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# Consenting to Geoengineering

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**Abstract**

Researchers have explored questions concerning public participation and consent in geoengineering governance. Yet, the notion of consent has received little attention from researchers, and it is rarely discussed explicitly, despite being prescribed as a normative requirement for geoengineering research and being used in rejecting some geoengineering options. As it is noted in the leading geoengineering governance principles, i.e. the Oxford Principles, there are different conceptions of consent; the idea of consent ought to be unpacked more carefully if, and when, we invoke it in the discussion. This article offers a theoretical reflection on different conceptions of consent and their place(s) in geoengineering governance. More specifically, I discuss three models of consent, i.e. explicit consent, implied consent and hypothetical consent, and assess their applicability to geoengineering governance. Although there are different models of consent, much discussion of geoengineering governance has committed only to explicit consent. I note that such a commitment springs from a specific ideal political order. Accordingly, we should be wary of any naïve commitment to it so long as the political order we hope for remains open to debate. Finally, I illustrate two approaches to introduce consent into a geoengineering governance framework.

**Keywords**: *Geoengineering, Consent, Democracy, Legitimacy.*

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# Consenting to Geoengineering

## Introduction

Policy-makers and researchers have expressed varying views on the prospect of geoengineering, i.e. the controversial idea of “deliberately alter[ing] the climate system to counter climate change” (IPCC 2013), as an option to address climate change.[[1]](#footnote-1) However, they generally agree that whatever benefits various geoengineering options have to offer, they too come with some undesirable impacts, and that the impacts of *most* – if not *all* – geoengineering options will be *global* and *long-term*.[[2]](#footnote-2) As such, any decision on geoengineering, especially on its deployment, is bound to affect people from various parts of the world and for generations to come. If we are committed to the liberal democratic conviction that those who are (or, will be) significantly affected by a policy ought to be in some ways included in the decision-making process, then public participation and consent will be normatively required for decisions on geoengineering (see, e.g. Jamieson 1996; Corner & Pidgeon 2010; Preston 2013; Rayner *et al.* 2013; Carr *et al*. 2013). Indeed, the Oxford Principles for geoengineering governance explicitly included “public participation in geoengineering decision-making” as its second principle (OXP2), and stated that “[w]herever possible, those conducting geoengineering research should be required to notify, consult, and ideally obtain the prior informed consent of, those affected by the research activities” (Rayner *et al* 2013, 502-503).

Questions concerning public participation and consent in geoengineering governance have already been explored by researchers, but they have so far focused on the importance of involving the public at the early stages of geoengineering research, and have explored various approaches and strategies of public engagement for the task (Corner & Pidgeon 2010; Corner, Pidgeon & Parkhill 2012; Parkhill *et al.* 2013; Stilgoe, Owen & Macnaghten 2013; Stilgoe, Watso & Kuo 2013; Macnaghten & Szerszynski 2013). The notion of consent itself, however, has received relatively little attention from researchers, and very few of them have discussed the notion of consent explicitly, despite it has been prescribed as a normative requirement for geoengineering research (see, e.g. Morrow, Kopp & Oppenheimer 2009; Rayner *et al* 2013). The issue of consent has also been used in questioning the social, political and ethical acceptability of different geoengineering options (see, e.g. Hale & Dilling 2011, for an argument against ocean fertilisation; and, Robock 2012; Macnaghten & Szerszynski 2013, for arguments against solar radiation management, in particular sulphate aerosol injection; also, see ETC Group 2009; Whyte 2012).[[3]](#footnote-3) Yet, as the authors of the Oxford Principles themselves noted, there are different conceptions of consent. This paper aims to unpack them in the interest of clarity in discourses about any kind of geoengineering governance framework.

This paper offers a theoretical reflection on different conceptions of consent and their place(s) in geoengineering governance. More specifically, I discuss three models of consent, i.e. explicit consent, implied consent and hypothetical consent, and assess their applicability to geoengineering governance. Although there are different models of consent, much discussion of geoengineering governance has implicitly or explicitly committed to explicit consent and has ignored the other models. I argue that the commitment to explicit consent springs from a specific ideal political order (or, model of democracy). Accordingly, we should be wary of any naïve commitment to explicit consent without also considering the implications of and for broader democratic decision-making.

## Why Is Consent Important in Geoengineering Governance?

It is useful to make explicit why consent has been regarded as an important issue in geoengineering governance before looking at the different conceptions of consent in detail, as it can inform us what roles consent is intended to play in geoengineering governance, and thus it can enable us to assess if and how different models of consent can fulfil them.

