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# An Introduction to Social Networks for Engaging the Community in Climate Policy

**Technical brief**

Prepared for: NSW Office of Environment and Heritage

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# TABLE OF CONTENTS

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<b>Executive summary</b>	Error! Bookmark not defined.
<b>1 Introduction</b>	<b>1</b>
<b>2 An overview of Social Networks</b>	<b>3</b>
<b>2.1 Defining Social Networks</b>	<b>3</b>
<b>2.2 The Structure of Social Networks</b>	<b>4</b>
<b>3 Benefits of Social Networks</b>	<b>8</b>
<b>4 Case Study: EnergyMark</b>	<b>10</b>
<b>4.1 EnergyMark: Empowering individual Australians to Reduce their Energy Consumption (Dowd, et al, 2012)</b>	<b>10</b>
<b>5 Key Considerations and Future Directions</b>	<b>12</b>
<b>6 Conclusions</b>	<b>15</b>
<b>7 References</b>	<b>16</b>

## TABLE OF FIGURES

---

Figure 1:Example Dense Network .....	6
Figure 2 : Example Fragmented Network .....	7

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# 1 INTRODUCTION

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Anthropogenic climate change is widely recognised as a global threat to natural systems, human populations and economies. Despite global efforts to ameliorate these concerns via the mitigation of greenhouse gases, historical and ongoing emissions mean that some impacts from climate change are now unavoidable (Solomon et al, 2009). Accordingly, adaptation to climate change has emerged as a key topic of scientific enquiry, with a growing body of literature demonstrating the importance of adaptation for managing the now unavoidable impacts of climate change (Bassett and Fogelman, 2013). The rapid development of adaptation as a mainstream strategy for managing the risks of climate change has also resulted in the emergence of a broad range of adaptation policies and management strategies, from local to global scales. However, although adaptation is firmly on the policy agenda, there is limited information or evidence regarding the factors that actually influence the successful implementation of adaptation initiatives (Ford et al, 2013). Engaging the public in climate initiatives is widely believed to be a critical factor underpinning the success of any policy or strategy (Sutton and Tobin, 2011; Schweizer et al, 2013), however, doing so successfully remains a significant challenge (Dilling and Mosser, 2007). A growing body of literature attributes this to the difficulties many people face identifying the importance of climate change to themselves, instead believing that it is an issue for other communities and future generations (Lorenzoni and Pigeon, 2006; O'Neill and Hulme, 2009). Furthermore, there is a widening gap between the public's awareness of what action is needed and what actions are being taken (Schweizer et al, 2013). This is problematic in that without an understanding about what to do, individuals may be left feeling overwhelmed and/or frightened, or even ignorant to the issue through denial (Moser and Dilling, 2004). Accordingly, identifying options to overcome these barriers to engage local communities in climate action will be critical to the success of future climate initiatives.

In recent times there has been a growing recognition and discourse regarding the use of social networks to engage the community in government actions. This is because strong social networks have been shown to improve collaborative governance processes by facilitating the generation, acquisition and diffusion of different types of knowledge and information (Crona and Bodin, 2006), overcoming many of the traditional barriers associated with knowledge sharing. However, despite increasing awareness about the potential importance of social networks, there is very limited evidence for their application

in relation to climate policy. Advancing our understanding about the potential importance and role of social networks for engaging the community in climate initiatives is of critical importance.

Here, we aim to fill this gap by reviewing the potential role and importance that social networks can play in engaging the community in climate policy and initiatives. Specifically, we begin (section 2) by providing an overview of social networks, including the different types of social networks and the key structural components of social networks. We then discuss the benefits of using social networks for the purposes of community engagement (section 3), and highlight these points through a detailed case study of when social networks have successfully being used to engage the community in Australia (section 4). In the final section (section 5) we identify the key considerations that policy makers and environmental managers must consider when using social networks to engage the community, including the identification of key research questions that, if answered, would improve the applicability of the ideas presented within this document. In doing so, this report fulfils the first milestone of the Science-Policy-Community Theme within the Adaptive Communities research node of the NSW OEH Adaptation Research Hub, which will subsequently test the ideas presented within this review through a series of NSW based case-studies; Nowra and Temora.

