Rethinking the procedural in policy instrument ‘Compounds’: a renewable energy policy perspective

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ABSTRACT
Contemporary research in the policy sciences places effectiveness as the central goal of policy design. This emphasis permeates both micro-level design considerations for specific policy calibrations, as well as more meso-level policy tool and tool mixes. Effective instrument design, therefore, augments the task of looking at individual tools to considering them as tool ‘compounds’, that comprise of substantive and procedural means interacting through the process of designing tools and subsequent tool calibrations. The academic study of policy tools thus far has proffered several perspectives on how they can individually be distinguished by their different substantive components and categorized based on common governance resources that need to be mobilized to create them. However, it is eventually how well policy tools are able to coordinate the support of common procedural means and how well they are able to align their enactment plans, which determine how effectively they work together as a deliberate toolkit. In line with the growing literature on policy design and multi-component policy means, this paper magnifies policy instrument design as a complex of procedural and substantive means. To illustrate the notion of such design compounds, this paper synopsizes the state of knowledge on the formulation of three classes of energy policies as an illustration of how substantive and procedural components interact during policy instrument design.

KEYWORDS
Policy instruments; procedural tools; policy tools; policy design; renewable energy

Introduction
The formulation of policy instruments to address public problems is an important topic of analysis across a variety of policy sectors—including those related to energy production and its sustainability. Such enquiries encompass the study of both traditional ‘substantive’ instruments of policymaking, such as regulation and fiscal policy, as well as lesser recognized ‘procedural’ tools (Hood, 2007; Elliot & Salamon 2002). The latter include tools related to government’s design and implementation of network management mechanisms and public participation, activities linked to the delivery of organizational services such as the formation of advisory committees to regulatory agencies, and...
policy processes more generally, such as the creation of public information commissions, government data portals and repositories, and judicial review processes (Howlett, 2000).

When conceptualizing policy instruments, the general tendency in the policy sciences has been to view them as a specific depiction of policy. They represent the most concrete manifestations of government intent and are the technical alternatives that policy formulators create and deploy to meet stated goals. As such, there is a general agreement in the policy sciences regarding what a policy tool conceptually indicates. Howlett (2000), for example, defines policy tools as the means of government ‘to deliberately affect the natures, types, quantities and distribution of goods and services provided in a society’ (p. 415). Vedung, Rist, and Marie-Louise (1998) have similarly alluded to government action that is embodied in a policy instrument that represents ‘a set of techniques by which government authorities wield their power in attempting to ensure support and affect or prevent social change’ (p. 21).

At their most fundamental level, it is understood that policy tools can be broadly typified based on their primary purpose in policymaking. The first classification informs the actual content of how public action is to be governed or influenced. The second targets government’s own processes of administration and seeks to affect political or policymaking behaviour during the setting of policy aims and means. Policy instruments, then, become those specific techniques that give effect to policy goals and which also differ according to their main purpose: falling into ‘substantive’ and/or ‘procedural’ categories as above (Hood & Margetts, 2007; Howlett, 2000).

While substantive policies, their analysis and categorization have remained at the forefront of studies of policy instruments and instrumentation, procedural policy means have in comparison enjoyed less academic exploration. Nevertheless, there is broad consensus that procedural policy components are fundamental to the formulation and effective functioning of substantive tools. And yet, this relationship that exists between these two categories, remains scarcely explored in the literature on policy instruments and design (Howlett, 2000; Howlett & Tosun, 2018). Unlike substantive tools that directly affect the production, consumption and distribution activities of public goods and services, procedural instruments have been envisioned as instead being focused with affecting governments’ own internal actions related to the policymaking process. For example, network management and governing the behaviours and interactions of policymaking agents is one significant function of procedural tools (Klijn, Koppenjan, & Termeer, 1995). Beyond their administrative function, procedural elements can also shape the substantive policy decisions that follow from government’s process-oriented actions. Examples include government forming an advisory committee of select citizens or experts to help timely deliberations on sensitive issues such as nuclear energy regulation, or the creation of freedom-of-information or access-to-information laws facilitating citizen access to government legislation and records. Additionally, re-organizing an administration’s own internal actions can impact the effective formulation of policies, as occurs when new regulating agencies are created by merging personnel from energy and environmental ministries, forcing the two to adopt a new collaborative operating arrangement.

Such observations indicate that procedural and substantive elements of policy tools interact frequently through policy design, yet this relationship remains under-theorized. In response to this opportunity, this article offers an initial exploration of two key
questions for advancing the scholarship on procedural tools, namely, (1) how exactly do procedural elements support the substantive within a policy mix? and (2) how do these interactions contribute towards effective policy design? The article presents a framework depicting the procedural and substantive components working together within policy instrument ‘compounds’ and uses illustrative examples from the global experience with renewable energy policy formulation to highlight the role and interactions of procedural elements in the design of policy tools and their eventual on-the-ground calibrations.

Policy tool design and the contribution of procedural components

Procedural tools are fundamental to the overall resilience of policy design, especially in sectors such as energy, which are increasingly defined by volatile resource endowments and erratic global trends. So much so, that understanding the interaction between the substantive and the procedural aspects of policy design is now deemed critical towards determining how best to proceed with effective energy policy formulation (Braathen and Croci 2005, Del Rio 2010). Only in recent policy design literature, including the articles of this special issue, is there now growing evidence of considering both substantive and procedural policy aspects of policy mixes together in the interest of upholding design effectiveness and long-term resilience (Howlett, 2020; Capano and Woo 2017; Kwakkel & Haasnoot, 2019; Nair and Howlett 2016; Walker, Marchau, & Kwakkel, 2013).