Geoengineering, by its very definition, will significantly affect people around the world as well as future generations. Different geoengineering options will affect people differently, and the scope and degree of impacts will vary from one geoengineering option to another. For example, geoengineering options which operate in the global commons, e.g. sulphate aerosol injection and ocean iron fertilisation, will induce short-term impacts on a larger population than territorial-based geoengineering options that have more localised short-term impacts (Humphreys 2011). Yet, as long as the aim of geoengineering is to intervene the climate system, it is fair to assert that *all* individuals around the world and future generations will be significantly affected by it because the climate is a background condition of human life. As such, geoengineering decision-making raises a question of legitimacy, for it is generally accepted in modern (liberal) political theory that institutions and their decisions are legitimate only if they can be justified to those who are subjected to or affected by them (see, e.g. Waldron 1987; Macedo 1990; Rawls 1993). The legitimacy question is relatively clear in the case of geoengineering deployment because people will experience its impacts, and thus they are directly affected by geoengineering. Following the accepted view in modern political theory, the deployment must be justified to those who are affected for it to be legitimate. Alternatively, the institutions in charge of geoengineering must be justified to those who are affected by their decision to geoengineer if one maintains the legitimacy of decisions is, or can be, derived from the legitimacy of institutions.[[4]](#footnote-4)

While my discussion focuses primarily on deployment of geoengineering, the legitimacy question arises in geoengineering research too. Geoengineering research requires major funding and efforts, and some have argued that any decision to pursue geoengineering research can divert resources from research on other climate change measures, i.e. mitigation and adaptation, which shape the climate policy that will in turn significantly affect people (Jamieson 1996, 333; Gardiner 2010, 289). Moreover, some have advanced the view that there is a slippery slope from geoengineering research to its deployment either because of cultural beliefs and vested interests permeated in geoengineering research (Jamieson 1996, 333; Long & Scott 2013), or because of the “institutional momentum” created by geoengineering research (Gardiner 2010, 289). According to this line of argument, geoengineering research has no less impact than its deployment, and thus too demands justification for its legitimacy.[[5]](#footnote-5)

This is perhaps why Corner and Pidgeon asserted that “the prospect of [geoengineering] is something that all citizens could reasonably claim to have a legitimate stake in” (2010, 29), and it too explains why the authors of the Oxford Principles, in their discussion of the values behind (OXP2), referred to the all-affected principle, i.e. those who affected by a decision should have a say in its making (Rayner 2013 *et al*., 505; Cf. Whelan 1983). In short, the key concern for geoengineering governance expressed is ensuring geoengineering decision-making to be legitimate.

In liberal political theory, there is a long tradition to view consent as the ground for political legitimacy.[[6]](#footnote-6) In other words, it is the consent of the people that confers legitimacy on political institutions to have political authority over them, and it is also their consent that legitimatises the decisions those institutions make.[[7]](#footnote-7) The function of consent to legitimatise institutions and their decisions can readily be extended to geoengineering governance.[[8]](#footnote-8) Accordingly, the consent of those who are affected by geoengineering research and deployment can confer legitimacy on the research and deployment or on the institutions in charge of geoengineering decision-making. As such, consent may serve to answer the legitimacy question of geoengineering.[[9]](#footnote-9)

Besides the question of legitimacy, there is another reason to introduce consent into a geoengineering governance framework. In cases where geoengineering research, especially large-scale experimentation and field trials, and geoengineering deployment could put some people at risk for *significant* harm, their consent might be necessary for the imposition of risk from the research and deployment to be *morally* justified. In other words, even if geoengineering research and deployment are considered to be legitimate in general, we still owe a moral justification to the individuals who the risk of harm from geoengineering will be imposed. Indeed, it has been pointed out that imposing *significant* risks on people without their consent is *prima* *facie* wrong, and that consent is *morally* necessary for risk imposition on individuals – at least in the less problematic cases, e.g. medical treatments and small-scale experiments (MacLean 1982; Tueber 1990). In effect, Morrow, Kopp and Oppenheimer (2009) had argued for the inclusion of informed consent as one of the ethical guidelines for geoengineering research to ensure research participants’ autonomy is being respected.[[10]](#footnote-10) Moreover, consent has a permissive function, which can justify performing some actions on individuals that would otherwise be morally impermissible without their consent (Beauchamp & Childress 2013; Kleinig 2010). As such, consent could be viewed as essential in the moral justification for imposing geoengineering risks.

To summarise, there are *two* reasons why consent is relevant to geoengineering governance, i.e. the legitimacy question and the moral justification for imposing risks associated with geoengineering research and deployment. In this article, I shall focus on the legitimacy question because it is the dominant theme in geoengineering governance, and also because of the moral justification for imposing geoengineering risks has a more restricted scope.[[11]](#footnote-11)

## The Legitimacy Question, Three Models of Consent, and Geoengineering

If consent can contribute to the legitimacy of geoengineering decision-making, or can even legitimises it, then it should be introduced into a geoengineering governance framework when legitimacy of the decisions for both research and deployment of geoengineering is one of the major social and ethical concerns about geoengineering. There is a host of questions, such as “whose consent is required?”, “how consent is to be obtained?”, etc., to consider when implementing consent in a geoengineering governance framework. The answers to those questions depend, however, at least partially on our understanding of consent. Hence, it is important to be clear about the model(s) of consent being invoked in the discussion. Three models of consent are particularly relevant here, i.e. explicit consent, implied consent and hypothetical consent, as they are widely used in risk governance, science and technology policy (MacLean 1982; Rayner 1984, 1990; Rayner & Cantor 1987; Hiskes 1998), and climate policy (Rayner 1995; Thompson & Rayner 1998).[[12]](#footnote-12) In the following, I will discuss the three models of consent with reference to geoengineering governance. More specifically, I will examine whether they could address the legitimacy question adequately.

