

**HOUSEHOLD ENERGY TECHNOLOGY PROJECTS
IN VOLUNTARY CARBON MARKETS:
STORYLINES OF CO-BENEFITS**

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<p>This Master's thesis has two sections. The first section is a methodological introduction that presents the data collection and analysis methods. The second part is an article 'Household energy technologies in voluntary carbon markets: storylines of co-benefits' that has been sent to the international, peer-reviewed journal Global Environmental Change.</p> <p>The thesis examines how the co-benefits of voluntary carbon market offset projects are conceptualized in household energy technology projects. Carbon markets have been presented as one of the solutions for climate change mitigation. In carbon offsetting, emissions produced in one place are compensated through reducing emissions elsewhere. Offset projects have been financed especially in the global South. In addition to reducing emissions, carbon offset projects are justified on the basis of creating local co-benefits. The focus of this thesis is on the voluntary carbon markets, where the price of emission reduction credits is influenced by perceptions of created co-benefits.</p> <p>Household energy technologies are technologies that produce emissions reductions either through increasing energy efficiency or using renewable energy. Three technologies that have been popular project types in the voluntary carbon markets are examined, namely improved cookstoves, ceramic water purifiers and biodigesters. The popularity of the technologies is based on win-win assumptions where the technologies are seen to tackle multiple goals, such as climate mitigation and development.</p> <p>The research material consists of interviews with 18 experts. The interviewees consisted of representatives of NGOs, carbon offset project developers, donors, carbon standards and entrepreneurs. The interviewees were selected based on their familiarity with household energy technologies and voluntary carbon markets. The interviews were conducted in Cambodia in March 2013. In addition, publicity material, speeches and documents from an international seminar on clean cooking was reviewed.</p> <p>The concept of storylines is used to examine how the co-benefits of household energy technologies are conceptualized. Storylines are middle-range concepts that enable a discourse-analytical approach to research. What is viewed as a relevant problem, how it has been created, how it should be solved and by whom are all important elements of a storyline. The research presents three different storylines through which the co-benefits of household energy technology projects are conceptualized in voluntary carbon offset projects. The first storyline focuses on the impacts of the technologies on the users' health. The storyline emphasizes the efficiency of the technologies as key to producing health impacts. The second storyline criticizes current ownership practices in carbon offset projects. The storyline claims that the greatest co-benefits would be realized if users would receive monetary compensation for the emissions reductions they produce. The third storyline emphasizes the role of developing local markets for the technologies. In the storyline, co-benefits are realized when local employment is improved and local markets developed.</p> <p>The first and third storyline were the most dominant ones in the analyzed material. Both storylines stressed the importance of scientific expertise and markets. The storylines differed in their views towards supporting local markets for producing the technologies versus importing more efficient technologies. The critical stance of the second storyline towards current practices in carbon credit revenue distribution was less present in the research material.</p> <p>Discursive forms, such as storylines, can influence what type of projects succeed in creating positive images and receiving better prices for the emissions reductions produced. How the co-benefits of household energy technologies are conceptualized carries material implications through influencing what type of projects are successful in the voluntary carbon markets.</p>			
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<p>Tämä pro gradu -tutkielma on kaksiosainen. Ensimmäinen osio on artikkeli 'Household energy technologies in voluntary carbon markets: storylines of co-benefits', joka on lähetetty kansainväliseen, vertaisarvioituun julkaisuun 'Global Environmental Change'. Toinen osio on metodologinen liite, joka esittelee tarkemmin tutkimuksen aineistonkeruuseen ja analyysiin liittyvät metodologiset valinnat.</p> <p>Tutkielma tarkastelee tarinalinjojen kautta, miten vapaaehtoisten hiilimarkkinaprojektien oheishyödyt hahmotetaan kotitalousenergiateknologiaprojekteissa. Hiilimarkkinoita on esitetty yhdeksi ratkaisuksi ilmastonmuutoksen hillitsemiselle. Hiilikompensaatioprojekteissa yhtäällä tuotettuja päästöjä kompensoidaan maksamalla rahallinen hyvitys päästöjen vähentämisestä toisaalla. Päästövähennystoimia on rahoitettu erityisesti globaalissa etelässä. Päästöjen globaalin vähenemisen lisäksi projekteja perustellaan niiden tuottamalla paikallisilla oheishyödyillä. Tässä tutkielmassa tarkastellaan erityisesti vapaaehtoisia hiilimarkkinoita, joissa päästöyksiköiden hintojen määrittelyyn vaikuttavat käsitykset hiilikompensaatioprojektin tuottamista oheishyödyistä.</p> <p>Kotitalousenergiateknologiat ovat teknologioita, jotka vähentävät kotitalouksien aiheuttamia kasvihuonekaasupäästöjä lisäämällä joko energiatehokkuutta tai uusiutuvan energian käyttöä. Tutkielmassa tarkastellaan erityisesti kolmea teknologiaa, jotka ovat olleet suosittuja projektityyppinä vapaaehtoisilla hiilimarkkinoilla globaalissa etelässä: energiatehokkaita liesiä, keraamisia vedenpuhdistimia ja biokaasukeittimiä. Teknologioiden suosio perustuu oletuksiin, joiden mukaan ne tuottavat sekä globaaleja päästövähennyksiä että paikallisia kehityshyötyjä.</p> <p>Aineisto koostuu kahdeksantoista asiantuntijan haastatteluista. Asiantuntijat edustavat kansalaisjärjestöjä, projektien kehittäviä ja rahoittavia tahoja sekä hiilimarkkinaprojekteja sertifioivia tahoja. Asiantuntijoiden valintaa ohjasi heidän asiantuntemuksensa kotitalousenergiateknologioista ja vapaaehtoisista hiilimarkkinoista. Haastattelut tehtiin Kambodžassa maaliskuussa 2013. Haastatteluaineiston lisäksi tutkimuksessa käytettiin esitelmiä ja dokumenttiaineistoja kansainvälisestä seminaarista, jonka aihepiiri oli kotitalousenergiateknologiat ja niiden markkinoiden sekä käyttöönoton lisääminen.</p> <p>Aineiston analyysissä käytettiin diskurssianalyysin käsitettä tarinalinja. Tarinalinjat ovat keskitason käsitteitä, jotka mahdollistavat diskurssianalyttisen lähestymistavan tutkimukseen. Tarinalinjoissa tiivistyy, mikä nähdään ongelmana, miten ongelma on luotu sekä miten ja kenen tulisi ratkaista ongelma. Analyysissä nousi esille kolme erilaista tarinalinjaa, joiden kautta hahmotetaan kotitalousenergiateknologioiden oheishyötyjä hiilikompensaatioprojekteissa. Ensimmäisessä tarinalinjassa korostuvat kotitalousenergiateknologioiden vaikutukset teknologioiden käyttäjien terveyteen. Tarinalinjassa painottuu teknologioiden tehokkuus terveysvaikutuksien tuottajina. Toisessa tarinalinjassa korostuu kriittisyys nykyisillä päästökompensaatiomarkkinoilla vallitsevia omistajuuskäytäntöjä kohtaan. Tarinalinjassa esitetään, että hiilikompensaatioprojektien suurin oheishyöty toteutuisi, jos teknologioiden käyttäjät saisivat rahallisen korvauksen tuottamastaan päästöyksiköistä. Kolmas tarinalinja korostaa paikallisten markkinoiden kehittämistä teknologioille. Tarinalinjassa hiilikompensaatioprojektien suurin oheishyöty toteutuu, kun paikallista työllisyyttä lisätään ja markkinoita kehitetään.</p> <p>Ensimmäinen ja kolmas tarinalinja olivat yleisimpiä aineistossa. Molemmat tarinalinjat korostivat tieteellisen asiantuntijuuden ja markkinoiden tärkeyttä. Tarinalinjat erosivat toisistaan suhtautumisessaan siihen, olisiko syytä tukea paikallisia markkinoita kotitalousenergiateknologioiden kehittämisessä vai tuoda maahan tehokkaampia teknologioita. Toisen tarinalinjan kriittisyys hiilimarkkinoilla vallitsevia omistajuuskäytäntöjä kohtaan oli vähemmän esillä aineistossa.</p> <p>Käsitykset hiilikompensaatioprojektien oheishyödyistä vaikuttavat siihen, minkälaiset projektit onnistuvat luomaan myönteisiä mielikuvia ja täten saamaan parempia hintoja päästövähennysyksiköilleen. Diskursiivisilla muodoilla, kuten tarinalinjoilla, voi olla suoria materiaalisia vaikutuksia siihen, minkälaisia projekteja vapaaehtoisilla hiilimarkkinoilla tuotetaan ja ostetaan.</p>			
Avainsanat – Nyckelord – Keywords ilmasto; kehitys; vapaaehtoiset hiilimarkkinat; tarinalinjat; teknologia; kotitalous			

Preface

This Master's thesis is about technologies, development and the storylines that surround the two. The voluntary carbon markets, where emissions created in one place are compensated through reducing emissions elsewhere, have created new connections between the global North and South. The emissions from a holiday flight from Helsinki to London can be compensated by purchasing emissions reductions credits created by a woman using a fuel-efficient improved cookstove in Cambodia. The technologies are claimed to also improve local development, such as health, incomes and markets, in Cambodia. In this thesis, I delve into this 'other side' of carbon offset projects, namely the co-benefits that are claimed to be created in carbon offset projects in addition to the emissions reductions. I approach the issue by asking what kinds of co-benefits are a specific type of carbon offset projects, household energy technologies, claimed to produce? More specifically, how are the co-benefits of the projects conceptualized by different actors?