Procedural–Substantive interactions and upholding durability

In policy domains such as energy and renewable energy in particular, procedural elements have been observed to strengthen the substantive purpose of policy tools working within dedicated policy mixes. For example, regular reviews and sunset clauses in the design of national clean energy plans are specifically deployed to mitigate against problems arising from the haphazard layering of policy elements, which can derail the original intent of design. Such tools can make use of processes of ‘smart layering or ‘patching’ to keep policy elements flexible and aligned with changing contexts (Capano and Woo, 2017; Gunningham et al 1999; Howlett & Rayner, 2013). Furthermore, procedural tools help towards estimating fluctuations in the policy context, thereby informing the success of the substantive contribution that a policy tool makes (Lang et al. 2019; Leung, Noble, Gunn, & Jaeger, 2015; Bond, Morrison-Saunders, Gunn, Pope, & Retief, 2015). Such processual activities necessitate the earmarked allocation of human capital, financial and administrative resources at the outset that can make available and deploy managerial and procedural support for a policy instrument during changing contexts that may often require a significant re-calibration or re-thinking of substantive elements (Doz & Kosonen, 2014; Luthar & Cicchetti, 2000).

Further to supporting the policy formulation process, procedural tools play a significant network management role by affecting the actions, locations, and behaviour of policy formulators, which in turn directly impact the design of substantive tools. While this research agenda is still emergent within the policy sciences, some evidence from studies on regulatory policy design are revealing that the deliberate adjustment of institutional frameworks faced by regulators, can lead to the formulation of better welfare-enhancing [substantive] policies (Dudley & Xie, 2020). This developing line of
enquiry highlights that the variation in how substantive tools and regulations are designed can be explained not just by varying endowments of professional training, experience and information but also in terms of the cognitive biases of regulators, subject-matter experts and analysts in government agencies, which can all be influenced by procedural policy decisions taken early on the design process (Carrigan & Mills, 2019; Tasic 2011). These lessons find agreement with earlier policy design scholarship, and most notably with the work by Linder and Peters (1989) related to the behavioural assumptions of policy designers, which suggests that ‘interest is concentrated on how instruments are viewed by actors inside and outside of government who make choices about them and more specifically, in the criteria used by those actors to judge the suitability of instruments for addressing policy problems over time’. (p. 36). On the other hand, such factors that uphold durability and perpetuate dominant styles of design may not always lead to a favourable outcome as procedural mechanisms may be used to essentially ‘lock-in’ the use of substantive instruments that become the ‘lowest common denominator’ of gaining support of multiple policy actors but might be objectively redundant or counterproductive to addressing the problem at hand (Fernandez-i-Marín et al. 2021, p. 10).

**Procedural elements of effective policy design**

The contemporary understanding of effective policy design heavily emphasizes the temporal tenacity of policy mixes (Peters et al. 2018). Perpetuating an environment that favours effective policy mixes over time, deeply relies on intentional planning and sequencing of underlying procedural elements that uphold the stability of substantive tools in the long-run. However, this temporal dimension of procedural tools has rarely been comparatively explored in the policy design literature (Howlett, 2020). The lessons that are emerging about the effect that procedural tools have on policy stability over time in sectors such as environmental policy and climate regulation studies, build on the ongoing theoretical development of concepts such as path dependence and policy feedback (Mahoney, 2000; Beland 2010 among others), in order to guide the formulation of policy strategies that endure by securing long-term political support (Bernstein and Hoffman 2018; Fouquet, 2016; Munck at Rosenschold et al. 2014). Rosenboom, Meadowcroft and Cashore (2019), for example, outline four main lessons from their study of path dependency for the formulation of climate policies, lessons which indicate procedural processes such as accounting for sunk costs and the accumulation of technological experience that ‘lock-in’ in the instrumental elements of policy design.

Such findings suggest that one direct effect that procedural tools can have on the effective formulation of instruments is by determining the ‘stickiness’ of individual policies or policy mixes by checking reversibility, engraining political support and expanding buy-in over time (Levin et al. 2012). In their exposition on what makes climate policy instruments durable by design, Jordan and Moore similarly emphasize that ‘such policy fosters and sustains its own political support base over time, triggering legacy effects that endure even after the waning of the political forces that generated the policy’s original enactment’ (p. 4). In other words, the investment that policymakers make to the initial substantive design of often ambitious climate policies is not self-enduring without the backing of underlying procedural support as ‘some recalibration of
a policy’s implementing instruments is likely if the policy as a whole is to remain on course to achieve its goals’ (Jordan & Moore, 2020, pg. 7)

The above examples reveal insights into the fundamental questions about when and how far procedural and substantive elements of policy tools interact during the process of policy design and signal the need for a perspective on procedural tools that is sensitive to their unique role within policy design. A closer examination of how procedural and substantive tools interact and are sequentially formulated would attempt to better situate the existing notion of procedural policy tools in the context of the policy process.

**Policy instrument ‘compounds’ – a general framework**

Subsequent to the new turn in policy design studies of the early 2000s, a disconnect has arisen between the scholarly discourse on policy formulation and how well it vouches for sound implementation. This disconnect is indicative of a growing need to foster a dialogue about creating effective implementation plans through procedural decisions made early in the policy process, alongside those of policy design as ‘it is often a highly rarefied world and policy design occurs far from places where policy implementation happens’. (Mintrom & Luetjens, 2017, p. 1). The creation of rigorous implementation plans is unsurprisingly also a cornerstone of good formulation, as it is widely understood that effectiveness of policy is a central purpose – in fact the central purpose – of policy design (Peters et al. 2018). And yet, there is also scholarly cautioning about the mismatched expectations and misinformation regarding contexts, which can exist between the design of the content of policy instruments and strategies for its on-the-ground implementation (Howlett and Rayner 2007).