Explicit consent – or, prior informed consent – is the most straightforward model of consent among the three models. It is also perhaps the most *direct* way to legitimatise geoengineering decision-making, because individuals *directly* and *actually* endorse the decisions (or, the institutions that make those decisions) through explicit consent, and thus the decisions that individuals have consented to can be seen as made by them. The central question for this model of consent is to determine whether and when someone’s consent is genuine, that is – to distinguish *valid* consent from *invalid* consent resulted from ignorance, incompetence, coercion, manipulation, etc.[[13]](#footnote-13) Implementing explicit consent in a geoengineering governance framework implies that the decisions on geoengineering research and deployment can be legitimate only if people have directly and actually consented to them.[[14]](#footnote-14) Accordingly, consent from those who are affected by the decisions on research or deployment must be obtained, and mechanisms against the conditions of invalid consent must be part of the geoengineering governance framework.

The problems of implementing explicit consent in risk governance and science and technology policy are well recognised (see, e.g. Hansson 2006). For geoengineering governance, it seems practically *impossible* to obtain consent from every individual who will be affected by geoengineering research and deployment, and it is also *implausible* to expect every individual to endorse the decisions (Elliot 2010; Morrow, Kopp & Oppenheimer 2009, 2013). Granted, the practicalities of obtaining explicit consent will be partially shaped by the geoengineering options in question. Obtaining explicit consent is likely to be especially challenging for geoengineering options that operate in the global commons, such as sulphate aerosol injection and ocean iron fertilisation, because of the larger area and population affected by them. Moreover, if we consider the scope of being affected not only in terms of short-term impacts but also in terms of lasting impacts in the climate system, then the problem also arises with territorial-based geoengineering options that have more localised short-term impacts. Worse still, if the long-term impacts of geoengineering research and deployment are taken into account, and thus future generations are too considered to be the affected group, the model of explicit consent implies the impossible requirement of obtaining explicit consent from non-existent people (Rayner 1984). Besides, it is unclear what mechanisms we can devise to counter the conditions of invalid consent in the case of geoengineering, e.g. how to overcome scientific ignorance when geoengineering research and deployment involve deep uncertainty, and how to ensure people’s consent is voluntary when opting out is not an option for some geoengineering options. In short, there are a number of challenges to operationalise explicit consent in a geoengineering governance framework, and those who seek to implement explicit consent must provide adequate responses to them.

Implied consent – also known as implicit consent (MacLean 1982) and revealed consent (Rayner 1984) – is another model proposed in risk governance and science and technology policy. In this model, consent is *inferred* from individuals’ actions (or, their lack of actions) in another situation which is sufficiently similar to the situation requiring consent. In other words, individuals’ decisions in another sufficiently similar situation provide the basis to determine whether they will endorse the current decision. Accordingly, individuals *indirectly* consent to a decision by endorsing a decision in another situation that is similar in nature. Applying to geoengineering governance, if individuals have already endorsed decisions that are similar to decisions on geoengineering research and deployment, then decisions on geoengineering research and deployment can be viewed as legitimate. More concretely, if risk is the primary concern in geoengineering decision-making, then individuals must have already endorsed research and deployment of a technology of a similar level of risk to geoengineering for it to be legitimate (see, e.g. Starr 1969). As such, the task is to identify a technology which is already endorsed by individuals and, at the same time, has a comparable level of risk. Alternatively, it has been argued that people’s acceptance of risk is revealed in their market preference, thus market values can provide a baseline of (implicit) consent as well (see, e.g. MacLean 1982).

The problems with implied consent are also well documented, particularly relevant to geoengineering governance is that the model of implied consent presupposes a questionable objective measure of risk such that different technologies can said to be similar in their level of risk, and thus the decisions about them can be meaningfully compared. More importantly, geoengineering does not only involve risks, but also *uncertainty*, which undermines the usefulness of (objective) quantifying measures (Hansson 2009) and cannot be captured by distinct, albeit similar, situations because of the existent of highly improbable “black swan” events (Taleb 2007).[[15]](#footnote-15)

The model of implied consent is also based on two questionable assumptions. First is that values and norms guiding decision-making travel across different domains, e.g. market versus non-market domains (MacLean 1982). Second is that they remain stable across time (Hiskes 1998). For the model of implied consent to be applicable to geoengineering governance, its proponents must invoke an objective standard of risk, and argue for the universality and stability of values and norms in decision-making. Yet, even if an objective standard of risk and the universality and stability of values and norms can be defended, this model remains susceptible to the charge of technocracy because it implies those who *know* the objective standard of risk and the universal and stable values and norms are in a position to make decisions for others, as they can simply infer consent from the standard and the values and norms. Accordingly, it will diminish the importance of the public and the affected people in decision-making.

