



Policy mobilities and the policy cycle: An analysis using two smart grid case studies

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ABSTRACT

This paper adds to scholarship on policy mobilities by borrowing a typology and set of ideas from political science about the different stages of the policy making process, namely agenda-setting, policy formulation, decision making, implementation, and evaluation. To date policy mobilities scholarship has mostly not been explicit about which stage of the policy process is being examined. We therefore provide a structure for analysing mobile policy inflows to, and outflows from, a policy over time, across the different stages, allowing the analysis of policy mobilities to be aligned more closely with government decision making processes. To test out our ideas we trace the policy mobilities associated with two Australian smart grid policies over their lifetime, i.e. in the lead up to the policy being implemented, and subsequently. The policies are the Advanced Metering Infrastructure (AMI) program in the State of Victoria, Australia (2009–2013) and the Australian federal government Smart Grid Smart City program (2010–14). We analyse a combination of codified and tacit forms of knowledge sharing, including through policy and industry reports, and interviews with policy practitioners. Key findings include a peak in policy mobilities during the implementation stage, and policy mobility inflows (learning from elsewhere) continuing even in later policy stages. In conclusion we advocate for greater attention to policy mobilities at different stages of the policy process, in order to broaden the scope of policy mobilities research and to develop a stronger understanding of the temporal dimensions of policy mobilities.

1. Introduction

Policy mobilities is an area of scholarship that has developed rapidly in recent years within the fields of human geography and urban studies (Baker and Temenos, 2015; Lewis, 2021). It is about the geographies of policy ideas, and how policy concepts, knowledge and learnings circulate from place to place, with an empirical focus on cities and urban areas (Peck and Theodore, 2015; Temenos and McCann, 2013; Wathne and Haarstad, 2020). There is a growing body of empirical cases, ranging from transport systems (Mittal and Shah, 2022; Wood, 2015), to international university student policies (Geddie, 2015) and drug policies (McCann, 2008b). Policy mobilities scholarship is positioned in part as a critical response to theories from political science about policy transfer and policy diffusion, which are seen as overly rational and government-centred, as Peck and Theodore (2010: 173) explain:

“In contrast to the policy transfer tradition, which invokes notions of rational diffusion and best-practice replication, critical approaches to policy mobility tend to explore open-ended and politicized processes of networking and mutation across shifting social landscapes.”

Whilst we agree there is strong merit in examining policy mobilities outside of the restrictive lens of government-to-government transfer, in this paper we argue the case for closer links with political science (see also McCann and Ward, 2013), through introducing analysis of policy stages - the policy cycle - to policy mobilities scholarship. We suggest the desire to move beyond policy transfer concepts, developed within political science, has ultimately resulted in a lack of sustained focus on the role of government and formal policy processes within policy mobilities research. These more formal aspects of the policy process do nonetheless dictate the pattern and rhythm of many policy flows, and deserve further attention. As noted, the concept of policy mobilities has developed based mostly on urban cases: the majority of empirical research to date has

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been about city-to-city transfer of policy, wherein private sector organisations and consultants play a prominent role (Temenos and McCann, 2013; Werner and Strambach, 2018). In these poststructuralist accounts, the role of cities as sites of competition for global capital presents an alternative way of thinking about policy development, much less centred on the state (Clarke, 2012; Temenos et al., 2019). In cases of urban governance, government policy processes do tend to be less prominent and notable, with government playing more of a background role. However, if policy mobilities scholarship is to broaden further beyond the urban, as seen already in recent studies on national policies (Lorne, 2022; Zhou, 2021), then there is strong value in attending more carefully to the way that government processes structure policy mobilities.

The idea of policy stages was first suggested in the 1950s by public policy scholars in order to enable clearer study of the policy process, by identifying the stages through which a policy passes as it is developed within government (Lasswell, 1956). It was also proposed as a way to unite the distinct sub-branches of political science, which tend to specialise in researching one area of the policy process, e.g. agenda setting, or implementation. Over time several different stages of the policy process have been put forward by political science scholars (Howlett et al., 2009; Jann and Wegrich, 2007). The five core stages that there are now general agreement on, and which we use here, are: agenda-setting, policy formulation, decision making, implementation, and evaluation (Howlett et al., 2009). We note that the policy stages model has been heavily criticised for oversimplifying a complex set of policy processes - which rarely conform to these linear stages - and, relatedly, for ignoring the politics inherent in policy making (Cairney, 2013). Despite these shortcomings it retains a prominent role in political science scholarship (Jann and Wegrich, 2007) and provides a useful means in this paper for us to consider policy mobilities over the life course of a policy.

In the paper we distinguish between two types of mobile policies: inflows and outflows. Mobile policy inflows are defined as flows of information and knowledge about policies from other places to the policy under study. Mobile policy outflows are flows of information and knowledge from the policy under study to people and organisations elsewhere. To date policy mobilities research has not always been specific about the distinction between inflows and outflows, but in studying a policy over its full life course - its policy cycle - it becomes important to separate out these two different types of policy mobilisations.

The main objective of the paper is to describe and introduce the policy stages model to policy mobilities scholarship. We do this by empirically examining two Australian smart grid case studies, using them to explore and identify the range of research findings that are enabled by taking a longitudinal policy stages approach. Research questions asked of our data are as follows:

At what stage of the policy cycle do policy mobilities (inflows and outflows) tend to occur - is there a pattern? How are the policy mobilities occurring? (e.g. via reports, face-to-face contact)
Are negative or positive interpretations/narratives about the policy more or less likely at different stages of the policy process?