My findings point to three storylines through which the co-benefits of household energy technology offset projects are conceptualized. The first storyline presents health impacts as the most significant co-benefit of household energy technology projects. The second storyline focuses on the ownership structures of carbon credit revenue, claiming monetary compensation from producing emissions reductions as the most important co-benefit. The third storyline presents local employment and market development as the most significant co-benefit of household energy technologies.

The findings highlight the importance of storylines in understanding how meanings do not simply emerge, but rather come into politics and practice through particular routines, norms and rules. The research presents how concepts and conceptualizations are continuously contested in struggles over meaning and interpretation. Storylines and the struggle over meaning carry material impacts. In the voluntary carbon markets, conceptualizations of co-benefits translate into price premiums and can influence what type of projects are successful and with what outcomes.

This Master's thesis has been written primarily as an article that has been submitted to an international academic journal. As such, it does not abide by the typical structure for a Master's thesis at the Faculty of Social Sciences. The thesis consists of two parts, where the first section is a methodological introduction intended to guide the reader, and the second section is an article 'Household energy technology projects in voluntary carbon markets: storylines of co-benefits', which has been submitted to *Global Environmental Change* on 03.05.2015.

I would like to thank all of my interviewees for giving their time and valuable comments for this research. My thesis supervisors Eeva Berglund and Janne Hukkinen, as well as my companions at the

environmental policy research seminar, provided critical and constructive comments along the research process that deserve thanks. I would also like to thank my colleagues at Finland Futures Research Centre, University of Turku, with whom I could always discuss questions that troubled me while conducting the research. Particular thanks go to Visa Tuominen, Outi Pitkänen and Mira Käkönen. Completing this thesis would not have been possible without baby-sitting and other help from my parents. The greatest thanks go to my dearest Antti and Lilja, who patiently supported me along the way.

Helsinki, May 3rd 2015

Kamilla Karhunmaa

Methodological introduction

Introduction

This Master's thesis has two sections. The first section is a methodological introduction that presents the data collection and analysis methods. The second part is an article 'Household energy technologies in voluntary carbon markets: storylines of co-benefits' that has been sent to the international, peer-reviewed journal *Global Environmental Change*. A Master's thesis is commonly a 60-80 page research text on a specific topic. As a thesis, one of its functions is to determine that the writer, a student, is capable of conducting and reporting scientific research. In comparison, an article in a scientific journal is usually a concise presentation of one key argument that is 15-25 pages long. While methods and methodological choices are extremely important in journal articles, articles rarely contain similar self-reflexiveness on the research process as a Master's thesis. To supplement the article, I have written a separate methodological introduction with a more detailed introduction into the specific methods used and choices made in this research.

In the methodological introduction, I will firstly outline the background of the research as part of a wider project. I will outline the theoretical background that informed the research. Then, I will present the data collection and data analysis. Finally, I will consider some ethical implications and limitations in the research. In writing this introduction after the research article has already been for the most part completed, I have been inspired by the 'paths' approach adopted by researchers describing their research paths in Ilmo Massa's (2014) edited book *Paths to social scientific environmental research (Polkuja yhteiskuntatieteelliseen ympäristötutkimukseen)*. In the book, researchers present the 'paths' they have traversed while undertaking research and the methodological, theoretical and practical issues faced along the way. In a similar vein, the making of this Master's thesis has required creative problem-solving along the way.

Background of the research

This research has its origins in the work I have carried out at Finland Futures Research Centre (FFRC), University of Turku. I began working at FFRC in fall 2011 as a research assistant on projects related to climate change and development policies. The research for this article has its premise specifically in a project called 'Scaling up low carbon household technologies in the lower Mekong Subregion'. The project commenced in 2012 and has been funded by the Nordic Climate Facility (NCF), which is financed by the Nordic Development Fund (NDF) and administrated by Nordic Environment Finance Corporation (NEFCO). The aim of the whole project is to scale up the production, distribution and use of household technologies, primarily ceramic water purifiers, in Lao

PDR and Cambodia. The project partners, social enterprises TerraClear in Lao PDR and Hydrologic in Cambodia, and a cooperative of development organizations called Nexus - Carbon for Development (henceforth Nexus), have a significant role in advancing this aim. In addition, the project contains an independent research component carried out by FFRC with the aim of contributing to the discussions on the development impacts of carbon offset projects. For the project, a report will be published in summer 2015 on the possibilities of assessing, measuring and monitoring the development impacts of carbon projects, with a focus on household energy technologies in the Mekong region.

The material for this article has been collected through the research carried out in the above project and the collection of the material has been supported by the NCF grant. Besides that, the article has been written as part of my Master's thesis, independently of the research project. All opinions and errors in the text are my own.

Theoretical background

This research is informed by the fields of discourse analysis, science and technology studies and actor-network theory. The article is strongly empirically oriented and the research trends outlined below are not discussed further in the article. In this methodological introduction, my aim is not to give a detailed and comprehensive account of how the research relates to contemporary questions in these fields. Rather, I aim to present some of the theoretical discussion that has informed the research and the specific research questions I address in the article. The article, in turn, presents a more detailed and concise literature review on carbon offsetting, voluntary carbon markets and the discursive and material implications they carry.

Discourse analysis forms the starting point of this research. As a method of inquiry, it has been applied to environmental questions especially since the 1990s (cf. Hajer 1995; Myerson and Rydin 1996; Hajer and Versteeg 2005; Dryzek 2005). Particularly Maarten Hajer has been influential in analyzing debates over environmental problems not as debates over the existence of the problems, but rather as struggles over the meaning and interpretation of the problem and the action it portends (Hajer 1995; 13-15). Hajer presents politics as a struggle over discursive hegemony, where different actors attempt to create support for their views of reality. This struggle is influenced by the credibility, acceptability and trustworthiness of both the actors and their arguments. Struggles over meaning and interpretation do not occur in a vacuum, but are strongly influenced and shaped by existing institutional configurations (Hajer 1995; 59-60).

The article is also informed by notions from the fields of science and technology studies (STS) and actor-network theory (ANT). These two fields of study depart from classical dialectical descriptions of the relations between nature and society or technology and society (cf. Peluso 2012). Rather, STS and ANT stress the role of technology and nature not as separate from society, but rather as mutually entangled socionatural entities or socio-natures (Braun and Castree 1998; Haraway 1988). The role of things, technologies and materials is warranted attention as increasingly constitutive of what we do and who we are (Braun and Whatmore 2010). The concept of actor is extended to account for non-human objects and their agency, shifting the focus to analyzing specific networks and assemblages, and the practices within them (Latour 2005).

Human-technology relations have been marked by notions of ‘progress’, where the relationship has focused on the making and use of technology (Winner 1986). There has been less space for appreciating technology as a force reshaping activity and meaning. Braun and Whatmore (2010; xi) seek to shift the focus away from technology as merely the object of politics. The idea of technology having agency through its material nature, its durability, acceptability and other characteristics has been discussed by, for example, Law (1992) and Akrich (1992). Braun and Whatmore (2010; xi) attempt to shift depictions of science and technology as mere objects of politics into ‘something that inheres in and precedes the collective (and discourse), and thus something that challenges how the category of the political is *itself* conceived and where and in what it is articulated’ (emphasis in original). While agreeing that science and technology needs to be appreciated as other than mere object of politics, the hybrid nature and co-creation of the technical and the social (cf. Peluso 2012) question the idea that science and technology itself could in turn be packaged into an a priori category that precedes the political. Rather, technology should as well be approached as a specific practice that can alike be constrained and conceptualized through discursive accounts and specific practices.

