planning for local services fits with a broader UK agenda to devolve power from the centre to local communities (Parkers, Dobson Lynn 2021) and SLES offer various depths of engagement of communities in different stages of the SLES lifetime. Research on existing energy communities finds a diversity of definitions, types of collaboration and roles and responsibilities. They vary in response to local needs, demands and contexts. (São José, Faria and Vale 2021).

Depth of engagement can also be understood against a spectrum of the power and control over change available to the participants. The democratisation of local energy systems and the making of “Energy citizens” through active participation (Devine wright 2007). This is described by Arnstein’s famous study of US citizen participation and taxonomy of participation.

It visualises increasing levels of the distribution of power (Arnstein 1969) on rungs of a ladder, with 1-5 representing manipulative, or merely feel-good gestures of involvement lacking any meaningful engagement, or tokenistic participation that lacks any real power over change. However, genuinely democratic participation in the design, planning and ownership of the project aims for a degree of delegated power, partnership, and citizen control.

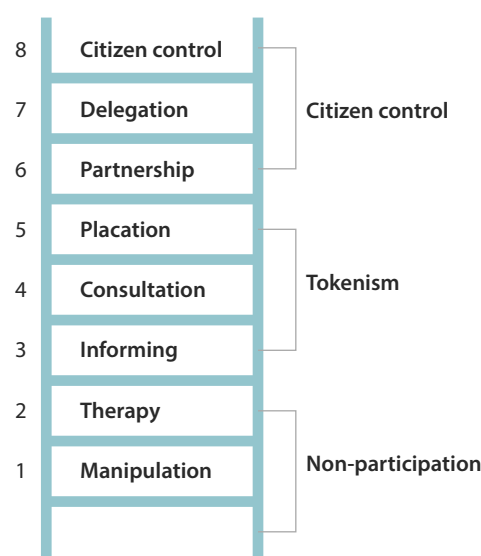


Figure 2: Degrees of citizen participation (Arnstein’s Ladder. Arnstein, 1969).

The difference between collaboration and other kinds of stakeholder engagement or other kinds of collective activities then is one of degree, intensity, and duration of relationships as well as power to change and control.

Models of the degree of collaboration, such as that shown in Figure 3 describe the degree of interdependency of different kinds of organisational interactions and relationships, starting from competition where connections are only occasional through to full consolidation where organisations have merged to become one unified entity.

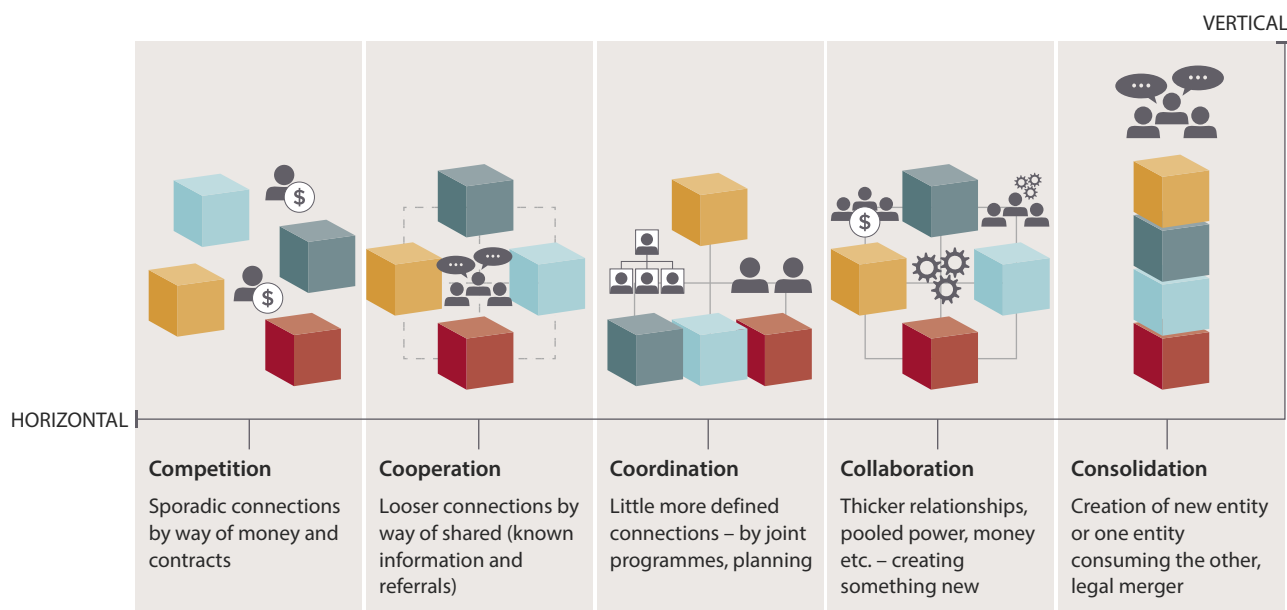


Figure 3: Continuum of interorganisational relationships: The five Cs (Keast 2016)

Research on collaborations

There have been many systematic reviews that consider what works for collaborations between diverse types of organisations. They can be between businesses, between public sector organisations and between multiple sectors.

Much of the research on collaboration originated in business-to-business collaborations. These have been mainly focused on how to manage the competitive drive of for-profit organisations to cooperate for mutual advantage. These include collaboration between small and medium sized enterprises to gain commercial advantages in international markets (Costa et al 2016, de Almeida Guimarães et al 2021, Zahoor et al 2021); managing relationships in cross organisational collaborations (Dir and Cappelli 2018) and the collaboration of entrepreneurs with other entrepreneurs (Tuominen et al 2013)

There has also been research on collaborations between universities and which were for the purpose of knowledge exchange, innovation and the commercialisation of academic knowledge industry (Ankrah and AL-Tabbaa 2015, Rybnicek and Königsgruber 2019)

Multiple stakeholder collaboration research is perhaps most well developed in the field of health promotion and usually involves collaborations with the aim of working together to target a particular disease or to promote health behaviours in populations. One of the first reviews that synthesised studies in health, social science, education, and public affairs identified what they saw as key factors for successful collaboration between non-profits (Mattessich and Monsey 1992) whose aim was a shared vision of achieving a “public purpose”. It found that collaborations were more successful if:

- There was mutual respect and understanding
- There was an appropriate cross section of members and collaboration was in their self-interest
- Members had both a stake in the process and outcomes Communication was frequent and open
- Goals and objectives were sustainable, achievable and concrete
- The group was sufficiently funded
- There was a skilled convener.

A recent review of frameworks for understanding collaboration (Calancie et al 2021) found many of the same factors and could be further grouped into seven domains:

- Community context
- Group composition
- Structure and internal processes
- Group dynamics
- Social capital
- Activities that influence or take place within the collaboration
- Activities that influence or take place within the broader community
- Activities that influence or take place both in the collaboration and in the community

Most of the collaborations in the study were cross sector, but still firmly within the public sector. It might be said that this would make having a shared vision easier and to engender less tension and fewer conflicts of interest, management structures and contractual challenges than between private and public, third sector and citizen organisations such as those envisioned for SLES. While it is useful to understand those factors for success for collaborations, it perhaps just as important to recognise and understand the ways in which tensions and contradictions between diverse types of stakeholders can impact on the desired outcomes.

Another more recent review of the research literature on collaborations between non-profit organisations (Gazley and Guo) found that there was a lack of sufficient attention paid to what does not work. Questions remain on what factors can intervene on the way to successful collaboration outcomes or even bring about their collapse. They found a lack of research sophistication; there were no comparative research studies to draw any firm conclusions about the mechanisms of collaboration on the causal pathway.

