

# The producer society and the transition towards a bio-based society: institutional innovation for a sustainable future

Udo Pesch<sup>1</sup>, Susan Sleenhoff<sup>2</sup>, Menno van der Veen<sup>2</sup>

<sup>1</sup> Delft University of Technology, Faculty of Technology, Policy & Management, 2628 BX Delft, The Netherlands, [u.pesch@tudelft.nl](mailto:u.pesch@tudelft.nl), +31 152788484

<sup>2</sup> Delft University of Technology

## Abstract

The biobased economy is a concept proposed by policymakers to accommodate the transition towards a sustainable society. This concept however is not familiar outside of policymaking and some academic circles, while a socio-technical transition supposes the shared commitment of the whole society. The need for this commitments becomes even bigger as society develops into a network society, which becomes increasingly irresponsible to one-sided governmental command. The paper contends that this dual problem should be overcome, the concept of a producer's society is introduced as a policymaker's perspective that allows the resolution of the need for having wide societal commitment to the transition towards a biobased economy and the need to make have a government that can address the network society in an effective manner. The concept of the producer's society entails that government should see citizens as the producers of their own environment, instead of either inactive policy consumers or active deliberative *citoyens*.

## Keywords

*Biobased economy, producer's society, network society, participatory decision-making*

## 1. Introduction

### *The complex nature of sustainability problems*

Most people will nowadays agree that current modes of production and consumption are not sustainable and that they will make the perpetuation of contemporary Western lifestyle impossible. Resource depletion and environmental degradation require a fundamental

reorientation of the way we produce and use energy. Instead of wasting natural sources, a new system of production that is based on renewable resources for energy, food and medicines will have to be introduced into society. In other words, a transition from a fossil based economy to a *bio-based economy* has to be made.

A bio-based economy assumes a paradigm shift in the way energy and commodities are produced and consumed. Such a paradigm shift poses a profound challenge for governments, businesses and civilians. When existing production and consumption structures are drastically changed, that also implies huge shifts in the geo-political landscape, and society will need to develop new understandings of concepts like 'naturalness' and 'sustainability'. A major controversial point at this moment is that the bio-based economy presupposes that GM-technology will be included in these definitions.

The encompassing scope of the changes involved in the transition towards a bio-based economy is not reflected in anyway by public attention – to say the very least. The bio-based economy seems to be an inward looking policy concept that is mostly used by government departments and surrounding action groups and lobbyists. A search in the newspaper database LexisNexis in October 2010 learned that the term has been used only six times in five Dutch national newspapers over eleven years (1999-2010). Another indicator of a lack of public awareness is that there is no Wikipedia page on the bio-based economy and one of the first pages to appear in Google is the one of the Dutch Ministry of Agriculture.

The fact that attention for the bio-based economy mostly comes from the direction of the government manifests a double-sided problem. On the one hand, the transition towards a bio-based economy can only be achieved through the combined efforts of basically all societal actors. Not in the least by having a significant extent of support by the general public. On the other hand, this one-sided interest testifies of the inability of the Dutch government to effectively relate to its citizens – which arguably is a problem that applies to most Western governments.

In this paper we will address this double-sided problem, and we will provide new approaches that may help to overcome this problem. In relation to the description of our problem, we will first contend that a bio-based economy entails a necessary transition in order to effectuate to a sustainable society. This transition requires such a different way of producing that it is commonly discussed in terms of paradigm shift. We argue that this transition can only be achieved by an accompanying paradigm shift that regards the interplay of society and its institutions.

Our argument is rooted in the long lasting notion that society has to an increasing extent evolved into a *network society*, in the sense that society is not stratified any longer in clearly

recognizable horizontal or vertical social entities, but that society has become a flexible constellation of changing coalitions, made up by emancipated, self-conscious and well-informed individuals. The notion of a network society implies that actors like governments, companies, civil society organisations, and citizens have to rethink the way they relate to society.