The article is informed by the above domains of research while not delving further into the questions raised by them. In the article, I aim to connect the discursive with the material through analyzing how storylines influence conceptualizations, which in turn carry material implications. Discourses are part of the sociotechnical assemblages behind technologies, their uptake and popularity, and can shape the material implications of technologies. I argue that material and discursive aspects are firmly interwoven in carbon offsets, and particularly in the conceptualizations of co-benefits. Appreciating these entangled sociotechnical entities calls for contingent empirical analysis that the article sets out to do. This leads me to the specific questions I aim to address in the article: how are the co-benefits of household energy technology carbon offset projects conceptualized by different actors within the voluntary carbon markets? Further, what implications can these conceptualizations carry?

Data collection

The article is based on an analysis of interviews, using discourse analysis as tool for interpreting the interviews. In addition, documents and publicity material complemented the interviews. Interviewing is one of the most common methods in qualitative social science research (Hirsjärvi and Hurme 2001). Discourse analysis in environmental policy has often been based on an analysis of documents and other policy texts, which have been interpreted as the source of meaning and determinants of the action to be taken (cf. Hajer, 1995; Yanow 2007). Interviews have been used as sources for discourse analysis especially in social linguistics (cf. Fairclough 2001), but have not been as commonly employed in environmental policy (e.g. Hajer 2006). The popularity of using documents and text sources resides in their easy availability compared to the time and costs of interviewing. In the case of analyzing the sustainable development impacts of carbon offset projects, for example, a majority of approaches have relied on document analysis (cf. Drupp 2011; Crowe 2013). While interviewing cannot be assumed as an automatically deeper mode of inquiry (cf. Töttö 2004), it does differ from document analysis in giving the interviewer the opportunity to question assumptions made by the interviewee and ask for clarifications. Further, the interview situation does not allow consideration and modification of meanings to a similar extent as writing texts. Interviewing can highlight the routine and unquestioned modes of thinking of the interviewee.

The material for the research was collected in March 2013 in Phnom Penh, Cambodia. A list of possible interviewees was drafted by colleague from FFRC and myself, with assistance from the project partner Nexus. Possible interviewees consisted of representatives of NGOs (both project implementing and advocacy), project developers, donors (both government and private foundations), carbon standards and entrepreneurs. The interviewees were selected based on their familiarity with household energy technologies, particularly improved cookstoves, ceramic water purifiers and biodigesters, as well as the carbon markets. An initial list of 50 interviewees were all sent an interview request via e-mail. Out of these, 15 agreed to be interviewed in Phnom Penh or via Skype in March 2013. The rest either did not respond or were interested, but our schedules did not match. The amount of informants expanded to 18, as the interviews were complemented by a focus group with four participants.

It is possible to influence the research setting through the selection of interviewees. In this research, the interviewees were limited to actors working within the carbon market. The carbon markets have been widely critiqued in both academia and activist circles (cf. Böhm and Dabhi 2007; Lohmann 2008) and actors critical of the carbon markets have generally tended not to participate in carbon offset projects. While I originally intended to interview more NGOs critical of the carbon markets, due to time constraints, I was able to interview only one, so the representation of this viewpoint is

limited. This was a significant factor in realigning the scope of the article to actors operating *within* the voluntary carbon markets. This is also reflected in my results, which I have discussed in the article.

Several of the interviewees had been involved in implementing or financing household energy carbon offset projects, and can be called specialists of carbon offsetting. These actors are key players in understanding how carbon offsets are produced and consumed (cf. Lovell and Liverman 2010). At the same time, they are key players producing those understandings and attempting to influence the voluntary carbon market through storylines. They were familiar with the terminology and recent developments in both the field of household energy technologies and the voluntary carbon markets. Interviewing experts carries challenges with regards to how the expert may attempt to influence the course of the interview and what details the interviewee shares (Rosaline 2008). In this research, the interviewees were keen on participation and willing to share information and details on projects. Being connected to the wider project described above that was related to the same field, and able to contact possible interviewees by mentioning the project partners, was likely to help here. At the same time, being able to distance oneself from the project partners as an independent research party was equally important. Interviewees were willing to share information they would not have shared with people considered competitors in the field and also to reflect upon their own experiences of the carbon markets with an ‘outsider’ to the field.

Geographically, the majority of the interviewees lived and worked in the global South but were themselves experts from the global North. A minority of the interviewees were from developing countries. All interviewees were experts on household energy technologies and carbon markets and part of similar policy circles. This is likely to have decreased the sense of cultural differences between the interviewer and interviewee. All the interviews were conducted in English, which was a working language for all interviewees and the interviewer. The language and terminology did not create any significant problems for conducting the interviews.

The interviews were semi-structured and lasted 45 mins – 2 hours. All of the interviews were recorded and detailed notes were made by myself. Present in the interviews was a colleague from FFRC, who is participating in the research project, and myself. Sometimes we were accompanied by a third colleague from FFRC, who was not part of the research project but interested in the theme of climate governance and carbon offsetting. Direct observations after the interview were discussed and noted with colleagues. Semi-structured interviews were chosen, as we had a clear interview agenda from the research project, but wanted to allow the interviewees flexibility and time for their own initiative (Ruusuvuori and Tiittula 2005). All the interviews consisted of more or less the same interview frame: the interviewees were first asked about their relation to the carbon offset markets, and then their views

on the co-benefits of carbon projects and the monitoring of co-benefits. The first question guided the interviews, and depending on the interviewees' experience of implementing or financing carbon offset projects, this often determined at what level of details they discussed the monitoring of co-benefits.

The interviewees participated in the research voluntarily and oral consent to record the interviews and use the interview material was solicited at the beginning of each interview. The interviewees were promised anonymity, and if direct quotes were used that they could not be identified. While a lot of the discussion regarded general issues related to household energy technologies or voluntary carbon markets, the interviews did contain information that can be regarded as confidential. This related to, for example, problems with authorities in the countries the carbon offset projects were implemented in, or details on the sales of carbon credits. Revealing such information could harm the execution of the carbon offset project or reveal information for competitors in the market. I have not used direct quotes from the document material, which is presented below, except in the case of the Global Alliance for Clean Cooking (GACC)¹. One of the aims of the GACC is awareness raising and publicity, and due to this it has wide visibility. The material which refers to the GACC is readily available on their website. For these reasons, I have used identifiable quotes from representatives of the GACC. In comparison, the majority of the interviewees represented small organizations and due to the promise of anonymity, I did not want to use their document material so that they could be identified.

The semi-structured interviews form the main substance of analysis of the research. In addition, I have reviewed publicity material and speeches while participating at the Clean Cooking Forum 2013 in Phnom Penh, organized by the Global Alliance for Clean Cooking. I have also reviewed information from websites and documents related to household energy technologies and the voluntary carbon markets that is available online. In the analysis, I refer in the most part to interview material, but in some cases also to information from websites or from speeches at the Clean Cooking Forum. I do not itemize the other documents reviewed as to maintain the anonymity of the individual respondents.

Data analysis

Finding the method of analysis is a significant phase in conducting research that can rarely be isolated as one step. It is seldom a linear process but rather constant iteration between the research material and the researcher. For this article, the process of finding the appropriate research method entailed analyzing and presenting the research material once into a brief report on the conducted interviews for the project partners. The focus of the report was on the measurement and monitoring of the co-

¹ The GACC is a public-private partnership formed in 2010 that aims for the adoption of clean cookstoves and fuels in 100 million households by 2020.

benefits of carbon offset projects. It contained sections on interviewees' general views, identified risks and opportunities, and presented ideas raised by the interviewees on how to measure and monitor the co-benefits of offset projects. The report was compiled using content analysis, where the research material is grouped by similarities and differences, and then regrouped into a coherent entity (Tuomi & Sarajärvi 2009). The report was made available only to the project partners. The results were presented to a wider audience by myself at a seminar in July 2013².

Having compressed the research material once into a report format, I felt there were still many unanswered questions in the research material that I wanted to explore further. Particularly, I was interested in the concept of 'co-benefits' and how differently it seemed to be understood by the interviewees. To be able to unravel these meanings, I turned to discourse analysis. Through discourse analysis it is possible to disentangle different elements, and show what types of meanings they draw on (Bacchi 2012). In the article, I am following Hajer's (1995: 45) definition of discourses as 'specific ensembles of ideas, concepts and categorizations that are produced, reproduced and transformed in a particular set of practices' (Hajer 1995: 45). Using discourse analysis, I focus on how various actors construct different, often competing, stories in which a problematic situation is linked to their preferred solution (cf. Wesselink et al 2014). Discourse analysis highlights how facts, interests and metaphors are used to persuade others of the superiority of a particular story (Dryzek 2005).

