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Pros and cons of the bioeconomy: a critical appraisal of public claims through Critical Discourse Analysis

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Summary

In this paper Critical Discourse Analysis (CDA) is used to uncover hidden political agenda and value systems concealed behind the alleged “value-free” discourse of EU and US governments on the bioeconomy. The main assumption of the paper is that the claimed social benefits of the bioeconomy, far from relying on sound scientific arguments (as stated in government documents), are instead false promises made in the interest of profits of powerful transnational companies (TNCs). The analysis is carried out on four publications which represent the voices of proponents (the EU and US governments) and the opponents (the two civil society organizations, ETC group and Global Forest Coalition) of the bioeconomy. The results of text analysis indicate that all the four texts exhibit some ideological biases. Nevertheless, pro bioeconomy documents prove to be far more ideologized than those against. The general conclusion of the research is that the debate on the risks and benefits of the bioeconomy needs to be cleansed of the ideological prejudices that characterize both its supporters and opponents and instead enriched with transparency and democratic political confrontation.

Keywords: bioeconomy, discourse analysis, ideology, neoliberalism

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1. INTRODUCTION AND RESEARCH OBJECTIVES

While many academicians, governments and business firms hail the bioeconomy as the techno-economic revolution which will save the world from hunger, and energy and environmental crises, other voices from civil society and non-profit organizations warn against the risks which the bioeconomy poses to health, environment and social justice. The paper analyzes these two points of view, comparing the arguments put forward in some key documents which in recent years have assessed the possible risks and benefits of the bioeconomy very differently. In particular, the paper focuses on the following four publications, with the first two representing the pros and the others the cons of the bioeconomy:

- 1) “The European Bioeconomy in 2030, a White Paper” released in 2011 by the European Commission (EC) as the result of the work of the European Technology Platforms carried out in a project funded by the European Commission’s Seventh Framework Programme.
- 2) “The National Bioeconomy Blueprint”, released by the White House in April 2012.
- 3) “The New Biomasters - Synthetic Biology and the Next Assault on Biodiversity and Livelihoods”, published by the ETC Group in 2011.
- 4) “Bio-economy versus Biodiversity”, published by the Global Forest Coalition (GFC) in 2012.

Text analysis and comparison is carried out using insights and methods from Critical Discourse Analysis (CDA). CDA is a multidisciplinary discipline for the analysis of texts and talks in social science which aims to identify the relationships between language, ideology, social structure and power (Wodak, Meyer, 2001, 2009). CDA is grounded in the idea that any discursive event is socially conditioned as well as socially constitutive, in the sense that it is affected by a given social order (including the social, cultural, economic and political sphere) but also directly affects social relations and structures, mainly by nourishing and propagating ideologies. At the core of the CDA research agenda is the interest in the semiotic dimensions of power, injustice, abuse, and political-economic or cultural changes in society. Its origins may be found in the work of critical linguists and in theories of society and power based on Foucault’s definition of power, as well in the Critical Theory set forth by the Frankfurt school and Habermas. CD is a broad research program encompassing methods and models from different disciplines, such as linguistics, sociology, political economy, anthropology and psychology. Nevertheless, there are three well-defined basic frameworks widely used in the literature (Sheyholislami, 2001): 1) the three dimensional framework proposed by Fairclough (Fairclough, 1995, 2010), based on the three core elements of text analysis, namely description, interpretation and explanation; 2) the framework by Hodge and Kress (Hodge and Kress, 1993) based on the dichotomous characterization of “euphemism” and “derogatory”; the categories model by Van Dijk (Van Dijk, 1997, 1998, 2000), based on identification of the basic categories of text structure (some examples are: disclaimers, comparison, euphemism, evidentiality, hyperbole, presupposition and vagueness).

In this paper CDA is used to uncover hidden political agenda and value systems concealed behind the alleged “value-free” discourse of EU and US governments on the bioeconomy. The main assumption of the paper is that the claimed social benefits of the bioeconomy, far from relying on sound scientific arguments (as stated in government documents), are instead false promises made in the interest of profits of powerful transnational companies (TNCs). The analysis is carried out on the four aforementioned publications which represent the voices of proponents (the EU and US governments) and the opponents (the two civil society organizations, ETC group and GFC) of the bioeconomy. The EU and US documents were chosen as representative of a fairly large set of documents produced in recent years by the global North for touting the bio-economy (OCDE, 2009, 2011; EC, 2007, 2010, 2012). It is worth noting that among the works produced as a result of research projects funded by the EU, there are only a few examples of reports critical of the bioeconomy (CREPE¹, 2010, 2011).

¹ Co-operative Research on Environmental Problems in Europe.

The study followed three steps. First, for each document, a summary was made of the main arguments for and against the bioeconomy. Second, a CDA was carried out in order to assess value systems and hidden ideological tenets in each of the six documents. Third, the two groups were compared with respect to the degree of the ideological bias and the correctness and verifiability of key statements. The CDA was carried out using van Dijk's model, which offers a general framework for analyzing the way in which ideologies are expressed, construed and legitimated by discourse. The model relies on two basic elements: a definition of ideologies in terms of "socially shared basic beliefs of groups"; identification of the levels of discourse (namely: meanings, formal structures, sentence syntax, rhetoric, action, form and argumentation) involved in the expression and reproduction of ideologies.