A focus on procedural policy tools can help to amplify this connection between the choice of policy instrument content and how the tool is applied on-the-ground. Cashore and Howlett’s original work (2007) on the topic, distilled six ‘elements or components’ (p. 535) of ends and means of policy design occupying three levels of analysis. Subsequent developments towards this line of thinking (Howlett and Rayner 2008; Howlett, 2009; Howlett Mukherjee and Rayner 2014; Peters et al. 2018) have solidified an understanding that choices about different types of policy tools occur at the ‘meso’ level of policy operationalization, while concerns about how chosen tools are enacted or deployed surround their more ‘micro’ level, on-the-ground calibrations. While distinct from each other at two different levels of analysis, design decisions for tools and calibrations are often taken together as illustrated by the examples herein from the renewable energy policy domain. Such a perspective that accommodates design decisions traversing meso–micro analytical divides necessitates a multilevel lens that looks beyond just the substantive content of tools and includes more procedural deliberations regarding its design and deployment. Especially, to uphold consistency and coherence within a policy toolkit, effective design merits that equal consideration also be given to the coordination of substantive and procedural elements of tools working within any instrument mix (Howlett et al. 2014; Peters et al. 2018).

In other words, bringing in procedural considerations into policy design frameworks and uniting them with the substantive allows for a more consolidated understanding of how meso-level policy tools and their micro-level calibrations are constructed. Procedural means support and uphold the aims of more substantive elements of policy
instrument formulation, and they make mutually supportive yet distinct contributions to the process of policy design. The discourse also points to how the decisions about the choice and content of tools and tool mixes are linked to those dealing with their on-the-ground calibrations. Uniting these meso- and micro-level considerations of policy design allows for a framework to be drawn about how tools and their enactment are constructed as a whole, and embody the union or ‘compound’ of four distinct design components (Figure 1).

Firstly, at the level of tools, there is the identifying substantive component (cell 1, Figure 1), which is what the policy instrument is ‘known for’ and which, the tools literature traditionally organizes in terms of the resources that the government puts behind its creation (Hood, 2007; Howlett, 2000; Vedung et al., 1998). That is, this first meso-level component is what is traditionally understood as characterizing policy tools formulated by deploying government resources of nodality, authority, treasure, or organization. Secondly, to support the formulation of the substantive means of policy tools through decisions related to the allocation of governance resources, articulation of its institutional framework as well as maximizing complementarity of policy elements, there are procedural means that also need to be deployed concurrently (cell 2, Figure 1) (Howlett, Mukherjee, & Rayner, 2017). At the level of calibrations then, contemporary work on effective policy design identifies that any formulation activity focused only on the characteristic features of policy instruments is incomplete without parallel consideration given to the means for implementing them (Adam, Hurka, Christoph Knill, Peters, & Steinebach, 2019; Mintrom & Luetjens, 2017). And so, the third component of an instrument ‘compound’ (cell 3, Figure 1) entails those substantive design considerations that are explicitly aimed at adjusting and attuning policy tool elements to the contexts within which they operate. Lastly, to address these calibrations of policy tools that govern

![Figure 1. Uniting substantive and procedural components in policy instrument ‘compounds’.](image-url)
their on-the-ground implementation, procedural means support the effectiveness of implementation planning decisions, that directly implicate matters related to participation, matching of governance contexts to existing policy capacities as well as the vertical coordination of government’s design work (cell 4, Figure 1). Highlighting the role of the procedural elements in this framework of policy instrument design, cells 2 and 4 of Figure 1 is discussed below.

**Tool Content (Meso-level components)**

As expressed above, a major way in which procedural means have been discussed in the policy design literature concerns how they directly uphold to the substantive component of policy tool design. In the policy sciences, the substantive component of design signifies a set of alternative arrangements thought potentially capable of resolving or addressing some aspect of a policy problem, one or more of which is ultimately put into practice. And the necessary procedural support results from a set of activities related to securing some level of agreement among those charged with formulating, deciding upon, and administering that alternative on its relative merits vis-à-vis other alternatives (Howlett, 2020). This interaction between the substantive and the procedural elements of policy tool design (depicted through cell 2 in Figure 1) signifies one that is driven by both political acumen and instrumental knowledge about the comparative merits and demerits in achieving policy goals.

**Building Networks and Institutional Capabilities**

Conceptually, the process of designing policy tools begins with an evaluation of the technical capabilities of preferred kinds of policy means to affect policy outputs and outcomes with respect to a specific chosen goal or set of goals and the resources required to maintain operation as intended (Hood, 2007; Salamon 2002). This instrumental knowledge is context-driven and necessitates an understanding of how the use of specific kinds of tools affects the target group’s behaviour and compliance with government aims. It thus includes the knowledge and consideration of many constraints on tool use originating in the limits of existing knowledge, prevailing governance structures, and other arrangements that define design styles by ruling out certain options and promoting others (Howlett & Mukherjee, 2018).

The tendency towards any particular design ambition for policy tools thus also requires government evidentiary capacity coupled with the intention to exercise it. That is, the activity of policy tool design essentially necessitates the ability to match ‘text with context’ (Lejano & Shankar, 2013) in the substantive content of tool itself, which often means the need to constantly reconcile between the evolving policy aims and the available policy means. Empirical realities have repeatedly shown that not all policy design can begin anew. Most design styles are significantly path-dependent because they are delimited by administrative legacies and can become constrained by numerous inconsistencies between the stated policy goals and the tools that are adopted to meet them. Institutionalizing the capabilities for mitigating such inconsistencies, even at the level of designing the content of specific tools, are embodied through procedural means such as setting up information architectures, budgeting and human resource
management systems; and institutions for knowledge generation, mobilization and use (Howlett and Ramesh 2016).