There remains a gap in our knowledge about what works overall for collaboration between multiple stakeholders of diverse cross sectoral types, including non-profits, for-profits and the community that are relevant to SLES configurations and contexts.

Cross sector, multiple stakeholders' collaborations need to consider the pitfalls and challenges as well as what works and the contexts, mechanisms and mediating factors that can influence the final outcomes.

Methods

Review questions and approach

A realist review is a theory-based approach that can offer insights to the factors that contribute to successful collaborations, the contexts that can impact on outcomes and the mechanisms by which complex social interventions are anticipated to work.

A rapid realist review is a systematic review that considers the context-mechanisms-outcome (C-M-O) configuration in a theory of change model, but is undertaken at pace, to a policy relevant timescale. We sought to achieve "rapidity" by reviewing and synthesising only the systematic review literature on multisectoral, multi stakeholder collaborations. We examined the overall effects and the factors that impact on success (C-M-Os) and produced practice relevant recommendations based on intervention component analysis (ICA) (Sutcliffe 2015) developed from across the studies (see appendix 2). We anticipated that the timing of the interventions – that is, at what stage in the project the collaboration is assembled and for how long it continues – were also important contexts in explaining outcomes. (See appendix 1 for methods of the review.)

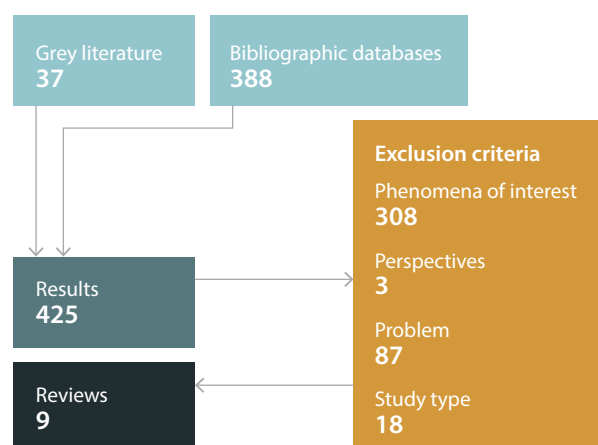
Results

Research map – what research did we find?

We identified and studied nine reviews based on our screening (see Appendix for more details on our methods). Four (R1, R3, R4, R8) were collaborations to improve health outcomes and represented cross sector services from education, health, criminal justice and third sector service providers and philanthropic organisations.

In these reviews, the private sector agencies in the collaboration were private providers of public services such as vaccine and drug development or, in another review, business sponsorship of health programmes. Cross sector collaboration for product development was the aim of three reviews (R4, R6, R8).

Three of the reviews (R4, R5 and R9) concerned Private-Public Partnerships (PPP), a particular kind of defined collaboration between government and private sector agencies for larger scale projects which tend to be over the longer term.



Figures 4: Flow of studies.

Table 1: Review characteristics					
Review number	Short title	Number of included studies	Date range	Sectors	Purpose of collaboration
R1.	Alderwick et al 2021	36	January 1999 -December 2019	Health Non-Health	To improve health outcomes To reduce health inequalities
R2.	Bryson et al 2015	196	2007 to early 2015	For profit Not for profit	To solve a public problem; to share skills and resources and risks
R3.	Calancie et al 2021	95	1982-2020	Criminal justice Faith Health Military Social services Transport	To improve health outcomes To address a specific disease
R4.	Campos 2011	50	1990-2010	Health Pharmaceutical industry	To address a specific disease; PPP. Using public-private partnerships for drug and vaccine development
R5	de Aragão 2016	3	1990-2015	Government Transport Construction	PPP. Financing infrastructure investments To assure that the private sector delivers timeliness, cost efficiency and project quality

Review number	Short title	Number of included studies	Date range	Sectors	Purpose of collaboration
R6.	Garousi 2016	33	1995 and 2014	Software Engineering Academia	Product development
R7.	Hamdan 2021	45	2000-2019	Academia Construction Community Housing Local Government Philanthropic Retail	To create sustainable neighbourhoods
R8	Lee 2020	13	1990-2017	Education Health Manufacturing Professional sports Retail Social services Transport	Product development Gaining business opportunities through networking and accessing government information Incorporating corporate ethics and enhancing organisation reputation To promote healthy behaviours Programme delivery
R9	Rybnicek 2020	92	2000-2016	Government Construction Manufacturing	To solve a public problem PPPs To overcome modern challenges and develop new opportunities.

Contexts mechanisms and outcomes

We studied the contexts that can impact on outcomes and the mechanisms by which complex social interventions are anticipated to work. We identified five different context, mechanism and outcome configurations for successful collaboration. We included intervention components, or the strategies and resources needed to implement the collaboration in the configurations to develop a programme theory of successful collaboration for each of the mechanisms.

Mechanisms that underpinned successful collaboration were:

- Mutual advantage or gain (5 reviews)
- Communication (in 5 reviews)
- Trust (5 reviews)
- Legitimacy (2 reviews)
- Leadership (2 reviews)

Mechanisms were often interconnected. Where one mechanism is needed to trigger successful collaboration, other mechanisms may also need to be in process to cause the expected outcomes.

Contextual factors are the pre-existing conditions that can moderate the action of the mechanisms on the expected outcome. The reviews identified several clusters of influential contexts:

- Political: regulatory environment and national policies
- Economic: available financial resources
- Social: relationships and interactions of the collaboration members
- Cultural: professional histories, cultures and ethos of the agencies involved
- Demographic: skills and capabilities of the members, and diversity of communities that were represented in the collaboration.

We examined each mechanism in order to develop logic models of change, describing resources necessary for that mechanism to “fire” in the form of inputs, the activities and actions that these create in the form of outputs, contextual factors that can help or hinder the working of the mechanisms and the outcomes reported for each. Like previous reviews we did not find comparative research that could determine the strength of the evidence linking actions to outcomes on a causal pathway, but by creating logic models of the collaboration programme theory we can devise strategies as to what should work and give practical guidance on how organisations can work together when trying to achieve similar aims under similar circumstances.

Mutual advantage, mutual gain

Five reviews found that mutual advantage, or the mutual gain to be had in participating in a collaboration (R2, R4, R6, R7, R8) was a mechanism of successful collaboration. In one review, this relationship of mutual advantages was called, “reciprocal interdependence”. This described a relationship where the associate benefits of collaboration towards a shared goal were greater, and the risks fewer, than acting individually. It depended on the ability of collaboration members to be flexible and adaptable.

A supportive regulatory context helped realise mutual gain because it meant that individuals did not have to consider every eventuality and course of action and this acted as a guide to the expected behaviours and actions of collaboration.