2. METHODOLOGY

The CDA carried out in the present study followed the approach proposed by Van Dijk. Stemming from a given definition of ideology, Van Dijk (2000) analyzes the discourse dimension of ideologies, that is to say "how ideologies influence our daily texts and talk and how discourse is involved in the reproduction of ideology in society" (p.4), looking into the various levels of discourse structure. Van Dijk uses the following general working definition of ideology: "ideologies are the fundamental beliefs of a group and its members" (Van Dijk 2000:7). Unlike common ground knowledge (which refers to beliefs and norms shared by a society, ultimately its culture), ideologies are not socio-cultural, and cannot be presupposed to be accepted by everyone. On the contrary, as in the case of attitudes, ideologies typically give rise to differences of opinion, conflicts and struggle. Ideologies form the basis for the social practices of group members and are used to achieve group goals; generally, ideologies are geared towards the reproduction of the group and its power (or the challenge toward the power of other groups), where power is defined in terms of the control one group has over the actions of the members of another group. Dominant ideologies refer to ideologies employed by dominant groups in the reproduction or legitimization of their dominance (Van Dijk 2000:35). With respect to the analysis of the ideological discourse structures, Van Dijk proposes a simple heuristic, a practical method to find ideology in text and talk (Van Dijk 2000:43). The basic assumption is that the overall strategy of most ideological discourse can be summarized in two sentences; 'say positive things about Us'; 'say negative things about Them' (where 'Us' refers to the members of the group sharing the ideology). Starting from this assumption it is possible to define the general conceptual framework that can be applied to all levels of discourse structures. This is what the author calls the 'ideological square', made of the following four sentences: 1. emphasize positive things about Us; 2. emphasize negative things about Them; 3. de-emphasize negative things about Us; 4. de-emphasize positive things about Them. Accordingly, the various elements of discourse structure are assessed with respect to their ability to fit into one of the four sentences of the ideological square.

The following table presents some of the elements of discourse structure, as suggested by Van Dijk, that were used in the present study.

Table 1 Elements of discourse structure; Van Dijk's definitions.

<p>Actors. The choice of subjects (personal/impersonal, individual/collective actors) in discourse statements may be ideologically driven.</p> <p>Contrast. Specific contents and discourse forms may serve to highlight the contrast between Us and Them, explicitly comparing the good things about Us with the bad things about Them.</p> <p>Disclaimers. They refer to a combination of positive self-presentation and negative other-presentation.</p> <p>Dramatization. Together with hyperbole, dramatization is a way to exaggerate the facts in one's favor; it is a familiar rhetorical device.</p> <p>Evidentiality. The kind of evidentiality provided for what is said (i.e. the kind of proof given for specific claims) may depend on (or be used in support of) the defended ideologies.</p> <p>Examples and illustrations. Stories may serve as premise in argumentations; presenting a credible story supporting ideological values in an attractive way may increase the persuasive strength of successive ideological argumentations.</p> <p>Generalization. Most debates involve forms of particularization, for instance by giving examples in which concrete events or actions are generalized and possibly abstracted from, thus making the claim broader, while more generally applicable. This is also the way discourse may signal the cognitive relation between a more concrete example as represented in a mental model, and more general opinions such as those of social attitudes or ideologies.</p>
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Hedging and vagueness. Hedging and vagueness are generally used for de-emphasizing the bad things about ‘Us’.

Implications and presumptions. Some declarations may tacitly presuppose the endorsement of ideological values and ‘visions of the world’.

Level of description-Degree of detail. Including many or few details about a theme is a way to emphasize or de-emphasize it.

Presupposition. It is a specific type of semantic implication, which by definition is true whether or not the current proposition is true or false. In this indirect way, propositions may be conveyed whose truth value is taken for granted and unchallenged.

Topics. Topics refer to the global themes dealt with in a text; they are the information that is best recalled of a discourse; topicalizing a theme is the starting strategy for emphasizing (or de-emphasizing) it.

Topoi. *Topoi*, or common loci, are a kind of topics which have become standardized and publicized; they are halfway between semantics and rhetoric. Ideological discourses generally have plenty of topoi (for example the *topos* of demographic growth threatening food security) that are used as standard arguments which need not be defended.

The main hypothesis of the study is that the documents of the US and EU governments proposing the bioeconomy as a strategy for socio-economic development are imbued with a techno-scientific and neo-liberal ideology, which hereafter is called techno-neo-liberalism.

The ideology of neoliberalism worships the market as the only viable means of civilization and human development (Birck, 2006; Mudge, 2006). Given its blind faith in free unregulated markets as guarantors of liberty and efficiency, neoliberalism calls for widespread processes of privatization, with the reduction of the public sector in society and the subordination of all human activities and institutions to the logic of profit. Neoliberalism was the weapon deployed by the corporate elites of the late capitalism to combat the shrinking profit rates of the 1970s and to regain the economic and political power lost with the economic and social achievements of the lower classes in the period of the welfare state. Techno-neo-liberalism comes from the alliance between neoliberal and techno-scientific ideology (Levidow et al., 2012; Hess, 2012). Techno-scientific ideology preaches the ability of scientific knowledge to solve any problem of human societies, and pledges the ethical and political neutrality of science (and scientists). The neutrality ideal of science opens the doors to technocracy, which is a form of governmental system where decision making is left to technocrats, i.e. individuals with technical training who perceive societal problems as being solvable through technological solutions. Ultimately, techno-neo-liberalism endorses the subjection of political power (the state) to market forces (corporate power) and to scientific knowledge (technocrats).

