

An evaluation of stakeholder management approach for improving energy efficiency outcomes in housing



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Abstract

Context - Energy efficient housing is influenced by a number of attributes that describe the key players involved in its production. Stakeholders' levels of interest, motivation, awareness and power to impose their decision can have an impact on housing energy performance. Understanding these stakeholder attributes can help resolve barriers to energy efficiency performance.

Approach - This paper examines a number of stakeholder management approaches, compares their classification and prioritisation approaches and analyses each approach's suitability to be adopted for managing energy efficiency stakeholders.

Results - Energy efficiency stakeholders can be classified as internal and external, with the attributes of power, interest, proximity and knowledge. The most suitable stakeholder management approach enables these attributes to be quantified, and with the addition of a time management, could enable a better understanding and management of energy efficiency stakeholders

Implications - This approach may enable a correlation between stakeholder management strategies and the energy performance of housing, and manage the relationships between stakeholders in a way that ensures the achievement of both their individual interests and sustainability goals.

Originality - This paper explores the possibility of applying stakeholders' theories that are commonly used for managing organisations to one aspect of the housing industry (energy efficiency).

Keywords – Energy efficiency- Housing- Stakeholders- Sustainability



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1. Introduction

Housing construction is an industry that comprises a variety of participants with different interests, needs, levels of commitment and goals. They participate in the decision making process according to their own set of rules (Crabtree & Hes, 2009) , and their communication is based on temporary networks, contrasting priorities and lack of cooperation (Berardi, 2013). The fragmented nature of the housing industry leads to the emergence of issues that *“contribute to producing low performance houses, such as the lack of trust among participants, short term demands rather than the long term goals, opportunistic behaviours, and the lack of communication”* (Tzortzatou, 2007). It also results in the development of a “circle of blame” where each stakeholder within the industry blames another stakeholder for the lack of implementation of energy efficiency (Crabtree & Hes, 2009; L. Davis, 2010; pitt&sherry, 2014) .

Research by Miller (Miller, 2012) strongly suggested that an energy efficient house is “an integrated system” that incorporates the interconnections between multiple stakeholders, scopes of work, and components. Collectively these interconnections contribute to creating the product (an energy efficient house). Consequently, achieving the goals of energy efficiency in housing is not the responsibility of any one stakeholder (pitt&sherry, 2014). It is related to the decisions made by all the stakeholders within the six broad segments of the housing industry (legislative, market, planning, design, construction and occupancy/ownership)(Miller et al., 2014), where any decision could have an impact not only on the overall energy efficiency outcomes, but also on the competence of decisions taken by other stakeholders who participate in the same process.

To be able to contribute to the transition towards this “integrated system”, approaches aside from top-down regulations need to be taken into consideration, since stakeholders usually treat these regulations as a burden that needs to be fulfilled with minimum effort (pitt&sherry, 2014). It has been argued that organizational/regulation institutes (that orchestrate rather than regulate) should devise interactive, higher transparency process policies, and a broader design process that integrates other actors (Rohracher, 2001). A strategy that aims to engage stakeholders, address their interests and guarantee their benefits is needed, so that energy efficiency aspects become a demand rather than a burden. Interest can be perceived from two perspectives; the first is regarding the interest in energy efficiency as a final goal, while the second is the personal interest of each stakeholder. This paper hypothesises that linking both types of interests as a project management strategy can allow for achieving both personal and collective goals and act as a means to enhance energy efficiency outcomes in owner-occupied housing.

An approach that links stakeholders’ interest and their impact on the collective outcomes of a project is stated in the stakeholders’ theory by Freeman, where *“a stakeholder in an organisation is any group or individual who can affect or is affected by the achievement of the organisation’s objectives”* (Freeman, 1984). Stakeholders seek to influence organisations’ decisions to match their needs and priorities, and organisations should understand, balance and try to fulfil the various stakeholders’ interests (Freeman, 1984; Ribeiro Soriano, Wagner Mainardes, Alves, & Raposo, 2012; Soriano & al., 2012). However, according to Clement (2005) and Fassin (2008), meeting every stakeholder’s needs puts too much pressure on organisations and is not feasible. This led to the necessity of classifying stakeholders based on their degree of influence and importance to organisations, as a way to analyse their impact on organisations’ outcomes and prioritise some stakeholders’ needs over others (Ribeiro Soriano, et al., 2012).