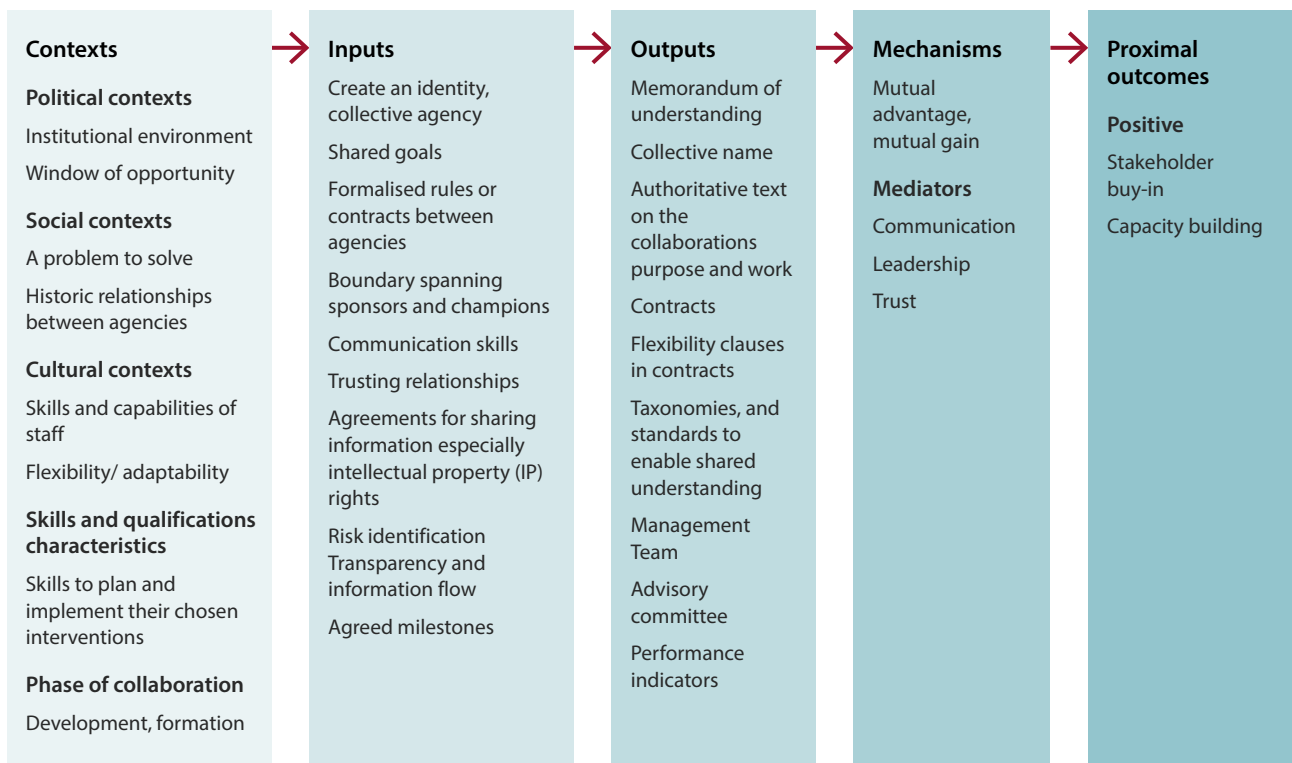
Trust was an important mediator to mutual gain. For there to be a belief that there was mutuality, there had to be trust between members and in the collaboration that both gains and risks were equitably distributed.

Strategies to activate and support mutual advantage, mutual gain

Strategies to support trust in beliefs of mutual gain were reinforced by regular updates against agreed milestones of success, demonstrating the continued success and value of collaboration as well as identifying risks and mitigations to the project early on.

Successful collaborations often enlisted the help of a kind of “broker” who activated this mechanism by mediating between the mutual interests. They could frame issues and goals in ways that made it relevant and important to a diverse collective of members and organisations. The skills and characteristics needed of a project champion were in their leadership qualities, they were charismatic and engaging and importantly, had a sincere interest in the success of the project. They used both formal and informal authority based on their expertise being valued by members of the collaboration and were trusted as “honest brokers” and “collaborative capacity builders”.

Doing advance work in defining the problem at the development and formation stage is another strategy to activate the understanding of mutual advantage because it demonstrates the “reciprocal interdependence” and mutual advantages in addressing the problem through collaboration. A focus on discovering the shared goals of the collaboration could be more successful in starting a dialogue than in attempts to align by shared values.



Box 1: Working together for mutual advantage and mutual gain: The case of ReFLEX Orkney

Since 2019, the ReFLEX Orkney project (<https://www.reflexorkney.co.uk/>) has sought to develop a local energy system that integrates local renewable generation with flexible power, heat and transport assets. While the ultimate goal is to make Orkney carbon neutral, the more immediate aim is to meet a range of objectives for different stakeholders: helping energy consumers reduce their environmental impacts without increasing their costs, encouraging private investment by demonstrating new technologies and business models, and boosting the economy by developing local skills and opportunities for replication elsewhere.

The success of the project has hinged on thorough engagement with the local community to raise awareness of the plans and aims, inspire participation and involve them in decision making and connect them to local services and organisations.

ReFLEX has built a strong presence in the area and beyond through the website and newsletters and through individual members championing the project, arranging and presenting at conferences and regular town hall meetings, and liaising with potential participants and partners to run trials of electric vehicles and car clubs. By stimulating early adoption, the project has been able to provide:

- Access to affordable technologies and support to the community,
- An enhanced local market for service and technology providers, and
- A greater understanding of what works to help the continued development of a blueprint for an innovative SLES.

Communication

Five reviews (R1, R2, R3, R4, R10) found that communication was critical for the successful operation of the collaboration; a lack of communication was often cited as a reason for the failure of project collaborations.

Several contexts could impact on the effective operation of this mechanism.

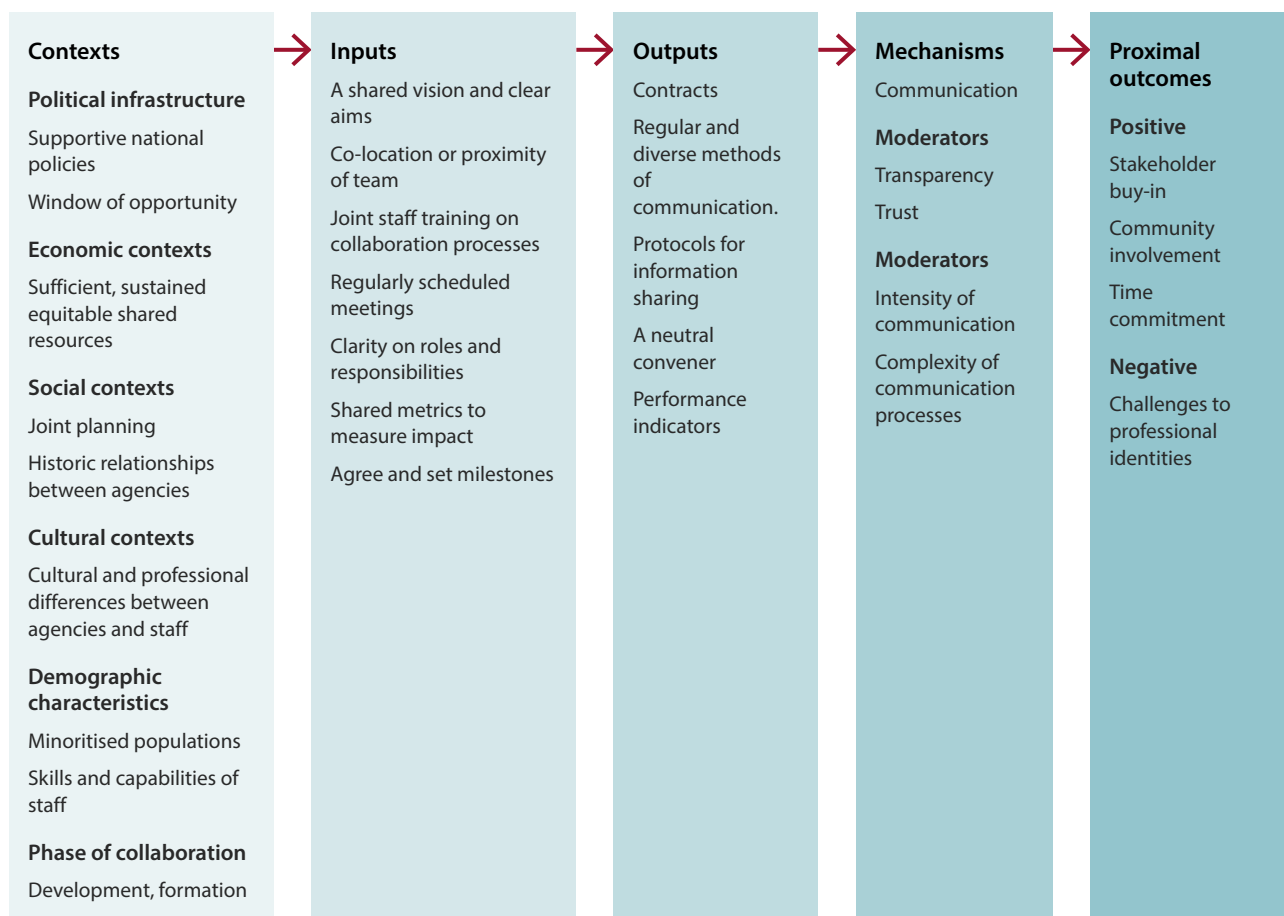
Sufficient, sustained and equitably shared resources among the members of the collaboration were important enablers to communication. There was recognition that historic relationships between the agencies involved could impact on communication in the present. Cultural differences in professional values and practices also played a role – particularly between not-for-profits and for-profits where traditionally for-profits were interested in short term rewards and return on investment, while not-for-profits were seeking longer term and non-monetary goals.