Particularly relevant to the purposes of this paper is the way in which neo-liberalism, through the concept of sustainable development, has been able to neutralize the environmental issue (healing the contradiction between capital and nature denounced by the economic thinking of the left). Indeed, after initial rejection, neoliberalism embraced the concept of sustainable development put forward by the Brundtland Commission, adapting the concept to its ideological dictates. Understanding sustainable development as a new and appealing framework for doing business, neoliberalism soon brought it into alignment with market capitalism (Cleaver, 1997). In the sustainable development literature the role of the government is generally portrayed as subsidiary and complementary to the central role of business, consistently with the need for privatization and deregulation stressed by neoliberal ideology.

With respect to the documents presenting the cons of the bioeconomy, no specific assumptions were made about their ideological stance. In this case CDA was carried out in order to understand their willingness to build a counter-ideology and to what extent such a counter ideology is imbued with some of the ideologies opposing neoliberalism and technocratism, such as socialism, communitarianism and different kinds of environmentalism.

Following Van Dijk’s approach and the definition of techno-neo-liberal ideology provided above, in the next sections the four texts stressing the pros and cons of the bioeconomy are analyzed, seeking to assess their adherence (opposition) to techno-neo-liberal ideology.

The texts are deemed to be adhering (opposed) to techno-neo-liberal ideology when the following arguments (which represent the myths underlying ideology, as mentioned in brackets) or ideological stances are endorsed (opposed):

1. Scientific knowledge and technology can definitively solve the most important social problems (That is, the myth of technological salvation).

2. Scientific advances result in benefits for society only if they translate into new products and markets (The myth of the free market).
3. In order to promote translational research² the public sector should: fund private research; set a straightforward regulatory framework; carry out communication policies aimed at increasing trust towards new technologies by the public (That is, the myth of the primacy of the private sector, with the state being considered as subservient to business).
4. Businessmen and scientists are far more suitable than the State for setting research and innovation priorities and for leading society (This is the myth of infallibility of experts).
5. Economy (and economics), business and science are all about efficiency, not about power. (This is the myth of market and science neutrality).

2. THE EU WHITE PAPER ON THE BIOECONOMY

The EU white paper on the bioeconomy (EC, 2011) sets forth goals and priorities of EU research policy for the coming years. The key message is that the EU is willing to provide substantial funding to research institutions involved in the wide field of the bioeconomy. The bioeconomy is referred to as “the sustainable production and conversion of biomass into a range of food, health, fibre and industrial products and energy” (EC, 2011:4). Hence, the sectors involved would comprise agriculture, fishery and forestry, energy, biotechnology, nanotechnology, health and pharmaceuticals. These sectors are pointed to as those which will be able to defend future European competitiveness in the world economy, while helping to address the issue of sustainability of economic growth. Another important message of the white paper is that funds shall go copiously to the private sector, which will lead research projects carried out jointly with public research institutions. The document is organized into two parts, the first (titled ‘How the Bioeconomy can meet the Grand Challenges’) showing the benefits of the Bioeconomy, and the second (titled ‘Making the vision a reality’) laying down the research policy agenda in support of the Bioeconomy.

When scrutinized through the lens of CDA, the entire document seems to be imbued with the techno-neoliberal ideology. With reference to the five ideological stances mentioned above the following considerations apply.

The first ideological stance is explicitly claimed at the beginning of the document, in the paragraph ‘summary and key messages’: “*This White Paper shows how the Bioeconomy can address the grand societal challenges and sets out a vision for 2030 together with a set of policy recommendations needed to achieve it. It is the result of a collaborative effort by experts involved in the nine separate Technology Platforms which cover the various aspects of the Bioeconomy*”. (EC, 2011:6).

In the same paragraph the following statements account for the second and third ideological stances: “*The successful Bioeconomy needs coherent and integrated policy direction, with key areas being: investment in relevant research areas; encouraging innovation to make sure that more of the knowledge developments reach the commercialization stage; good two-way communication with the public embedded in R&D projects to ensure societal appreciation of research and innovation.*”(EC, 2011:4).

While the first three ideological arguments appear as well defined topics (as witnessed by the statements quoted above), the fourth and fifth arguments are less explicitly set forth in the text and appear rather as assumptions underlying the entire discourse. Here the element of discourse structure involved is Presupposition which shows up when the truth value of a proposition is taken for granted and unchallenged. As an instance, the statement “*the integrated Bioeconomy we envisage is not simply about science, but is rather an integration of science with business and society*” (EC, 2011:5), together with the assertion “*bioeconomy can address the grand societal challenges*” clearly demonstrate the faith in the capability of scientists and businessmen to lead society to an a-political context (i.e. a context where social power struggles are ruled out).

The whole ideological content of the EU document, besides the evident support of the five ideological stances mentioned above, can be inferred from the use of the following discourse structures.

Topoi

Proponents of the bioeconomy use as a recurrent argument the ability of the bioeconomy to solve what are referred to as the main problems facing humanity, namely: hunger, human diseases, energy insecurity,

²Translational research is scientific research that helps to make findings from basic science useful for practical applications that enhance human health and well-being.

climate change, natural resource depletion and economic underdevelopment. This allows them to present the bioeconomy as something extremely positive for anyone, something which no person of common sense and good moral values should oppose. The EU document makes use of all these topoi, which are referred to as the six Grand Challenges (namely sustainable management of natural resources, sustainable production; improving public health; mitigating climate change; integrating and balancing social developments; global sustainable developments) and are dealt with the first half of the document in a chapter entitled ‘How the Bioeconomy can meet the Grand Challenges’. Here, the standard arguments which need not be defended, i.e. the common loci used to propagandize the ideology, are:

1. Solving these problems would benefit all; this is clearly untruth because as long as other plagues - such as gender inequality, economic inequality, war, lack of democracy and human rights - are not addressed, the alleged benefits of the bioeconomy will not be for all.
2. The bioeconomy is definitively able to solve these problems; however, so far the bioeconomy has not proven able to solve any of these problems, as testified by the case of genetically modified organisms (GMOs), that did not alleviate food insecurity, and the case of biofuels, that did not reduce pressure on non-renewable natural resources.