To overcome this multiplicity of problems, we will propose instruments that can be taken up by government to connect more directly to the characteristics of the network society. The concept of a *producer's society* (Van der Veen et al. 2010) will be suggested as a solution to reduce the distance between government and individual citizens; we will also address the way participatory decision methods can contribute to transcending existing institutional boundaries.

## **2. The bio-based economy**

*What is a bio-based economy?*

The bio-based economy can be defined as the technological development that leads to a significant replacement of fossil fuels by biomass in the production of pharmaceuticals, chemicals, materials, transport fuels, electricity and heat (Langeveld & Sanders 2010). This economy is called bio-based economy by the Dutch government and the OECD but it is also known as the Knowledge Based BioEconomy (EU), Industrial Biorefinery Industry (World Economic Forum), White Biotechnology and Industrial Bioeconomy (Organization of Biotechnologists), the Carbohydrate Economy (Institute for Self Reliance), the Bioeconomic Revolution (the Biomass Research and Development Board of the US Government), the Green Economy and Biodiversity Services (UNEP), and the biomass economy as well as the bioeconomy. All these terms refer roughly to the same set of technological and economic changes (ETC Group, 2010:12). When compared to photovoltaic technologies, and wind energy, an interesting feature of biomass is that it does not only provide energy, but can provide many other vital functions as well and may thus contribute in a broader extent to the problem of waste and pollution.

The idea of a bio-based economy is not new: different types of biomass have always been used for various products and processes on a local basis. Straw was used as feed but also as isolation material. Wood was used for cooking, heating or even running steam engines. This system of production was mostly replaced during the industrial revolution with the rise of the use of fossil fuels and electricity – allowing a level of prosperity that was previously inconceivable (see Asveld et al., forthcoming). Still, on a small scale, a bio-based

economy survived, for instance with the production of linen to make fabrics and the use of vegetable oil in paint. The bio-based economy that has to be developed nowadays, however, refers to technological changes that allow significant replacement of fossil fuels in a way that is beyond traditional applications (Langeveld & Sanders 2010). The scale of the development of this new development needs to change in order to keep up with the globalised, industrialised world.

#### *Why this shift towards a bio-based economy?*

Several reasons have been provided in favour of a shift towards a bio-based economy (Langeveld and Sanders 2010). Such as:

- Limiting dependency on fossil fuels
- Diversification of energy resources
- Reducing GHG emissions
- Creating more economic of biomass resources

Moreover, the shift towards a bio-based economy will be more than just goals related to sustainable development. There are also strong political and societal motivations to support the transition towards a bio-based economy, such as:

- Less dependency on countries that are politically unstable
- Having a stable production output
- Benefits for public health
- Self sufficiency of developing countries
- Regional and rural development

The world's crude oil reserves eventually will run out. With crude oil being the basis of many chemical substances, products and energy source this will become a major problem. With the availability of this resource becoming scares oil prices will rise as we have seen in the past. Nowadays the prices of bio-based products can hardly compete with fossil based ones however with prices of fossil based products that will continue to rise and resources to run out bio-based products will become a necessary and affordable alternative. Furthermore, most crude oil can be found in unstable political regions (see Friedman 2008). This makes the supply of crude oil insecure – the same can be said about nuclear energy resources and materials that are used in batteries for electric vehicles.

Next, due to a world wide increase of population growth there will be a growing demand for raw materials. While currently 20% of the world population is using 80% of the available raw materials and energy it is expected that the remaining 80% of the world population will do everything to improve their life standards hence using more raw materials and energy (Soetaerd & van Damme 2006). This will inevitably lead to a even faster depletion of raw materials and fossil fuels.

The waste streams that are produced in a bio-based economy can also be deployed and converted into new products or energy (Soetaerd & van Damme 2006). If the bio-based economy is succesful it will produce enough biomass to sustain the current level of consumption, and new options for regional and rural development will emerge. Changing the system creates new possibilities, new markets and new jobs. The production and use of energy sources will become decentralized allowing regional and rural development, especially in developing countries.