The strength of the relationship of communication to successful collaboration can be dependent on the transparency of information, goals, expectations, and clarity over roles and responsibilities, which builds trust between members and by members in the collaboration. Similarly, the quality of communication shapes the activation of other mechanisms of collaborations, such as trust and understanding between members. The intensity, frequency and type of communication and the complexity or ease of communication channels and processes can have an impact on success of the collaboration.

Strategies to activate and support communication

Strategies to enable communication for collaboration included working together to articulate a shared vision and a clear statement of aims and developing a shared understanding of success that could be measured throughout the lifespan of the collaboration through milestones and performance indicators. A shared vision and clear aims require members to be transparent about their expectations and goals at the earliest opportunity to enable communication throughout. Co-location, proximity, and face-to-face meetings and learning together through joint training sessions were strategies used to enable communication. Staff turnover could create uncertainties in roles and responsibilities, and so collaborations needed processes that could manage such transitions.

Intermediate outcomes from communication include stakeholder buy in and community involvement. Negative outcomes from not having communication were seen in the withdrawal of time, disengagement, challenges to professional identities or resistance in creating a collaboration identity.



Box 2: Communicating in a common language in Project LEO (Local Energy Oxford)

Project LEO is an innovative cross-sector collaborative project looking to demonstrate how social, environmental and economic goals can be achieved by trialling smart, flexible technologies, services and models (Darby & Banks 2020). By building a diverse consortium of partners from the public sector, industry and academia, the project is well placed to deliver a complex suite of measures to fit local conditions but its success hinges on coordination and communication.

To improve collaboration and communication between partners, workshops were conducted on key areas like stakeholder engagement to build shared understanding. Project LEO also adopted a 'minimum viable service' (MVS) approach which proved useful for clearly articulating the activities or propositions involved in different elements of the project, and for identifying issues and solutions.

Over the course of the first year of operation they identified a number of necessities to ensure that their range of partners could work together effectively to achieve both individual and shared goals.

These included:

- An owner responsible for trialling, communication and readiness of each MVS
- A common language with consistent terminology
- Detailed procurement standards for flexibility assets
- Protocols for two-way communication between flex assets and network
- SLES framework for failures, delays etc – penalties, fall back arrangements
- A data sharing agreement between partners which:
 - Identifies needs and responsibilities early, and collects the right metadata
 - Coordinates members and requires documented processes

Trust

Five reviews discussed trust as a critical mechanism for collaboration success. It could be enabled by members of the collaboration having trust in the project itself to achieve its aims. It could also be enabled between the members of the collaboration.

A supportive regulatory environment helped build trust in the collaboration's ability to achieve its aims because it ensured that the "rules of the game" were understood by all and a provided a neutral, interest free framework for engagement. Supportive regulations ensure that contracts were meaningful, upheld and provided an avenue of recourse if they were not. Just like communication, national policies that were consistent and supportive of collaboration for local projects enabled trust in by providing a stable context for the project over its lifetime.

Supportive national policies provide other important mediators to trust, such as affirming the legitimacy of the collaboration.

Trust was also enabled when members were confident in the ability of the collaboration to achieve its aims, and that the aims were legitimate. This was described in the reviews as a consensus that there was a problem that needed to be, and could be, solved by the collaboration – or, that more could be achieved by the collaboration than any of the organisations operating alone could achieve. The purpose of the collaboration had to be relevant to the members and important to them. One strategy was to establish a collective identity through a narrative or storyline of the collaboration and its work and purpose.

The legitimacy of the collaboration, and trust in its ability to deliver, relied on a transparent examination of risks and mitigations. Advisory groups and community involvement were ways of incorporating knowledge and independence of interests in understanding and responding to risks and setting realistic goals. Agreeing upon milestones towards success and using established methods of monitoring and evaluation ensured that the collaboration was making progress as planned.

Trust between members of the collaboration was enabled when differences in power, resources and interests were explicitly recognised. Competing agendas and being uncertain of the benefits could all impact on successful collaboration, but a recognition of mutual advantage and interdependence could build trust between members.

Trust between members was a necessary mechanism for enabling communication, particularly in the sharing of confidential or commercially sensitive information. Discussing sensitive issues early in the formation of the collaboration helped establish transparency that builds trust and reduces scepticism of individual members.

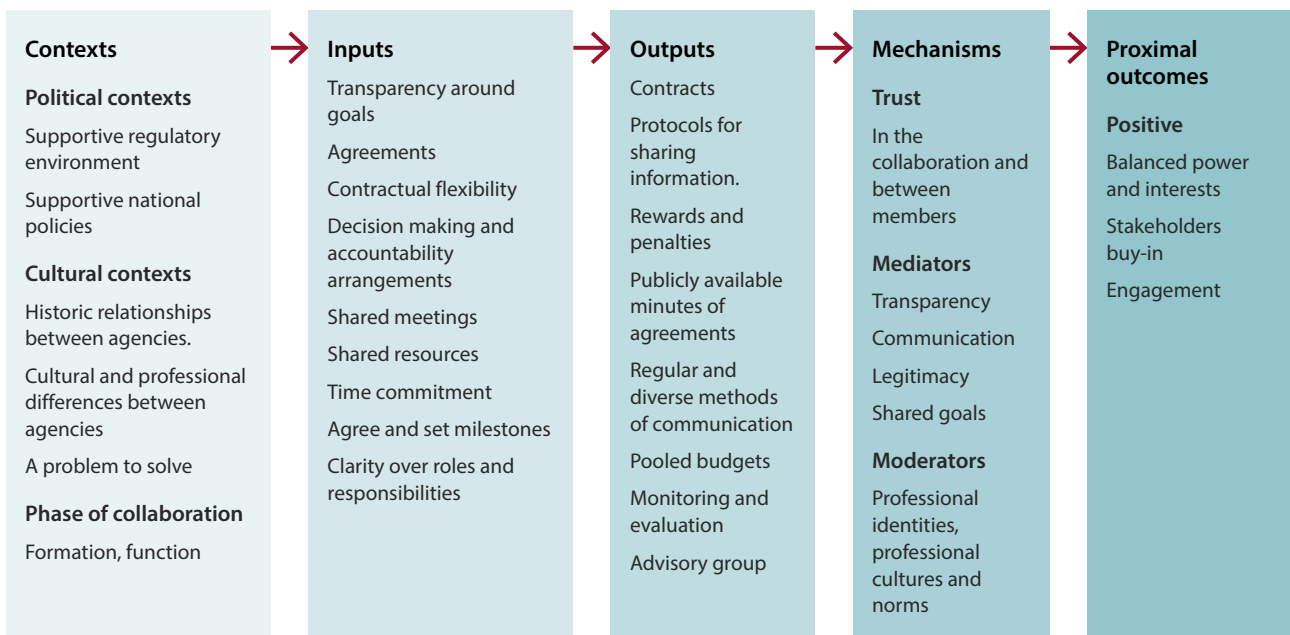
Strategies to activate and support trust