Hypothetical consent is the final model of consent I shall consider here. Unlike explicit consent and implicit consent, both of which are *actual* consent – either directly in the case of explicit consent, or indirectly in the case of implied consent, hypothetical consent does not involve individuals’ *actual* consent. Instead, hypothetical consent looks at what they *would* consent to under certain *background* *conditions*, and decisions are legitimate if they would be endorsed by individuals under those conditions. For example, an ideal version of hypothetical consent proceeds by looking at decisions made in an ideal world by fully rational agents, and then concludes that those are the decisions we *should* make (see, e.g. Rawls 1971). According to this version of hypothetical consent, the ideal conditions and the model of rational agency provide us a neutral and fair decision-making procedure, and the decisions arrived through this procedure are deemed to be fair and unbiased. Hence, we can assume the individuals *would* consent to the decisions. The model of hypothetical consent, however, needs not to be *idealised*.[[16]](#footnote-16) A non-ideal version of hypothetical consent could be formulated with *non-ideal background conditions*. Accordingly, a non-ideal hypothetical consent is derived from the decisions made by individuals in the stipulated non-ideal conditions, which broadly match the *actual* conditions, e.g. an imbalance of power, a scarcity of resources, etc. For both ideal and non-ideal hypothetical consent, the key is the specification of the background conditions and the model of rational agency, as hypothetical consent derives its legitimatising force from them, and thus the background conditions and the model of rational agency must be acceptable to the individuals. In general, hypothetical consent is employed to justify principles, policies and institutions, and to show why individuals should be bound and obliged by them. Applying to geoengineering governance, the emphasis is to establish the basis for geoengineering-related principles, policies or institutions, and to demonstrate individuals are bound and obliged by them.

Since hypothetical consent does not have the difficulties associated with actually obtaining consent from people, it is perhaps the easiest model to implement in geoengineering governance. Unfortunately, there are also some setbacks for this model of consent. For instance, the legitimatising power of hypothetical consent has been questioned (see, e.g. Dworkin 1975).[[17]](#footnote-17) Recall the source of legitimacy of explicit consent and implied consent comes from people *actually* endorsing the decisions or the institutions that make those decision; given that hypothetical consent is only *hypothetical*, and that people have not *in fact* consented, the source of legitimacy in hypothetical consent is relatively unclear. While one might locate it in the values captured by the acceptability of decision-making procedure supplied by the background conditions and the model of rational agency, doing so may render hypothetical consent redundant and irrelevant, because one can then legitimatise decisions by appealing to those values without invoking hypothetical consent. More importantly, if the source of legitimacy of hypothetical consent indeed comes from the values embodied in the acceptability of the decision-making procedure, there is the question of whether those values – or, the decision-making procedure and the conditions that ground it – can be genuinely acceptable by *all*. This is particularly problematic for geoengineering governance, as geoengineering has both *negative* and *positive* impacts on individuals, societies, and the planet, which reshape the conditions of human flourishing and even the meaning of being human (see, e.g. Clingerman 2014). Hence, the decisions on geoengineering research and deployment will not be based only on a thin idea of human good, but a thick idea of the good life and the good society.[[18]](#footnote-18) As we are living in a world characterised by “the fact of reasonable pluralism,” i.e. “a pluralism of comprehensive religious, philosophical, and moral doctrines [and, more importantly,] a pluralism of incompatible yet reasonable comprehensive doctrines” (Rawls 1993, p. xvi), it is difficult to see how diverse and incompatible views of the good life and the good society can be accommodated by a background for hypothetical consent that can be agreeable to all individuals.[[19]](#footnote-19)

## Which Model of Consent for Geoengineering Governance? A Normative Question

Rayner (1984, 1995) has suggested that each of the models of consent discussed in the previous section is likely to be favoured in different decision-making contexts, explicit consent seems to match with direct democracy, implied consent with market ideals, and hypothetical consent with hierarchical forms of human organisation.[[20]](#footnote-20) In the current research on geoengineering governance, there is a strong tendency to fall back to explicit consent when consent is invoked in the discussion. For instance, (OXP2) seems to regard explicit consent as the best option by recommending “those conducting geoengineering research should […] *ideally obtain the prior informed consent* of, those affected by [geoengineering research]” (Rayner *et al* 2013, 502; my emphasis). Similarly, the model of explicit consent is presupposed by various arguments *against* the prospect of geoengineering. For example, one line of argument asserts that sulphate aerosol injection is inherently undemocratic because people cannot opt out from it nor can they *directly* and *actively* decide on its course once it has been deployed (Macnaghten & Szersyznski 2013; Szersynski 2013). A similar argument, with an emphasis on procedural injustice, has been formulated: geoengineering – or, more specifically, sulphate aerosol injection – is procedurally unjust insofar as people cannot *directly* and *actively* decide on its deployment (Svoboda *et al* 2011). Although these arguments are not formulated in terms of explicit consent, and indeed they are often only construed as arguments for the need to involve the public at the early stages of geoengineering research, i.e. “upstream engagement” (see, e.g. Corner & Pidgeon 2010; Corner, Pidgeon & Parkhill 2012; Parkhill *et al.* 2013; Carr *et al*. 2013), the view that some geoengineering options will be undemocratic, unjust or illegitimate if people cannot directly and actively decide on geoengineering-related matters indicates their commitment to a model of explicit consent.