It should be noted that this review is not intended to be a comprehensive technical guide on social networks or social network analysis (SNA). Rather, it is intended to introduce the key concepts relevant to community engagement, and be used as a guide for NSW OEH staff who may have little previous exposure to these ideas.

## 2 AN OVERVIEW OF SOCIAL NETWORKS

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### 2.1 DEFINING SOCIAL NETWORKS

In their broadest sense, social networks are defined as a social made up of a set of actors (termed nodes) and the relationships (termed ties) between these actors. These relationships may be as simple as an inter-organisational arrangement between two government agencies, or a complex combination of organisations, groups and individuals from a variety of sectors. Relationships between actors can be of different kinds, however, all these relationships rely on a key process: the circulation of information within a social network.

Social networks occur in a variety of settings and manifest in multiple ways. They may evolve gradually to govern a shared resource, or be initiated by mandate or regulatory requirement (Weber and Khademian, 1997). Most commonly the scientific literature has focused on the latter, formal institutional networks such as those associated with a government agency, where the actors and their relationships to one another are easily identified given the operational framework in which they have been constructed and maintained. However it has become apparent that such formal networks can be overtly formulated and subject to rational control and management through mechanisms such as legislative or institutional frameworks (Brown and Duguid, 1991). As such these networks tend to operate at a higher political level and for the purposes of community engagement, tend to focus on traditional top-down delivery of information, which to date has proven largely ineffective.

In recent times, however, there has been a growing recognition regarding the role of informal institutions or networks (sometimes termed shadow networks or secondary networks), which underpin formal networks (Stacey, 1996). These secondary networks may be embedded within formal networks, however, the actors and their relationships are not as easily identifiable. However, in the case of engaging community on government initiatives such as those associated with climate policy, these secondary networks are thought to be of greater importance given that they are considered tacit, and can include variables such as cultural norms, values, and accepted ways of doing things (Pelling et al, 2008). Network entry to both formal and informal networks is an important factor as it speaks to the socially inclusive or exclusive nature of a group( Williams 2006). . Within

informal networks, often, there are fewer restrictions on members, allowing them to interact freely without fear of crossing some contractual boundary. As described by Stacey (1996), these secondary networks acknowledge the often hidden, implicit behaviours of individuals and communities that are typically challenging to delineate and thus hard to control. However, once identified, it is believed that utilising such secondary networks to engage communities in any action will enhance its likely success given the bottom-up approach to information delivery.

## 2.2 THE STRUCTURE OF SOCIAL NETWORKS

The structure of a network plays a significant role in understanding both its development and operation, and fortunately the development of social network analysis (SNA) has provided the capacity to quantify and understand the various attributes of social networks (Scott, 2011; Prell, 2012). This is particularly important given that social networks are considered a “moveable feast” of activity, with the dynamics undergoing constant change (Adler et al, 2008). Accordingly, understanding the various attributes of a network and how they may change over time is central to successfully utilising the network for the purposes of community engagement. A key factor here will be the implementation of longitudinal SNA which provides researchers and policy-makers with the means to track dynamic social networks over time (Prell, 2012).

All social networks are made up of a series of interconnected individuals, and as such they are considered as having a social structure (O’Toole, 1997). Research has identified a number of important features within social networks that are comprehensively reviewed by Bodin et al (2006) and discussed here. While this list should not be considered exhaustive, it serves to illustrate the key components of social networks, and the interaction among components of a network. This section is designed to provide a simplistic overview of the structure of social networks, and the implications of this for engaging the community in climate initiatives are discussed in section 5.

Firstly, centrality refers to how many ties a specific node has (Freeman, 1979), and can be applied at either the individual or network level. A high degree of centrality occurs when an individual has considerably more ties with other actors than other individuals within the networks. In other words, individuals with a high degree of centrality are the most highly

connected individuals, and are therefore important for the diffusion of information throughout the network. This is considered advantageous for solving simple tasks because relevant information can be relayed to other actors who can then make a decision and take action. However, while social networks in which a few actors display a high degree of centrality can lead to enhanced decision-making and action, it may also in turn have adverse effects (Bodin et al, 2006). For example, it may limit learning among other actors within the network as it will reduce access to multiple sources of information (Abrahamson and Rosenkopf, 1997).