While procedural means help build and institutionalize capacities with substantive design, they also work to critically uphold the policy network surrounding incumbent policy instruments. As design proceeds through the interplay of multiple policy actors, the network-management effect of procedural elements of an instrument’s administration can impact how the instrument eventually achieves sufficient levels of legitimacy and agreement within the policy network that enables it (Daugbjerg & Fawcett, 2017). This is especially pertinent as there are typically varying degrees of overlap between state, non-state and international actors in policy formulation who play the role of policy principals, entrepreneurs, targets, implementation agents and beneficiaries. The management of these relationships relies on a range of procedural tools from notice and comment and other regulatory devices to the development of position papers and committee and legislative hearings (Howlett, 2000; Howlett & Mukherjee, 2020).

Maximizing Complementarity
Another related procedural contribution to policy tool design (cell 2, Figure 1) is to maximize complementary relationships while mitigating incompatibility between constituent policies, and their eventual union in policy portfolios and toolkits (Gunningham et al., 1999). Policy design studies have pointed out that many existing policy mixes are not composed exclusively of tools that complement and enhance each other (Grabosky, 1994). Grabosky (1994), and other scholars investigating policy tool combinations throughout the latter half of the 1990s, for example, noted that policy packages and programs combining command-and-control regulation with modes of voluntary compliance can be internally contradictory and should be avoided in interest of upholding effectiveness. Further evidence from the drive for renewable energy and energy efficiency, as a consequence of climate change and energy security concerns in the last two decades, has similarly also shown that internally conflicting substantive tools of policy mixes often elicit contradictory responses from those who are the targets of a program (Boonekamp, 2006; Del Rio, Silvosa, & Gomez, 2011). This finding is common in many other sectors where, for example, using both regulation and voluntary compliance measures in the same program at the same time may undermine the realization of intended objectives. While some tools or tool mixes can contain duplicative elements and the redundancy or resiliency inherent in them may help to ensure that the stated policy goals are achieved, in most cases this is not the result (Braathen, 2007; Grabosky, 1994). Rather, as Hou and Brewer (2010) have noted, programs or policy ‘toolkits’ composed of tools that complement or supplement each other (e.g. the use of command-and-control regulation to prevent undesirable behaviour while simultaneously providing financial incentives to encourage desirable behaviour) in most circumstances will achieve more effective policy responses.

Calibrations (micro-level components)
In addition to supporting meso-level design matters regarding the choice and content of policy tools, the contribution of procedural components is also distinct at the level of micro-level calibrations that determine how policy tools are enacted (cell 4, Figure 1).
Effective design of policy tool calibrations can rely heavily on the participation, coordination and capacity of multiple government actors, considerations that directly implicate procedural aspects of policy design and how well they are devised at the outset and alongside the substantive, in order to help tools adapt to a wide range of anticipated future policy contexts (Moynihan 2009).

**Contracting and participation**

While the well-known resource-based taxonomy of policy tools by Christopher Hood (1986) categorically organises major substantive classes of tools, its scope has since been extended over the last two decades to procedural components of design and whether they are intended either to enhance or to diminish actors’ participation in policy-making (Howlett, 2000) (cell 4, Figure 1).

For information-based procedural tools, participation within the administration may be encouraged through targeted training programs such as seminars, workshops and online training modules. For encouraging uptake of renewable energy by households and industries, for example, state governments in the U.S. provide resources on procuring and installing solar energy solutions to sub-jurisdictions. Another example of governments enhancing stakeholder participation in design, this time using authority-based procedural means in policymaking, includes the creation of an advisory committee—such as the federal advisory committee policy by the United States Environmental Protection Agency—of particular citizens or experts in order to contribute towards the deliberations surrounding contentious issues such as chemical regulation (Howlett et al., 2017). The workings of treasury-based procedural elements are observed, for example, through the level of research funding or grants that environment, water or energy ministries forward to public universities and research institutes.

On the flip side, procedural components are also capable of on occasion supressing participation by hindering public access to information such as the level of emissions arising from mainstream energy sources. Categories of civil associations or NGOs, for example may be excluded from policy deliberations about zoning and electricity grid expansion, as an example of how authoritative procedural tools can be used to curb participation. Reducing or eliminating funding is an instance of the use of treasury tools to negatively impact participation. Lastly, an example of negatively impacting the public involvement through the use of an organizational policy instrument is administrative obfuscation. As exemplified by McCubbins et al.’s (1989) extensive analysis of the United States Clean Air Act (‘CAA’), the structure and process of administrative arrangements can be used by politicians to exert control over bureaucratic agencies. This was the case for US air pollution control regulation through the 1960s and 1970s, a time during which procedural tools linked to the amendments to CAA were used by different politicians to benefit their own constituents and thwart the policy objectives of legislators.

**Matching governance modes and administrative capacities**

Matching capacities with prevalent modes of governance is yet another distinct principle of effective design that relies on early alignment of procedural policy elements alongside preferred substantive mechanisms for service delivery. Government actions through legal governance, for example, rely on courts and litigation as the key procedural means for implementation, while more market-oriented governance style employ regulatory
boards, tribunals and commissions (Considine & Lewis, 2003). Contemporary studies on how specific policy capacities become fundamental to the success or failure of the design efforts by specific styles of governance, all allude to the significance of procedural aspects of policy design (Howlett and Ramesh 2015, Menaheim and Sten 2013). Technical knowledge, for example, is thought to be a critical competence forming the ‘Achilles’ heel’ of market-based governance wherein organizational-analytical capacities of government needs to deal with complex quantitative economic and financial issues while regulating and coordinating public financial exchanges (Rayner, McNutt & Wellstead, 2013). For environmental policy design specifically, countries with better administrative capacities have been comparatively observed as being better equipped to design customized policies for emerging problems (Fernandez-i-Marin et al. 2021).