#### *Why is it such a major shift?*

The transition towards a bio-based economy is expected to have major effects on society at large and will not be limited to the biomass production or conversion alone. It will change conditions for production of food, feed, materials and many other biomass-related commodities and affect process of land use, deforestation and food distribution world wide. The transition involves so many different types of changes on many different levels that it is difficult to assess its implications. Due to the different often interrelated effects, and the fact that those effects might have other implications, with changes that on a local scale might have global effects and will not be limited to agricultural and rural areas it will affect many different aspects of everyday life (Langeveld & Sanders 2010).

To enable this shift changes on different institutional levels are required. The economic system must be reformed (internalisation of external effects), socio-cultural patterns (e.g. consumption behaviour) must be restructured and the political and administrative system must start to function differently (Ten Pierick et al. 2010). Table one summarises the implications for different societal levels and institutional domains of the transition towards the bio-based economy.

Table 1: The bio-based economy as a major shift on different scales and in different domains

Scale	Domains
<u>International level</u> focus on environmental costs of production will eventually have to lead to a decrease in transportation and a revival of local production, World economy will be decreasingly dependent on oil market. Oil companies will loose dominant position.	<u>Government</u> Bio-based economy as a central part of its policies. Focus on relational planning methods.
<u>National level</u> An encompassing set of policies should create a package of incentives and disincentives for its creation.	<u>Industry</u> Bio-based economy as the only feasible business model means that production chains have to become less wasteful and more integrated.
<u>Regional level</u> Renewed focus on regional and local production techniques.	<u>Civic society</u> Bio-based economy requires individual responsibility and new sense of collectivism.

### *Criticism*

The bio-based economy and the present developments that should lead to its implementation are not praised by all. In a forthcoming report the ETC Group argues that the bio-based economy (that it refers to as bio-economy) is mostly used to favour the needs of the developed world, is ran by the largest Western companies, is to blame for an increase in cases of land grab and for a further depletion of biodiversity. In table two that we cite here, it compares the bio-economy to an economy of biodiversity and argues that the two have nothing to do with each other.

Table 2: a tale of two bio-economies (source, ETC Group, 2010:22, forthcoming)

<b>Biomass-based economies</b>	<b>Biodiversity-based economies</b>
HOMOGENOUS - Defines plant life and organic life by lowest common denominators: as undifferentiated providers of - feedstocks – sugars, starch, cellulose, oil, etc.	HETEROGENOUS - Defines plant life and organic life heterogeneously by differentiating individual species and parts of plants and animals with specific properties and uses.
MONOCULTURE - Organizes large- scale sourcing of monoculture crops, plantations, forest destruction and land clearance.	DIVERSE - Organizes small-scale cultivation of diverse cropping and gathering of wild harvests. When it occurs, land clearance is on rotational or shifting basis.
MARKET DRIVEN - Based on industrial transformation of biomass into bulk commodities for the global market – e.g., electricity, biofuels, bulk chemicals, pharmaceuticals, textiles.	SUBSISTENCE DRIVEN - Based on community or individual transformation of plant and animal materials for personal or community use – e.g., as medicines, food, dyes, clothing, cultural and spiritual uses.
HIGH TECH - Uses, proprietary, capital-intensive technologies to transform biomass – e.g., biotech, synthetic biology, synthetic chemistry. Innovation occurs quickly and diffuses rapidly on a large scale – often prematurely.	APPROPRIATE TECH - Uses human scale, community-centred technologies to transform plants – e.g., drying, fermenting, and cooking. Innovation may occur quickly but on small scales and diffuses slowly to larger scales.
REDUCTIONIST – Nature is imbued with commercial value and profit potential.	HOLISTIC - Nature is imbued with cultural and spiritual values and often seen as sacred.