It is, however, an unwarranted leap from people not being able to directly and actively decide on geoengineering-related matters to the conclusion that they *cannot* consent to them, and thus geoengineering research and deployment being undemocratic, unjust or illegitimate because there is more than one model of consent.[[21]](#footnote-21) The belief that geoengineering research and deployment can be legitimate only if the affected people have been directly and actively involved in geoengineering-decision making has its root in a specific model of democracy, i.e. participatory (and deliberative) democracy.[[22]](#footnote-22) Proponents of participatory democracy consider “outcomes [to be] legitimate to the extent they receive reflective assent through participation in authentic deliberation by all those subject to the decision in question” (Dryzek, 2001, 651; also, see Benhabib 1996). Given this conceptualisation of political legitimacy, the model of explicit consent appears to be the best candidate to ground it.

I should clarify that my claim is *not* that explicit consent is the *only* model of consent compatible with participatory democracy, nor decision-making in participatory democracy always requires explicit consent. To argue for these claims require further conceptual or empirical arguments on the relations between participatory democracy and explicit consent. Here, my claim is rather that given how proponents of participatory democracy conceptualise legitimacy, explicit consent will be the *default* position for them. In short, the requirement of explicit consent will seem natural to those who believe in participatory democracy because it fits well with the idea of legitimacy in participatory democracy. Yet, it is not necessarily the case for others who favour a different model of democracy. For example, in representativedemocracy, which legitimate decisions are to be made by representatives chosen by the people, hypothetical consent to the institutions (or, the decision-makers) might be enough for the legitimacy of decisions. In other words, the model of consent one prefers is *not* independent of the ideal political order she believes in (Kusch 2007; Rayner 1984, 1990).

More recently, Morrow, Kopp and Oppenheimer (2013) have argued that we should move away from the idea of explicit consent and shift to the idea of *political legitimacy* as the basis of legitimacy for geoengineering research and deployment, and their claim is that decisions on geoengineering are legitimate if they are made by legitimate political institutions representing all affected people, which respect their moral rights (also, see Gardiner 2013).[[23]](#footnote-23) Notice that this account does *not* require individuals *directly* and *actively* decide on geoengineering-related matters for the decisions about them to be legitimate, but it relies on hypothetical consent (or, implied consent). Alternatively, it could be interpreted as individuals consenting to a specific research governance arrangement and delegating the decision-making power to it (see, e.g. M.G. Hansson 2009; Sheehan 2011; Helgesson 2012). I suspect that advocates of participatory democracy will doubt the claim that political legitimacy so defined is a sufficient answer to the legitimacy question. Yet, proponents of participatory democracy ought to be reminded that their requirement of explicit consent can too be challenged by proponents of other ideal political orders. Insofar as the ideal political order, or the model of democracy, is open to debate, it is important to be reflective of one’s own position and the biases that come with it. Ultimately, the purpose here is not to argue for a specific ideal political order – be it participatory democracy, representative democracy, or any other political orders; my aim is only to show that the discussion of consent in geoengineering governance requires an awareness of its *normative* foundation presumed in the discussion as well as a more substantial reflection on the ideal political order or the model of democracy to avoid unreflective practices.[[24]](#footnote-24) In effect, my argument shows that the discussion on consent could not, and *should not*, be isolated from the more fundamental discussion about the ideal political order. As such, the discussion on the model of consent for geoengineering governance framework needs to (re)consider – or, at least, to be aware of – this *normative* question too.

## Two Approaches to Consent in Geoengineering Governance

I have discussed three models of consent and the practical and theoretical difficulties of each model of consent in applying to geoengineering governance. I have also noted the preference for a specific model of consent is determined by one’s ideal political order (or model of democracy), thus proponents of a specific model of consent should not take for granted the model of consent they favour will be accepted by those who do not share their ideal political order. In short, there are two sets of issues in introducing consent into a geoengineering governance framework: first, there are *practical* and *theoretical* difficulties associated with each model of consent in applying to geoengineering; second, there are *normative* disputes arise from disagreements between proponents of different ideal political orders. Here, I shall illustrate *two* approaches to introduce consent into a geoengineering governance framework. It should be noted, however, it is *not* my aim to argue for a specific approach to introduce consent, but to merely describe how it *can* be done.