Such policy capacities span a variety of procedural processes that are needed to help effectively generate policies. They include the managerial capabilities that let state resources be allocated effectively to different regulatory priorities and the political endowments that delineate the policymaking space that policymakers and administrators have within which to coordinate, create and implement their regulatory policy plans over time. (Gleeson, Legge, O’Neill, & Pfeffer, 2011; Howlett & Ramesh, 2014; Rotberg, 2014; Wu, Howlett, & Ramesh, 2017).

At the level of calibrations of regulatory design (cell 4, Figure 1), administrative capacities, such as those delineated above, are often more directly addressed by combining procedural and substantive means, than with substantive considerations alone. Identifying regulatory ‘best practices’ over the years has included (among others) suggestions for enhancing participation in the formulation process of regulations (Ansell and Gash 2007); applying standard and transparent performance and progress management mechanisms for attaining public value (Min trom & Luetjens, 2017; Moynihan & Pandey, 2010; Radin, 2009), and engaging strategically with stakeholders in the regulatory industry (Hutter, 1997). More recently, a systematic analysis of regulatory design from around the world has identified three core pillars of effective regulatory design that rest primarily on the long-term administrative capacities of regulators. These include analytical know-how, instrumental aptitude and high standards of performance; purposeful, even-handed engagement with the various stakeholders of regulation and the civil society; and the highest level of integrity with respect to fidelity to law, commitment to public interest and an utmost dedication to democracy (Coglianese, 2015). The operational proficiency of policymakers early in the process of policy design can also have a profound impact on the eventual outcome of that design. Mintrom and Luetjens (2017), for example, speak directly to the need to tightly connect policy design and management order for the implemented policy to achieve public value.

**Vertical coordination for tool implementation**

As identified in the discourse on policy design emerging out of recent studies of comparative policy analysis, another important procedural consideration for designing effective policy tool calibrations, has to do with better organizational coordination (Adam et al., 2019). This stance emphasizes improving coordination among the various regulatory actors involved in implementation, in addition to the coordination needed between the different levels of policy design (i.e. macro, meso and micro levels) in effective policy mixes. That is, ‘vertical coordination improves the fit between necessary
and available administrative arrangements for putting policies effectively into practice’ (Adam et al., 2019, p. 2), and this consideration is one that falls decidedly under the purview of procedural means that are devised to support the design of instruments and their calibrations (cell 4, Figure 1).

Furthermore, procedural elements of policy design can also be observably dynamic as they progress from initial planning stages to more mature phases of review and recalibration. The types of procedural elements that support the early design processes of goal formation, wherein the emphasis is on actor identification and consensus orientation, are distinct from those that support effective calibrations later on when the focus is more on target participation, joint action, reporting and monitoring (Bryson, Crosby, & Stone, 2015; Lang et al. 2019). The contribution of effective compliance mechanisms (both binding and non-binding), for example, to effective instrument enactment is well understood and highlights the contribution that procedural considerations of design can make to the variety of behavioural responses that need to be considered in order to effectively match policy tools to targets (Howlett 2018).

What the above discussion and framework (Figure 1) indicate is the definite place that procedural elements occupy during the creation and application of policy tools. Such a framework distinguishes between substantive and procedural elements of policy instruments, while alluding to how they interact during policy instrument design. In other words, the framework offers two main points for advancing the scholarship on policy instruments. First, it suggests that individual policy tools are unique in how their own procedural components interact with and uphold the substantive components. Secondly, it asks how these interactions directly impact the effectiveness of policy tools and tool mixes. Analytically, cells 2 and 4 in Figure 1 symbolize distinct elements of procedural components that often precede and lock-in the substantive choices (cells 1 and 3) that are made for policy instruments. At the level of individual tools, this means that building networks of support, setting up institutional capabilities and maximizing complementarity between existing and proposed policy elements precede and thereafter perpetuate the kind of decisions that are made for allocating governance resources towards the substantive content of the tool. Similar implications for temporality and durability exist at the level of calibrations, wherein procedural considerations about contracting and participation; matching administrative capacities to prevailing governance styles and vertical coordination of relevant actors influence how the substantive elements of the tools are adjusted to on-the-ground implementation contexts.

As the brief exploration of the major policy tools of the renewable energy sector indicates below, the substantive components of instrument design play a primarily defining role, distinguishing one instrument from the other. While the procedural elements, by bridging tool formulation and implementation concerns, appeal to the overall stability and ‘mixability’ of the instrument within a broader, dedicated policy mix over time.

**Designing renewable energy policy mixes: an illustrative example**

As of 2019, over 135 countries worldwide have formulated and implemented dedicated renewable energy policies in the power sector with Feed-in-Tariffs (FITs), net-metering (also known as ‘smart-metering’) and renewable energy mandates or targets as the
leading instruments within this category (REN21, 2019). Together, these instruments are classified by the sector as broadly ‘regulatory’ even if this generalization covers distinct tools such as quotas, mandates, and pricing instruments (REN21, 2019). Furthermore, it is understood that to ensure effectiveness from the outset of policy design, ‘a robust framework to monitor and penalise non-compliance is needed’ (REN21, 2019, p. 56). Feed-in-Tariffs (FITs) are most often designed or revised in conjunction with metering technology, to align with national targets for renewable energy generation. To allude to Hood’s (1986) categorization, this policy mix unites the functions of three distinct substantive instruments; a financial tool (FIT), an organizational tool encapsulating the direct provision of a good (smart-metering) and service (smart-grid), and their ultimate coordination with an authority-based instrument, (national renewable energy standard or targets). The former two are also often packaged together as a form of ‘pull’ policy that incentivize certain actions, to go with renewable energy mandates that direct or ‘push’ those actions. Most governments pursuing renewable energy targets make explicit this connection between these differing substantive means of these tools. For example, the UK Department of Energy and Climate Change states that ‘the objective of FITs is to contribute to the UK’s 2020 renewable energy target through greater take-up of electricity generation at the small scale and to achieve a level of public engagement that will engender widespread behavioural change’ (DECC 2009).