In the analysis, I use the concept of storylines to examine how the co-benefits of household energy technologies are conceptualized. Storylines are middle-range concepts that enable a discourse-analytical approach to research (Hajer 1995). Storylines can be described as subtle mechanisms that structure perception and action (Hajer 1995). What is viewed as a relevant problem, how it has been created, how it should be solved and by whom are all important elements that when linked together create a more or less coherent storyline or narrative for a particular issue (Benford and Snow 2000). The primary function of storylines is to link together the causes, impacts and solutions of a particular problem through drawing attention to certain aspects of reality while downplaying others (Jones and McBeth 2010). The meanings that arise from storylines do not simply emerge, but rather come into politics and practice through particular routines, norms and rules (Hajer and Versteeg 2005). Discourse analysis enables tracing how concepts are continuously contested in a struggle over meaning and interpretation (Hajer and Versteeg 2005).

I began the analysis by grouping together similar conceptualizations of co-benefits into categories. The coding was done manually using a word processing program, reviewing the interview notes several times. In addition to the detailed interview notes, I listened to the audio recordings of the

² 'Development Impact Assessment, Measurement, Monitoring and Design', Nexus Annual Meeting, Singapore, 11-13 July 2013

interviews and made exact transcriptions of the relevant sections of the interviews. In grouping the conceptualizations of co-benefits, I tried to grasp what different actors were raising as the most important co-benefit of household energy carbon offset projects. The co-benefit had to be mentioned by several interviewees for it to be identified as a storyline. Since the number of informants was not particularly large (n=18), the number of interviewees mentioning a particular conceptualization of a co-benefits was not predetermined. As discussed by Bäckstrand and Lövbrand (2006), one actor can make use of different storylines simultaneously. Similarly in this research, the interviewees could make references to several storylines in their interviews. In the discussion, I present which storylines were primarily advocated by which actors. This is based on which storyline the actors made most reference to, even though other storylines could also be mentioned.

The coding process was abductive (cf. Tuomi and Sarajärvi 2009), as it was guided by previous literature I had read on carbon offset projects. At the same time, I allowed for the meanings from the research material to differ from the previous literature and made groupings based on the research material rather than previous literature. As discussed in the article, I build especially on the approaches of Bäckstrand and Lövbrand (2006), Boyd (2009) and Melo et al (2014), but also come to different conclusions than they present. The research material was reviewed several times. The pauses between reviewing the research material and writing the article allowed reflecting on the storylines and how well they represented the research material. The validity of the research material was sought primarily through two different types of triangulation: data and investigator triangulation (Tuomi and Sarajärvi 2009). In data triangulation, the storylines were compared to the document material I discuss above. While not stringent investigator triangulation, I sought validity for the storylines through asking for comments from colleagues at FFRC present at the interviews and familiar with the issue. They agreed that the identified storylines were present in the research material and represented in the article.

Ethical considerations and limitations

Conducting research is a process that requires constant self-reflection, especially with regards to research ethics. This research raised some concerns over the confidentiality of the interviewees that was discussed above. For confidentiality purposes, the documents through which the interviewees could be identified are not referred to directly. The interviewees were willing to participate in the research and share their views, which could have lead to bringing out only a certain voice from within the carbon markets, as discussed in the article. Validity of the research was sought by the triangulation described above. Identifying the selection of the interviewees and contextualizing this with previous research on discourses in carbon offsetting provides an open account of the research process and results. The willingness to participate of the interviewees was certainly aided by the link the research

had to the wider project and the networks provided by it. However, it was equally important to specify the research as an independent component that was not aimed for advancing the views of any of the project participants. Questions of interpretation, representation, and the power and politics behind them, are always particularly challenging issues in research. In this research, I have sought to answer part of the challenge through the triangulation methods discussed above. I have also been lucky in being able to discuss any challenges along the research path with colleagues at FFRC and my thesis supervisors.

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Household energy technology projects in voluntary carbon markets: storylines of co-benefits

ABSTRACT

This paper analyses how co-benefits have been conceptualized in household energy technology carbon offset projects. Offset projects, where emissions in one place are compensated through reducing emissions elsewhere, are justified on the basis of providing local development co-benefits in addition to the global emissions reduction. I focus on the voluntary carbon market, where the price of emissions reductions is more sensitive to the perceptions of produced co-benefits. I focus specifically on three types of household energy technologies that have been popular in the voluntary carbon markets: improved cookstoves, biogas digesters and ceramic water purifiers. The co-benefits of the technologies are conceptualized through three different storylines: achieving health benefits, challenging carbon credit ownership and creating sustainable local markets. While the first and last storylines have been dominant, they also contain a tension over supporting local production of the technologies versus importing more efficient technologies. The storyline of carbon credit ownership is more marginal. How the co-benefits of household energy technologies are conceptualized carries material implications through influencing what type of projects are successful in the voluntary carbon markets.

Keywords: climate; development; voluntary carbon market; storylines; technology; household

1. Introduction

Climate change is acknowledged as one of the greatest environmental concerns of our time. Carbon markets have become formalized in intergovernmental arrangements such as the United Nations Framework Convention on Climate Change (UNFCCC) and parallel voluntary approaches as one of the solutions to the problem of climate change (Newell and Paterson 2010). Both compliance and voluntary markets have embraced the notion of offsetting, whereby reductions in emissions in one place can be used to compensate for releasing emissions elsewhere. Carbon offset projects in the global South are an example of how developing countries are enrolled into participating in climate change mitigation efforts (Mathur et al 2014). The incentive to participate in climate mitigation is fostered in developing countries through promises of mitigation projects contributing to poverty reduction and local development (Käkönen et al 2014). Such local development benefits are referred to as co-benefits or side benefits, and include, for example, community development, biodiversity

conservation or improved health, created in addition to the global emissions reduction (Lovell et al 2009). Whether carbon markets in developing countries are able to create both global emissions reductions and local sustainable development benefits has been at the centre of critiques on carbon markets (Boyd et al. 2009; Peskett et al 2012). The critique is linked to wider debates on the realization of win-win assumptions in projects that attempt to tackle multiple goals, such as climate mitigation and development (cf. Forsyth 2007; Hirsch et al. 2010). This article analyses how actors within the voluntary carbon markets conceptualize the co-benefits of household energy technology carbon offset projects. Focusing on the conceptualizations of co-benefits opens up the range of meanings attributed to co-benefits and their realization as well as the different win-win assumptions through which household energy technology carbon offset projects are portrayed. These differing conceptualizations carry material implications through influencing what types of offset projects are successful and which are not within the voluntary carbon markets.

The main carbon market mechanism for developing countries is the Clean Development Mechanism (CDM). The CDM is one of the flexible market mechanisms of the Kyoto Protocol, whereby industrialized Annex I countries can meet their emissions reductions commitments through purchasing credits from offset projects in non-Annex I countries. The CDM contains a dual objective to produce emissions reductions and local sustainable development benefits in the countries the projects are hosted in. How well the CDM has delivered on this dual objective has received wide academic attention (e.g. Sutter and Parreño 2007; Olsen and Fenhann 2008; Boyd et al 2009; Alexew et al 2010). The CDM has withstood changes both in terms of developments at the UNFCCC and due to the collapse of prices from the peak year of 2008. This makes the voluntary carbon market, the focus of this article, increasingly significant for developing countries. The CDM and voluntary carbon markets are interlinked in a variety of ways. Practices first established in the voluntary market have later been incorporated into the CDM and CDM credits may be sold in the voluntary carbon markets. However, the two contain differences especially with regards to their governance. The CDM is regulated by the UNFCCC and the CDM Executive Board. In comparison, the voluntary carbon market is regulated through a variety of different carbon standards, each with their own set of practices. The common function of the standards is to verify carbon credits produced in offset projects for sale in the voluntary carbon markets. The production and monitoring of co-benefits differs in each of the standards and there is no widely used international regulation for valuing and monitoring the co-benefits of voluntary offset projects (Wood 2011).

Voluntary carbon markets can be viewed as a heterogeneous field through which specific practices are emerging. Discourse analysis is particularly suitable for analyzing how different conceptualizations are being constructed and what implications this can have for carbon offsetting. Discourse analysis focuses on how a shared meaning of an issue is created and sustained (Hajer 1995). Meanings,

however, do not simply emerge, but rather come into politics and practice through particular routines, norms and rules (Hajer and Versteeg 2005). In tracing how concepts are continuously contested in a struggle over meaning and interpretation (Hajer and Versteeg 2005), discourse analysis is suited for analyzing how actors within voluntary carbon markets conceptualize offset projects' co-benefits.