Another common structural element of social networks that can be distinguished through SNA is the density of the network, which refers to the number of links divided by the number of nodes in the network (see Figure 1). The density of a network typically grows over time, as individual actors increase their interactions (Granovetter, 1985). As such, networks exhibiting a high density may contribute to the strengthening of trust between individuals and/or groups and thereby also increase the possibility for social control (Pretty and Ward, 2001). As described by Bodin et al (2006) this is important for a number of reasons. Firstly, it decreases the risk and cost of collaborating with others, which is considered a critical prerequisite for collective action and collaboration (Burt, 2003). Secondly, high density may also benefit the spread of information throughout a network by increasing the accessibility of information (Abrahamson and Rosenkopf, 1997). However as is the case with centrality, care must be taken when considering the density of a network as an overly dense network may homogenize experiences and knowledge within a network, preventing the acquisition and sharing of new knowledge (Bodin and Norberg, 2005; Crona and Bodin, 2006). This concept is often referred to as network closure (see Figure 2) wherein ties become redundant as many network members are in constant contact, and in essence, there is a lack of fresh information and potential opportunities (Burt, 2004; Zaheer & Bell, 2005).

Finally, Bodin et al (2006) also identify the importance of 'betweenness' when considering social networks, which refers to the extent to which each node contributes to minimizing the distance between nodes within the network (Freeman, 1979). That is, this measure can be used to identify the actors that contribute most to linking the network. This is important given the tendency of networks to form clusters (or modules), small dense and isolated groups within networks. While clusters can be important features within social networks, allowing different groups to form different opinions and knowledge bases, the



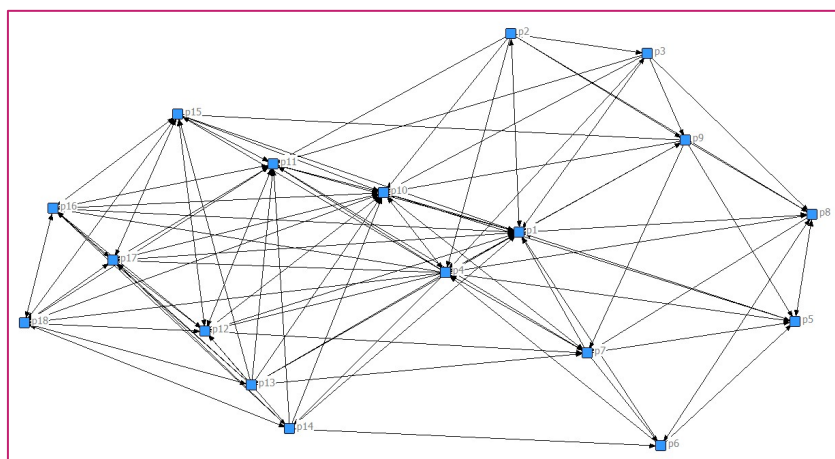
actors connecting these clusters are critical to ensure shared learnings and cooperative action.

Within network literature the term “structural holes” refer to the position a network member has within the network, for example a network member may be connected to other members who are also connected to each other as an insular cluster, or a network member may be connected to a variety of other members who are not connected to each other (Burt, 1992). Structural holes have been defined as “gaps in the information flow between partners”(Lee & Chiu, 2012 p.339). Within the study of structural holes, there have been contrary findings, as in some settings, less structural holes increase network performance (Coleman, 1988; Gargiulo & Benassi, 2000; Lee & Chiu, 2012), whereas in other settings, more structural holes have been found to have more benefit, in particular for those who act as bridges or boundary spanners (Burt, 1994; Zaheer & Bell, 2005; Lee & Chiu, 2012).