The objections and findings of these reports are important enough to cite them here but the criticism of existing practices of exploitation and unjust and unwise policies should not be confused with the need of a drastic change of production and consumption practices. Reports like that of the ETC Group mostly tell us that existing policies are focussing on all kinds of (mostly government based) stimuli to change production methods instead of consumption practices. Or, in other words, they don't accept that a paradigm shift is needed that will not only introduce a bio-based economy, but a bio-based society of which the principles fall mostly within the right part of the table.

### **3.The network society**

How to facilitate this encompassing shift? Who should start and who should be involved in instigating the change towards a bio-based economy, and how should this instigation process take place? In the coming sections, we will address these questions; our starting

point will be that it is essential to assume that society has become a network society in which no hierarchy or fixed stratification can be recognized.

To successfully transform into a bio-based economy also the relations between different domains in society needs to change. The power of churches, brands, newspapers and governments as leading opinion makers is fading. No longer do we have a society where people behave like a herd and follow the opinions of trusted institutions.

Instead of trusting opinions of leading institutions individuals now rely more on the opinions of people that closely surround them – either personally or virtually. With an increase of communication between individuals via all sorts of social media. Those opinions greatly determine what we like and dislike, where we go and how we should behave, while at the same time, we are fully capable of expressing our own expressions to our peers. With an ever expanding network of people and their opinions, society behaving more as a swarm or flock of birds than as a herd. The strength of the swarm is determined by the strength of each individual within the network and the basic principle of the swarm is that of reciprocity.

Accompanying this replacement of traditional forms of public cohesion by new forms of civil engagement are radical developments in the public domain of politics and policy-making. According to Dijkstra & Holtslag (2010:33), governments have to deal with a differentiation of institutions, a diffusion of politics; a fragmentation of the public; and the continuous questioning of authority. The governmental apparatus has been spread out over many different organizations and institutions, leading to an incoherent and disorderly governmental system which is not controllable any longer by the mechanisms of representative democracy, and, hence, has lost a large share of its public legitimacy.

So, if a government wants to communicate with individuals that behave and move in networks, it cannot act as an outsider by telling them what to do. Instead a government must descend from its pedestal position and become a member of the network. This implies a non-hierarchical interaction with the other members and a pronounced vision for a bio-based economy that can become subject of debate with the other actors in the network.

To explain our view on how the government (or governmental institutions) should behave towards society we will start by following Boelens (2010), who speaks of a misguided self-perception of the government in the context of spatial planning. He holds that the government still lives in a 'comfort zone' in which it applies all kinds of new and innovative systems to involve all kinds of stakeholders, but these systems are still very much dependent on the public sector. In the end these processes come down to nothing more than input for public sector led processes and this leads to complex compromises that nobody outside

government really prefers. Boelens emphasizes that it is necessary to look at other cultural, social, and economic domains than that of the government, if one wants to say something meaningful about urban and regional planning – because the dynamics of planning are found in these other domains (2010:186). One of the results of the tendency of the government to preserve in its self-image as the agency that bears all responsibility is that industry and the civic society are discouraged to take any initiative. Thus, as Boelens holds, except for a couple of widely published experiments, planning is mostly a public sector led process with only limited input from other fields. At the same time, the emergence of a network society implies that the government is rapidly losing its capacity to implement policies in a top-down manner, and is increasingly relying on other actors to successfully implement planning policies. In other words, it becomes harder and harder to bring government projects to a successful ending.

It would be far more productive to perceive the implementation of policies as a co-production function that is taken care of by different actors in policy networks. Boelens sketches a relational context in which planning takes place in actor networks that are shaped by their relations. The government is part of these networks, it cannot step in and take a decision like a *deus ex machina*; society has become too complex for that. The sketch of Boelens is in line with a forthcoming report of the Dutch Rathenau Institute on the implementation of the bio-based economy in the Netherlands. The authors of the report claim that with the concept of a bio-based economy the government uses a notion which is hardly known to a wider public (a) and on top of that is approached in various ways by various government institutions (b). Moreover, concepts like 'naturalness' and 'sustainability' which are key notions to understand the 'bio-based economy' are left unclear and inconsistent, which hinders public understanding of the concept of the bio-based economy.