Strategies to balance differences in power, resources and interests were:

- Stating of goals and formalising them into agreements
- Sharing skills, knowledge, and resources in shared meetings in diverse ways
- Sharing time and financial resources through pooled budgets and face-to-face meetings
- Being clear about members roles and responsibilities
- Creating clear and transparent procedures for decision making and accountability
- Ensuring that the skills and knowledge of members were utilised effectively and that members felt empowered to participate and their contribution valued.

Shared professional values can act as a shorthand route to trusting relationships between members, and differences in professional cultures and ways of working can all impact on establishing trust. Contractual arrangements between parties that had flexibility built in to accommodate changes in circumstances that might arise during the lifetime of the collaboration ensured that responses were transparent and fair.

Negative outcomes from lack of trust in the collaboration could result in the withdrawal of engagement of the members, delays in the delivery of the project, with the increased costs and waste of time and resources that that would entail, protectionism and challenges to professional identities. These negative experiences of collaborations are likely to put participants off participating in future projects. Positive intermediate outcomes included balancing power and interests of the members, engagement and stakeholder buy-in.



Box 3: A case study in trust: The Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)

CARIAA is a climate change adaptation research program involving over 450 researchers and practitioners from multiple countries and disciplines. In their study of this program, Cundill et al (2019) shared insights into the challenges that faces such large-scale, transdisciplinary research and the features that influence their success.

Trust was found to be a foundational issue because partners had not worked together before, were geographically dispersed, collaborated online, and often were competitors previously or even continued to be outside of the programme so were not incentivised to share. Cultural and historic differences and perceptions were noted as potential obstacles to effective collaboration. The authors also highlighted systemic factors that could either enable or constrain outcomes such as the design of partnership agreements and processes (like risk management), power asymmetries between partners, and conflicting institutional cultures, values, or understandings of success.

A key aspect to achieving successful collaboration was to use existing research to explicitly design plans to foster collaboration, such as:

- Adopt a learning framework to support ongoing mutual learning with collaborative spaces and regular learning reviews on common themes
- Co-design with consortia members and external professional facilitation support
- Build flexibility into budget allocation to enable adapting to new learning and support new collaborations

Leadership was seen to be most successful when inclusive and hands on, engaging partners in design and ensuring they had a stake in outcomes. In some cases, the friendships developed during the process became the incentive to collaborate and removed the need for further incentives.

Legitimacy

Four reviews (R1, R2, R4 and R8) described the legitimacy of the collaboration as a mechanism for its success. This could be perceived and expressed internally amongst the participants, in the acceptance of procedures and decisions by mutual understanding and consent. It could be perceived and expressed externally by the community the collaboration was intended to serve. Supportive national policy could promote or incentivise collaboration, by demonstrating representative political authority. On the other hand, where national policy conflicted with local priorities this could destabilise and delegitimise the project, undermining the purpose of the collaboration. Collaborations that could establish a stakeholder advisory group to consult on local needs and priorities, local cultures, and histories of previous working relationships between agencies could influence members' views of the legitimacy of the projects.

Strategies to activate and support legitimacy

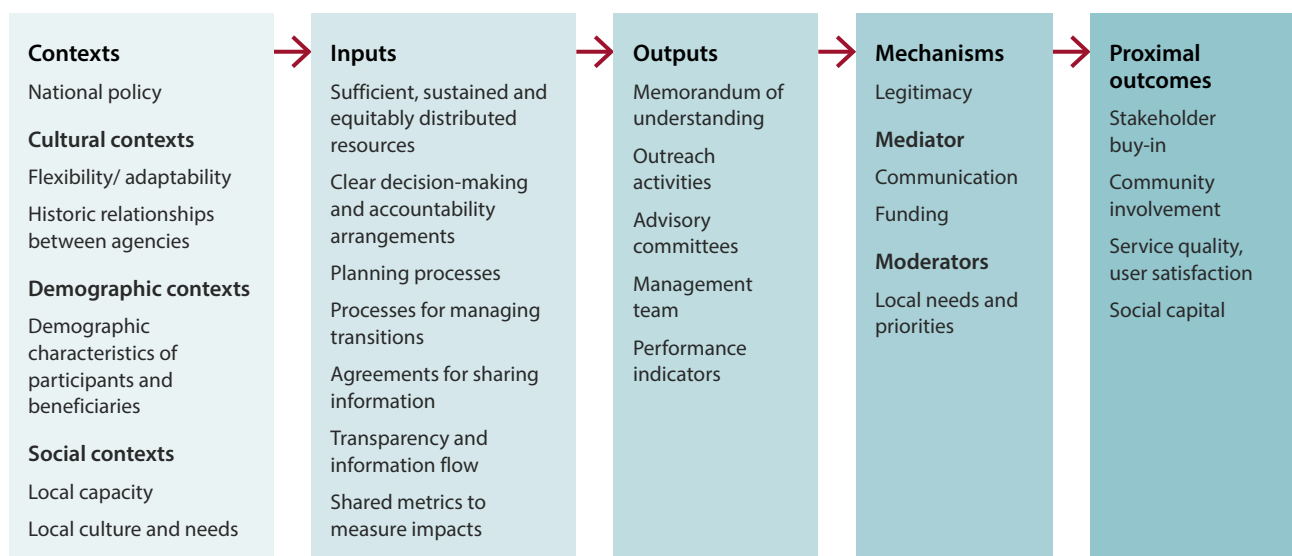
Strategies for enhancing the legitimacy of collaborations included building in capacity for flexibility and adaptability, or what one review called being "structurally ambidextrous." This meant recognising and managing the challenges of tensions that could arise from cross sector collaborations, such as in managing hierarchical versus lateral relations, voluntary and involuntary power sharing, and between formal networks versus informal networks.

Decision making procedures that were transparent and responsive to change could resolve tensions through the legitimacy of process, ensuring that everyone felt that they got a "fair hearing", if not their desired outcome every time.

Equitable funding and resourcing of staff, equipment and time were important supports to resolving tensions; a lack of equitable funding and resource sharing was identified as a common barrier to collaboration.

Strategies for enhancing the legitimacy of the project for the local community included outreach activities which had the potential for greater inclusion and participation, particularly for people who are typically underrepresented and underserved in community-led collaborations.

Outcomes from enhancing the internal and external legitimacy of collaborations included stakeholder buy in, community action and community involvement and increasing access to services. Cross sector collaborations between publicly funded organisations and private expect a greater demand for accountability on the results and how public money has been There are familiar challenges in measuring the value of intangible assets, such as enhancing social capital through collaborative, community involvement and the creation of new working relationships.