2. Applying a stakeholder management approach to energy efficiency in housing

A stakeholder management approach, normally used for managing organisations’ stakeholders, could potentially be used to tackle the problem of fragmentation and conflicting interests of the housing industry and to enhance the energy efficiency outcomes of its end product. To do this such an approach might need to be modified to be able to be applied to only one aspect of the

housing industry (energy efficiency), rather than a whole organisation. Such an approach would aim to identify and classify energy efficiency stakeholders, and determine their relationships, interests, importance, and influence on outcomes. Following this approach a strategy could be developed to fulfil stakeholders' individual interests (such as lowering utilities cost, building faster or better marketing) without lowering the quality of energy efficiency. Such a proposed modified strategy would aim to promote individual benefits (that do not conflict with the collective goals) to each stakeholder rather than promoting energy efficiency benefits as the common goal to all.

This paper aims to evaluate several stakeholder management approaches to identify which might be suitable for adaptation to the management of energy efficiency outcomes in housing. This will be done through reviewing a number of stakeholder management approaches and evaluating the degree to which they could be applied to the classification and prioritisation of energy efficiency stakeholders. This paper is focusing only on the stakeholders of owner-occupied energy efficient homes. Owner-occupied apartments and rented houses and apartments are not included in this analysis because they involve different stakeholders. It is also important to note that the concept of an energy efficient house in this paper is limited to the energy consumed during the operation/use of the house. It does not include the energy consumed during other stages of its life cycle (such as construction, manufacturing, transport, etc.).

The energy efficiency stakeholders were identified based on the analysis of the relationships maps of the Australian housing industry stakeholders demonstrated by Zedan & Miller (Zedan & Miller, 2015). The stakeholders of the whole industry were reduced to only the stakeholders who might affect or be affected by the energy efficiency of an owner-occupied house, as shown in figure 1.

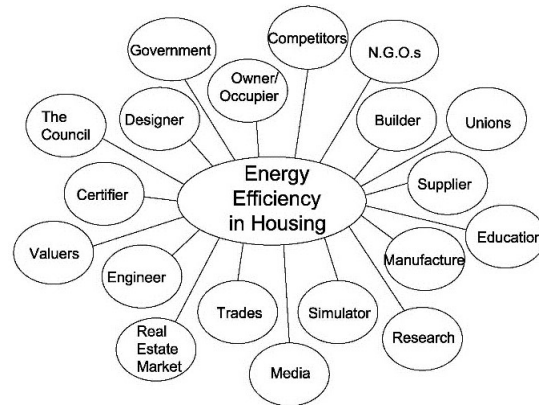


Figure 1 Energy efficiency stakeholders

3. Evaluation of stakeholder management approaches

The next sections demonstrate a number of categorisation and prioritisation approaches that have been discussed in literature and analyses each approach's suitability for application to energy efficiency stakeholders.

3.1 The Classification approaches

Freeman (Freeman, 1984) classified stakeholders of an organisation into either *internal stakeholders* (who work as a part of the organisation) or *external stakeholders* (who are not a part of the organisation but can affect or be affected by its outcomes). To apply this approach to energy efficiency in housing, internal stakeholders could be considered as the ones who have direct responsibility for decision making and execution of work that could have direct impact on energy efficiency. External stakeholders could be considered as those who can sometimes monitor, impose rules, influence internal stakeholders' decisions or indirectly impact energy efficiency outcomes, but are not directly involved in the decisions or execution of work that might affect the outcome of energy efficiency.

Clarkson (Clarkson, 1995) also divided stakeholders into 2 groups: (i) *primary stakeholders* (who have contractual relationships with the company) and (ii) *secondary stakeholders* (who have no such contracts). This approach could be understood as the items in contracts/law that could impact energy efficiency, which could be in the design brief, energy certificate, builders' contract,

and the suppliers contracts (e.g. the R value and U value agreement between the builder/owner and the suppliers, or between the supplier and the manufacturer etc.). Applying Freeman's approach mentioned previously, internal stakeholders could be considered to have contractual agreements with each other that could impact on energy efficiency. The external stakeholders may or may not have contractual agreement with internal stakeholders however they may exert an influence that impacts on energy efficiency.

Vos and Achterkamp (Vos & Achterkamp, 2006) followed a different approach that classifies stakeholders based on their role within an organisation. Stakeholders were classified as: *client*, *decision maker*, *designer*, and *passively involved*. When applied to the case of owner-occupied housing, the client and designer could be considered as *decision makers* (they make decisions that impact on energy efficiency), and the *passively involved* can include all stakeholders who are not directly involved in the decision making process (external stakeholders). So the four stakeholders' roles could be reduced to two categories: *actively involved* (the same as *internal stakeholder*) and *passively involved* (the same criteria as the *external stakeholder*).