This problem description suggests that it will be necessary to develop new arrangements and dispositions that facilitate the integration of different societal sections, so that our institutional template will correspond to societal reality – which is that of a network society. We will see how the government should position itself as an actor inside a network, and provide a possible paradigm with which this can be done – namely the paradigm of a *producer's society*. We will introduce some promising participatory methods of decision-making that allow the effective integration of different societal domain. Finally, we will address the issue of public responsibility in a globalized and individualized society.

#### 4. The producer society

##### *What is a producer's society?*

The producer's society comes with two essential terms. The first is, naturally, the term producer, the other term is environment. The term producer refers to the term creator but is more neutral. Where 'creator' will, in most circumstances, have the connotation of the intentional act of creation, producing does not require this intention (a), while producing may also be a more daily activity than creating which is more associated with the activity of artists or even gods (b). The term producer is also used to oppose it to consumer. A producer's society in that sense is the opposite of a consumer's society (Van der Veen et al. 2010; Barber, 2007).

A producer's society is a society in which people are not treated as consumers, nor do they understand themselves as consumers. The term producer then also refers to terms like active consumer or prosumers in the sense that all these terms reflect to an active capacity of human beings to stand for themselves and their broader ideals. However, the term producer is not limited to the role that people assume in their interaction with various markets, it also refers to their role as citizen in a society and to the way in which they understand their life on a personal level (see below).

The term environment means 'that what surrounds us' in a broad sense of the word. It refers to 'that' in which an individual lives. 'That' can be the virtual as well as the material world. Thus, someone's environment exists as much of how he defines himself with social media as it does of his house and the street in which he lives. We mean it to be a broader term than milieu (cf Sloterdijk, 2010). Thus, someone's environment can exist of various milieus. An environment, in order to be 'someone's environment has to be produced by that someone. This type of production is by definition a type of coproduction since producing takes place in an environment and with tools that preceded the act of production. That what is produced in an environment can be something that can be touched, but the term also refers to what Hannah Arendt calls deeds. Thus it can be material and immaterial and it can have to do with the creation of oneself and with the creation of that what surrounds oneself.

##### *Three premises*

The concept of the producer's society starts by three premises

- 1) Every individual is at least in part the producer of its own environment.
- 2) Governments have the obligation to enable individuals to become producers of their own environment.

3) Producing comes with responsibility for any harm that is caused by what is produced.

The upshot of the first premise is that not only every individual is the producer of his or her environment, but also that if life as we know it has a purpose. Its purpose is that all human beings are (co-)producers of their own environment, meaning that they are in charge of their own life. However, the first premise also holds that one can never be a 100 % non-producer. Living means producing. Human beings leave their material and immaterial traces, and at the minimum level they do at least produce (to some extent) the actual presence of their bodies. Producing will often mean co-producing, since 'no man is an island'. Even our identities are probably shaped as much by our environment as they are by ourselves. The interior of our houses is designed by ourselves and our partners but also by the gifts of others, the taste of the architects etc. If we go a step further, then we are co-producers of everything that surrounds us; whereby we have never totally created what we find, but we also cannot be non-creators. Thus everything around us is produced by us in a range of <0 and 100<. In other words, it is impossible to have no influence at all on one's own environment but it's also impossible to be the only producer of it with no influence whatsoever of others.

Finally, the key question then becomes: are inhabitants – as a group and as individuals - feeling that they are in sufficient control of what surrounds them? Do they act as if they were the (co-)creators of their environments? We hold that this is a necessary requirement if we want to engage people to become active participators in the transition towards the bio-based economy, we should acknowledge the fact that this transition should provide them with a general sentiment that it creates more options for them to become the producers of their environment (and we hold that the transition has the ability to do that).