One important clarification before proceeding is about what we mean by the term 'policy', for it is a broad term. To date 'policy' has not been well defined in much of the scholarship on policy mobilities (see for example Peck and Theodore, 2010; 2015), in contrast to political science where the definition of policy is extensively discussed. McCann, in his analysis of urban policy mobilities, provides perhaps the fullest definition of policy as "... formally drafted and adopted guidelines and procedures setting out the long-term purposes of and addressing specific problems of governance....." (McCann, 2011: 109). Although the long-term nature of a policy is noted here, there is not any detail of how a policy might initially emerge and evolve over time. In political science an initial distinction is made between 'policy' and 'public policy'. 'Policy' is a much more general definition, encompassing the actions and

initiatives of a wide range of types of organisation "... a general term used to describe a formal decision or plan of action adopted by an actor, be it an individual, organization, business, government etc., in order to achieve a particular goal." (Richards and Smith, 2002: 1). Whereas 'public policy' is of course more specific - referring to the ideas, intentions and actions of governments. But even so political scientists have struggled to define public policy, as Cairney (2012: 16) concedes: "'Public policy' ... is one of the many terms in political science... that are well known but difficult to define." For Cairney (2012: 18) public policy is very broadly "the sum total of government action". Richards and Smith (2002: 1) provide a slightly more detailed definition as follows: "'Public policy' is a more specific term applied to a formal decision or a plan of action that has been taken by, or has involved, a state organization." Using these definitions of public policy, the two case studies we analyse here are examples of public policy. However, they are two quite different types of public policy: the Advanced Metering Infrastructure Program was a regional state-led initiative to enforce the implementation of digital meters to households and small businesses across the State of Victoria, Australia; whereas Smart Grid Smart City was an Australian federal government funding competition developed in close collaboration with the private sector to encourage innovation in smart grids. Nonetheless, as discussed below, they were both part of the broader landscape of Australian energy policy at the time.

The paper proceeds as follows: first, there is an introduction to the Australian smart grid case studies that form the empirical basis for the paper; second, a more in-depth analysis of existing scholarship on policy mobilities as well as the political science policy stages model; third, presentation of our findings from applying these theories in conjunction to our smart grid case studies, using our research questions as a guide; and, fourth, summary and conclusions.

2. The empirical cases: Australian smart grids

In the early to mid 2000s Australia pioneered experimentation with how new information technology capabilities could catalyse innovation in traditional utility infrastructures, and thereby enable the development of smart grids (DEWHA, 2009c; KEMA, 2013). Smart grids are initiatives that involve the digitalisation of the electricity sector: the application of new computer science techniques and technologies to the electricity grid with the aim of improving its function. Australia positioned itself as a world-leader in smart grids policy development and implementation, for example developing the first set of technical standards for smart grids (Standards Australia, 2013 - AS 5711 Smart Grids Vocabulary). It was a time when other countries were similarly investing in smart grid pilots and trials, for example the USA through its Smart Grid Demonstration and Grant Programs, part of the 2007 Energy Independence and Security Act (US SmartGrid, 2007). The Australian federal government and national energy regulators were highly attentive to international smart grid initiatives, for instance a consultancy report was commissioned in 2008 by the Australian Energy Market Coordinator to review smart metering in mix of international locations, including countries (the UK, Italy, Sweden), cities (New York), and states (Ontario) (NERA, 2008). The federal government and other national institutions viewed smart grids both as way of resolving long-standing domestic policy problems (see for example AEMC, 2012; NSMP, 2008), as well as boosting the global impact of Australian companies working in this sector (Smart Grid Australia, 2014). The two case studies we analyse here were developed during this era of strong attention to smart grids in Australia: the Advanced Metering Infrastructure (AMI) program in the State of Victoria, Australia (2009–2013; hereafter the 'AMI Program') and the Australian federal government Smart Grid Smart City program (2010–14; hereafter 'SGSC'). The AMI program and SGSC were initiated by a state government (Victoria) and the federal government respectively, and were part of broader Australian government policy at the time to encourage innovation in the energy sector, in particular the National Smart Metering Program

(2006–08) (NSMP, 2008) and the National Energy Efficiency Initiative (DEWHA, 2009a).

The AMI Program involved the mandatory implementation of smart (digital) meters to all households and small businesses in the Australian State of Victoria. It was given state government approval in 2006 and commenced implementation in 2009, in anticipation at the time of the other Australian states following. The agenda setting and policy formulation stages started several years before: there was agreement in 2004 on a program to replace traditional electricity meters with interval meters on a gradual (non-mandatory) basis (ESC, 2004). But, after a number of studies and further consideration (see CRA International and Impaq, 2005), it was decided to modify the interval metering programme to a smart or advanced metering program, i.e. to install meters incorporating two-way communications, and to do this more quickly, using a mandatory ‘accelerated roll-out’ (DPI, 2007: 7). In the policy implementation stage (2009 to 2013) 2.8 million advanced meters were installed on this basis in 93% of homes and small businesses across Victoria in both urban and rural areas (VAGO, 2015). This involved removing the old mechanical meter in each property and replacing it with a digital advanced meter. Customers were charged directly for the new meters, with Victorian households paying on average \$760 extra on their bills in the period 2010–2015 because of additional metering charges (VAGO, 2015: 29). It was anticipated that customers would make equivalent or larger savings through reduction in bills because the meters allow more detailed feedback on electricity use, and facilitate use of new flexible pricing tariffs with cheaper consumption at particular times of day (called ‘time of use’ tariffs). The AMI Program implementation stage officially finished at the end of 2013, and a rebate was offered to customers if smart meter installation had still not been attempted at their property by mid-2014 (VAGO, 2015: 29).

SGSC was funded by the Australian federal government in 2009, around the same time as the start of the AMI Program implementation, with AUD\$100 million provided by the federal government, along with a further \$390 million contributed by industry (directly and in-kind) in order to undertake “...a commercial-scale trial deployment” (AEFI, 2014a: 9) of smart grids in Australia; “...an innovative solution that can serve as a global reference case” (DEWHA, 2009b: 16). The funding was announced in the May 2009 federal budget, as part of a national energy efficiency policy initiative, led by the federal Department of the Environment, Water, Heritage and the Arts (DEWHA, 2009a). The core purpose of SGSC was stated at the outset as “...aimed at creating, in one Australian city, town or region, an energy network that integrates a smart grid with smart meters in homes, to enable greater energy efficiency, reduced emissions and the use of alternative energy sources, such as solar power” (Commonwealth of Australia, 2009: 199). In mid-2010 the SGSC funding was awarded to a consortium led by the utility EnergyAustralia (later renamed Ausgrid), along with several project partners including IBM Australia, CSIRO, and the City of Newcastle. From 2010 to 2014 SGSC trials took place in the state of New South Wales, predominately in the cities of Newcastle and Sydney. SGSC therefore fits closely with other policy mobility empirical cases, which have tended to be about urban policy mobilities (Temenos and McCann, 2013). Unlike the AMI Program, SGSC was not just about digital meters, but involved testing a whole range of smart grid technologies, including electric vehicles, batteries, grid sensors and wind turbines. Further, SGSC was purposefully set up as an experiment, to facilitate learning about smart grids. All data and reports from SGSC were made publicly available, initially hosted by Ausgrid on an online Information Clearing House, and later by the Australia government through their central data repository ‘data.gov.au.’ Several interim reports were written for each trial, describing the work in progress. There were also a number of final reports published, including a 668 page summary ‘National cost benefit assessment’ report (AEFI, 2014b), as well as more specialist reports, such as on customer research (Langham et al., 2014).