Boundary spanning individuals, organisations or objects have been found to be useful to bridge gaps in knowledge in policy. A deep exploration of boundary spanning organisations and objects lies outside the scope of this literature review; however, Crona and Parker (2012) provide insights as to how bridging organisations and objects may successfully operate within an adaptive resource governance context, and Long, Cunningham & Braithwaite (2013) provides a systematic review to bridges, brokers and boundary spanners in collaborative networks (see Figure 2 below).

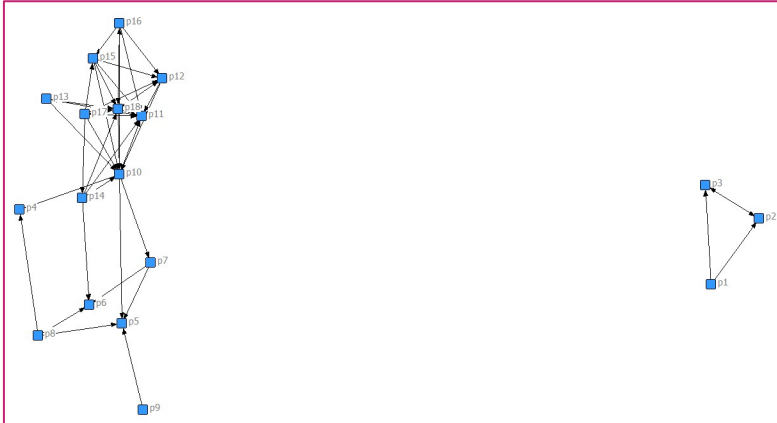
### Figure 1: Example of a dense network

*Network of 18 participants (n=18). Density is high (Density = 42%). Fragmentation is low (Fragmentation = 0) as is the Diameter (Diameter = 3) meaning that network members can access each other with a maximum path through the network of three members. The central players of this network are p1, p4 and p10*



**Figure 2 : Example of a fragmented network**

Network of 18 Participants ( $n = 18$ ). Density is low (Density = 15%). Fragmentation is high (Fragmentation = 66%) although the diameter of the main component (left quadrant of image) remains the same (Diameter = 3). There are 3 obvious groups. One isolated group of 3 (right quadrant of image), and two clusters (top and bottom portion of the left quadrant of the image). The central players of this network are p10, p14 and p18 with p10 acting as the primary boundary spanner between the two interconnected groups.



### 3 BENEFITS OF SOCIAL NETWORKS

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So far we have introduced the main types of social networks and the key structural characteristics within social networks. In this section we identify and discuss the main benefits in using social networks to engage the community in government initiatives.

There is no blueprint for engaging communities in environmental initiatives, and indeed the perceptions of individuals and communities can significantly differ over spatial and temporal scales. As such, collaborative efforts providing solutions tailored to local contexts are likely to have the greatest results (Innes et al, 1994). Networks cater for such an approach as they are more flexible than most types of community engagement activities, such as top-down communication strategies typically implemented by governments or other institutions. Specifically, using social networks to disseminate information allows for messages to be tailored according to individual or community perceptions and attitudes, and the tailoring of messages will naturally occur as information is shared throughout the network, ensuring that information is delivered in a manner most relevant to the recipient. Within a policy context, there is a significant caveat that messages are not to be distorted nor diluted, rather it is possible that science and policy translated into meaningful messages can be sent through the most efficient channels into the community.

Furthermore, a key component underpinning the uptake of climate initiatives by communities is the extent to which they trust the information being delivered. Accordingly, understanding the traits that confer trust in climate science and policy is critical for identifying knowledge gaps and tailoring and improving communication and engagement activities to facilitate the uptake of science by the community (Longstaff and Yang 2008; Hamm et al, 2013). A recent survey of over 1000 community members in Queensland, Australia, identified that for the most part local communities do not trust information provided by the government (Smith, Leahy, Anderson, & Davenport, 2013; Marshall et al, in prep). Rather, most community members stated that their family and friends are among the most trusted source of information (Marshall et al, in prep). As such utilising social networks and alternative mechanisms, such as boundary spanning organisations and objects, to engage to community in climate policy should prove advantageous as the information being disseminated is likely to be trusted and accepted and prompt individual and collective action.