If we hold that a government should enable individuals to become producers of their own environment, and non-producing is not an option, the obligation of a government to enable individuals to become producers can be interpreted as a minimum duty, and as a maximum duty (table 3). If we were to interpret the enabling duty as a minimum duty, it would hold that the government has an active duty to make sure that individuals are not dominated by others (including the state) in a sense that they cannot be said to be capable of any kind of meaningful production. This duty would include the duty to safeguard people from war, hunger and other threats that are capable of destroying the ability to produce one's own life. The test if the government lives up to this duty would be the opinion of an outsider who would review the laws of a certain state and the way they are enforced. In a sense these minimum duties can be traced back to classical liberalism as it pictures a state that does not interfere

in the lives of its inhabitants and ensures that its citizens do not enslave each other (Mill, 1975; Locke, 1999).

The maximum duty is not a duty to ensure 'absence of domination' but a more active and encompassing duty to enable people to become producers of their own environment while acknowledging that they live in a complex society. The duty then includes the creation of new structures that serve as tools for (co-) producing. Well-known (and well debated) government actions in this respect include education programmes (such as live long learning), and participatory democracy initiatives.

Although not every individual can be satisfied, the test here would not be that of the reasonable opinion of an objectified outsider but the actual sentiment of the insiders that should have the legitimized impression that they are in control of their own environment. This would show, amongst other things, in their sense of co-responsibility when confronted with government initiatives and their general view of the state as 'their own collective project' (see below 'Producia').

We argue that the maximum duty fits the transition to the bio-based economy. The transition towards a bio-based economy is far reaching and requires an active participation of citizens that trust the institutions in which the transition gets 'institutionalised'. Therefore, the government as one of the leading actors in the transition has to understand (and frame) this transition as a chance for citizens to become – better or to a larger extent –producers of their own environment.

When individuals are (co-) producers of their environments and governments are actively engaging them by providing them with chances to be even more so, individuals should accept a responsibility for what they are co-producing. This responsibility can be understood as a social contract (now that the government is providing citizens with the opportunity to become producers it may accept responsibility in return). It can also be argued that responsibility as such does not need a further legitimation, since everyone is responsible for his or her actions. The question is to which account citizens can be held accountable for their actions. We argue that if a government or other institution succeeds in shaping the transition to a bio-based economy by providing agents with more opportunities to act as producers, it may also hold them accountable for what they produce by providing them with more 'active duties' in the sense of new legislation that can be enforced by penalties. At this moment however, we are not primarily discussing the introduction of new policies, but instead we discuss from which perspective citizens should be invited to participate in these policies.

If we accept this focus the premise is not only about responsibility for harm but can also be about honour. If people produce something that is profitable for the community they

should receive some honour for doing so. If we were to apply this rule to the transition to the bio-based economy, it would for example hold that individuals that participate in policy-making networks, should receive some honour for doing so. For example, by receiving some kind of membership (cf. Keulartz et al., 2010) or by receiving individual feedback on the follow up of their input.

Table 3: Duties for government and individuals based on the premises of a producer society

Premise	Bio-based economy: duties for government	Bio-based economy: duties for individuals
1. Every individual is the (co-producer) of its own environment.	<ul style="list-style-type: none"> <li>- Acknowledge the producing capacity of citizens.</li> <li>- Accept that bio-based economy should be understood as an asset that enables individuals to become better producers.</li> </ul>	<ul style="list-style-type: none"> <li>- Accept that producing can never be 0%.</li> <li>- Accept that everyone has a right to (co-)produce his or her environment, including future generations.</li> </ul>
2. States should enable their citizens to be the producers of their own environment.	<ul style="list-style-type: none"> <li>- Engage citizens in policy networks.</li> <li>- Accept that in a complex society, producing is also complex and multi-dimensional.</li> </ul>	<ul style="list-style-type: none"> <li>- If meaningful participation structures are invented, individuals should be willing to participate in them.</li> <li>- Acknowledge that the transition cannot and should not be implemented by the state only but should be produced in society.</li> </ul>
3. Producing implies responsibility.	<ul style="list-style-type: none"> <li>- Hold people accountable for harm.</li> <li>- Invent ways to honour them for their contributions.</li> </ul>	<ul style="list-style-type: none"> <li>- Accept responsibility for the result of your actions even if these results are indirect.</li> <li>- Accept that transition comes with obligations.</li> </ul>