Taken together as major policies that are usually deployed within countries’ renewable energy policy ‘toolkits’, the general design of these instruments displays discernible procedural components that are separate from the substantive. Reflecting the elements listed under cells 2 and 4 of the framework depicted in Figure 1, the main procedural components pertaining to the design of tools and calibrations of renewable energy targets, FITs and smart metering are shown in Table 1.

**Renewable energy targets or quotas**

Renewable energy quotas or targets outline mandated national (and often sub-national) goals for the development and deployment of renewables in the power sector. Often aligned to a country’s national greenhouse gas (GHG) emission reduction targets, these obligations require that a set percentage of electricity must be generated from renewable energy sources and often these targets correspond with higher level national targets for sustainability or climate change mitigation (Streimikienes and Balezentis 2016). Such quotas are also known as renewable portfolio standards (RPS) or renewable purchase obligations (RPOs) and are devised to provide high-level policy signals that can then cascade down into more specific (technology or industry based) objectives (Lipp, 2007; Sun & Nie, 2015). There can be various substantive modifications that are possible in the design of this instrument, including those that specify a preferred technology (such as natural gas) or more general goals for energy resource diversification (that are non-binding for any particular form of renewable energy).

The procedural components of the design of such quotas are oriented heavily towards building administrative frameworks for monitoring compliance and penalizing non-compliance during implementation. These activities are generally carried out by either central or state-level regulators who manage rosters of the issuance of clean energy certificate (or allowances). In several instances (such as in Australia), there is
Table 1. Procedural means of renewable energy (re) policy instruments design.

| Procedural Means (Examples) | Calibration (Micro-Level Components) |
|-----------------------------|---------------------------------------|
| **Tool: RE Targets and Quotas** | **Facilitating market creation and moderation of tradeable energy certificate.** |
| - Devising clear objectives and sequencing of targets. | **Assigning duties to national power producers association to acts as contractual intermediary between individual producers and local utilities.** |
| - Outlining and customizing signals specific to consumers and industry based on type of quota; time frame; technology; obligated entities and compliance rules. | **Transferring capacities to local utilities to maintain original retail billing relationships and accept new FIT production payment relationships with participants.** |
| - Designing federal and state level targets for compliance. | **Transferring capacities to local utilities to manage grid interconnection.** |
| - Coordinating RPS amendments to allow/disallow energy uses (e.g. allowing renewable heat to qualify towards quota requirement). | **Empower province level power agency to authorize/conduct long-term planning and procurement.** |
| - Creating multi-actor, expert working groups to set initial baseline and target. | **Assigning responsibility to FIT agency to control and constrain total uptake (e.g. enforce a cap on the number of participants).** |
| - Creating forums for public consultation and input during RE target deliberations. | **Administrative setting of price policies and their continuous adaptation to changing market adjustments and costs of technologies.** |

**Tool: Feed-in-Tariffs (FITs)**

- Aligning RE Capacity allocation to match program objectives.
- Allocation of funds based on FIT program’s lifetime and/or technological advancements.
- Allocation of FIT host organization rights and responsibilities (examples).

At the municipal level, the local utility administers entire FIT program including applications, interconnection, contract administration and production payments.

At state and provincial levels, the program is sponsored by independent purchasing agent, and national energy producers act as intermediaries between RE producers and local utilities.

**Tool: Net-Metering**

- Installation of sensing technology and equipment (controls, automation and computing systems) to existing electrical grid.
- Ascertain eligibility requirements, the value of excess electricity, additional taxes and fees, consumption entitlement period.
- Raising buy-in from power consumers through consultations, training workshops, outreach forums to install two-way monitoring technology.
- Implementing dynamic pricing mechanism for energy use/supply.

At the level of federal states working with a common target for efficiency improvement or power reduction, a new association of regional governors is formed to jointly formulate transmission siting initiatives.

- Alignment of existing regulatory bodies to coordinate the overseeing of new interconnection, dispatch and tariff policies to incentivize decentralised producers to feed power into smart grid.
- Regional coordination to link member states’ centralized and decentralized power storage solutions.
- Building in capacities to implement dynamic pricing and pilot projects to showcase and ‘test’ new regulatory policies for decentralised power generation.

**Sources:** (REN21, 2019, p. 2018; Daugbjerg and Fawcett, 2017; Fouquet, 2016; Del Rio 2010, p. 2012; (Hutter, 1997; DECC 2009; Balezentis and Streimikienės, 2016; Sun & Nie, 2015); (Kent & Mercer, 2006; Lipp, 2007; Shammin & Bullard, 2009, Fitzgerald et al. 2003; Bertoldi & Huld, 2006; Del Rio 2012; Menanteau et al., 2003; Butler & Neuhoff, 2008, Klein et al. 2008; Zhang & Wang, 2017; UK 2019; USDOE 2019); (Couture et al. 2019; Zervos & Adib 2018)
also the establishment of new agencies dedicated to overseeing the implementation of national greenhouse emission strategies, and the role of RPSs therein, that are distinct from those agencies created for informing the design of the substantive content of the RPS. As noted in the Australian example by Kent and Mercer (2006, p. 104), the latter took the form of the Renewables Target Working Group that ‘comprised representatives of the Commonwealth, State and Territory Governments, the electricity supply sector, electricity user group sand the renewable energy industry’ and was responsible for the coordinating consultation forums and public submissions to all preliminary whitepapers.