Finally, using social networks to engage the community in climate policy is also advantageous given the speed and ease in which information can be disseminated. For example, through the use of social media networks such as Facebook or Twitter, information can be disseminated to vast networks quickly and across governance scales (Schroeder et al, 2013). This is particularly important during times of public crisis, such as those associated with events such as bush fires and flooding, where information and advice must be disseminated quickly and succinctly to entire communities or regions. To this end social networks have already proven their value, for example, during disasters including the Japan tsunami (Acar and Muraki, 2011) and Haiti earthquake (Vroegindewey, 2011). However, when entering the realm of social media networks, although information may be spread quickly, some reserachers have identified the potential for malicious use or information corruption when not supplied and shared through reliable sources,(Lindsay 2011; Lu & Yang 2011 )) and in some instance the volume of data causes the important information to disintegrate into sheer noise (Kavanaugh et al., 2012).

## 4 CASE STUDY: ENERGYMARK

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### 4.1 ENERGYMARK: EMPOWERING INDIVIDUAL AUSTRALIANS TO REDUCE THEIR ENERGY CONSUMPTION

Large-scale mitigation of climate change will most likely be achieved through the implementation of revised regulatory policies, energy efficient practices, alternative energies and technological advances (Dietz et al., 2009). However, energy-related behavioural change on an individual level also has the potential to contribute significantly to a reduction in green house gas emissions. To this end, the Commonwealth Scientific Industrial Research Organisation (CSIRO) developed the EnergyMark Program (Dowd, et al, 2012), using critical features identified in social psychological literature and the practical principles of the “WaterMark” program (Victorian Women’s Trust 2007). The program was designed to exploit the power of social networks in creating durable behavioural change in the energy consumption habits of participants. Changes in household emissions and attitudes were critical for gauging behaviour change over time and to determine whether individual behaviour change could significantly assist in the pursuit of mitigation targets.

Using the ‘Kitchen table approach’ voluntary community groups conducted eight dialogues around the topics of climate change, energy and mitigation using peer reviewed factsheets as impetus for discussion. At each session participants set personal goals for behaviour change and reported to the group about their achievements and challenges. Questions that required further clarification were submitted to a panel of experts to provide answers. The program ran for eight to twelve months to allow groups to move at their own pace with individual questionnaires completed at the outset of the trial, the mid-point and during the final session. The questionnaire was designed to track changes in participants’ beliefs and values, knowledge and acceptance of energy technologies, dissemination of information and household emissions. Household emissions were estimated using a carbon footprint calculator developed by CSIRO scientists for the “CSIRO Energy Saving Handbook” the calculator incorporated the energy used at home, waste, spending on products and services, beef consumption and transport (Wright et al., 2009).

Participants reported an average 20% reduction in energy consumption at the conclusion of the program, a substantial reduction when compared with an average 2% increase in energy consumption recorded across five states from 2008 to 2009. Participants reported that in addition to emission reductions they were developing a sense of social responsibility and awareness of information. This behaviour change and subsequent reduction in emissions was achievable through the provision of information, social support, goal setting and access to feedback.

## 5 KEY CONSIDERATIONS AND FUTURE DIRECTIONS

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The effectiveness of a network is defined as a positive achievement at a network-level, whereby the network as a whole creates levels of operation that are more than the sum of the individual nodes (Provan & Kenis, 2008). Such emergent properties of self organisation have been found in a variety of networks (Padgett & Powell, 2012). In order for a network to be measured as “effective”, it must have an aim, a goal or rule against which one can assess the network and decide whether or not it has performed to standard. When a network has a goal, be it spoken or unspoken, the outcomes may be measured as particularly positive when the flow of information optimises the utility of the network; thus prolonging its functionality. Similarly, having the ability to measure success against a stated goal allows for deficiencies to be identified early and rectified. Formal networks may have a stated goal, whereas informal networks’ goals remain more tacit. Within the context of a science-policy-community interface, it may accordingly, be possible to use social networks to engage the community in climate action. In doing so the tacit goal may be identified and made explicit, identifying and articulating this goal, and complimenting it with a monitoring and evaluation strategy is of utmost importance. Furthermore, in section 2 we discussed the key structural components of social networks: centrality, density and betweenness. For social networks to be used effectively for community, it is important to first identify which members of the community are the most important in light of these characteristics. For example, by using highly connected individuals the information will be distributed more broadly and efficiently than would be the case if using people that did not have many connections. As such, identifying these key individuals through social network analysis, and engaging them as a starting point in information delivery, will be vital for the success of the program.