To address how co-benefits are conceptualized, this paper focuses on household energy technologies as a specific group of projects within voluntary carbon markets. Within the study of climate and offset governance, discourse analytic approaches have previously been applied mainly to forest- and land-based carbon offset projects and their co-benefits (Boyd 2009; Bäckstrand and Lövbrand 2006; Melo et al 2014). There is a need to extend this analysis to household energy technology projects as an area that is rapidly growing and lauded with win-win expectations. This paper focuses specifically on three types of household energy technologies: improved cookstoves (ICS), biogas digestors and ceramic water purifiers. The conceptualizations of co-benefits are approached through interviews with 18 experts in household energy technologies and the carbon markets, conducted in Cambodia in 2013.

This paper proceeds in the following manner. First, I give an overview of co-benefits in the voluntary carbon markets and household energy technology projects. Second, I outline how discourse analysis can be applied to the question of carbon offsets. Third, I present the materials and methods of the research. In the analysis, I present three storylines through which the co-benefits of household energy technologies are conceptualized, which is followed by a discussion and conclusions.

2. Co-benefits in the voluntary carbon market

The voluntary carbon market consists of a variety of carbon standards, each with different processes for the validation and verification of offsets. The voluntary carbon market is often described as a parallel market to the compliance carbon market, and contrasted especially to the CDM. However, the price of emissions reductions in the voluntary carbon market is more sensitive to perceptions of the co-benefits of projects (Lovell et al. 2009). The more local sustainability benefits a voluntary offset project can claim to produce, the higher a price it tends to generate in the markets (Hamilton et al. 2012). This is due to the high demand for projects that can claim to visibly contribute to local sustainable development in developing countries. Credits from these projects are sought by, for example, corporate buyers interested in improving their public image through corporate social responsibility marketing (Lovell et al. 2009; Simon et al. 2012). The demand for such 'premium projects' has been increasing, and the volume of offsets from projects associated with co-benefits was at an all time high in 2013 (Peters-Stanley and Gonzalez 2014).

Co-benefits in the voluntary carbon markets are addressed in various ways in different standards, each highlighting different aspects of offset projects. The most popular and oldest standard is the Verified Carbon Standard (VCS), which does not contain measurement and monitoring requirements for co-benefits. As a response, the Gold Standard was created by WWF in 2003. It places more emphasis on co-benefits through increasing stakeholder consultations of projects, excluding all project types besides renewable energy and energy efficiency, and creating the Gold Standard Passport for the monitoring of co-benefits. In forestry, the Climate, Community and Biodiversity standard (CCB) is used as an add-on to address co-benefits. Offset projects that describe themselves as ‘premium’ or ‘charismatic’ tend to choose the Gold Standard, or in forestry the CCB standard (Wood 2011).

Projects in voluntary carbon markets are demanded because they have a story associated with them (Lovell and Liverman 2010). This creates a connection between the carbon offset buyer, who is often located in the global North, and the offset producer, located in the global South. The technology that produces the emissions reduction can also facilitate the creation of a connection. In an otherwise unstable carbon market, a specific technology can be viewed as a source of permanence that the offset buyer can connect to (Lovell and Liverman 2010). Alongside the increased demand for co-benefits has been an increased interest to verify these co-benefits through measurement and monitoring practices. A news provider on the voluntary carbon market stated that 2013 could ‘expect a continued emphasis on carbon projects’ social and other “non-carbon” co-benefits’ (Ecosystems Marketplace 2013). A market survey from 2011 by Crowe (2013) finds that carbon offset actors are generally interested in the co-benefits of projects, with co-benefits as the second most important criterion for project selection following project additionality.

Several studies have assessed the co-benefits of carbon offset projects in the global South, however, the majority of these have focused on the CDM (e.g. Sutter and Parreño 2007; Olsen and Fenhann 2008; Watson and Fankhauser 2009; Boyd et al. 2009). A substantial part of the analyses conclude that achieving the dual objective of the CDM has been difficult to realize. Climate objectives have been the main focus of carbon projects, while social development impacts have lacked clear definition and indicators, and been poorly monitored (Peskett et al. 2012). Similar thorough analysis of the sustainable development contributions of the voluntary carbon markets are lacking. Voluntary offset projects have been claimed to be able to deliver more local development impacts due to their smaller project size, stronger sustainable development focus and lower transaction costs (HoC Environmental Audit Committee 2007, quoted in Lovell and Liverman 2010: 258). The limited amount of analysis on the question suggests this might not be the case. Factors that have been identified as important for the production of co-benefits include project size, technology choice and the project developer rather than the standard used (Corbera et al 2008; Drupp 2011; Crowe 2013).

Household energy technology projects in the voluntary carbon markets

Household energy technology offset projects can broadly be defined as projects that reduce emissions caused directly by households and communities in activities of their daily life (Müller et al 2010). They produce emissions reductions either through increasing energy efficiency or using renewable energy. In comparison to larger projects targeted at one or a few industrial sites, household projects are decentralized and target emissions dispersed over a large area. Some of the co-benefits that have been associated with household energy technologies that reduce cooking with indoor fires include, for example, reduced indoor air pollution, reduced pressure on forest resources and increased available time of women and girls (cf. GACC 2011). Household energy technology projects have often been financed through development assistance and have only in the last decade been partly financed through the sale of offsets in the carbon markets (Simon et al. 2012).

In the voluntary carbon markets, household energy technology projects have become highly demanded in recent years and able to generate significant price premiums (Peters-Stanley and Yin 2013). The exact share of household energy projects is difficult to estimate since carbon standard databases do not separate projects by technology but by sectoral scopes or methodologies. From the State of Voluntary Carbon Market reports, an annual report produced by a news provider, estimations can be established by the share of transacted offset volume (see Table 1). These figures show that especially improved cookstoves (ICS) have increased their share in recent years. Water purification technologies have also increased, but significantly less. The only other type of household project that reaches 1 per cent share is household biodigesters. These three technologies are all directed at households and aim to create a change from previous cooking or water treatment practices.

Table 1: Market share of household energy projects in the voluntary carbon markets

Market share in 2012-2013	VCM		
	ICS	Water filters	Biodigester
Year			
2010	n/a*	n/a*	n/a*
2011	4 %	n/a*	n/a*
2012	8 %	2 %	1 %
2013	24 %	4 %	1 %

Source: State of Voluntary Carbon Market Reports 2011 – 2014 (Peters-Stanley et al. 2011, Peters-Stanley and Hamilton 2012, Peters-Stanley and Yin 2013, Peters-Stanley and Gonzalez 2014)

* shares of marginal project types are in ‘other’ category and not specified in the report

3. A discursive approach to analyzing carbon offsets

This paper uses discourse analysis to address how household energy technology projects' co-benefits are conceptualized. Discourses are not simply descriptive accounts of problems or phenomena; rather, they shape how phenomena are understood and what options exist for action (Gottweiss 2003). Concepts, in this case the concept of co-benefits, are understood to be continuously contested through a struggle over their meaning, interpretation and implementation (Hajer and Versteeg 2005). I follow Hajer's (1995; 45) definition of discourses as 'specific ensembles of ideas, concepts and categorizations that are produced, reproduced and transformed in a particular set of practices'. In this paper, discourse analysis functions as a tool to open and challenge the win-win assumptions behind household energy technology projects' co-benefits.

The field of carbon offsetting contains several points of departure for a discourse analytic perspective. First, carbon offset markets are complex and interlaced in several ways from the local to the global (Bumpus and Liverman 2008). While analysis (including this one) often distinguish between the compliance and voluntary carbon markets, the two are intertwined and procedures, practices and projects can move from one to the other (Lovell and Liverman 2010). The array of actors involved is vast, and can span from the user of a water purifier technology in the global South through the project developer and carbon standard to the Northern consumer wishing to offset emissions from a holiday flight. Discourse analysis underlines how these different actors constantly interpret and reinterpret the meanings and implications of carbon offsets (cf. Hajer and Versteeg 2005). Second, discursive and material aspects are tightly interwoven in carbon offsets, and the stories of offset projects carry with them material impacts (Bumpus 2011; Lovell and Liverman 2010). In offset projects, discursive formations can significantly influence the emergence of a specific 'problem', which in turn calls for a specific socio-technical arrangement as the only rational solution, while sidelining other alternative approaches (cf. Fairhead and Leach 2003; Lansing 2011). This highlights how discourses are not merely descriptive accounts, but powerful tools with real material impacts. Third, carbon offsets operate on the interface of diverse and often competing claims, such as climate change mitigation, sustainable development and technology transfer. Offsets are constructed through an array of fragmented and contradictory discourses that draw on various different domains (cf. Hajer 1995). Fourth, scientific and technological expertise has become central to the defining of a carbon offset (Gupta et al. 2012). This shapes which claims can ascertain discursive authority in the field of offsetting and which ones cannot. It also limits the range of options for understanding what carbon offset projects are and what is possible to speak about them (Lansing 2011). Discourse analysis enables examining carbon offsets through the competing claims and struggles of a variety of actors, whose actions carry material impacts.