Turner (Achterkamp & Vos, 2008; Turner, 2006, 2014) had a similar approach to Vos and Achterkamp, where stakeholders are classified based on the seven roles they play in project management: *owner*, *users*, *sponsors*, *resources* (human material or financial), *brokers*, *steward*, and *manager*. These stakeholders are responsible for managing five functions within a project: the scope, the project organisation, the quality, the cost, and the time. This approach is very specific to a corporation's structure and is difficult to apply to the stakeholders of energy efficiency in owner-occupied housing as its categories do not translate well into the housing supply chain.

The approach of Callan et al. (Achterkamp & Vos, 2008; Callan, Sieimieniuch, & Sinclair, 2006) on the other hand classified stakeholders based on their responsibilities within a certain project. Four types were generated: *controllers*, *executors*, *constraining advisors* (whose advice cannot be ignored), and *discretionary advisors* (whose advice can be ignored). All the categories in this approach are for "internal" or "actively involved" stakeholders. In an energy efficient house production process, "controllers" could be considered as the decision makers, while "executors" should follow the decisions makers' orders. Some energy efficiency stakeholders can be regarded as advisors, providing advice that could be constraining (e.g. the structural engineer's advice to add a column), or discretionary (e.g. energy simulator's advice to use double glazing).

Bourne (Bourne & Walker, 2005) also divided stakeholders into four categories based on the direction of influence on the project work: (i) *upwards* (who are responsible for managerial decisions (e.g. senior managers); (ii) *downwards* (who make decisions regarding specific tasks e.g. team members); (iii) *sidewards* (who are peers to the managers e.g. competitors); and (iv) *outwards* (who do not execute work themselves e.g. suppliers, unions, governments). To apply this approach to energy efficient houses, "upwards" and "downwards" could be regarded together as the "actively involved" or "internal" stakeholders, who are in direct contact with decision making and the work that impacts on energy efficiency. "Sidewards" and "downwards" could be regarded as the "passively involved" or "external" stakeholders. They are not directly involved in the work or decision making but could still influence the decisions of the internal stakeholders. A further classification of the outwards stakeholders could be made to differentiate between stakeholders with legal authority or claim, and stakeholders who can influence outcomes without legitimate claims.

Fassin's (Fassin, 2009) stakeholders are divided into three types based on the degree of claim they have over the organisation: *Stakeholders* (who have a stake, legitimate claim, power, and influence), *stakewatchers* (who have pressure, power and indirect claim), and *stakekeepers* (who act as regulators who impose external control and regulations on the firm but have no claim). These types could be regrouped into two categories, where the stakeholders are the *internal* players, and the stakewatchers and stakekeepers are *external* players with authority to cause change.

Wagner et al. are reported to follow a different approach that is based on the degree that the stakeholder and the organization impact each other (Ribeiro Soriano, et al., 2012). Six stakeholders' types were generated: (i) *regulator* (the stakeholder can influence the organization but not vice versa); (ii) *controller* (the stakeholder has higher influence than the organization); (iii) *partner* (neither party predominates); (iv) *passive* (the company has higher influence); (v) *dependent* (the stakeholder can't influence the organization but can be influenced by it); and (vi) *non-stakeholder* (neither party has influence over the other). Applying this approach to energy efficiency stakeholders will not give accurate results. For example, all the stakeholders (except the end-user) could be regarded as "Regulators" since energy efficiency has minimum influence on them.

3.2 Evaluation of classification approaches

From the evaluation of the degree of suitability of each stakeholder classification approach, two approaches (Wagner et al & Turner) were evaluated as not applicable. The remaining approaches that could be applied to manage the stakeholders of energy efficiency are presented in Table 1.