Box 4: The Energy-SHIFTS project: Legitimacy through inclusion

A Horizon 2020 project in the field of energy-related social science and humanities research, Energy-SHIFTS aims to improve collaboration between energy researchers and their impact on EU policy (Suboticki et al 2019). A workshop was held with prominent researchers and policy makers on the role of inclusive engagement, a term that can be defined in many ways but involves collaboration with a wide range of stakeholders. Participants highlighted that this engagement can be both a process and an outcome: that collaborating inclusively enhances the legitimacy of the project and in turn improves future cooperation. They also noted that engaging in sufficient depth with a truly representative range of stakeholders requires time, effort and money.

- Analysing and adapting to needs and gaps in terms of both the skills and practices required and the stakeholder groups that should be represented

It was noted though that such work can may not align with policy. In energy, the pace of transition needed to meet carbon targets is at odds with thorough engagement that may cause delays or raise objections from people with differing goals. Workshop participants highlighted the need for EU to recognise the contribution of inclusive engagement, focus research policy more on social and diversity issues, and provide financial and managerial support for inclusive engagement. They recommended that EU energy research funding should:

Recommendations for interdisciplinary research projects included:

- Going beyond tokenism to consciously embed inclusive engagement throughout projects
- Connecting with a variety of actors – opponents and existing actors, not just new entrants – through a range of methods
- Being open to differing perspectives of what inclusive engagement means
- Ongoing dialogue to maintain relationships and capture changing views such as increasing receptivity to change as participants experience the impacts

- Create space for participation such as consultation with local decision makers and continual dialogue events
- Reflect on the relevance and effectiveness of their engagement tools
- Assess whether the competencies required for certain institutionalised funding strategies can exclude some people or perspectives
- Recognise the need for continual development in public engagement and for accountability systems that assess inclusive engagement

Leadership

Two reviews found leadership to be an important mechanism for successful collaboration (R1, R2). This mechanism was most closely dependant on other linked mechanisms to mediate its successful operation.

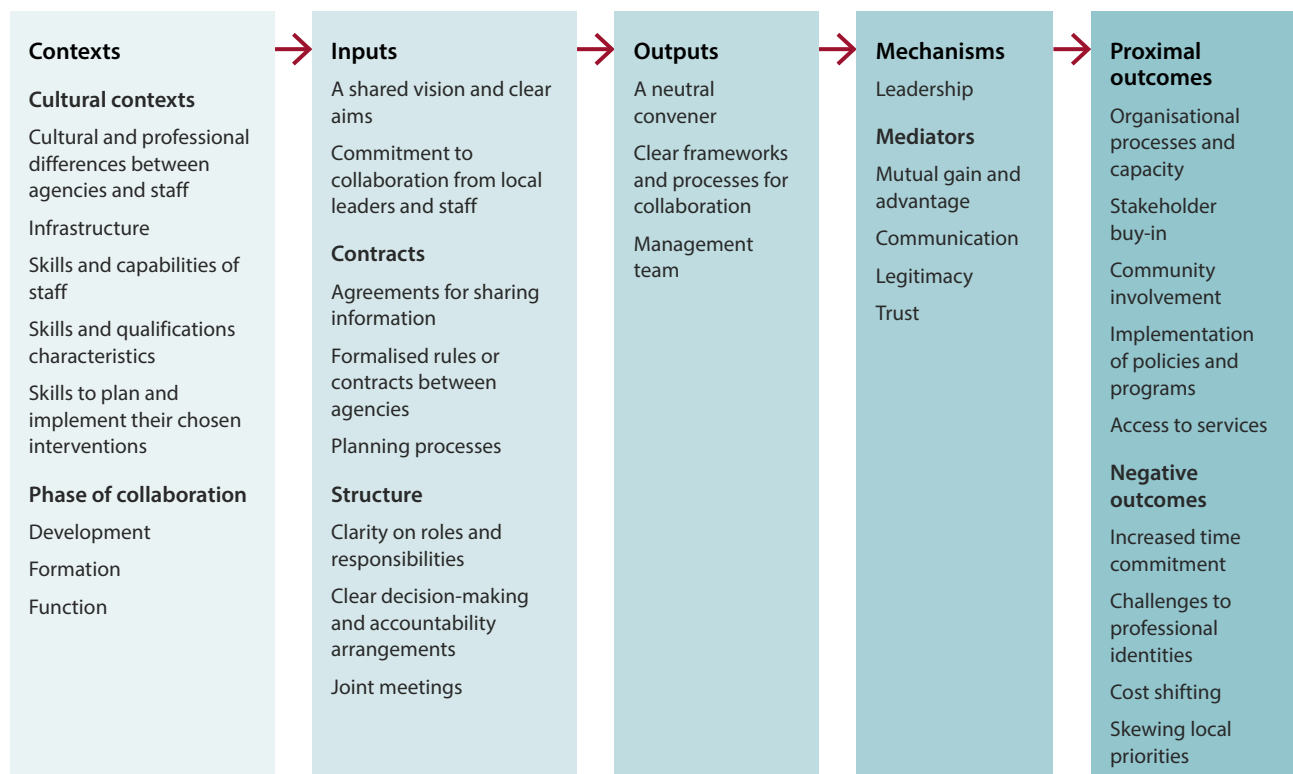
The skills, competencies and qualifications, as well as the personal attributes of leaders, were important contextual factors that triggered leadership as a mechanism. Cultural and professional differences between organisations could potentially impact on collaborations. Leaders could potentially inhibit collaboration by defending their own organisational interests over that of the shared goals and interests of the collaboration.

R2 suggested that more research was needed on the specific characteristics, skills and competencies that were required from good leaders and project champions. It may be that the lack of evidence indicated that there is no single blueprint for effective leadership waiting to be discovered, but that there were many routes to effective leadership or that leadership was a supporting, enabling mechanism of all the others.

An important characteristic of a leader is that they exist “in the eye of the beholder”. They are recognised by others as leaders because of their established reputation as a legitimate authority; because of their influence, their adaptability and their skills in problem solving; and ultimately as a trusted “honest broker”, who can mediate fairly between the different interests and resolving tensions and conflicts through fair and open processes,

Strategies to activate and support leadership

Collaborations that supported leadership sometimes appointed a neutral convener and/ or nominated a dedicated management team. Successful collaborations were not solely led by these “boundary-spanning leaders”, project sponsors and champions but in combination with, and supported by, the structures of collaboration which provided fair processes, clarity of roles and responsibilities, and clear frameworks for interaction and operation.



Box 5: Leadership through local governance: Milan district heating

Leadership through local governance: Milan district heating

Milan is working to meet environmental goals – energy emissions, consumption and efficiency targets – using district energy. A 2017 case study of the scheme (UNEP 2017) showed that by switching energy consumption from gas boilers on to its large district heating (DH) system, thousands of tonnes of CO2 emissions have already been avoided; cost savings have been made by residents, businesses and the city; and the energy system has become more resilient to price fluctuations, safety issues and network constraint issues.

To achieve these goals, the local government has undertaken a variety of leadership roles and activities to facilitate this switch and encourage development by boosting investor confidence:

Planner and regulator:

- Plans pathways, maps potential networks and opportunities
- Provides coherence between national and local objectives, EU legislation
- As part owner of the DH operator, the city administration shares mapping data and ensures development is in line with planning and CO2 targets
- Implemented building codes that require greater energy efficiency than national standards and encourage connection to DH

Facilitator – leveraging finance:

- Offers incentives including loan guarantees; reduced infrastructure charges for buildings that meet standards (like connection to DH); subsidies to switch to DH
- Creates pilots of new technology and policies. For instance, developing and testing individual starter networks in high potential areas can reduce the risk in expanding and connecting other networks, aggregating loads and demands

Provider and consumer:

- Provides large, ambitious plans for district energy network expansion and interconnection. These are not possible without interconnected policies and incentives (support and partial ownership)
- Allows free use of assets such as wells to facilitate investment
- Allows optimisation via ownership/control over multiple utilities; coordinating earthworks to minimise disruption, developing gas & DH networks strategically rather than competitively
- 10% of its building stock connected to DH

Coordinator and advocate:

- Raising awareness: help desk promoting DH and switching, providing technical and financial information to consumers and building owners. Schedule of experts available to offer advice.