Level of description)- generalization- hedging and vagueness

In explaining how "the Bioeconomy can meet the Grand Challenges", the EU document uses a wise mix of generalization, level of description and hedging and vagueness, in order to emphasize the positive things and deemphasize the negative things about Us (the Bioeconomy). For each of the above grand challenges, generalization is used in such a way as to represent the problem as entirely encompassing and touching general social sensitivities. The bioeconomy is introduced as the magic wand which will save humanity but with a graceful use of hedging and vagueness in order to de-emphasize the scant proof on its actual usefulness. Accordingly, when introducing the actual areas where the bioeconomy is deemed to bring extraordinary benefits, the expressions used are quite vague. Here are some examples: ‘specific opportunities include’; ‘areas where the Bioeconomy will have an impact’; ‘particular ways in which the Bioeconomy can help meet this challenge’; ‘other important contributions which can be made by the Bioeconomy’. By contrast, the examples given of possible future innovations and benefits are provided in detail and with great assertiveness. This assertiveness tries to mask the great uncertainty about the actual potential of the bioeconomy. Indeed, the quoted innovations are either of limited scope (such as all the innovations concerning food production and animal breeding) or have still not been provided in the real world.

Actors and level of description

When describing the subjects involved in the bioeconomy and in the entailed “transition from a dependence on fossil fuels to full use of renewable raw materials”, the document names general aggregate anonymous subjects, such as: Europe, science, industry, civil society, policymakers, regulators, investors, professionals, business, technologists, scientists, and so on. Moreover it repeatedly calls for collaboration and networking among different subjects and for communication interventions aimed at creating social consensus on bioeconomy. This choice is clearly a way to de-emphasize negative things about Us, namely the possible conflict over exploitation of natural resources and new technologies. Avoiding naming individual sectors or companies and specific institutions and groups in society is a discursive strategy for concealing power struggles and asymmetries inherent in the development of the bioeconomy and for reinforcing the myth of science and market neutrality.

Topics

A further discourse strategy used for deemphasizing the negative things about Us is to leave little room for the discussion of the possible risks of the Bioeconomy. In the entire text the word risk appears 17 times; in seven cases what is dealt with is the risk faced by investors and in one case it is the risk of a low market acceptance of new products. In the remaining cases the word is contained in one of the policy recommendations provided by the White Paper, namely Recommendation 5: “*assess risk and benefits: open and balanced assessment*” (EC, 2011:19). The content of this recommendation is a blatant example of the willingness of the authors of the document to prevent open public discussion about the potential risks of the bioeconomy: “*In today’s risk-averse culture, a highly precautionary approach to policymaking has often reinforced the concept of potential and hypothetical risk in people’s minds, and this is all too infrequently offset by a consideration of benefits. To make properly informed choices, consumers are entitled to full and*

transparent information on both risks and benefits for traditional and novel products. Clarifying and communicating this information properly needs good cooperation between researchers, policymakers, industry and consumers.” (EC, 2011:19).

The clear meanings of these words are that: the EU is willing to reject the previously subscribed precautionary principle (thus giving way to the iterated requests of the biotechnological industry); the EU wants to make an effort to reduce the perception of risk on the part of the general public; to this end the advice is to say more about benefits than risks, and to rely on industry as a trustworthy subject from which to obtain clear, honest information for risk assessment.

Contrast and level of description

The basic discourse strategy to support the endorsed ideology is to say many positive things about Us, only a few negative things about Us and nothing about Them. The bioeconomy is presented as the only way forward to achieve economic growth and social well-being, notwithstanding the fact that it is such an ill-defined project that it needs to be called “vision” (the title of the second part of the document is in fact “the Bioeconomy vision”). In a way, the neo-liberal ideology here seems to have been accepted as a hegemonic thought, ready to transform itself from ideology (in terms of opinions shared by a group) into common sense accepted by all members of society, i.e. into dominant culture.

3. THE US BIOECONOMY BLUEPRINT

The document on the bioeconomy released by the White House (WH) on April 2012 (WH, 2012) is very akin in its structure and content to the EU white paper. Also the US document is made of three parts: an executive summary, a chapter defining and describing the bioeconomy (titled “Background and impact of the US Bioeconomy”) and a chapter outlining the government strategic objectives in the field of Bioeconomy R&D (titled “Federal Bioeconomy strategic objectives”). Bioeconomy is defined as “*economic activity that is fueled by research and innovation in the biological science*” (WH, 2012:1). The key messages of the document are: 1. Bioeconomy is able to assure the future well-being of Americans and to help maintain US economic power and global hegemony; 2. In order to succeed the bioeconomy requires strong public R&D investments and a regulatory framework able to lower constraints on the private sector and to help bioinventions easily reach the market.