Table 1: Applicable classification approaches

Freeman	Clarkson	Vos and Achterkamp	Callen et al	Bourne	Fassin
Internal External	Primary Secondary	Active involvement Passive Involvement	Controller Executor Constraining Advisor Discretionary Advisor	Upwards Downwards Sideways Outwards	Stakeholders Stakewatchers Stakekeepers

Collectively these approaches classify stakeholders from two perspectives: their relationship with the organisation and the role they play within (or outside) an organisation. The integrated model (figure 2) illustrates the hierarchy and similarities between all the classification approaches and each category's location in the hierarchy. The colour of each category matches the colours utilised in table 1, to be able to identify which approach covers the greatest portion of the integrated model (which means better covering of the energy efficiency categories). The integrated model shows that energy efficiency stakeholders can be divided into 'internal' stakeholders ('actively involved', 'primary') who have contractual agreements with each other, and 'external' stakeholders ('passively involved') who are either 'primary' or 'secondary'. Applying the role based perspective; classifications could be regarded as sub categories of internal and external stakeholders. Internal stakeholders could include stakeholders who make the most influential decisions that could impact energy efficiency (e.g. the owner, builder and designer) and 'executors' (e.g. trades, labour, etc.) who are hired by the decision makers. External stakeholders could include (i) 'outward stakeholders' who have indirect impact on the decisions made by the internal stakeholders (e.g. external authorities like unions, councils, government or external influencers like suppliers, manufacturers, the media, non-government organisations, universities etc.) and (ii) 'sideward stakeholders' such as industry peers, competitors etc.

Figure 2 shows that Bourne's approach (purple) is the only one that covers both the internal and external stakeholders' categories. However, an addition of the "advisors" category presented by Callen et al. (Callan, et al., 2006) could present more accurate description of some of the internal stakeholders. Another useful addition to Bourne's approach could be sub-categorising the "outwards" category into stakeholders that have legal authority to impose influence on the decisions of the internal stakeholders and energy efficiency outcomes, and Influencers who might have influence but not the authority to impose it.

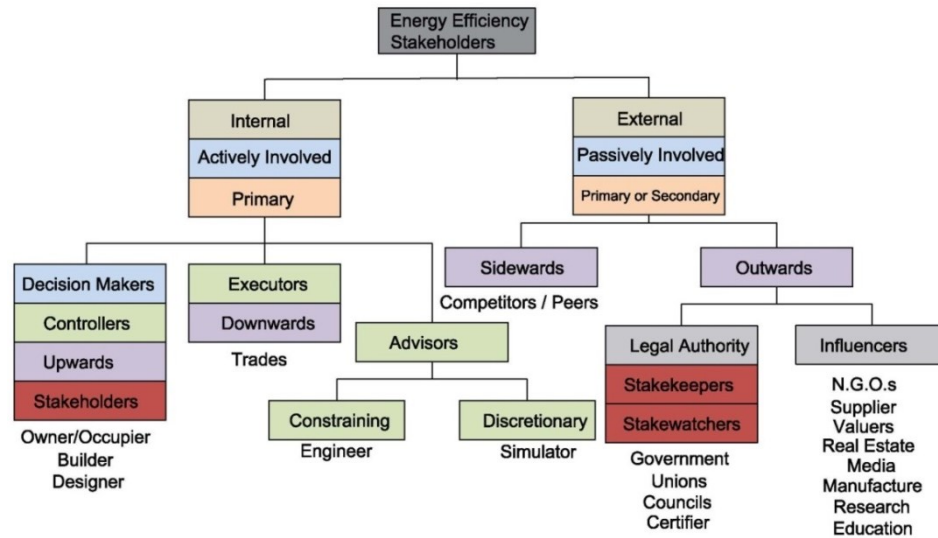


Figure 2 Integrated stakeholders' classification hierarchy

3.3 The prioritisation approaches

Identifying the level of influence of each stakeholder on project/activity outcomes is essential to prioritise the fulfilment of interests of different stakeholders during the management process. Researchers used a number of attributes to differentiate between the degrees of importance of stakeholders. This section will evaluate the relevancy of these attributes in assessing the importance and influence of stakeholders on energy efficiency.

Mitchell et al. (Mitchell, Agle, & Wood, 1997) developed one of the most established approaches for identifying the degree of stakeholders' salience and influence. It is based on three relationship attributes (power, legitimacy, urgency) and ranked according to which of those attributes each stakeholder possesses: (i) low salient "latent" stakeholders who possess only one attribute; (ii) moderately salient "expectant" stakeholders who possess two attributes; and (iii) highly salient "definitive" stakeholders who possess all attributes. When applying these attributes to energy efficiency, "power" could be regarded as the power to make and implement decisions that could result in enhancing energy efficiency. "Legitimacy" would be hard to adopt due to the lack of clear lines of responsibilities among stakeholders for energy efficiency outcomes. "Urgency", i.e. the degree that a stakeholder can demand immediate action, is not highly relevant to the implementation of energy efficiency, since energy efficiency is not the result of a single action but of a number of decisions and tasks that develop through all stages of the project.