*‘Producia’*

If we were to think a producer society as a utopia, it would bring us to Producia. On the island of ‘Producia’ all individuals accept that they are producers of their own environment. To determine their accountability for any kind of harm that may be done to others, they use a ‘circle of responsibility’ system. The first circle exists of responsibility that is more or less direct such as that of a parent for its child or a lover for his or her beloved ones. It also exists of the responsibility for actions with direct results such as the decision to do any physical harm to someone, or to ruin the barbeque party of a neighbour.

The second circle exists of the responsibility for ones' choices that have indirect effect. This can be the decision to buy a good that one knows or should know to have a very negative CO<sub>2</sub>-balance in a supermarket.

The third circle exists of the responsibility for choices that have a remote effect. This can be the decision to vote for a political party that aims to cut the budget for the transition to a bio-based economy. It also includes choices that have a positive effect in our direct environment but are harmful for communities or the environment in foreign countries, such as the decision to purchase a car that is fuelled by first generation biofuels. Theoretically there is an unlimited number of circles that all come with a different degree of responsibility and accountability but it never amounts to zero.

The inhabitants of Producia don't accept the notion of consumers because of its passive characteristics (Barber, 2007). In addition they don't think of the state as an outside entity; the state is the outcome of their choices and actions and therefore they are also responsible for the failures and successes of the state.

Producia is a utopia because it presupposes full rationality and consistency of its inhabitants. They are supposed to understand fully the consequences of all their actions and then to act upon it (Van der Veen, 2010; Van der Veen et al., 2010). A utopia cannot be realised, however it may serve as an ideal upon which existing actions and the present situation can judged. In an ideal situation citizens would think of the government as 'their' government, and would accept all consequences of their choices. In addition they would be proud of all the projects outside themselves to which they have contributed or are contributing since they regard producing as the purpose of their lives.

## **5. Guidelines for a more participatory approach towards the bio-based economy**

The paradigm shift that goes with the transition into a bio-based economy needs a different form of governance and needs to increase the responsibility/accountability of each individual within society. Life is what you make of it. We have argued that government has to become a strong member of the network in order to more or less direct that same network into the transition towards a bio-based economy. Next to that it has to create room or space for individuals to create their own surroundings, to become producers of their own environment and to regard the transition to the bio-based economy as an option to become so.

Shifts and transitions do not happen by themselves and overnight. Both government and society have to change. This change asks for more participation of society with government

and for government to become a member of society with strong visions and actions upon those visions (Table 4).

Table 4: Changes actions government has to take for a bio-based society

<b>Government attitude</b>	<b>Government actions</b>
Acknowledge that participants become disillusioned if they are unaware of the results of their input.	Define some actions that will be based on the outcome of public discussions on beforehand.
	Inform participants what was done with their input.
Acknowledge that a network society cannot be changed top down (modesty).	Base policy measures on the outcome of discussions in policy networks.
Do not present the bio-based economy as a policy problem that can only be solved in one manner but as a series of connected problems on which people can disagree.	Involve the public to define the bio-based economy in terms of structured conflicts.

#### *Public participation*

Not only could the notion of the producer's society be used as a concept with which government can frame its policies. The description of a producer's society also prompts the direct development of policy instruments that may contribute to its realisation. In recent years, a lot of attention has been paid – both in theory and in practice – to participatory methods of decision-making. In general, these methods try to engage non-governmental parties into processes of public-decision making.