Different accounts of ideal political orders have been developed and defended in political philosophy and political theory. Accordingly, one can start with a particular ideal political order, and infer from it a specific model of consent for geoengineering governance. I shall call this the *theory-driven* approach. For instance, proponents of explicit consent in geoengineering governance can start with arguments in favour of participatory democracy, and then proceed to demonstrate explicit consent to be the superior (or, the best) model for realising participatory democracy. This approach differs from merely *assuming* explicit consent – or, any model of consent – to be the superior model in that it explicitly offers the *normative* ground for preferring that particular model of consent, thus addressing the *normative* disputes directly.

This approach has the advantages of clarity and inclusiveness: it offers a clear *normative* ground for introducing a specific model of consent, and it is applicable to different stages of geoengineering, i.e. from research to deployment, and to different geoengineering options because it is grounded on a specific normative foundation. Yet, it is unlikely that we can arrive at an uncontested account of ideal political order, particularly in the case of *international* geoengineering governance where social, political, ethical, and cultural differences in various regions of the world are *expected*, and thereby it calls into question the viability of this approach. One possible response to this challenge is to restrict this approach to territorial-based geoengineering options that have direct impacts on relatively contained regions, where the difference in fundamental values and ideal political orders is considerably limited. Yet, the conflict of fundamental values and in beliefs of ideal political order remains a real challenge to the theory-driven approach even at a more local scale. An alternative response, therefore, is to insist that the theory-driven approach is *normative* and *evaluative*, i.e. it asserts which model(s) of consent oughtto be implemented given a specific ideal political order, and assesses the model(s) of consent in a geoengineering governance framework based on the ideal political order. It is worth pointing out that this approach has *only* addressed the normative issues, and therefore it will need to address the practical and theoretical problems of each model of consent when introducing it in a geoengineering governance framework.

Another approach does not start with normative theories, but with the context in which consent is deemed to be required, i.e. the *contextual* approach.[[25]](#footnote-25) In other words, the model of consent to be chosen will be based on the geoengineering options in question and on the views of ideal political order of the individuals whose consent is required. For example, a deployment of sulphate aerosol injection is expected to affect a large population, which makes it difficult – if not impossible – to obtain explicit consent. As such, other models of consent will be preferred in this context in part based on the practical and theoretical limitations engendered by the geoengineering option in question.[[26]](#footnote-26) Moreover, this approach will also take into consideration the beliefs about the ideal political order held by those whose consent is required, and select the model(s) of consent in accordance with those beliefs. In other words, the contextual approach aims to accommodate the limitations set by the geoengineering option in question as well as the different beliefs on ideal political order in a *given* context.

Unlike the theory-driven approach, the normative ground for choosing one model of consent over the other models is less clear in the contextual approach, particularly if individuals whose consent are required hold different beliefs on what is considered to be an ideal political order. Accordingly, the contextual approach has to address the normative issues arise from the tensions in different ideal political orders. Yet, this approach has the advantage of being more flexible in the introduction of consent in a geoengineering governance framework, and being more sensitive to the distinct situations in different stages of geoengineering research and deployment and for different geoengineering options.

## Concluding Remarks

To reiterate, the main purpose of this article is to unpack different understandings of consent, and to examine their place in geoengineering governance. I have examined three prominent models of consent in risk governance, science and technology policy, and climate policy, i.e. explicit consent, implied consent and hypothetical consent, and have illustrated the difficulties of each model of consent in applying to geoengineering governance. My intention is *not* to show that they are *inapplicable* to geoengineering governance, but to identify various challenges to implement consent in a geoengineering governance framework. Then, I briefly looked at the current research on geoengineering governance, and noted that the discussion has assumed explicit consent as the ideal model of consent for geoengineering governance. This is, however, not unproblematic because the model of consent one favours is not independent of the ideal political order she believes in. Accordingly, one ought not to naïvely commit to a particular model of consent without substantially reflecting on the ideal political order it is based on. Finally, I illustrated two approaches to introduce consent into a geoengineering governance framework, i.e. the theory-driven approach and the contextual approach, and outlined their advantages and disadvantages.

The present analysis of consent and their places in geoengineering governance, of course, is far from complete. Particularly, there are lingering questions concerning (i) the necessity and sufficiency of consent to justify geoengineering research and deployment (see, e.g. Hale & Dilling 2011), (ii) the feasibility of consent in geoengineering governance (see, e.g. Morrow, Kopp & Oppenheimer 2013; also see Hansson 2006), and (iii) other ideas of consent, e.g. broad consent (see, e.g. M.G. Hansson 2009; Sheehan 2011; Helgesson 2012) and group consent (see, e.g. Brugge & Missaghian 2006; Schrag 2006; Grill 2009; Varelius 2008, 2009), and their applicability in the context of geoengineering governance. Future research on (i), (ii), and (iii) is required to fully explore the relevance of consent in geoengineering governance.