3. Literature review: policy mobilities and policy stages

Policy mobilities scholarship builds on research from a number of disciplines and sub-disciplines including economic geography, urban studies, political science and science and technology studies (Baker and Temenos, 2015; Lovell, 2019a; Temenos and McCann, 2013). Empirical cases have been diverse, ranging from education policies to drug rehabilitation, to urban business centres and transport (Fiorentino, 2018; Geddie, 2015; McCann, 2008b; Prince, 2012). There has been a focus on city-to-city policy movement (McCann, 2011), as well as close attention to the broad range of actors who are involved in policy; not just the state but also non-governmental organisations (NGOs), corporations and consultants (Peck and Theodore, 2010; Prince, 2012). Policy mobilities scholarship has developed most strongly from urban studies, and has a poststructuralist understanding of urban policy development arising from globalisation and in particular competition for global capital (McCann, 2011; Peck and Theodore, 2015).

A key finding from these poststructuralist accounts of policy is about the mutation of policies as they move from one context to another and over time (Robinson, 2015, 2018), as McCann (2011: 111) describes:

“Policies, models, and ideas are not moved around like gifts at a birthday party or like jars on shelves, where the mobilization does not change the character and content of the mobilized objects”

Another key finding is that of ‘fast policy’ - the speeding up of the international circulation of policy examples and ideas - because of increased globalisation, as Peck (2011: 773) describes:

“...networks of policy advice, advocacy, and activism now exhibit a precociously transnational reach; policy decisions made in one jurisdiction increasingly echo and influence those made elsewhere; and global policy ‘models’ are exerting normative power over significant distances.”

There is not the space here to fully review all aspects of what is a rapidly growing area of scholarship (for reviews see Lovell, 2019a; Peck, 2011; Temenos and McCann, 2013). Instead, we concentrate on one aspect of policy mobilities research that has to date been overlooked, which is the links between the mobility of policy and the stage of government policy decision making. First, therefore, we explain the concept of policy stages.

The so-called ‘policy stages model’ has been developed within political science and public administration over several decades (Howlett et al., 2014; Howlett et al., 2009; Jann and Wegrich, 2007; Lasswell, 1956). The intention of the model is to enable clearer study of the policy process through identification of the stages through which a policy passes in government, i.e. the events, processes, politics and so on that are typical as policies progress from an initial idea through to an implemented policy. The early scholarship of Lasswell defined seven policy stages, as follows: intelligence, promotion, prescription, invocation, application, termination, and appraisal (Lasswell, 1956). But over time these stages have been refined and adjusted. In this paper we take the main policy stages to be *agenda-setting*, *policy formulation*, *decision making*, *implementation*, and *evaluation*, as these are the five stages most commonly referred to and used within contemporary political science (Howlett et al., 2009; Jann and Wegrich, 2007). Although dismissed by some political scientists as too linear and simplistic (see for example Sabatier, 1999), the policy stages model has value in providing a structure through which to classify and assess inherently messy policy processes (Jann and Wegrich 2017). Note that some scholars refer to the policy stages as ‘the policy cycle’, reflecting an evolution in thinking towards continual repetition through the stages (Bridgman and Davis, 2003; Jann and Wegrich, 2007).

It is relevant to consider policy stages with regard to policy mobilities because at the different stages of the policy process policy actors are likely to have different needs and receptiveness to mobile policies in-flows, as well as differing levels of policy outflows from their own

activities. In comparing the scholarship about the policy stages model with research on policy mobilities, it is evident that not much work has been done yet in policy mobilities scholarship to identify and discuss at which stage of the policy process policy mobilities are most active. Policy mobilities empirical research to date has typically either focused on policy inflows to a particular place - usually a city - examining mobile policy inflows to the development of a new policy in its early policy stages (agenda setting, policy formulation, and decision making) (see for example Crivello, 2015; McCann, 2008b; Temenos and McCann, 2012); or it has focused on policy outflows, i.e. how certain places become well known as best practice examples and are drawn on frequently, ranging from Business Improvement Districts in New York (Ward, 2006) to policy approaches to planning and design across whole cities such as Barcelona and Bilbao (González, 2011), and city suburb redevelopments such as Kings Cross in London (Brill and Conte, 2020). This is admittedly somewhat of a 'straw man' distinction, as rarely are cases only about either policy inflows or outflows (see for example Robinson, 2015, 2018). Nevertheless in this paper, through our longitudinal empirical research, detailed below, our objective was to take two policies and examine policy inflows and outflows over the full course of their lifecycles. This is a different empirical approach to the majority of existing policy mobilities literature, which advocates a 'follow the policy' approach (Jacobs, 2012; Peck and Theodore, 2010). Instead, we used a longitudinal methodology, and thus were able to examine flows of policy information and learning in and out of our two case study policies over time.

4. Methodology

The methods used to research our two case studies were a mix of quantitative and qualitative approaches. The quantitative research focused on identifying and collating written reports that cited either of the two case studies, i.e. codified forms of knowledge transfer. The qualitative research involved interviews with key people involved (37 interviews in total). The interviews discussed codified as well as tacit forms of knowledge transfer. Each research approach is described below, along with a discussion of methodological limitations.

4.1. Quantitative report data and analysis

English language Australian and international policy and industry documents related to smart grids and publicly available on the internet were analysed for references to the two smart grid case studies. References to smart grid trials were limited to reports from smart grid related organisations and policy makers, and focused on smart meters, pricing, regulatory regimes and customer engagement. The review was done by searching the document for 'Australia' and then narrowing down to the case study name (if it was present). The documents were then skim read as a final check. An excel spreadsheet captured the document reference, purpose, and how the case study was referred to, including example quotes.

Policy and industry documents about the two case studies were similarly analysed for international content, particularly references to international case studies. This was conducted by reviewing the report table of contents and searching for 'international', 'global' and 'world' and then individual country names, such as 'Italy'. The document was then skim read as a final check. An excel spreadsheet captured the document reference, purpose, which region, country, state and/or trial was referenced and then an example quote if applicable, as above.