However, while SNA provides a tool for identifying the key people as discussed above, it should be noted that there are ethical considerations that must be adhered to when undertaking SNA. Firstly, it is of the utmost importance that participation is voluntary. Data may be collected in a variety of ways including social media, online surveys or interviews. The information required to perform SNA is often personal information, and may include a range of demographical information such as name, age, gender, community role, business role and other names (nick-names) or alternative titles the participant may hold.

This raw data must be respected and stored securely and as soon as viably possible, the raw data must be coded in order to de-identify participants thus maintaining their anonymity. There is a balance to be struck between maintaining anonymity of individual participants, while still including enough detail in reporting so that the channels of information flow throughout the network may be quantified. As such, a very specific set of skills is required by the researcher in order to maintain equilibrium between under and over disclosure of information. When working in small communities, this is further complicated as although measures are put in place to maintain anonymity of participants, it may still remain possible in some instances for someone's identity to be inferred by others within the network where they are well known to each other. However, when undertaken within the appropriate setting with appropriate ethical measures, is possible to collect, analyse and report upon both formal and informal SNA data sets in a meaningful manner.

Also discussed in section 2 were the ways in which social networks can occur, such as formal networks associated with formal institutions, or secondary informal networks that are less tangible. Different networks operate in different manners, with formal networks typically associated with traditional top-down and regulated delivery of information while secondary networks can provide a mechanism for the bottom-up delivery of information, enhancing factors such as the trust of information. Such a method for knowledge delivery although potentially powerful must be protected in order to maintain trust and respect built within the community. Ultimately, the best results for engaging communities in climate actions are likely to be achieved where the two networks intersect and the top-down and bottom-up delivery of information are complemented. It is at this boundary where novelty will emerge in a form that is positive with a sense of continuity, ensuring learning and innovation among networks actors (Shaw, 1997; Griffin et al, 1999). However to our knowledge, no study to date has quantified the role and importance of both the formal and secondary networks for engaging the community in climate action, or the ways they can be utilised to increase the success of climate action. Further to our knowledge, no study to date has quantified the potential activation of boundary spanning organisations and objects. This warrants further investigation, and indeed will be addressed through a series of NSW case-studies completed through the Adaptive Communities Node.

Finally, a critical factor underpinning the success of social networks for engaging the community in public policy will be the extent to which the information being communicated is tailored to local perceptions. A key consideration is, therefore, understanding the



perceptions and demographics of the community as a starting point, so that communication material can be tailored to align with the existing values and attitudes of the community. Doing so will enhance the success of the program from the onset, by improving the likely acceptance of the information being provided. To this end, it would also be valuable to engage the key community members (i.e.- high connected people) in the development of communication material at the onset, to ensure bottom-up ownership over the products, and empowerment to act, again improving the likelihood that the information will be disseminated and accepted throughout the network.

## 6 CONCLUSIONS

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Engaging the public in climate initiatives is a critical factor underpinning the success of any policy or strategy, however, doing so successfully remains a significant challenge. As illustrated above, social networks represent one option for overcoming these barriers associated with community engagement. However, the implementation of social networks in this manner remains untested, and several key research gaps and consideration must be taken into account. However, upon testing these ideas, decision-makers will be equipped with a powerful tool to improve the uptake of climate policy and programs by local communities, enhancing the likely success of government driven climate initiatives.

The science-policy-community theme within the Adaptive Communities research node of the NSW OEH Adaptation Research Hub aims to achieve this, by undertaking a series of case studies throughout NSW. This information, including the implications of the results, will be delivered to NSW OEH in subsequent reports.

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UTS:INSTITUTE FOR SUSTAINABLE FUTURES

# Chapter Title

Subtitle