When scrutinized with respect to the five ideological stances previously mentioned, also the US document proves to endorse techno-neoliberalism. The opening statements of the documents soon introduce the myth of technological salvation: “*The bioeconomy has emerged as an Obama Administration priority because of its tremendous potential for growth as well as the many other societal benefits it offers. It can allow Americans to live longer, healthier lives, reduce our dependence on oil, address key environmental challenges, transform manufacturing processes, and increase the productivity and scope of the agricultural sector while growing new jobs and industries.*” The myths of free market and of the supremacy of the private sector emerge from the central role ascribed to the private sector in fostering social well-being and from the focus on translational science. See for example the following two statements: “*The pursuit of a greater understanding of natural systems yields knowledge, ideas, and technologies that the private sector can build on, sparking economic growth by giving rise to new products, services, and jobs*”. (WH, 2012:3) “*If it is to be successful and thrive, the bioeconomy will be based on a steady flow of new products and services that address American needs. To ensure this flow, policies must be developed and taxpayer dollars must be used responsibly to foster an ecosystem that supports discovery, innovation, and commercialization*”. (WH, 2012:3).

The myths of infallibility of experts and of market and science neutrality emerge in the form of the presumption that new technologies and new products necessarily bring a plethora of benefits for all people, without possible social conflict. These myths also underlie the idea that “*Federal agencies should provide incentives for public-private partnerships and precompetitive collaborations to benefit the bioeconomy broadly*”(WH, 2012:5) which means that scientists, businesses and government are all deemed to share the same goals of public interest.

Unlike the EU document the US blueprint is imbued with strong nationalism. The underlying tenet is the well-being of Americans and the economic power of the Nation. In this regard, the quotation which opens the document is significant: “*The world is shifting to an innovation economy and nobody does innovation better than America* (President Obama, December 6, 2011)”.

As in the case of the EU white paper, also in the US blueprint the underlying ideology is underpinned by many of the discourse structures contained in Van Dijk's approach. Here below are some examples.

Topoi

Also the US document, in order to defend the bioeconomy, points out its capability “*to offer solutions to our most demanding scientific and societal challenges*” (WH, 2012:8). The topoi used refer to the spectacular benefits that the bioeconomy will provide in the fields of health, energy, agriculture, nutrition, environment and climate change. For each of these fields the document envisages the possible innovations that the bio-economy will be able to provide.

Level of description and evidentiality

In order to emphasize the positive things about Us (which in this case is the US bioeconomy) the document provides a detailed description of the research fields and economic sectors most involved in the bioeconomy, trying to show the large (positive) economic impact of the already available biotechnologies and of the emerging technologies such as synthetic biology, proteomics, bioinformatics and computational biology.

Hyperbole and dramatization

These rhetorical devices are used in order to emphasize the positive thing about Us. Here is an example of hyperbole: “*Decades of life-sciences research and the development of increasingly powerful tools for obtaining and using biological data have brought us closer to the threshold of a previously unimaginable future: ‘ready to burn’ liquid fuels produced directly from CO₂, biodegradable plastics made not from oil but from renewable biomass, tailored food products to meet specialized dietary requirements, personalized medical treatments based on a patient’s own genomic information, and novel biosensors for real-time monitoring of the environment.*” (WH, 2012:1). Dramatization is used in the following sentence: “*The public benefit gained through biological research can be seen through the eyes of a patient who receives a critical medication that did not exist a decade ago, a farmer whose higher-yield crops are turned into fuels, food, and intermediate chemicals, and a small-business owner whose innovative biobased products are breaking new ground in manufacturing*” (WH, 2012:7).

Contrast - Disclaimer

As in the EU case, also the US document fails to mention the alleged risks and negative aspects of the bioeconomy such as denounced by its critics (Them). This is a discourse strategy useful to deemphasize positive things about Them. Such a strategy is attested by the way in which the topic of safety and security risks associated with the new technologies is dealt with. The word ‘risk’ appears 18 times in the US document: five times the reference is to investment risks, five times the word appears in indexes and headlines, and the remaining times it is contained in a section called ‘Reducing Regulatory Barriers’ (WH, 2012:29-32). In pure neoliberal style what is said about risk is that risk perception and aversion may induce too much regulation and hinder investments in new technologies. Therefore, policy makers should be committed to reduce the burden of regulation. Here is a quotation summarizing the US government approach to bioeconomy risk management; it is worth noting the use of a disclaimer as discourse structure: “*Regulations governing our health products and services, energy production, national security, food, and environment are protections that necessarily reduce safety and security risks. However, some longstanding regulations have become inadequate or unnecessarily restrictive because technology and its associated products and services, as well as our national interests, have evolved and regulations may not have kept pace..... Federal agencies should develop new, efficient regulatory processes and reform extant ones where necessary. This will reduce barriers to innovation and increase predictability and timeliness of regulatory processes to stimulate the bioeconomy in all sectors,*” (WH, 2012:33).

4. THE ETC GROUP DOCUMENT

The ETC Group document (ETC, 2011) is a critical appraisal of the bioeconomy and an accusation against all those actors, namely governments, industry and international organizations, which present the bioeconomy as a solution to the world's environmental, energy, food and health problems. The authors of the document are scientists and representatives of civil society who work with the ETC group, and other civil society organizations engaged in the defense of the environment and people's rights in the global South.

The core message of the report is that under the banner of the bioeconomy “*what is being sold as a benign and beneficial switch from black carbon to green carbon is instead a red hot resource grab (from South to North) to capture a new source of wealth*” (ETC, 2011:1). In other words, the bioeconomy is not meant to meet the needs of humankind, as stated by its proponents, but rather to serve the interests of the most powerful transnational companies (TNCs), Wall Street and Northern economies and countries.