Note that for both data collection activities only reports were collected. Blogs, news media, brochures, advertisements, short policy briefs, conference papers and academic journal articles were excluded. Other documents excluded were those that had moved over time and were not able to be found or were behind internet paywalls and not freely retrievable. This is a recognised limitation of the methodology, because not all relevant reports were available online. Another

limitation of the methodology is that any mention of either case study in a report was counted and included in our data set, so there is a risk of our analysis reifying or overemphasising the existence of policy mobilities.

4.2. Qualitative interview research

The qualitative research involved 37 interviews with actors from across the public and private sectors involved in either the AMI Program or SGSC. The selection of interviewees was on a 'whole of population' basis (i.e. there was no sampling): all senior people involved in either of the case studies were approached with a request for an interview. The large majority of interviews were in person, with the remainder taking place via video-phone or telephone. Interviews lasted in the range of 20 to 90 min, with most just under an hour in duration. The interviews were semi-structured and questions and topic areas covered included: motivations to establish the policy, the learning that has taken place (both within Australia and from overseas), and their level of engagement with policy. Permission was asked to record the interview, and the interviews were transcribed through a professional service. These transcripts were carefully checked and corrected by the authorship team. Emergent themes were subsequently discussed by the team prior to more detailed thematic coding and analysis of the interview transcripts using nVivo, a computer program for assisting with qualitative analysis.

5. Findings

In this section we summarise our findings to the key guiding research questions that we have used to explore the data from our two empirical cases. Here we answer each question in turn, before proceeding to draw together our overall findings in conclusion.

Question 1: At what stage of the policy cycle do policy mobilities (inflows and outflows) tend to occur - is there a pattern? How are the policy mobilities occurring? (e.g. via reports, face-to-face contact).

In our two case studies we can see evidence that policy mobilities vary over the lifecycle of a policy, according to the different policy stages. As introduced above, we distinguish here between policy mobility inflows, defined as learnings and new knowledge from elsewhere drawn on by our case studies, and policy mobility outflows - learnings and new knowledge from our case studies that disseminated to other places (hereafter simply 'inflows' and 'outflows'). We first analyse the quantitative report data, as shown in Figs. 1 and 2, and then assess the qualitative interview data.

Figs. 1 and 2 show the inflows and outflows of policy knowledge to and from other countries for our two case studies, based on data from published reports. For both case studies the data reveals a peak of policy mobilities during the policy implementation stage. This is understandable as it is the policy stage when changes are happening 'on the ground' for the first time, which generates attention from media and within international policy networks, thereby promoting mobile policy outflows in particular. In contrast, the agenda setting stage - the earliest policy stage - is not characterised by outflows in either of the case studies. The agenda setting policy stage is when early ideas are being discussed, and information is not necessarily in the public domain, which explains why mobile policy outflows are not present. For the SGSC case study policy outflows start to emerge during the implementation stage, but for the AMI Program it is earlier, during the decision making stage. This likely reflects the longer agenda setting, policy formulation and decision making stages of the AMI Program (2004–2009).

There is evidence of the SGSC and the AMI Program teams seeking out knowledge from international trials across a number of policy stages, from policy formulation to implementation and evaluation. Overall, there were more inflows with the AMI Program, indicating a wider international search for information and learning. The inflows are located within the early policy stages - agenda setting to decision making - as one might expect, as this is when policy teams are looking to learn from experiences elsewhere to help guide their early decision making.

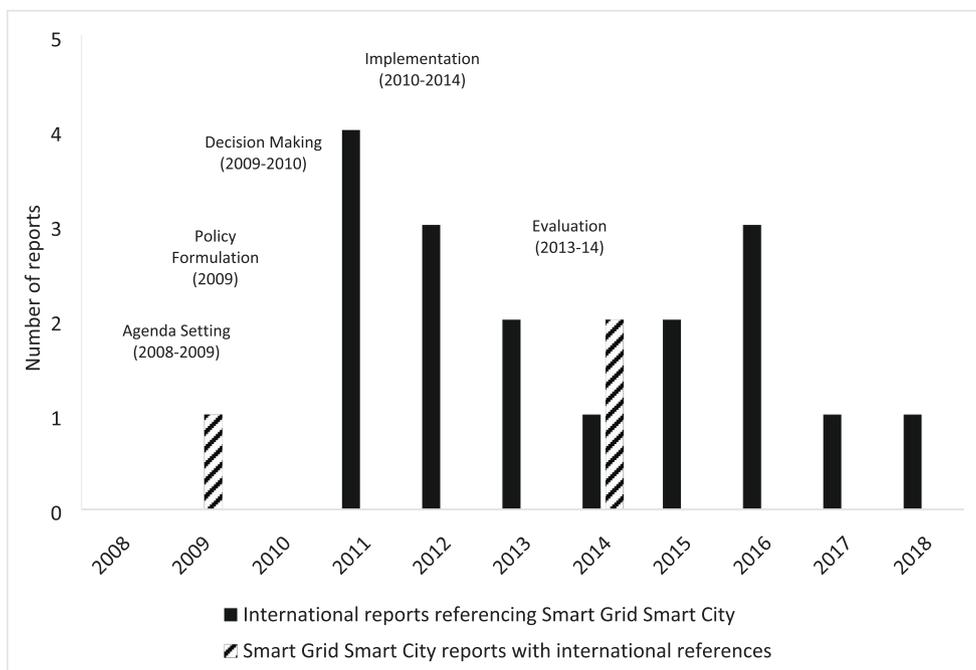


Fig. 1. Policy mobility inflows and outflows over the policy cycle for the Smart Grid Smart City case study.