However, the presence of participatory decision-making methods does not automatically lead to a closure of the gap between the government and the public. There are quite a lot of differences between these methods, as well as internal ambiguities, that can cause that the gap between government and public is not decreased – it can even lead to the widening of this gap. To start with, instead of incorporating individual citizens, these methods often concern the incorporation of representatives of non-governmental organizations, industrial partners or other stakeholders that in general have not that much difficulty in finding access to governmental processes (Hertin et al. 2008).

Moreover, theoretical classifications such as Arnstein (1969) take the existing institutional system for granted; they do not give indications about how to arrive to structural changes. Elsewhere at this conference, one of us presented a paper in which the different conceptual and practical areas of tension in participatory methods can be found (Pesch & Quist 2010).

The areas of tensions first relate to the question *who* to involve, *how* to involve, and with *which goal*.

As claimed, the selection of participants is an important feature, especially related with the notion of the producer's society. Using this framework clearly implies that participants should be individual citizens for whom the participatory method has to be an event in which they can contribute to designing their environment in a meaningful and effective way. If a method fails to fulfil this goal, the participants will only be disappointed, leading to a wider distance between them and government.

A second important aspect involves the ideological outlook of a method. The application of a participatory method always means that a selection of individuals out of the general public has to be made, which leads to the question how this selection of individuals should relate to the general public (cf. Huitema et al. 2007). Do these individuals represent the general public, or do they form a new distinctive group? In the first case, a participatory method can be used to retrieve information about an effective policy; however, the question is how such an outlook concurs with the concept of a producer's society? In the second case, the connection to the producer' society is made, but how does the creation of an isolated group lead to a decreased distance between public and government?

A final issue to be brought in here concerns knowledge issues. The transition towards a bio-based economy does to a large extent involve all kinds of discussions about the status of knowledge. If the bio-based economy is to become a part of the collective project of the producer's society, the prevalence of making knowledge claims cannot be granted to experts only. Instead, a participatory process should be able to effectively bridge the gap between expertise and lay knowledge (cf. Rip 2003; Irwin 2005).

A possible form of an effective participation would for instance be a 'meta-debate' within a broad network of actors on these abstract concepts of 'naturalness' and 'sustainability'. In turn, this discussion should be part of a (both broader –since it includes more concepts – and more specific – since it would be about a new set of policies) debate on the bio-based economy as a whole. These debates have to some extent been taking place in various settings, but they all have the character of experiments, not of an on-going debate that hopes to reach an outcome on which new policies can be built that are supported by the civic society.

Actual methods that seem quite capable of facilitating such a productive 'meta-debate' are for instance backcasting (Quist 2007) and constructive conflict methodology (Cuppen 2009). If such methods are able to contribute to the meaningful definition of 'naturalness' and

'sustainability', it would be more likely that the institutions of the representative democracy could start implementing policies. However, this should not withstand the fact that these policies have to comply with the premises of the producer society meaning that if the government wants citizens to take responsibility, it should involve them when these policies are made.

## **6. Conclusions**

We have presupposed that there is no question if the transition towards a bio-based economy is necessary, but that the question is how it should be done. We have argued that this transition offers, like all major changes a rare opportunity to redefine the relation between citizens and the state. This change requires that the government understands itself as an actor in a network of which it cannot gain control.

The change further requires that the government, if it wants citizens to take responsibility, should acknowledge that these citizens are producers of their own environment and want to be treated as such. This means that they need to understand a bio-based economy as a system that enables them to produce their own environment.

We have provided a view on the kind of participatory structures that can be used to involve people in the meta debates that should take place on concepts like naturalness and sustainability that come with the bio-based economy.

The government, or society for that matter, may require citizens to take an active responsibility for their actions and choices but it can only expect them to do so, if it treats them as responsible adults, as producers.

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