The document is organized in two parts. The first reviews the various fields of development of the bioeconomy and shows how the alleged social benefits that it is expected to provide are rather myths constructed to promote the interests of large corporations. Table 2 provides a summary of the ten myths identified by the report and the reasons for their demystification (ETC, 2011:31-33).

Table 2 The New Biomass Economy: 10 myths

The ten myths	The reality
1. Basing our economy on biomass is natural: we've done it before and it's time to do it again.	When the global economy last ran primarily on plant matter (in the 1890s), it required one-twentieth the energy it consumes today. Environmental history teaches us that when natural resources are overexploited, the result is often civilization collapse.
2. Biomass is a carbon-neutral energy source and a solution to climate change.	Burning biomass can release even higher amounts of carbon dioxide at the smokestack or tailpipe than burning fossil resources, since plant material has a lower energy density.
3. Biomass is a renewable resource.	While plants may be renewable in a short period of time, the soils and ecosystems that they depend upon may not be.
4. There is enough biomass, especially cellulosic biomass, to replace fossilized carbon.	Far from having enough biomass to supply a biomass-based economy, we are already deeply overdrawn at the biomass bank.
5. We can increase biomass yields over time.	Global production of biomass is already at historically high levels and there are limits to the quantities of biomass that the planet can surrender. These limits are dictated by availability of water, certain minerals and fertilizers, and the health of ecosystems.
6. Cellulosic fuels and chemicals solve the “food vs. fuel” dilemma.	While we may not eat the cellulosic parts of plants, they provide a valuable service in returning nutrients, structure and fertility to agricultural soils. Removal of these ‘agricultural wastes’ on the scale envisioned will likely lead to a decline in yields, a dramatic increase in synthetic fertilizer use, or both.
7. Bio-based plastics and chemicals are more environmentally friendly than fossil fuel-based chemicals.	Increasingly, chemical companies are devising ways to produce extremely toxic compounds such as PVC from biomass sugars rather than hydrocarbons. DuPont's propanediol polymer (Sorona), a leading commercial bioplastic, turns 150,000 tonnes of biodegradable food (corn) into 45,000 tonnes of non-degradable plastics annually.
8. Biomass is good for the global economy, aiding economic development in the South and creating “green jobs” in the North.	Biomass technologies are largely subject to patents and other proprietary claims, and attempts by countries to develop bio-based manufacturing industries will be subject to royalties and/or licensing fees. Industrial agriculture and plantations are already controlled by a handful of transnational companies. Moreover, there is no reason to presume that biorefineries and monoculture plantations of energy crops are in any way ‘green’ or safe for workers.
9. A Biomass economy reduces the political instability/wars/terrorism associated with petrodollars.	Removing fossil hydrocarbons from the global energy mix (even if it were possible or likely) would not magically dissolve geopolitical tensions. Like fossil resources, biomass is also unevenly distributed around the globe, and there is already a scramble to secure and control the land, water and strategic minerals, as well as the intellectual property, that will enable the new biomass economy.
10. Biomass technologies need support as a transitional step to a new mix of energy sources, including nuclear power, wind, “clean coal,” etc.	At its root, global society is faced with not simply an energy crisis but a crisis of overproduction and consumption. Reduction in overall energy demand is more politically unpalatable but ecologically critical.

Source: adapted from ETC, 2011.

The second part describes in detail the new technologies, highlighting the potential risks for the environment and human health. In both parts for any information on new products and technologies there is a

list of the corporations involved in their development, with details about investments, expected profits and, if any received, public aid. It turns out that the protagonists of the new bio-economy are the old oil, chemical, pharmaceutical, agribusiness and financial companies that until now have been responsible for the world's pollution and the plunder of natural resources in the global South. These are, just to give a few examples: ExxonMobil, BP, Shell, BASF, DuPont, Syngenta, Procter & Gamble, Microsoft, Monsanto, Total Oil, Chevron, Goldman Sachs, J.P.Morgan, Unilever, Coca-Cola, Cargill, ADM, Weyerhaeuser, Stora Enso, Tate & Lyle, Bunge, Cosan Ltd. Moreover, it emerges that many companies have been generously supported by billions of dollars of U.S. government and state funding; in particular, the money fuelling synthetic biology currently comes mainly from the U.S. Department of Energy.

When the CDA is applied to the ETC Group document, the first general finding is that it builds quite an explicit counter hegemonic discourse opposing the rhetorical claims of governments and corporations which parade the amazing potential of the bioeconomy. Although the word neoliberal(ism) appears only once in the document, the arguments warning against the bioeconomy all seek explicitly to deconstruct the myths which support the techno-neo-liberal ideology. The myths of technological salvation and infallibility of experts are deconstructed by reviewing the wide range of potentially dangerous (even catastrophic) effects on ecosystems and human health of new 'bio-based' technologies and by providing evidence of the past inability of scientists to predict some of the worst environmental impacts of the old 'oil-based' technologies. The myths of the free market, the primacy of the private sector and of market and science neutrality are deconstructed by pointing out strongly, throughout the document, that the new bioeconomy is nothing more than an instrument in the hands of monopoly capitalism for molding new sources of profit even to the detriment of human health and ecosystems (Rossi, 2010; Levidow et al., 2012).

In order to deconstruct these myths the ETC Group document reveals the groundlessness of the reasons given in favor of the bioeconomy, showing that the stressed arguments of sustainability, safety and feasibility of the new technologies (which are the topoi used in the discourse strategy by the EU and US documents) are nothing but false truths. It uncovers what is concealed by the vagueness of EU and US documents used for deemphasizing the 'negative things about Us', namely that the bioeconomy is spurred by the most powerful TNCs to make profits by further exploiting natural resources in the global South. The words profit, corporation and South appear respectively 15, 25 and 32 times in the ETC Group document and do not appear at all in the EU and US documents.