There is no established typology of discourses in the carbon offset literature. However, there have been studies on storylines and discursive elements in specific carbon offset projects and standards. I draw upon the analysis of Bäckstrand and Lövbrand (2006), Boyd (2009) and Melo et al. (2014), who have examined forest-based carbon offsetting through a discursive lens. Forest offset projects differ from household energy technology projects significantly, and have their own set of unresolved questions regarding, for example, accountability, legitimacy, land tenure and the rights of forest-dependent people (Corbera and Schroeder 2011; Larson 2012). Bäckstrand and Lövbrand (2006), Boyd (2009) and Melo et al. (2014) however form an interesting starting point this study, since they have all identified and described different storylines present in carbon offsetting. Bäckstrand and Lövbrand (2006) focus specifically on afforestation in the UNFCCC and the CDM, Boyd (2009) on local and global discourses in specific carbon sequestration projects and Melo et al (2014) on the storylines in the Community, Climate and Biodiversity standard. Below, I summarize key elements of three storylines that they have identified, including some additional literature. Bäckstrand and Lövbrand (2006) and Boyd (2009) have both identified three main storylines, while Melo et al (2014) refer to four storylines. I have combined the last two storylines of Melo et al (2014) into one. These storylines serve as an anchoring point for reflection in the discussion section upon the similarities and differences of previous research to the findings of this study.

a. *Marketization* highlights the relationship between the environment and the economy as mutually supportive rather than antagonistic (Bailey et al 2011). The notion of ‘win-win’ is a dominant element of the storyline, which implies that multiple beneficial outcomes for several groups may be achieved through a single program (Simon et al. 2012). Economic optimism is paired with technological optimism and there is a strong belief in the ability to scale-up current technological approaches (Bailey et al 2011). In one variant of the storyline, emphasis is placed on the creation of markets in developing countries. The justification is drawn from the limited market infrastructure in developing countries, which calls for institutional support for creating and maintaining markets.

b. *Technocratization* brings forth the role of expert knowledge in carbon offsetting. Climate change has to a large extent been framed through expert language (Jasanoff 2010; Castree et al. 2014). In this technocratic storyline, climate change is viewed through the lens of measuring, accounting and monitoring carbon (Melo et al. 2014). Scientific expertise, especially of the global North, has a significant role in defining the problem and its possible solutions (Lövbrand 2009). It has a role also in creating the measurement and monitoring systems for tracking carbon emissions (Gupta et al 2012). These measuring and monitoring systems entail a high level of simplification and standardization, which requires expert knowledge, creating a mutual dependency (cf. Simon 2014). Other values and knowledge systems of the environment may become marginalized (Bäckstrand and Lövbrand 2006).

c. *Rights-based approaches* group together concerns over questions of participation, equity and social justice. They have also been referred to as ‘civic environmentalism’ (Bäckstrand and Lövbrand 2006) and ‘participation’ and ‘poverty alleviation’ (Melo et al. 2014). In the storyline, the role and capacities to participate of different actors, including civil society and the communities affected by carbon projects, is stressed (Melo et al. 2014). At the same time, the reality of participation may be more challenging, especially if it does not take into consideration the dynamic relations in a community (Boyd 2009). In contrast to the first storyline, this storyline is skeptical about the potential of win-win outcomes in policies and projects with multiple goals and stresses the role of trade-offs in policy choices (cf. Forsyth 2007; Hirsch et al. 2010). The storyline focuses especially on how carbon projects affect local communities and their livelihoods, and the capabilities of local communities also to resist carbon projects (cf. Boyd et al 2009; Peskett et al 2012).

Marketization and technocratization are the currently dominant storylines in the governance of carbon offsets in forest-based projects (Bäckstrand and Lövbrand 2006; Melo et al. 2014). Participatory approaches and a focus on equity and social justice tend to form a more marginalized counternarrative.

4. Materials and Methods

Previous research on co-benefits in voluntary carbon markets has been largely desk-study based (e.g. Melo et al 2014; Crowe 2013; Drupp 2011). The benefit of such approaches whether they employ a discursive approach (Melo et al. 2014) or a portfolio approach (Crowe 2013; Drupp 2011) is that they can analyse large quantities of project documents and make generalizations. Desk-study based research does not offer the depth and reflexiveness of interviews, however. Another drawback of desk studies is that the project documents are often polished and biased towards presenting the projects in a favourable light (Alexeev et al 2010).

This article is based on an analysis of interviews conducted in Cambodia and over Skype with 18 stakeholders involved in or familiar with household energy projects, specifically improved cookstoves, domestic biogas digesters and ceramic water purifiers. Additional material in the form of publicity material, speeches at the Clean Cooking Forum 2013, organized in Phnom Penh by the Global Alliance for Clean Cookstoves (GACC)³, and project documents and websites has also been used but not itemized for anonymity purposes. The interviews were semi-structured and lasted 45 mins – 2 hours. The interviewees were first asked about their relation to the carbon offset markets, and then their views on the co-benefits of carbon projects and the monitoring of co-benefits.

³ The Global Alliance for Clean Cookstoves (GACC) is a public-private partnership formed in 2010 that aims for the adoption of clean cookstoves and fuels in 100 million households by 2020.

The interviewees consisted of representatives of NGOs (both project implementing and advocacy), project developers, donors (both government and private foundations), carbon standards and entrepreneurs. The interviewees were selected based on their familiarity with the three technology types and carbon offset markets. The identification of interviewees was assisted by a cooperative of carbon offset project developers⁴ working to assist development-oriented projects enter the carbon markets. Several of the interviewees had been involved in implementing or financing household energy carbon offset projects, and can be called specialists of carbon offsetting. These actors are key players in understanding how carbon offsets are produced and consumed (cf. Lovell and Liverman 2010). At the same time, they are key players producing those understandings and attempting to influence the voluntary carbon market through storylines.

Geographically, the majority of the interviewees lived and worked in the global South but were themselves Northern experts. A majority of the interviewees identified themselves as representing projects that delivered significant local co-benefits. Excluding both the buyers of carbon credits and the producers of the credits (in the case of household energy technologies, the users of the technology) enables examining the group of stakeholders that are largely responsible for creating the storylines surrounding the co-benefits of offset projects through, for example, project documentation, publicity material, critique of project proposals and demands for reforms. As the focus of this paper is on the actors *within* the voluntary carbon markets there is a limited representation of counternarratives. The stronger counternarratives have tended to criticize carbon offsetting and do not engage in the practice (Böhm and Dahbi 2008). I return to this point in the discussion.

I use the concept of storylines to examine how the co-benefits of household energy technologies are envisaged by actors within the voluntary carbon markets. Storylines are middle-range concepts that enable a discourse-analytical approach to research (Hajer 1995). Storylines can be described as subtle mechanisms that structure perception and action (Hajer 1995). What is viewed as a relevant problem, how it has been created, how it should be solved and by whom are all important elements that when linked together create a more or less coherent storyline or narrative for a particular issue (Benford and Snow 2000). The primary function of storylines is to link together the causes, impacts and solutions of a particular problem through drawing attention to certain aspects of reality while downplaying others (Jones and McBeth 2010). The meanings that arise from storylines do not simply emerge, but rather come into politics and practice through particular routines, norms and rules (Hajer and Versteeg 2005). Discourse analysis enables tracing how concepts are continuously contested in a struggle over meaning and interpretation (Hajer and Versteeg 2005). Storylines can shed light on how specific

⁴ Nexus Carbon for Development is a cooperative of development organizations that assists its members to scale-up projects though, for example, carbon finance.

practices related to, in this case, the conceptualization of co-benefits, play out as part of larger practices of carbon offset governance.