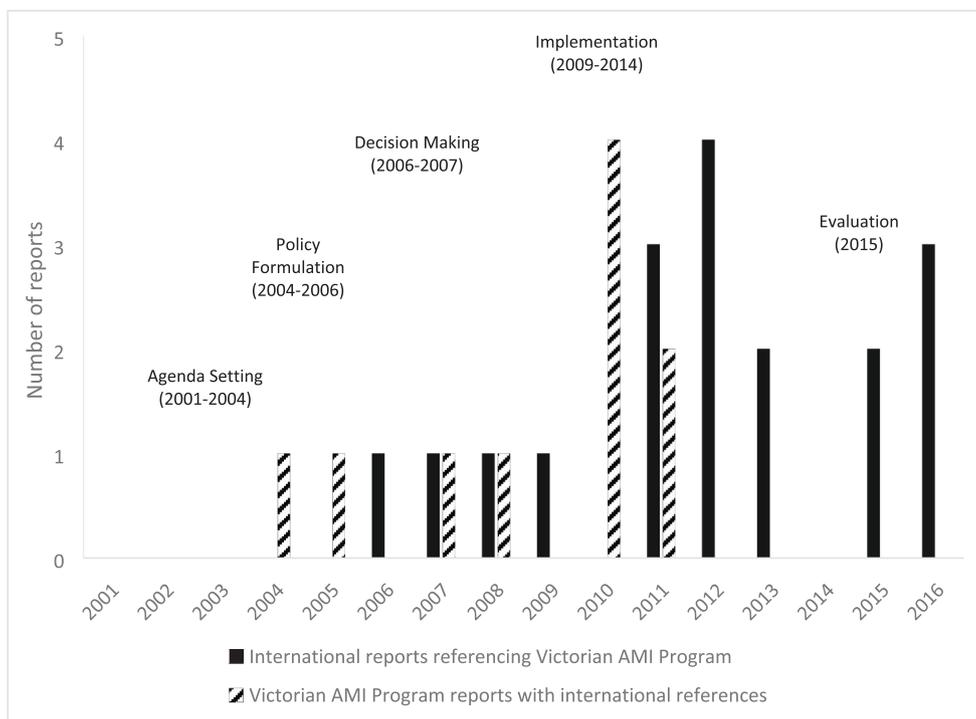


Fig. 2. Policy mobility inflows and outflows over the policy cycle for the AMI Program case study.

However, for the AMI Program there was a peak of inflows during the implementation phase. With regard to SGSC, policy inflows are far fewer, based on our report data. But once again we see a peak in policy inflows later on in the policy cycle, in this case at the evaluation stage. The reasons for these inflows later in the policy cycle are uncertain. It is an interesting finding as it is contrary to ideas within policy mobilities scholarship that localities actively seek information from elsewhere when they are considering a change in policy (see for example McCann, 2008a; Wood, 2015), i.e. much earlier in the policy cycle. There is evidence with our two case studies that during the implementation and

evaluation policy stages problems were being encountered and discussed (Lovell, 2017, 2019b), and there was hence a period of renewed learning and information seeking.

Figs. 1 and 2 reveal that the total number of reports showing evidence of policy mobilities (outflows and inflows) is modest, with only between 1 and 4 reports per year for each case study. For the AMI Program we identified a total of 18 outflow reports and 10 inflow reports (28 reports in total over the policy cycle). SGSC in comparison had 15 policy outflow reports and 3 inflow reports (18 reports in total over the policy cycle). The relatively modest report volumes, particularly for

SGSC, suggest that knowledge sharing is likely to have been taking place in addition through other more tacit forms (e.g. study tours, conferences, face-to-face through professional networks). Our qualitative interview data supports this. For example, there is evidence of study tour activity in the AMI Program's early policy stages, in order to facilitate policy inflows (mentioned by 9 out of our 14 AMI program interviewees). For instance, a senior government policy officer describes how they drew on the experiences of the United States (US):

"There had been [digital meter] rollouts started in the United States and as much information as possible was taken from those in terms of impacting on the plans here [...] We had representatives from different energy companies in the US come out and talk to us ..." (Interview, December 2016).

The US was likewise mentioned by a regulatory strategy manager as a source of policy inflows in the early stages - along with New Zealand and various European countries - although more cautiously:

"North America we don't consider as particularly instructive unless it's a Texas-type situation [...] Europe, again the UK is probably the most comparable market, and the Nordic countries..." (Interview, September 2015).

Other key policy actors mentioned both reports and conferences as key avenues of information sharing (e.g. a metering services manager - Interview December 2016; a consumer advocate - Interview September 2015). Interestingly, there was also caution expressed by several of our interviewees about the relevance of policy inflows for the AMI Program, because it was seen to be unique. For example, according to a principal government policy officer:

"In relation to policy decision making, it was very hard to find precedents... There was data there that was useful. To the extent that we could draw on that data, we did. But we were just in a very, very different space to that..." (Interview, November 2016); and "So other countries are good examples and they're good to consider, but without understanding those differences between Australia and other countries that we're using... You can't just pick up a model and plonk it straight down without considering and adjusting it." (Interview, metering services provider, September 2015).

These findings corroborate strongly with findings from across policy mobilities scholarship regarding the differences between places and the mutation of policies as they travel and are implemented elsewhere (McCann and Ward, 2013).

With respect to policy outflows later on in the policy cycle, interviewees similarly spoke of informal modes of knowledge exchange. For example, a principal regulatory officer involved in the AMI Program states:

"I know we do have some discussions with the UK. I'm in contact with a person quite regularly on and off [...] and recently we've been in discussion with some people at [UK] Competition and Markets Authority ... So, you know, we do keep in touch but [...] there's not a lot perhaps written..." (Interview, September 2015).

There was also evidence of several policy outflow study tours to Victoria in the evaluation stage of the policy cycle, in particular from Asian countries:

"Last week we had a study group from Malaysia and, you know, they were really engaged and switched on because they're trying to do something similar. They've done a trial of a thousand smart meters in Malaysia, really sort of engaged and interested in our experience... So we get a lot of people coming to see what we've done [...] we get a lot of visitors, yeah, from overseas, particularly around Asia" (Interview, principal regulatory officer, September 2015).

This was reiterated by other key policy actors within the AMI Program context (network provider, November 2016, and, Metering

services manager, December 2016). In the quantitative report analysis there was an absence of smart grid reports from Asia, so this finding is interesting. Asia has a strong presence in global smart grid organisations and notable trials and policies (ISGAN, 2014). The lack of reports may well be due to the differences in regulatory regimes and transparency, as well as language differences.

SGSC was established from the outset to have a range of formal and regular methods of information sharing through reports and other more tacit activities such as quarterly forums. These activities were agreed upon at the start of SGSC, and took place because of the substantial federal government funding (AUD\$100 million). All reports and data published by SGSC were made publicly available on an online 'Information Clearing House', which aimed to facilitate policy outflows via the provision of codified knowledge (reports and datasets) (Lovell and Powells, 2020), as a government commissioned report explained:

"The intent is that registered users [of the Information Clearing House] will be able to download and use the Smart Grid, Smart City data and research to further their own knowledge and research and in so doing contribute to the global knowledge base of smart grids and associated technologies." (AEFI, 2014a: 22).