Savage et al. (Savage, Nix, Whitehead, & Blair, 1991) ranked the degree of stakeholders' support to the organization based on their potential to threaten or cooperate with it. Four types of stakeholders were generated: (i) supportive (low potential threat but high potential for cooperation); (ii) mixed blessing (potentials to threaten or to cooperate are equally high); (iii) non-supportive (high potential threat but low potential cooperation) and (iv) marginal (neither threatening nor cooperative). The potential threat could be regarded as the negative influence on energy efficiency. The potential to threaten/enhance or negatively/positively influence energy efficiency could be identified by a range of attributes (power, authority, legitimacy, urgency, etc.) as discussed previously in Mitchell's et al. approach. Therefore, the potential to threaten is too broad when compared to Mitchell and Wood's approach that could provide more accurate and comprehensive explanation of the causes of the potential threat of certain stakeholders. The attribute of cooperation is important for managing the relationships between stakeholders and maximising energy outcomes. However cooperation can also be thought of as one criterion used to identify the value that a stakeholder holds for energy efficiency. The degree of this value could be identified by the actions that the stakeholder is willing to make (such as the willingness to

cooperate, to learn, spend time, spend money, etc.). So the willingness for cooperation is only one of the criteria that are used to identify the interest in energy efficiency.

Rowley (Rowley, 1997) used social network analysis principles instead of attributes to construct a theory of stakeholder influences. Four types of firm behaviours related to resisting stakeholder pressures were generated: commander, compromiser, subordinate, and solitarian. This approach addresses the dynamic nature of the stakeholders' relationships, and how they impact each other as much as they impact the organization. The application of this concept to energy efficient houses was discussed by Zedan & Miller (Zedan & Miller, 2015). This is a more complex approach that could be a further step after the identification of stakeholders and quantifying their influence.

In Scholes and Clutterbuck's approach (Scholes & Clutterbuck, 1998), stakeholder groups are assessed and their demands are prioritised according to three sets of criteria: (i) their potential to influence the business outcomes; (ii) the impact of business activities on them; and (iii) the alignment of their shared values/purpose with the business goals. To adapt this approach to energy efficiency, the potential to influence the business could be regarded as the potential power to enhance energy efficiency. The shared value could be regarded as the common interest in certain aspects that could enhance energy efficiency (such as low energy bills, using energy efficient materials, etc.). The impact of company activity on stakeholders could be understood as the impact of energy efficiency outcomes on stakeholders and the value of these outcomes to the stakeholder (such as the lower operation costs for the occupier, the good business reputation for the insulation supplier, etc.).

Johnson et al. (Johnson, Scholes, & Whittington, 2008) developed the power interest matrix to identify the influence that every stakeholder has on a project based on their levels of interest and power. So the potential to influence the outcomes of an activity is directly proportional to the degrees of interest in the outcomes of this activity and power to influence it. This can be applied to energy efficiency since the interest in energy efficiency and the power to implement it into the house could potentially impact the degree of influence of stakeholders on achieving energy efficiency.

Berardi (Berardi, 2013) then developed the approach of Johnson et al. to include the time dimension, to demonstrate that the levels of power and interest of a stakeholder can change based on the stage that a stakeholder becomes involved (for instance; a designer's involvement at the late stages of construction will have less influence on energy efficiency than involvement in the initial stages). This supports Zedan and Miller's argument that stakeholders' participation in the decision making process should start from the early stages of the project to ensure making informed decisions and limiting risks that could result in lower performance of homes (Zedan & Miller, 2015). So the time dimension should be taken into consideration to check the significance of the attributes used to prioritise the influence of the energy efficiency stakeholders at each stage of the housing lifecycle.

Bourne's (Bourne & Walker, 2005; Bourne, 2009) prioritisation method gives each stakeholder a numerical index based on: the degree of power, the proximity to the organisation/project, and the urgency, which determines the importance of the organisation outcomes to each stakeholder (the urgency is derived from the vested stake or the value that the stakeholder holds for the organisation's outcomes, and the actions that they are prepared to do). To apply this approach to energy efficiency, the power attribute could be understood as discussed previously in Mitchell and Wood, Johnson & Scholes, and Berardi's approaches. The two attributes that identify the urgency should be focusing on energy efficiency, (the value of energy efficiency to each stakeholder, and the action they are willing to make (for example, sacrifice, time, money or effort) to achieve energy efficiency. The two attributes could identify and quantify the degree of alignment of interests between the stakeholder and the activity (Energy efficiency). The proximity could be comprehended as the degree of involvement in the decisions that could impact on energy

efficiency. This is particularly important to energy efficiency stakeholders since small decisions or modifications during construction could have big impact on energy efficiency outcomes.