5. Storylines of co-benefits in household energy projects

Two points are important for the analysis of voluntary offset projects through a discursive lens. First, there is no universal governance of co-benefits, and second, stories and their communication in the voluntary carbon markets is important (Lovell and Liverman 2010; Wood 2011). The latter point highlights the importance of stories as explanatory factors of price premiums and the high demand for certain projects in the voluntary carbon markets. The material impacts of storylines can be significant, as certain project types become viewed as sustainable and are able to attract financing whereas other projects may lose market shares due negative images of co-benefits. The first point, on the other hand, implies that there is room for contesting the concept of co-benefits, as no universal measurement and monitoring practices yet exist. The analysis therefore hinges on the conceptualization of co-benefits, acknowledging it as both an issue open to interpretation and carrying significant material and financial impacts. The following section presents the different storylines through which the co-benefits of household energy technology projects in the voluntary carbon markets are viewed by different actors. The co-benefit had to be mentioned by several interviewees for it to be identified as a storyline. Table 2 gathers more examples of the statements the particular storylines consisted of.

a. Health benefits storyline

The health benefits storyline focuses on household energy technology projects as projects that disseminate technologies for reducing household air pollution and improving the health of people, especially women and children, in developing countries:

“4 million deaths a year. Cookstove smoke kills 1 person every 8 seconds - almost half the world's population still cooks food, boils water, and warms their homes by burning wood, animal and agricultural waste, and coal in open fires or rudimentary cookstoves.”

(Global Alliance for Clean Cookstoves website, accessed 21.01.2015)

In this storyline, the most important co-benefits of household energy technologies are the health benefits created for the local population in developing countries. The benefits are realized at the uptake of the new technology when shifting away from previous cooking practices. A sustainable

benefit occurs when the shift from previous cooking practices is complete, and households do not use the new technologies in conjunction with previous cooking methods⁵.

In the storyline, household air pollution caused by open fires or traditional cookstoves, is presented as one of the most significant health issues in developing countries, with a parallel drawn to the health impacts of smoking: “*A typical woodfire is about 400 cigarettes an hour worth of smoke*” (Academic, March 2013). The parallel with smoking is potent not only in its descriptiveness and familiarity, but also in presenting smoke from woodfires as a similar threat to health as smoking. The metaphor is strengthened as it is juxtaposed to the image of women and children suffering from smoke.

The voluntary carbon markets are seen as one of the sources of financing for addressing this problem. In the storyline, household energy technologies are framed as modern solutions to the problem of household air pollution, whereas previous cooking practices are viewed as underdeveloped. As the leader of a lobbying organization of clean cooking stated, “*We cannot allow billions more to cook the way their ancestors did since the beginning of human history*” (March 2013). In the storyline, focus is placed on the technologies that reduce household air pollution most effectively. In the case of improved cookstoves, for example, centrally produced cookstoves outperform artisanal stoves in terms of emission reductions and efficiency (Jetter et al. 2012). The most efficient technologies are often developed and produced with expertise and materials from the global North and imported to developing countries (cf. Simon et al. 2014). In the storyline, the health impacts of household air pollution are presented as such a significant challenge that other concerns, such as those related to the production and distribution methods of the technology, may be sidelined.

Another element of the storyline was the question of scale. As seen in the first quote, the health impacts of household air pollution are presented as a large-scale global problem that justifies the use of various approaches for technology uptake. One project developer commented on the scale of technology distribution and its effects on local manufacturing: “*If you want to have a big impact, you need to distribute big numbers. Local manufacturers are not up to speed.*” (Project developer, March 2013). The question of scale appears to be used as a justification for the import of technologies to developing countries. The technologies themselves are very central in the storyline, and they are viewed principally through the emissions reductions created and the ensuing health benefits. The standardization of technologies is important for measuring and verifying emissions reductions.

⁵ With the ICS technology, using new technologies alongside old ones is called stove stacking. See e.g. Ruiz-Mercado et al.(2013) and Ruiz-Mercado and Masera (2015)

b. Carbon credit storyline

The carbon credit storyline presents the ownership of carbon credits as the most significant co-benefit an offset project can create. The end-user of the household energy technology, who is the producer of the emissions reductions, is supposed to benefit from the carbon credit revenues produced by the use of the technology. The benefits are realized if and when the end-user receives financial compensation from the sale of carbon credits. A sustainable benefit occurs when the end-user is ensured a source of income from carbon credit revenues.

The storyline focuses on who owns the carbon credits that the use of a given household energy technology produces. A common practice in voluntary carbon market projects involves transferring the ownership of the emissions from the user of the technology to the project developer through signing a waiver. Project developers use the carbon credit revenue according to their own needs and principles, for example, to sell the household technology at a subsidized rate or for other operative or research purposes within the business (cf. Lambe et al 2015). There are no common practices in the voluntary carbon markets on the ownership of the carbon credit.

The carbon credit storyline claims that household energy technologies could create monetary benefits for the users of the technology through carbon credit revenues, and that these should be viewed as significant co-benefits. Proponents of the storyline view the commonly associated co-benefits, such as reduced household air pollution, as default benefits of adopting the given technology. Instead, they claim that the end-user should receive financial reward from becoming involved in the voluntary carbon market. This storyline calls for transferring the revenue from the sold carbon credits to the user of the household technology. A project developer commented on their motivation:

“Unfortunately the experience that we have seen from other projects operating in the cookstoves arena is that carbon credit revenues end up in a chain of intermediaries and carbon brokers and profits in banks. And actually the end user, the woman who uses the stove and the actual owner of the carbon credits, who is generating the emissions reductions, all they get it’s a stove with a reduced price, which we think is really unfair.”

(Project developer, March 2013)

The storyline criticizes using the carbon credit revenues as direct subsidies for the technology, which is a common practice in household energy technology projects (cf. Buysman and Mol 2013; Simon et al. 2014). Another element in the storyline is the focus on participation in the voluntary carbon markets. It challenges the extent to which people in developing countries can actually participate in the voluntary carbon market without access to ‘internationals’, i.e. experts from the global North. The storyline questions the expert-driven nature of the carbon markets and the ensuing exclusion. This was

seen as an issue derived from the complex and bureaucratic processes related to the carbon market. As one critical project developer stated:

“Information is power, and I think this tool, the power tool, that project developers want to hang on, to make it complicated and technical, so that they can still bank on that, because it’s so difficult, and they can’t decode that so they can hang on to a monopoly of getting that handle by themselves and getting high fees”

(Project developer, March 2013)

c. Sustainable markets storyline

In this storyline, household energy technologies are presented as development interventions that create considerable benefits at the household level where they are adopted, but more significantly to the local economy through creating and developing local production chains and employment. The beneficiaries are the various people involved in the local production chains and distribution networks. The benefits are realized as employment opportunities are created. A sustainable benefit occurs when local markets are able to function independently of outside assistance and finance.

The storyline emphasizes the role of public finance and institutional support required for market creation in developing countries. The role of public finance is in the initiation and scale-up of carbon projects, after which the role of private finance, also from the voluntary carbon market, steps in. The storyline should not be conflated with market-based approaches in environmental governance that emphasize substituting government regulation with markets, since the role of public finance and institutional support is significant. Finance from the carbon markets is viewed as temporary, and the long-term aim is the creation of a sustainable local market independent of donor or carbon finance for the given household technology. As a project developer commented:

“[We] define sustainable development as a market-based approach. So everything we do, every project we develop is based on creating markets and creating commercial transactions by the time we leave.” (March 2013).

In the storyline, the emphasis is on supporting local production for all aspects of the supply chain and creating local economic benefits, especially through employment. The expertise behind market creation and support is mainly assigned to foreign experts adept in the complexities of the carbon market. However, there is an element of capacity development in training local staff on both production and carbon market practices.