From our interview data there was also evidence of more tacit knowledge sharing - both nationally and internationally - as described by a SGSC policy manager in federal government:

"We were also part of the International Smart Grid Action Network. So we were providing information and filtering information through to that group. And that had ... I think it was about 23 countries on it. So we kept in regular contact with those guys and [...] We had regularly quarterly forums and we used to pull all the key players across the country together. We used to provide updates, information." (Interview, July 2015).

In summary, there is evidence of the SGSC and the AMI Program teams seeking out knowledge from international trials across a number of policy stages, from policy formulation to implementation and evaluation, and through various means including codified and tacit forms of knowledge transfer. There is also evidence of policy outflows from both of the case studies. We now shift to consider how the two policies were interpreted, whether positively or negatively.

Question 2: Are negative or positive interpretations/narratives about the policy more or less likely at different stages of the policy process?

As might be expected, given some of the problems the AMI Program encountered (Lovell, 2017; VAGO, 2015), a number of international reports have a negative sentiment about it (see Fig. 3 and Table 1). In contrast there are no negative international reports about SGSC (see Fig. 4 and Table 2). The negative sentiment reports about the AMI Program occur from the implementation stage onwards. This makes sense as it was only once the implementation stage was reached that problems became apparent. A report on the AMI Program by the Victorian Auditor General criticised some aspects of the program, especially related to cost-benefit analysis and governance issues leading to delays (VAGO, 2009). This sentiment flowed into other AMI reviews where the Auditor General's criticisms were referenced. For example, in New Zealand, reports by the Electricity Commission and the New Zealand Smart Grid Association quoted these concerns, leading to a negative sentiment regarding the AMI Project both during implementation and post-project stages (Electricity Commission, 2009; New Zealand Smart Grid Forum, 2016).

It is, however, interesting to note the existence of positive reports in the evaluation stage of the AMI Program, not just negative ones, for example from the Indian Smart Grid forum and the European Commission (see Table 1). Although in papers to the Indian Smart Grid forum, the Victorian AMI Program is discussed in the context of expected benefits, such as reduction in peak demand and cost savings, rather than focusing on the actual outcomes and the Auditor General's criticisms

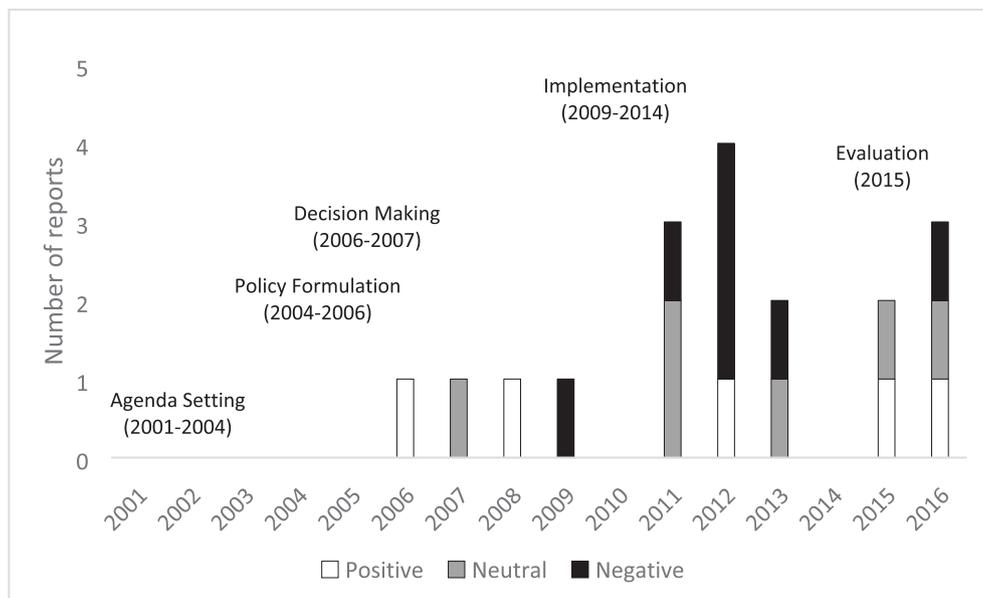


Fig. 3. Sentiment in international reports referencing the AMI Program.

Table 1
Summary of International Reports referencing the AMI Program showing sentiment.

Author	Report Title	Year	Country or region	Publishing Organisation	Policy Stage	Sentiment
Owen, G and Ward, J	Smart Meters: Commercial, Policy and Regulatory Drivers	2006	UK	Sustainability First	Policy Formulation, Decision Making	Positive
European Regulators' Group for electricity and gas (ERGEG)	Smart Metering with a Focus on Electricity Regulation	2007	Europe	ERGEG	Decision Making	Neutral
Stratra Energy Consulting	Report on international experience with smart meters (energy)	2008	New Zealand	Parliamentary Commissioner for the Environment	Pre implementation	Positive
Electricity Commission	Advanced Metering Infrastructure in New Zealand: Roll-Out and Requirement	2009	New Zealand	Electricity Commission	Implementation	Negative
Joint Research CentreInstitute for Energy	Smart Grid projects in Europe: lessons learned and current developments	2011	Europe	Joint Research CentreInstitute for Energy	Implementation	Neutral
APEC Energy Working Group	Using Smart Grids to Enhance Use of Energy-Efficiency and Renewable-Energy Technologies	2011	Global	APEC	Implementation	Neutral
US Energy Information Administration	Using Smart Grids to Enhance Use of Energy-Efficiency and Renewable-Energy Technologies	2011	USA	US Dept of Energy	Implementation	Negative
APEC Expert Group on New and Renewable Energy Technologies	The Study of Addressing Challenges of AMI Deployment in APEC	2012	Global	APEC	Implementation	Negative
GmbH and iHomeLab Research Centre	IEA-4E Scoping Study on Smart Metering Infrastructure	2012	Global	International Energy Agency (IEA)	Implementation	Positive
Global Smart Grid Federation	Global Smart Grid Federation 2012 Report	2012	Global	Global Smart Grid Federation	Implementation	Negative
Lewis P.E, Dromacque, C, Brennan, S, and Kennedy, D (VaasaETT)	EMPOWER DEMAND 2 - Energy Efficiency through Information and Communication Technology –Best Practice Examples and Guidance	2012	Europe	European Smart Meter Industry Group	Implementation	Negative
Hiscock, J, and Kang, D.J	Spotlight on advanced metering infrastructure. AMI Case Book	2013	Global	ISGAN	Implementation	Neutral
SmartGridGB	Smart grid: A great consumer opportunity	2013	UK	SmartGridGB	Implementation	Negative
Various authors	Indian Smart Grid Week Technical Papers	2015	India	India Smart Grid Forum	Evaluation	Positive
Asia Pacific Energy Research Centre	A Study on Smart Communities in the APEC Region	2015	Global	APEC	Evaluation	Neutral
Ruxton, K	Letter on emerging technologies workshop	2016	New Zealand	New Zealand Smart Grid Forum	Post project	Neutral
PWC, Danish Technology Institute, ISIS, SIGMAORIONIS	Analysing the potential for wide scale roll out of integrated Smart Cities and Communities solutions SCC solution best practices,	2016	Europe	European Commission	Post project	Positive
Smart Grid Forum New Zealand	Relative Progress of Smart Grid Development in NZ	2016	New Zealand	Smart Grid Forum New Zealand	Post project	Negative