When the CDA is used in order to ascertain whether the narrative of the document relies in turn on specific ideological stances, two strategies may be pursued: looking for ideology-based topics; looking for those discourse structures typical of ideological discourses (emphasizing/deemphasizing the good/bad things about Us).

The kind of ideologies that may be considered opposed to the techno-neo-liberalism are the eco-socialism and the ecocentrism. These ideologies take equality and human and nature rights as the basic values that should inform human society. Moreover, they maintain that, in order to affirm these values, "*what must be changed in priority is the way people experience nature, the way people think about it and the whole cultural matrix of industrial society*" (Boulanger, 2012:11). The two myths underlying these ideologies are that: 1) traditional rural communities are able to conform to these values and behaviors (the myth of the virtuous traditional rural communities); 2) a real social development is ultimately cultural and spiritual in nature (this is the myth of the spiritual development of humankind).

When searching in the ETC Group document for the tenets and myths of eco-socialism and ecocentrism, it was found that: 1) while it actually defends equality and human rights as basic values, it does not hold that the sole way to achieve it is a change in personal attitudes (implicitly assuming that institutional change is important as well); 2) it exhibits only faint traces of the two myths of the virtuous traditional rural communities and of the spiritual development of humankind; the principal example is on page 16 with "the tale of the two bioeconomies", which contrasts the traditional biodiversity-based economies with the new biomass-based economies. In this tale the myth of the spiritual development of humankind seems to be somehow endorsed by the claim: "*an important character of the biodiversity-based economies is their holistic feature, with nature imbued with cultural and spiritual values and often seen as sacred*" (ETC, 2011:6).

Contrary to the EU and US documents, the ETC Group document is all about Them, and in particular emphasizes negative things about Them. In a way, the scant references to the positive things about Us weaken the ideological content of the discourse. Also when exploring the discourse structures signaling ideological underpinnings, it turns out that these are far harder to find than in the case of the EU and US

documents. Since the majority of the assertions are carefully supported by data and references, it is difficult to find discourse strategies such as topoi, hedging and vagueness.

There is indeed a certain asymmetry in the level of description with respect to the negative things about Them and the negative things about Us, with the first presented in a far more detailed way and sometimes too colorfully (an example can be found on page 2: “*The same transnational companies that fostered dependence on the petroleum economy during the 20th century are now establishing themselves as the new biomassers. When that coup is complete.... they will have achieved a firmer clutch, perhaps even a death grip, on the natural systems upon which we all depend*”). Nevertheless, the fact that all the arguments are generally treated from a positive rather than a normative perspective³ (contrary to the EU and US documents with all their “ought to’s”, recommendations and policy designs, all aimed at supporting the Bioeconomy) cleans the text of strong ideological accents.

5. THE GLOBAL FOREST COALITION DOCUMENT

The GFC document (GFC, 2012) addresses the issue of the bioeconomy by focusing on its implications for forest conservation and biodiversity. It stresses that the bioeconomy represents a major threat to forests and biodiversity because either it uses old technologies (burning wood for electricity and heat) increasing pressure on land and forests and generating loss of biodiversity, hunger and conflict, or it uses risky (as regards both human and ecosystem health) new technologies such as: genetically engineered (GE) trees, algae and bio-energy crops, the development of synthetic organisms for food and fiber production (biorefineries). Against the bioeconomy agenda the GFC document advocates the biodiversity agenda, which means tackling the environmental, energy and food crisis starting from the teachings of indigenous people and local communities that have proved able worldwide to develop sustainable livelihoods and preserve the ecosystems they live in. Like the ETC Group document, it points to the most powerful TNCs as the main actors maneuvering the bioeconomy in order to exploit new profit-generating opportunities.

Unlike the three documents previously analyzed the GFC document states quite explicitly the ideological stances of supporters and opponents of the bioeconomy. The discourse is constructed not just to emphasize the positive things about Us and the negative things about Them, but rather to clarify the political choices and ethical values which lie behind the two different attitudes towards the bioeconomy. For example, criticizing the UNEP report which praises the green economy (UNEP, 2011), the GFC states: “*The upbeat tone of the report and UNEP’s enthusiasm for capturing the attention of world leaders cannot be denied. Rather bizarrely, however, this report embraces the neoliberal perspective wholeheartedly, while claiming political neutrality*” (GFC, 2012:3). In a similar way, the ideological stances of the opponents of bioeconomy are quite explicitly declared:

“Instead of promoting a socially-blind ‘green economy’, an alternative world view would recognize the bio-cultural approaches of indigenous peoples and local communities who have long succeeded in developing sustainable livelihoods, a ‘buen vivir’ in harmony with the ecosystems they live in. Territories and areas conserved by indigenous peoples and local communities, women-driven forest conservation and restoration initiatives, community initiatives that sustain food and energy sovereignty, and the efforts of small peasants to produce food in harmony with our planet all serve as inspiring examples of ways in which local economies build on the principles of care, harmony with nature, human rights and sovereignty, and contribute to the well-being of both community members and the planet as a whole”. (GFC, 2012:3).

The ethical issue, which lies at the core of the ecocentrism, is also explicitly addressed: “*The Earth’s ecosystems provide a very limited source of biomass, which cannot be endlessly exploited as a resource base for unlimited economic growth. Moreover, there are fundamental ethical and cultural concerns over the commodification and privatization of biodiversity through markets in environmental products and services*”.(GFC, 2012:10).