Discussion

The increasing interest in cross sector collaborations stems from a particular socio-political position that many social problems are too complex to allow governments alone to impose broad based solutions from top down, and that combining the private sector market logic of innovation and competition with public sector goals of social welfare, will be better in defining and meeting locally defined needs and preferences. Whether this is shown to be true through multiple stakeholder and cross sector collaboration remains to be seen. There was a lack of comparators in the interventions in the reviews to make claims about whether this arrangement is more effective or confers more advantages in bringing together these two logics in project delivery than in single sector collaboration.

For instance, it is notable that reviews of collaborations with health organisations did not find greater improvement of health outcomes which was the aim and purpose of the collaboration. It may be that there are reasons for collaboration that are no better but also no worse than single sector or single organisational projects. And it may be that measures of success are not empirical but normative, such as in building social capital, enhancing reputation, or building trust in institutions. Or they may be ethical considerations, such as involving stakeholders in local energy projects that will affect them, and by actively involving typically undeserved or excluded groups of people.

In these ways, multi-stakeholder, cross sectoral collaboration is a means by which SLES can be part of the “Just transitions” to fair energy futures (Macguire and Shaw 2021) because they offer opportunities for a deeper level of participation than at the superficial level of consultation; creating a space for local, deliberative democracy and energy citizenship. On the other hand, care should be taken not to create, re-create or amplify the hierarchies and inequalities that exist in the member organisations or in their local communities, as achieving equity of outcomes is unlikely to happen by itself. (Johnson et al 2020).

National policies that were consistent and supportive of multi-stakeholder collaborations presented a “window of opportunity” to act where the streams of problems, politics and policy solutions come together at the right time (Kingdon 1984). Conversely, national policy priorities that were constantly shifting can undermine local project collaborations.

Tensions between aims and goals and organisational values are to be expected where it is the differences in perspectives and purpose that offers the advantages of collaboration. As a result, a breakdown in communication was often cited as a reason for collaboration failure. Resolving conflict by preventing misunderstandings and being realistic and open about divergent goals needs clear and fair processes, spaces and means for open and honest communication of aims and goals, and ways to measure progress against these. This suggests also that collaboration itself is an ongoing process rather than a single state or entity.

Conclusions

This realist review of reviews of multiple stakeholder, cross sectoral collaboration identified five key mechanisms that underpinned successful collaboration: communication, mutual advantage and mutual gain, trust, legitimacy and leadership. Mechanisms were closely linked, in that one mechanism’s operation or the strength of effect depended on, or was mediated by, the other mechanisms.

Several contextual factors were common to all of the mechanisms, such as national policies that were aligned with local priorities and regulatory environments that were supportive of these kinds of collaboration.

There was agreement that it was important for cross sectoral collaborations to establish early on how information was to be shared. A potential conflict of interest lies in the consideration of information as commercially sensitive for business, compared to the obligation to make information publicly available for publicly funded organisations. PPPs may be subject to closer scrutiny than single sector funded projects.

When compared to systematic reviews of public sector collaborations, there were many of the same themes of intervention components necessary for success in establishing trusting relationships between members and identifying mutual interests. However, there were challenges (and advantages) particular to cross sectoral collaboration. Differences in organisational values and working cultures between business, not-for-profit and third sector collaboration could impact on successful operation and the cultural and professional differences between organisations was associated with the operation of several of the mechanisms. The reviews suggested that it was more effective to focus on shared goals rather than shared values, given that there were likely to be fundamental differences in values between for-profits and not-for-profits. Indeed, it is these differences in cultures, values and perspectives that are the advantages promised by cross sectoral collaboration.

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Appendix 1

Methods

Review questions

- What works, for whom and under what circumstances for successful collaboration between multiple stakeholders from business, not-for-profit and third sector, organisations?
- What are the core components for successful collaboration?
- What are the practice implications for Smart Local Energy System collaborations?

Search strategy

We searched for systematic reviews in Google and Google scholar, and Web of Science bibliographic database using relevant keywords for:

- “Systematic review”
- Collaboration or partnership OR alliance OR coalition
- Energy OR Engineering OR planning OR public-private OR community.

Screening studies – applying the inclusion criteria

From the results of the search, we upload the records into EPPI reviewer, the EPPI Centre’s information management software (Thomas et al 2010). We included a study if it met the following inclusion criteria:

Perspectives: the study must include the views and experiences of multiple stakeholders from both the private and public sector.

The phenomenon of interest: in this review the phenomenon is the collaboration, and the activities, practices, and approaches to the challenges and solutions that arise. The organisations must come from cross and multiple sectors, from non-profit organisations and for-profit organisations as we anticipate this will be where the challenges lie, and will be most translatable to SLES collaborations.

Problem: we anticipated that the main issue would be the potential tensions and challenges of collaboration that include multiple, and cross sector organisations from the private and public sectors and community and citizens

Study type: The study must be a systematic review.

Characterising included reviews

We extracted data from systematic reviews on key characteristics and findings. We started from a framework drawn from the Clancie et al 2021 review of consolidated frameworks for collaboration, and took a flexible, inductive approach to describing studies, adding or revising the framework as more studies were examined, considering the different focus of the review on cross sector, public-private sector collaborations and any additional characteristics or features of collaborations of this type that emerged from the findings.

- **Study characteristics:** date of review, type of review or synthesis, types of included studies, date range of included studies.
- **Setting:** country region or other level of collaborations.

- **Contexts:** background characteristics that can influence final outcomes, including social, cultural, economic, and political contexts.
- **Mechanisms:** the features of the collaboration that must operate, or “fire” for the collaboration to be a success
- **Components of the collaborations:** activities and key features of the collaboration include those in the domains described in the Calancie et al (2020) consolidated collaboration framework: structure and internal processes, group dynamics, group composition
- **Collaboration phase:** at what stage is the project in, for how long does the collaboration continue?
- **Findings:** views and perspectives of the participants, process evaluations, factors impacting on outcomes
- **Impacts:** these were broadly ordered into positive, negative (i.e. harmful or unintended outcomes) small positive, no effect.
- **Quality assurance process:** reviews were examined for any elements in the process of execution that would likely impact on the confidence in the findings that are common to systematic reviews.

Synthesis

The synthesis of review findings used a version of Intervention component analysis (Sutcliffe 2015) that extracts key features of the collaboration and reported programme features from findings and author reflections on key features and factors. The aim was to produce practice relevant recommendations from the core or common components of successful collaborations in different contexts.

Appendix 2

Intervention components analysis

Intervention components analysis can determine which features of interventions are critical and which features optional for successful collaboration. Features of collaborations were extracted from review findings and author reflections about effectiveness. All reviews were included as cases, and outcomes were “collaboration success”. There was a lack of detail in reviews as to the strength of effect, and this limits the ability of this analysis to determine the features of and comparisons with less effective collaborations or the strengths and weaknesses of individual components. However, the following table shows the relationships between the synthesised frameworks of intervention components against the different phases of collaboration at which they are supposed to occur and the number of times the features are discussed in the reviews which shows a level of agreement across the reviews to some of the features of the collaboration.