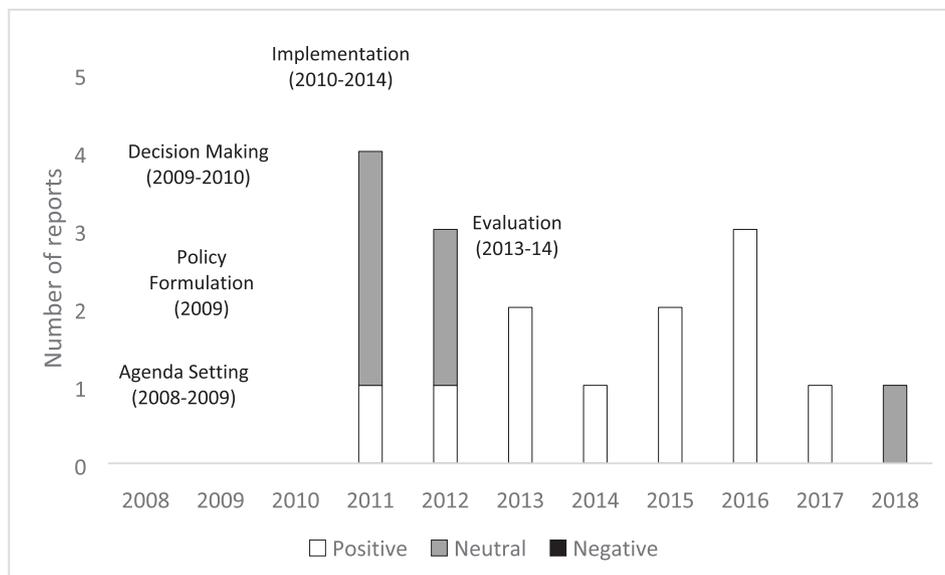


Fig. 4. Sentiment in international reports referencing the Smart Grid Smart City Project.

Table 2
Summary of international reports referencing the SGSC showing sentiment.

Author	Report Title	Year	Country or region	Publishing Organisation	Policy Stage	Sentiment
International Energy Agency (IEA)	Technology Roadmap Smart Grids April 2011	2011	Global	IEA	Implementation	Neutral
APEC Energy Working Group	Using Smart Grids to Enhance Use of Energy-Efficiency and Renewable-Energy Technologies	2011	Global	APEC	Implementation	Neutral
US Energy Information Administration	Smart Grid Legislation and Case Studies	2011	USA	US Dept of Energy	Implementation	Positive
Millar, M, Beauvais, D	Smart Grid Contributions to Variable Renewable Resource Integration	2012	Global	ISGAN	Implementation	Neutral
GmbH and iHomeLab Research Centre	IEA-4E Scoping Study on Smart Metering Infrastructure	2012	Global	IEA	Implementation	Neutral
Global Smart Grid Federation	Global Smart Grid Federation 2012 Report	2012	Global	Global Smart Grid Federation	Implementation	Positive
APEC Center for Technology Transfer	Cooperative Study on Efficient Renewable Resources Integration and Distribution Technologies for Smart Grid Construction	2013	Global	APEC	Implementation, Evaluation	Positive
Lewis, P (VaasaETT Global Energy Think Tank)	Smart Grid Global Impact Report 2013	2013	Europe	VaasaETT Global Energy Think Tank	Implementation, Evaluation	Positive
Power Advisory Llc	Jurisdictional Review of Dynamic Pricing of Electricity	2014	Canada	Ontario Energy Board	Implementation, Evaluation	Positive
ELECTRA (European Liaison on Electricity Committed Towards long-term Research Activities for Smart Grids)	WP 10 Actions on International Cooperation Deliverable 10.1 List of mutually interesting R&D topics and prioritization by country of R&D topics to be jointly addressed – Phase I (M16)	2015	Europe	ELECTRA	Post project	Positive
Asia Pacific Energy Research Centre	A Study on Smart Communities in the APEC Region	2015	Global	APREC	Post project	Positive
PWC, Danish Technology Institute, ISIS, SIGMAORIONIS	Analysing the potential for wide scale roll out of integrated Smart Cities and Communities solutions	2016	Europe	European Commission	Post project	Positive
Smart Grid Forum New Zealand	Relative Progress of Smart Grid Development in NZ	2016	New Zealand	New Zealand Smart Grid Forum	Post project	Positive
Nordling, A, Pädam, S, af Burén, C, Jørgensen, P	Social costs and benefits of Smart Grid technologies Discussion Paper	2018	Global	ISGAN	Post project	Neutral
Nordling, A, Pädam, S, af Burén, C, Jørgensen, P	Social costs and benefits of smart grid technologies, report for Swedish Smart Grid Forum	nd	Sweden	Swedish Smart Grid Forum, ISGAN, Swedish Energy Markets Inspectorate	–	Neutral

(Stromback 2010). This trend is also observed in positive sentiment related to SGSC, where the project is discussed as an example of national smart grid demonstration and deployment, with the focus on expected project benefits (see for example [IEA, 2011](#); [US Energy Information Administration, 2011](#)).