Since the GFC document explicitly recognizes its ideological stances, CDA, which is precisely meant to help uncover hidden ideological stances, proves of little use. Indeed, when searching for those discourse structures deemed to reveal the ideology behind the text, the results are disappointing. Overall, in the GFC document there is a very limited use of discourse structures and strategies, such as topoi, disclaimers, levels of description, hedging and vagueness, hyperbole and dramatization.

³It is worth noting that the ETC document leaves little room for recommendations, which take up only two (pp. 55 and 56) of the 84 pages of the text.

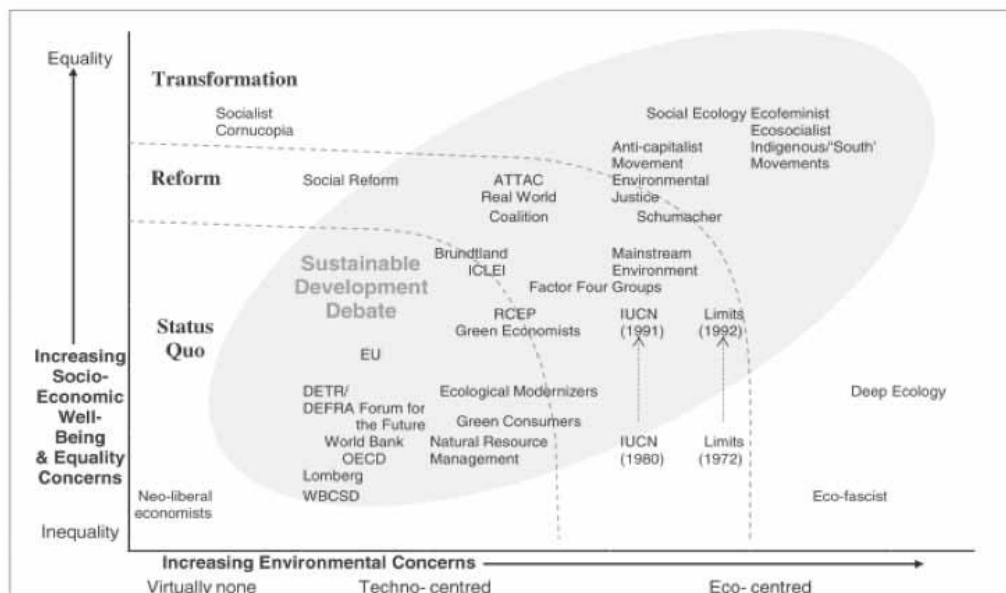
6. DISCUSSION AND CONCLUSION

The results of text analysis indicate that all the four texts exhibit some ideological biases. Nevertheless, pro bioeconomy documents prove to be far more ideologized than those against.

The ideology underpinning the praise of the bioeconomy is a kind of techno-neo-liberalism, supported by global industrial capitalist elites in order to forge new forms of capital accumulation. Because the fundamental trait of neoliberalism is the capture and use of the state for the benefit of a small group of large businesses, it is hardly surprising that the EU and US governments have become the champions of the bioeconomy.

The ideology embraced by the opponents of the bioeconomy seems to be a kind of eco-socialism and eco-centrism. These ideologies are part of a large bundle of different currents of thought and political and philosophical perspectives which may be put under the banner of deep ecology and radical environmentalism (see the figure below for a synopsis of the different perspectives). Both eco-socialism and eco-centrism, when dealing with environmental issues, advocate the local versus the global dimension, democratism versus technocratism and people-orientation versus resources-orientation policy design approaches. Eco-centrism is more centered on ethical issues, preaching the virtues of reverence, humility, responsibility, and care (namely the virtue ethics praised by Van Staveren, 2007) in opposition to the straight utilitarianism of neoliberalism.

Figure 1 Mapping of environmental discourses.



Source: Boulanger, 2012

Revealing the ideological stances beyond the discourse on the bioeconomy is of utmost importance in order to bring the debate on the bioeconomy toward fairer and more rational tones, which would help recognize the risks that it poses in terms of: social justice, conflict over natural resources (chiefly land and water) and intellectual property rights, environment and resilience of ecosystems, and human health. Once these risks are acknowledged, it becomes clear that any discourse on the bioeconomy should include political and ethical issues well before technological and economic issues. This is because in a democratic society the decision about the ‘acceptable’ level of risk (and the distribution of risk among its members) cannot be taken without explicitly referring to value judgments and engaging in political debate.

The recommendations given at the end of the ETC Group document go in this direction and do not seem to be imbued with ecoradicalism. They call for an effort at international level (involving governments and international organizations such as FAO, UNCTAD, EMG and CBD⁴) to build a Technological Governance based on the goal of fulfilling human rights and on the principle of the participation of society at

⁴UN Environment Management Group (EMG); UN Convention on Biological Diversity (CDB); UN Conference on Trade and Development (UNCTAD); UN Food and Agriculture Organization (FAO).

large in decision making processes. An example would be a legally-binding International Treaty for the Evaluation of New Technologies (ICENT) which would allow the monitoring of major new technologies by governments and all people affected.

The general conclusion of the research is that the debate on the risks and benefits of the bioeconomy needs to be cleansed of the ideological prejudices that characterize both its supporters and opponents and instead enriched with transparency and democratic political confrontation. Currently, the bioeconomy seems to be more about power struggles than social development. This could mean that the opportunities for human and social development offered by technological innovation might be transformed into new challenges for the environment and humankind.

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