Turner (Turner, 2014) proposed more than one approach to identify the degree of influence of stakeholders. The approaches proposed always used matrixes of two attributes such as, the knowledge/support matrix, the power-impact matrix, and the support-agree matrix.

The power, support (which can be understood as interest) and agree (which can be understood as alignment with project goals) attributes were used in other approaches. The addition of Turner's approach is the Knowledge attribute, which could be an important attribute to energy efficiency, since knowledge of design, building techniques, materials properties etc. can contribute to enhancing energy efficiency.

3.4 Evaluation of the prioritisation approaches

Table 2 compares the attributes used by each of the prioritisation approaches discussed in section 3.3. The shaded cells indicate attributes and approaches considered unsuitable for energy efficient housing purposes, because of complexity and deviance from other approaches (Rowley, 1997), because attributes are too broad or narrow (Savage, et al., 1991), or attributes would be difficult to apply or give inaccurate results (Mitchell, Agle, & Wood, 1997). The remaining attributes were considered to be suitable for prioritising energy efficiency stakeholders:

- *Power*: The power to implement energy efficiency, impose decisions and take actions that will result in enhancing the energy efficiency of the house.
 - *Interest/value*: The value of energy efficiency to each stakeholder. The value/interest attribute could be understood as the actions that a stakeholder is willing to make to enhance energy efficiency (the willingness to pay, cooperate, spend time, effort, etc.), and the degree that their interests align with the goal of enhancing energy efficiency,
 - *Proximity*: How involved and close to the decision making and execution processes are these stakeholders.
- Knowledge*: The degree of knowledge about the requirements needed to achieve energy efficiency (e.g. designers who have the knowledge about energy efficiency design principles have more power to implement energy efficiency).

Table 2: Analysis of prioritisation attributes applicable to energy efficiency

Authors	Mitchell et.al	Savage et al.	Rowley	Scholes and Clutterbuck	Johnson et al.	Berardi	Bourne	Turner
Attributes	Power	Potential threat (too broad)	No attributes	Impact (power) on business	Power	Power	Power	Power
	Legitimacy / inapplicable	Potential cooperation (too narrow)		Shared purposes (interests)	Interest	Interest	Value & action	Interest
	Urgency / inapplicable			Impact by business		Time	Proximity	Knowledge

The time dimension could be useful as a sub-attribute for analysing/quantifying the significance of each one of the four main attributes since their significance could vary depending on the stage of the house lifecycle that a stakeholder becomes involved in.

Table 2 illustrates that three out of the four relevant attributes are inherent in the approaches of both Bourne and Turner however there are other factors that favour the former over the latter. First, Bourne's approach provides a numerical value for the overall priority of a stakeholder to the

organisation, possibly enabling quantifiable outcomes of prioritising stakeholders to be compared with the quantifiable outcomes of energy efficiency. Second, this approach's visualization tool enables the immediate comparison of a number of attributes between different stakeholders. With the addition of the knowledge attribute and the time dimension, it appears that Bourne's approach could be the most suitable approach for prioritising energy efficiency stakeholders.

4. Conclusion

This paper has analysed 16 approaches to stakeholder management in order to evaluate which approach is theoretically best suited for evaluating stakeholders that could influence energy efficiency performance outcomes for housing. This evaluation has shown that Bourne's classification and prioritisation approach is the most suitable for this purpose however it will require some modification, such as the addition of a knowledge attribute and a time dimension. Further research will apply the identified modifications and test the applicability of the modified tool on a range of practices that aim to maximise housing's energy performance. Potential applications of such a modified tool include: optimisation of housing industry's stakeholders conflicting goals; quantifying the impact of each stakeholder on energy performance; correlating stakeholders' relationships models with energy efficiency; developing policies that are embraced by the majority of stakeholders; and tailoring a combination of instruments that aim to steer the cultures and behaviours of stakeholders towards more energy efficient practices.

Further areas of research could be expanded also to include other stages of stakeholder management such as the engagement and monitoring that comes after the identification, categorisation and prioritisation stages discussed in this paper, to discuss and investigate the most suitable strategies for engaging and monitoring energy efficiency's stakeholders.

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