Qualitative interview data similarly revealed criticism of the AMI Program and spoke of how this circulated nationally and internationally.

For example, “we look at Victoria as a basket case” (Interview, manager of a Victorian metering company, September 2015) and “it just turned into an absolute disaster” (Interview, distribution utility manager, December 2016). This stands in contrast to the early stages of the AMI Program, when there was strongly positive international attention:

“... as Victoria utilities decided to go ahead [with the AMI]... of course people talked about it a lot – in Canada, US and every time I came over and they said, “Wow, you are leading the world.” (Interview, power company director, January 2017).

Perhaps more surprising though, given the positive sentiment data in Fig. 4, is the level of criticism of SGSC revealed in interviews, for example,

“... it’s not well regarded; it’s disregarded. There’s very little use of that [SGSC] worldwide, or recognition of it, I think.” (Interview, global utility manager, January 2017).

“... part of the sales pitch around Smart Grid, Smart City at the outset was around it being a project of international significance. Do you think that came to pass? Do you think it met that objective of having an international reach?

A: No, not really. I think it needed to ultimately live and breathe beyond the project if it was going to be that significant.” (Interview, network innovation team leader, January 2017).

One interviewee, with long experience in the smart grid sector, describes the international view of Australia’s smart grid work evolving over time from positive to negative sentiment, because of the outcomes of the AMI Program and SGSC:

“The Australian experience of smart grid was very much, five years ago or more, seen as world leadership and Ausgrid were part of that. So was the Victorian rollout of smart meters. But those things were seen as offering a leadership to the world and the things were looked at very closely and with a positive view. Because of our troubles, Smart Grid, Smart City and across the Victorian disaster... we’ve just become less and less interesting.” (Interview, global T&D solutions leader, January 2017).

Overall, our analysis reveals a mix of interpretations about our two case studies, both positive and negative, with negative interpretations emerging from the implementation stage onwards. SGSC did not have negative sentiment in any reports but negative sentiment was evident in interview data.

6. Summary and conclusions

The main objective of this paper has been to further develop scholarship on policy mobilities through exploration of a typology and set of ideas from political science about the different stages of the policy making process. We have suggested the policy stage model as providing a structure for analysing mobile policy inflows and outflows over time. In a practical way this enables the analysis of policy mobilities to be more attentive to key government decision making processes. Conceptually, the paper further strengthens ties between political science and policy mobilities scholarship, the latter of which has mostly been developed by human geographers and related disciplines. To date policy mobilities scholarship has mostly not been explicit about which stage of the policy process is being examined. In practice the majority of policy mobilities research has either concentrated on policy inflows in the early policy stages of agenda setting and policy formulation, or policy outflows in the later policy stages (implementation and evaluation). Empirical case studies have thus rarely encompassed a whole policy cycle approach to examining policy mobilities. So, this is what we empirically researched, by tracing the policy mobilities associated with two Australian smart grid policy programs over their lifetime: the AMI Program and SGSC. We assessed policy mobilities in the lead up to the policy being implemented, i.e. at the agenda setting, policy formulation and decision making stages, as well as over subsequent stages – implementation and evaluation. To do this we analysed a combination of codified and tacit forms of knowledge sharing, including the quantitative tracing of policy and industry reports, as well as qualitative interviews with key policy practitioners. This mixed methods research

approach is a new direction for policy mobilities scholarship, and it is considered to have yielded some useful insights about the constitution of policy mobilities, both temporally and spatially. Here in conclusion we summarise and reflect on our findings, before going on to consider their implications for further research.

In answer to our question about the stage of the policy cycle at which policy mobilities (inflows and outflows) occur, there was not a clear pattern in policy mobilities observed in our two case studies. We found that policy mobilities occur over the whole policy cycle, but with a peak of policy mobilities during the policy implementation stage. Breaking it down into policy inflows and outflows based on our quantitative report data, with the SGSC case study policy outflows to other places started to emerge during the implementation stage, whereas for the AMI Program it was earlier, during the decision making stage. With regard to policy inflows, there was evidence of the SGSC and the AMI program teams seeking out knowledge from international trials across a number of policy stages, including latter stages. Based on our report data there were larger policy mobility inflows with the AMI Program, indicating a wider international search for information and learning. We acknowledge here that that the distinction between policy outflows and inflows is a binary that oversimplifies, but consider nonetheless that it is a useful categorisation to help us understand policy mobilities with the distinctive empirical framing we use in this paper, namely examining two case study policies over their life course.

In terms of how the policy mobilities are occurring, we found there to be several different types of knowledge sharing taking place along the policy cycle, including reports, conferences, study visits, and sharing through professional networks. Our novel mixed methods approach was perhaps most useful in terms of being able to distinguish between the different types of knowledge sharing taking place over time. For instance, a key finding from our qualitative interview data, which didn’t appear in our quantitative report analysis, was about policy outflows from the AMI Program to Asia. Our research points to the value of a mixed methodological approach in policy mobilities scholarship, including taking a longitudinal perspective (Clarke, 2012).

In relation to our question about sentiment, negative interpretations of the AMI Program were evident in reports in the later policy stages, as one might expect. SGSC only had positive or neutral commentary in reports, however, qualitative interview data did reveal negative sentiment in the evaluation phase of SGSC.

Overall, our findings reveal some interesting insights about the temporal nature of policy mobilities over the life course of a policy. Whilst we acknowledge the fluidity of mobile policy flows, including the difficulty of tracing their origins as they mutate over time (Robinson, 2015), we suggest that our mixed method approach to examining policy mobilities – taking two case studies over their life course - does enable a different perspective and new understandings of mobile policies. Our analysis confirms that there is value in attending to policy mobilities at different stages of the policy process, in order to improve our understanding of what types of policy knowledge are mobile and when, in the process broadening the scope of policy mobilities research and developing stronger links with political science scholars. The initial laudable objective of policy mobility scholarship to move beyond rational policy transfer concepts, developed within political science, has perhaps ultimately resulted in too much of a shift away from analysis of the role of government and policy processes and stages. These structured aspects of the policy process do nonetheless dictate the pattern and rhythm of many policy flows and deserve further attention.

CRedit authorship contribution statement

Heather Lovell: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Project administration, Funding acquisition. **Cynthia Nixon:** Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Visualization. **Alana Betzold:** Formal analysis, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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