As shown in Table 1 (and reflected through cell 2 in Figure 1), these instances indicate meso-level procedural means for building networks of support and analytical capacities that are put in place first, for helping to combine RPS with subsequent tools (such as FITs, among others) that are designed to meet RPS-set targets. As such, maximizing complementarity with new and emerging technological developments remains a significant procedural priority for the effective design of RPS and quotas, as their administrative components must be deliberately designed to prevent premature lock-in of any one or dominant technology. Furthermore, these considerations reflect a significant procedural effort to build market-based institutions through the design of RPS to encourage renewable energy diversity. As reflected through the case of the US RPS, empirical evidence points to notable interaction effects between the general targets and what provisions are made therein for technology-specific designs (Kim and Tang 2021).

At the more micro-level (Table 1 and cell 4 in Figure 1) of how the quotas are calibrated for implementation, procedural tasks geared towards enhancing participation and vertical coordination for tool implementation include establishing a system of regular reporting by designated nodal agencies on compliance or non-compliance by obligated entities. In cases where the RPS includes the concurrent creation of a tradeable energy certificate, procedural aspects of tool design also include means of accreditation and registration of renewable energy projects, as well as the creation and moderation of trading activities among the policy targets (Lipp, 2007; Shammin & Bullard, 2009) and setting up a mechanisms that match administrative capacities for facilitating trade within predominant modes of governance (Bertoldi & Huld, 2006). Often, these procedural tasks are taken up directly by public utilities commissions (such has been done in the state of California in the United States) instead of first having to go through a national level regulatory agency (REN21, 2019).

**Feed-in-tariffs**

The substantive means of the design of Feed-in-Tariffs (FITs) as a particular category of tools reflect elements that combine regulation-based instruments governing the rules and rates of the tariff, as well as organizational resources dedicated to the formulation of government-sanctioned contracts and a regulated market between power purchasers and producers. In the first instance, the design of substantive means concerning the financial structure of FITs can include policy choices regarding the level of the tariff (whether fixed or flexible in the form of regressions), support linked to price of electricity over the duration of the FIT and setting of maximum and minimum limits on the electricity price
(Del Rio 2012, Butler & Neuhoff, 2008; Klein et al. 2008; Menanteau, Finon, & Lamy, 2003).

For almost every example of the design of Feed-in Tariffs (FITs), the decision to create a scheme and the initial timeline of its launch have been articulated in the government’s overall national renewable energy target or quota. At the outset, there is a temporal dimension of the design of FITs wherein there is initially greater emphasis put on procedural means being put in place before designing the substantive elements. For example in the UK, FITs were first introduced in the 2008 Energy Act that gave the regulatory bodies enabling power to set up the tariffs through the passing of an initial ‘statutory instrument’ (UK 2019). This procedural aspect of design qualified relevant regulatory agencies of the government to responsibilities such as setting-up the accreditation system, calculating FIT payment and levelisation rates to keep up with market rates, creating a central FIT register and mandated internal reviews of the scheme prior to the implementation of the instrument. Additionally, this statutory mechanism articulated administrative functions such as the publication and dissemination of national FIT guides, annual reports, list of licensees, and all legal notices pertaining to any RE supplier entering into an FIT arrangement (UK 2019). Similarly, as shown in Table 1, procedural means in the initial design of their respective FIT schemes have helped to lay the groundwork for the support of the substantive aspects of FITs as and when they are rolled out and perpetuated.

At the meso-level (cell 2, Figure 1) of the design of FIT, enabling capacities for analysis and institution-building underpin their success or failure as a viable instrument for promoting renewable energy development. For example, a lack of technical expertise for designing suitable auction mechanisms alongside the FIT policy itself have been shown to severely hinder the commercial roll-out of projects to meet national targets in Kenya (at the scale of above 10 MW) (Zhang & Wang, 2017). At the same level, lacking procedural legitimacy during FIT design undermines greater institutionalization of community-based renewable energy projects. For instance, a survey of such projects in the UK has recently concluded that RE technology and structural legitimacy gaps emerge without insufficient support built into FIT programs to uphold planning permissions, eliciting stakeholder involvement, relationship-building with project partners and access to expertise, when developing specific renewable energy technologies such as onshore wind-turbine installation, which can be seen as being undesirable without due support from local authorities during the planning phase (Genus and Iskandarova 2020).