Another element in the sustainable markets storyline was an attempt to differentiate from voluntary carbon market projects that were not committed to longer term market creation in developing countries. The practice of giving out technologies for free to end-users in developing countries was severely criticized in the storyline. The damaging effect such practices have on creating long-term change was captured by a project developer:

“If you distribute stoves, you destroy a full market sector. And of course distributing stoves for free, [worth] \$80-100, there is no way the local producers can compete. And so after three years when the first stoves are broken, people revert back to the traditional methods.”
(Project developer, March 2013)

A third distinctive factor in the sustainable markets storyline was an aversion to the overt focus some actors had on the health benefits of household energy technologies, especially improved cookstoves, discussed in the first storyline. Focusing too much on the health benefits of household energy technologies was seen as on the one hand diverting attention away from the economic benefits of local production and on the other hand justifying bad practices, such as giving away technologies for free. As a project developer commented:

“It’s only one of the problems of the GACC [Global Alliance for Clean Cookstoves], they are focusing only on the health of IAP [indoor air pollution]. But what is the health impact of a family that loses its income?”
(Project developer, March 2013)

Table 2 Example statements of the storylines in the analysed material

Storyline	Examples of statements
Health Benefits	<ul style="list-style-type: none"> - Smoke from traditional cookstoves and open fires has been a silent killer in developing countries for far too long - Exposure to these toxic fumes is greatest among women and young children, who spend the most time near open fires or traditional cookstoves - I guarantee you, we have this meeting in ten years, we're going to add six or seven, or eight or nine more diseases to this [global burden of disease] and I know what diseases they are, they're the same diseases that are caused by smoking
Rights to carbon	<ul style="list-style-type: none"> - The end user needs to receive the credits of the carbon reduction - We are hoping that carbon finance will be seen as a tool for sustainability and not for something that again is dominated by Northern countries, making profit out of it - There should be clear rules for equal benefit sharing - We need to question ourselves, just because you manufacture a product does that mean you own the carbon credit?
Sustainable markets	<ul style="list-style-type: none"> - The aim is always to develop a market. - It's important to strengthen the market. It's easier to give stoves for free, but we see benefits in going the longer way. - First make sure that you are not harmful to the existing markets, then you can talk about positive impact - [our organization] has a capacity development role. We are not the ones building biodigesters, we are supporting the sector, the enterprises.

6. Discussion

The sustainable markets and health benefits storylines are the most dominant ones in the analyzed material. They are supported by project developers, representatives of project implementing NGOs, donors and social businesses as well as philanthropic organizations. The carbon credit storyline is more marginal, and supported mainly by some project developers and representatives of NGOs. The three storylines focus on different aspects of household energy technologies and the co-benefits surrounding them. The first storyline focuses on the technology itself, its uptake and use, the second on the ownership structures of the carbon market behind the technology, and the third on the

production and distribution networks of the technology. The extent to which the technology itself is part of the conceptualization of co-benefits varies. In the health benefits storyline, it is specifically the technology and its use that operationalizes the concept of co-benefits through reducing household air pollution. In the sustainable markets storyline, it is the production and distribution of the technology that creates co-benefits, not the technology itself.

The sustainable markets and health benefits storyline appear to be in tension over how co-benefits are conceptualized, which differs from previous research on forest-based offsets (Bäckstrand and Lövbrand 2006; Melo et al 2014) where marketization and technocratization support one another. Promoters of the sustainable markets storyline focus on production chains and market creation, whereas promoters of the health benefits storyline focus on the technology itself and its attributes, such as efficiency. Framing household air pollution as a humanitarian crisis in developing countries was seen by promoters of the sustainable markets storyline to justify interventions where the effects of distributing imported technologies on the local markets were not regulated.

In the carbon credit storyline, the conceptualization of co-benefits is not based on the technology or its production chains and distribution networks, but the practices of benefit sharing in the carbon markets. The ownership structure of carbon credit revenues is seen to create the most significant co-benefits. The storyline challenges the efficiency-based arguments of the sustainable markets storyline, where the transfer of carbon credit revenue to widely dispersed users of household technologies is seen as inefficient and costly.

Lovell and Liverman (2010) have argued that technologies create connections between the offset project and the potential carbon credit buyer in the voluntary carbon markets. Technologies are something that buyers can imagine and they may create an image of stability and credibility in the voluntary carbon markets (Lovell and Liverman 2010). The conceptualization of co-benefits in the health benefits storyline may be more easily captured into the voluntary carbon markets, since it is centered on the technology itself. This was raised as a concern by promoters of the sustainable markets storyline, who worried that focusing too strongly on the attributes, particularly those affecting health, of household energy technologies could endanger local production networks.

While the storylines on sustainable markets and health are in tension over the production of technologies versus the import of technologies, they both reflect the significant role expert knowledge has gained in carbon markets. A high level of standardization is understood as an entry requirement for technologies into the carbon market (Simon 2014). Consistent monitoring and reporting are necessary for household energy technologies to enter the carbon market, but complicated by their dispersed use (Bumpus 2011). The stringent monitoring requirements are reflected in the analyzed

material as well. The sustainable markets and health benefits storylines highlight the importance of expert knowledge. The health benefits storyline relied on expert knowledge to define appropriate levels of indoor air pollution, while the sustainable markets storyline required expert knowledge for defining good practices for local production processes as well as in ensuring access to carbon markets. The storyline on carbon credits questions the purpose of expert knowledge as excluding some actors from participation in the carbon markets.

The storyline on carbon credits presents a counternarrative to the other two storylines as it challenges some of the assumptions present in them. However, limiting the research scope to actors within the voluntary carbon markets also limits the scope of the counternarrative. The storyline on carbon credits, where ownership is understood only through the ownership of carbon credit revenues, offers quite a narrow view on climate justice (cf. Mathur et al. 2014). The conceptualization of co-benefits becomes hinged on the monetary benefits derived from carbon credits. While there are some notions regarding participation in the carbon markets, carbon credit ownership structures arise as the most important issue. In contrast, previous analyses on carbon offset discourses in forest-based carbon projects have brought out more radical counternarratives that challenge issues related to global inequalities and responsibility for climate change mitigation (cf. Bäckstrand and Lövbrand 2006). Household energy technologies as a project group may account for the relatively modest counternarrative. Household energy technologies are generally viewed as less intrusive projects than forestry projects since they are often based on the purchase of a product and can claim the purchase of the technology as willingness to participate in the project. The extent to which the intricacies of the carbon market are understood at the purchase of the technology and signing of the carbon credit waiver can vary, however. Calling for a change in the carbon credit ownership structure can be understood as a climate justice argument, where the users of the technology would have a stronger voice in comparison to, for example, the businesses involved (cf. Mathur et al 2014). At the same time delivering carbon credit revenues directly to the users of the household energy technology contains risks, such as raising expectations of future income from offset revenues in a volatile carbon market (Käkönen et al. 2013). How such concerns can be addressed remains an issue that has received little attention in the case of household energy technologies.

7. Conclusions

Carbon markets have arisen as one of the responses to climate change. Offset projects in the global South are justified through the co-benefits they produce in addition to emissions reductions. This article set out to examine how co-benefits are conceptualized in one specific project type, household energy technology offset projects. In the article, I have presented three different conceptualizations of win-win assumptions in household energy technology projects. The differences in the

conceptualizations point to the need for a more empirically-driven and contingent appreciation of win-win assumptions in carbon offsets. It is important to open up and disentangle the various meanings and interpretations behind win-win assumptions as the foundation upon which carbon offset projects are structured as both climate mitigation and development projects.

How co-benefits are conceptualized is an increasingly important question in the voluntary carbon markets where market actors stress the importance of measuring the ‘non-carbon’ benefits of voluntary offset projects (Ecosystems Marketplace 2013). Which conceptualizations of co-benefits succeed in creating meaning can shape the future design of a monitoring and verification system of co-benefits in voluntary carbon markets. Meanings do not simply emerge, but rather come into politics through particular routines, norms and rules that require careful examination. The conceptualizations of co-benefits carry with them material impacts. Different standards and monitoring approaches produce varying stories of co-benefits, which in turn lead to some projects gaining higher price premiums as they are viewed as more sustainable, whereas other projects can lose market shares due to negative images of their co-benefits.

The current dominance of the sustainable markets and health benefits storyline reflect co-benefits being conceptualized in terms of market creation and employment benefits on the one hand, and health impacts on the other. While there remains a tension with regards to supporting local production chains versus importing technologies, in other aspects these two storylines support the general tendency in climate governance towards emphasizing expert knowledge and market-focused solutions (Bäckstrand and Lövbrand 2006). The negotiation of the tensions between longer term market-creation and the standardization of technologies and monitoring is an issue that is currently under debate in the discussions on clean cooking (Simon et al. 2014). There is, as of yet, no fixed regulation. It is relevant to consider to what extent the debates are reflected in the voluntary carbon markets, where an increasing amount of household energy technology projects receive their financing from. In the voluntary carbon markets, the presence of several different standards and varying monitoring and verification practices ensures that the discussion on what are considered locally relevant and valued co-benefits is open to contestation and interpretation. At the same time, the focus on stories and the technologies themselves risks presenting a simplified picture of household energy technologies and their co-benefits. Questions related to the less material aspects of the technology and its use that are more difficult to communicate, such as the production methods and carbon credit ownership structures, may be sidelined. There is a need for further research into the realization of co-benefits at the local level and how the win-win assumptions behind offset projects translate into practice.

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