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1. An example of the positive view is presented by Keith (2013), and an example of negative view is presented by Hamilton (2013). Of course, their views do not by any means represent all positions held bypolicy-makers and researchers, but they do offer a nice illustration of the two sides in the debate. [↑](#footnote-ref-1)
2. For an overview of various geoengineering options, see Vaughan & Lenton (2011). [↑](#footnote-ref-2)
3. Some researchers have used the term ‘consent’ in their discussion, e.g. Corner & Pidgeon (2010). However, the term is often being used interchangeably with terms like ‘public participation’ and ‘public engagement’. With only a few exceptions (e.g. Gardiner 2013, Morrow, Kopp & Oppenheimer 2013), few have explicitly noted the differences between consent and public participation (and, public engagement). Some scientists also use the term ‘governance’ to broadly include consent and other regulatory concepts (see, e.g. Parson & Keith 2013). It should be pointed out that consent and public participation (or, public engagement) do differ. For example, some have argued consent and public participation are different in their scope and nature, where consent is considered to be personal and/or individualistic, public participation (or, public engagement) is considered to be political and/or collectivistic (see, e.g. Gardiner 2013; Morrow, Kopp & Oppenheimer 2013). It has also been argued that the justification grounded by consent is more substantial than public participation (Grill 2009). It is also pointed out by an anonymous reviewer that merely consenting to research or deployment of geoengineering does not entail the public has participated in its development or the decision to deploy. In this paper, my focus will be on the question of consent in geoengineering governance. [↑](#footnote-ref-3)
4. More precisely, the claim is that individuals have an obligation or duty to obey the laws and policies of legitimate institutions (see, e.g. Rawls 1971, Christiano 1999). [↑](#footnote-ref-4)
5. As an anonymous reviewer rightly notes, the differences between the scope and degree of impacts of research and deployment of geoengineering are likely to call for different forms of consent. [↑](#footnote-ref-5)
6. See Waldron (1987) for an account of the importance of consent in liberal political theory. The role of consent in grounding political legitimacy, however, is not unquestioned, e.g. Buchanan (2002). Since research on geoengineering governance does implicitly or explicitly refer to consent, and my aim is to reflect on the applicability of consent in geoengineering governance, I will not pursue this debate in detail here. [↑](#footnote-ref-6)
7. One may wish to distinguish between the legitimacy of institutions and the legitimacy of decisions made by those institutions, as it is possible for legitimate institutions to make illegitimate decisions (see, e.g. Grill 2009, Morrow, Kopp & Oppenheimer 2013). [↑](#footnote-ref-7)
8. Elsewhere, I have argued that the liberal view of personhood makes consent a *normative* requirement in geoengineering decision-making, see Wong (2013b). [↑](#footnote-ref-8)
9. This is not to assert that consent alone *sufficiently* justifies any decision on geoengineering research or deployment. Indeed, Gardiner (2013) has rightly pointed out that there are things consent cannot normally justify, e.g. slavery. Nevertheless, it can still be argued that some forms of consent remain *necessary* for the legitimacy of geoengineering decision-making. Unless one is prepared to forgo *all* forms of consent as a requirement for the legitimacy of geoengineering decision-making, I think consent deserves more attention in the discussion. [↑](#footnote-ref-9)
10. Morrow, Kopp and Oppenheimer (2013) have recently rejected the applicability of informed consent – as it is understood in biomedical and research ethics – to geoengineering governance, and have replaced it with the idea of political legitimacy. I will return to their new position in a later section of this paper. [↑](#footnote-ref-10)
11. An alternative way to distinguish between the question of legitimacy and the question of moral justification I have outlined is to view the former primarily as a *political* question and the latter primarily as a *moral* question. As an anonymous reviewer suggests, if one construes legitimacy broadly to include *both* the political and moral dimensions, the question of moral justification for risk imposition can too be viewed as a part of the legitimacy question. In this paper, I shall formulate the question of legitimacy in the narrow sense to avoid the controversial issues on the relation(s) between the political and the moral in political philosophy and ethics. [↑](#footnote-ref-11)
12. The three models of consent presented in this section do not exhaust *all* models of consent, and my focus on explicit consent, implied consent and hypothetical consent only reflects their relative prominence. Recently, a number of new models of consent have been proposed. For example, recent debates in bioethics and public health ethics have introduced the idea of broad consent, i.e. a general consent to a specific research governance arrangement (see, e.g. M.G. Hansson 2009; Sheehan 2011; Helgesson 2012) and the idea of group (or collective) consent, i.e. the consent given by a group or collective (see, e.g. Brugge & Missaghian 2006; Schrag 2006; Grill 2009; Varelius 2008, 2009). However, these ideas remain controversial, particularly (i) whether they can be viewed as a form of genuine consent, especially in the case of broad consent, and (ii) what is the normative justification for them, especially in the case of group consent. While I believe that broad consent and group consent will be welcoming additions to the discussion of consent in geoengineering governance, much work is required to examine their nature and applicability. [↑](#footnote-ref-12)