Procedural aspects to support the calibration of FITs at the micro-level on the ground (cell 4, Figure 1) include internal mechanisms that allow national regulatory authorities to set up the initial design of an FIT and thereafter, adjust the FIT rate to keep it aligned with existing renewable energy legislation (such as laws or new ministerial decrees). For example in Japan, soon after the Fukushima nuclear disaster, the government issued new legislation and a concurrent FIT scheme to ramp up support for alternate renewable energy such as solar PV and wind, which required the creation of a special parliamentary committee to oversee progress towards the 2021 targets (REN21, 2019). As FITs must typically remain stable during the guaranteed payment period, this necessitated building in analytical capacities into relevant committees as well as review mechanisms that allowed rates to be adjusted at predetermined intervals or as deemed necessary by market realities.
**Net-metering and smart-grids**

Net metering mainly involves the supply, installation, monitoring and functioning of a metering apparatus that measures the relative power consumption of an individual or household or organization that also produces its own power from its own renewable energy facilities. In other words, consumers can ‘feed’ some part of the energy they produce into the grid and receive payment for it. Most of the cases of net-metering are concentrated on decentralized solar photovoltaic (PV) technologies that can be incorporated within the consumer’s own facility. The interaction between the procedural and substantive elements of instrument design is visible quite profoundly in net-metering mechanisms as they most closely reflect a nodality- or information-based policy tool that must work in conjunction with a more financial tool such as an FIT (Zhang & Wang, 2017). The meter is bi-directional or a combination of two unidirectional meters that measure the net energy produced by these facilities. A smart grid indicates a network of such meters and facilities. It is defined as ‘the digital technology that allows for two-way communication between the utility and its customers, and the sensing along with the transmission lines’ (USDOE 2019).

At the meso-level of tool design (cell 2 Figure 1) fostering partnerships with the administration is a cornerstone of effective application of smart grids that, at the outset, relies on ‘new interconnection, dispatch and tariff policies to address market barriers and incentivize decentralized generators’ (REN21, 2019, p. 184). At the level of cities or federal states (such as in the United States), procedural functions such as devising permitting and interconnection procedures, reducing installation and other fees for end-users, overall 'rule-making' for implementing legislative goals and even conflict management and arbitration are carried out by public utilities commissions that are appointed at the jurisdictional level and supported by the legislature (Hess & Lee, 2020). The deliberate designing of these initial procedural functions can both enable as well as limit for how the substantive tool is able to subsequently address its stated objectives (e.g., to increase the share of distributed PV in the national energy mix).

At the level of calibrations (cell 4, Figure 1), procedural means to facilitate the implementation of net-metering and the uptake of smart-grids rely heavily on the coordinating capacity of administrators and regulators to jointly enable transmission and siting initiatives (Table 1). Maintaining partnerships with key stakeholders (such as households producing energy and state utilities purchasing this at a favourable rate) falls under the purview of the administration that must continuously calibrate payment structures as the supply of decentralized renewable energy grows, as has been shown in the experience with net metering in the United States as well as member states of the European Union (Hess & Lee, 2020; Iliopoulos, Fermeglia, & Vanheusden, 2020). Procedural roles of regulators are additionally detrimental to the vertical coordination between suppliers and utilities in the substantive implementation of net metering policy. Such activities include, for example, setting up accounting systems for monetary/energy credits, outlining accumulation rules for energy credits (e.g. Number of billing periods and rules for ‘rolling over’ credits as well as defining quantity and quality restrictions on the supplied energy (Soto, Mejdalani, Nogales, Tolmasquim, & Hallack, 2019)).
Conclusion and future research directions

Until recently, procedural policies had not garnered as much systematic research attention as substantive policy tools have in modern policy studies. Ongoing and future research work in this area of policy studies is shifting the focus towards understanding not only how these different design components work individually, but how they can be deliberately planned to interact and work together in complex policy mixes to address complex policy problems. Theorization about the particular relationship that procedural means share within the design of policy mixes – whether with each other or with more substantive elements of tools – remains a promising area of future research, especially in light of what design considerations can offer towards planning for sound and sustainable implementation. Furthermore, procedural policies also implicate a discussion of what cognitive and behavioral aspects of policymakers cause them to favor one design over another and this discourse can have profound implications for what is being revealed about governments’ preferred policy styles (Howlett and Tosun 2018). Thinking of the procedural along with the substantive during policy design, and especially environmental policy design, can offer richer insights on both choices made at a single moment in time and over a period of years, or decades (Hughes & Urpelainen, 2015). In a time where we can no longer assume that sustainability will automatically always result from effective environmental policy blueprints, it is now all the more important to directly examine how good design can beget the sound application of policies in sectors such as renewable energy and energy efficiency. Questions about the temporality and sequencing of procedural means during policy design, which this broad examination of renewable energy has alluded to, can help to set the direction towards this necessary and pertinent aim of modern policy studies.

The conceptualization of tool ‘compounds’ as introduced in this article proposes two main advances to the scholarship of procedural policy tools, alongside the other contributions to this special issue. Firstly, it provides an analytical space within existing frameworks of policy design to focus on questions about how substantive and procedural policy elements support and interact with each other during the design of policy tools and their calibrations for effective deployment on the ground. By doing so, the concept addresses considerations of temporality in the process of policy formulation, a topic in the policy sciences that has so far disjointedly dealt with substantive and procedural policy tools. Secondly, coupling meso- and micro-level considerations of policy design closely reflects how major classes of policy tools include planning for implementation into their initial design. This allows for the discussion on policy tool design to go beyond explorations of governance resource-based classifications of tool origins and explore hypotheses of tool choice that are linked with variables such as policy capacity, organizational coordination and behavioral motivations of policy designers. The various behaviors of, and avenues of participation by, different policy actors in policy implementation can be notably affected by procedural tools that are used to manipulate policy processes and have a bearing on how multiple tools can be expected to work towards a broader common goal, such as the development of renewable sources of energy.

With respect to stakeholder and public participation, this can occur ‘naturally’ or with more regulatory encouragement in the renewable energy domain, but it is also carefully devised by governments through the sequential deployment of procedural tools that
enhance or curtail specific kinds of activities. These instruments, including the creation and legitimization of independent power producers and local regulators, or the provision of funding and differential tax treatments for users and producers of alternate energy, invisibly yet profoundly impact policymaking behavior in articulating, developing, choosing, or supporting particular policy solutions over time and through changing environmental realities (Thatcher and Rein 2004).

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