We took the Calancie framework synthesis (Calancie et al 2021) as a starting point to order and group the intervention components into common themes and extracted the data from the systematic reviews on the different activities, resources and outputs that were described as necessary features of successful collaboration for between multisectoral and cross sectoral members. There were six themes of collaboration components: those that were related to the group’s purpose; to structures and processes which in turn were comprised of resources, contracts and structure; group composition and evaluation. We then compared these interventions components against the distinct phases of the collaboration duration.

Interventions components for successful collaboration were mentioned most often in the formation stage, closely followed by the pre-formation, set-up phase. In this phase defining the goals and responsibilities of the collaboration (3), was followed by translating these into measures of success in performance indicators (4) and deciding on shared metrics for evaluation (3) and formalising the agreed upon rules into contracts (3).

Evaluation throughout the collaboration phases was an important way of demonstrating the collaboration’s success to both the members and the wider community and in measuring progress towards these pre-defined and agreed aims and objectives. Using established methods of evaluation ensures that the meaning of collaboration measures of success was shared in the wider community and contributes to the knowledge base on multi stakeholder, cross sector collaboration.

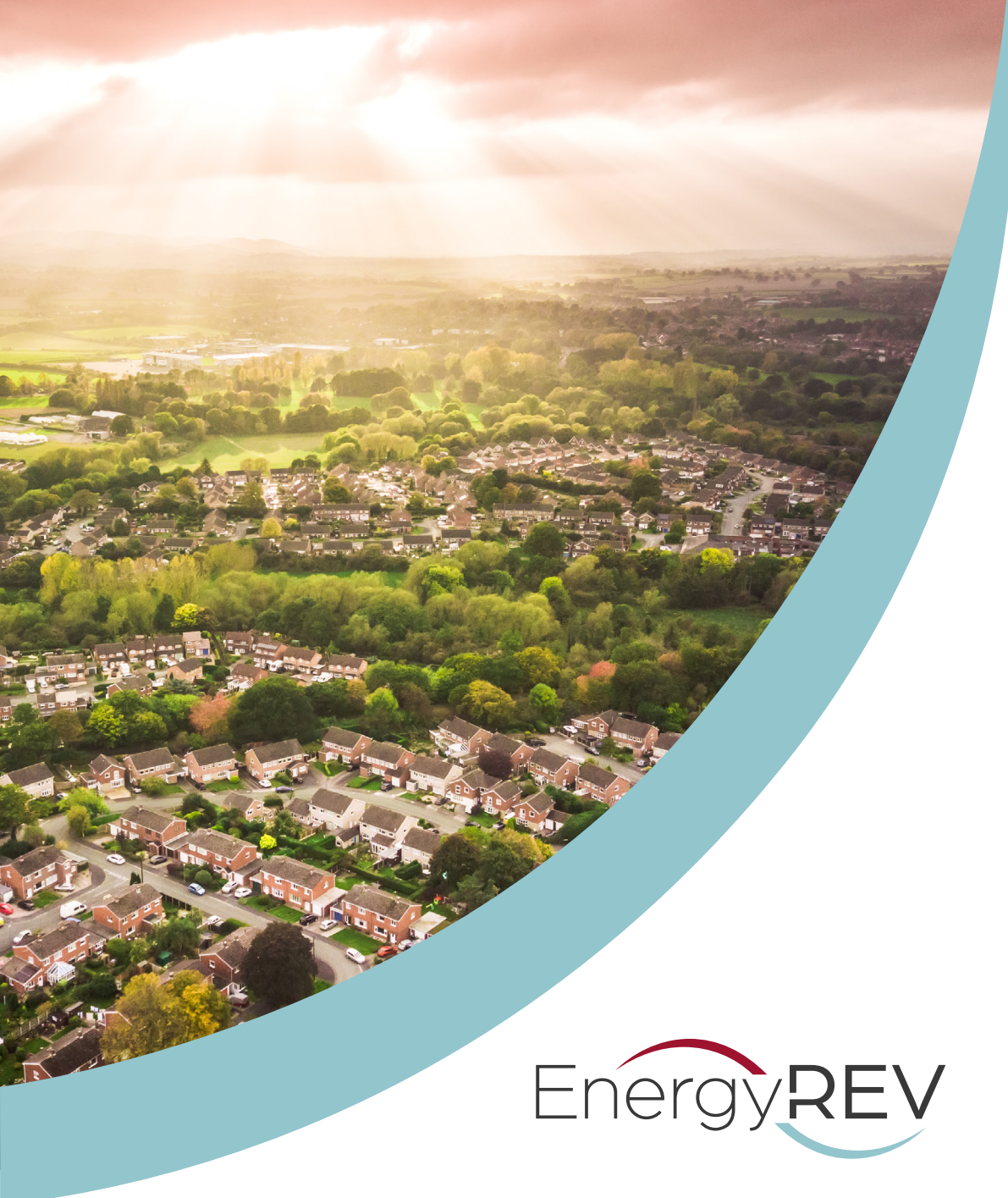
There was a similar level of agreement in the reviews that formalised rules of contracts were critical in both the formation and functioning of the project. There was also agreement that there should be rules and agreements covering the sharing of information.

The collaboration group composition included an advisory team and a management team through the lifespan of the project. A project champion was also mentioned for all phases of the collaboration.

Table 2: Phases of collaboration

	Development phase	Formation	Function	Close-down	Total components
Group purpose					
Define goals and responsibilities	2	3	3	1	9
Create a shared vision and clear aims	1	2	1	1	5
Memorandum of understanding	1	2	2	0	5
Structure and process					
Resources					
Regularly scheduled meetings and protocols for information sharing	1	2	1	1	5
Co-location or close proximity of team	1	1	1	1	4
Staff training on collaboration processes	1	1	1	1	4
Integrated funding	1	0	0	1	2
Sufficient resources to fund and deliver interventions,	1	1	0	0	2
Contracts					
Formalised rules or contracts between agencies	2	3	3	1	9
Agreements for sharing information	2	2	2	1	7
Taxonomies, and standards to enable shared understanding	1	1	1	1	4
Risk identification	1	2	1	0	4
Budget reporting	0	1	1	0	2
Contractual flexibility	0	1	1	0	2
Clear frameworks and processes for collaboration	0	1	1	0	2
Rewards and penalties	0	1	1	0	2
Integrated contracting	1	0	0	1	2
Demand forecast	0	1	0	0	1
Risk allocation	0	1	0	0	1

	Development phase	Formation	Function	Close-down	Total components
Structure					
Clarity on roles and responsibilities	0	2	1	0	3
Clear decision-making and accountability arrangements	1	1	1	0	3
Enable diverse channels of communication	0	1	1	0	2
Group composition					
Management team	2	2	2	1	7
Project champion	1	1	1	1	4
Synergies of expertise	1	1	1	0	3
Advisory committees	1	1	1	0	3
Communication skills of participants	0	1	1	0	2
Involvement of influential partners	1	0	0	1	2
Stakeholder diversity	1	0	0	1	2
Evaluation					
Performance indicators	3	4	3	1	11
Shared metrics to measure impact	2	3	2	1	8
Use established research methods	1	1	1	1	4
Agree and set milestones	0	1	1	0	2
	Development phase	Formation	Function	Close-down	
Totals Phases	30	45	36	17	



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About EnergyREV

EnergyREV was established in 2018 (December) under the UK's Industrial Strategy Challenge Fund Prospering from the Energy Revolution programme. It brings together a team of over 50 people across 22 UK universities to help drive forward research and innovation in Smart Local Energy Systems.

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