13. For an overview of the conditions of valid consent, see Kleinig (2010), Eyal (2011). [↑](#footnote-ref-13)
14. Here, I only focus on the legitimacy of decisions. As I have noted, institutions – even if they are legitimate – can make illegitimate decisions. Provided the separation of the legitimacy of institutions and the legitimacy of decisions made by them, the model of explicit consent appears to require individuals to consent to *every* decision made by those institutions, and their consent to the institutions alone is insufficient to warrant the legitimacy of the decisions. [↑](#footnote-ref-14)
15. Following S.O. Hansson (2009), I distinguish risk from uncertainty, where decisions “under risk” are understood as decisions with known or knowable probabilities, and decisions “under uncertainty” are those to be made with *unknown* probability. See, also Knight (1921). [↑](#footnote-ref-15)
16. I want to thank an anonymous reviewer for pointing this out. There is a growing literature on the distinction between ideal and non-ideal theory in political philosophy, and one strand of the discussion focuses on the real-world applicability of ideal theory, especially of Rawls’ theory of justice (see, e.g. Valentini 2012). Since the decisions on geoengineering research and deployment are going to be made in the real world, it is likely that a non-ideal version of hypothetical consent will be more preferable. [↑](#footnote-ref-16)
17. For a discussion of this objection and a defence of the justificatory force of hypothetical consent, see Stark (2000). [↑](#footnote-ref-17)
18. My distinction between ‘thin idea of human good’ and ‘thick idea of the good life and the good society’ is based on Rawls’ thin and full theory of the good, in which goods that every person needs (or wants) independent of their personal preferences and sociocultural background, e.g. freedom, opportunities, self-respect, wealth and income, are distinguished from those that are based on personal preferences and sociocultural background (Rawls 1971, 395-399). [↑](#footnote-ref-18)
19. I use the term ‘thick idea of the good life and good society’ to refer to what Rawls meant by comprehensive doctrines, i.e. “conceptions of what is of value in human life, and ideals of personal character, as well as ideals of friendship and of familial and associational relationships, and much else that is to inform our conduct, and in the limit to our life as a whole” (Rawls 1993, 13). [↑](#footnote-ref-19)
20. It should be noted that Rayner’s definition of hypothetical consent differs from the definition of hypothetical consent I have used in the paper. For Rayner, hypothetical consent refers to consent to a particular social arrangement. [↑](#footnote-ref-20)
21. For a similar critique of unreflective commitment to explicit consent in geoengineering governance, see Heyward & Rayner (2013). [↑](#footnote-ref-21)
22. I use the term ‘participatory democracy’ and ‘deliberative democracy’ interchangeably in this paper. My rationale to use them interchangeably is based on view that the current research on geoengineering governance can be said to belong to the broader ‘participatory turn’ in science and technology studies, and the theoretical foundation of the participatory turn is precisely deliberative democracy (Lovbrand, Pielke & Beck 2011; Durant 2010, 2011; Biegelbauer & Hansen 2011). For an overview of the participatory turn, see Jasanoff (2003). [↑](#footnote-ref-22)
23. Gardiner has not discussed this issue at length, but he wrote “in political theory [consent] plays a much more complex role. Arguments about consent are key in debates about political legitimacy and justice, but even here the consent is usually stylized in certain ways, as tacit or hypothetical, and the role of consent is far from secure. Arguably, justice and legitimacy are the more central notions” (2013, 33ff). [↑](#footnote-ref-23)
24. Lovbrand, Pielke and Beck (2011) have offered a similar challenge to the “deliberative turn” in science and technology studies, and they have noted that researchers in science and technology studies require a more substantial reflection on the *normative* ground(s) of their studies. [↑](#footnote-ref-24)
25. The contextual approach I describe here is not entirely new, similar approaches have been proposed by Walzer (1985) and Carens (2000, 2004) in political theory. Carens (2004) provided a defence of the contextual approach, and highlighted its advantages over the theory-driven approach. In the context of geoengineering governance, one formulation of the contextual approach has been offered by Whyte (2012), which states that “[e]arly research that risks placing large degrees of control over Indigenous people's basic needs and preferred lifeways must be bound up with an earlier consent process that accords with indigenous peoples' customary laws and decision-making process. […] Any process that eventually secures Indigenous peoples' consent must have been structured collaboratively (i.e. in the spirit of partnership) so as to genuinely include Indigenous people (i.e. [free, prior and informed consent]) customary laws and decision-making processes. For another formulation of the contextual approach and its application to ethics of technology and technology assessment, see Wong (2012, 2013a). [↑](#footnote-ref-25)
26. This is *not* to assert that explicit consent is *necessarily* inapplicable in this context, but only to claim that other models of consent might be more preferable. [↑](#footnote-ref-26)