

## ***Interactive comment on “Framing hydropower as green energy: assessing drivers, risks and tensions in the Eastern Himalayas” by R. Ahlers et al.***

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A common response especially to Reviewers 1 and 2 - is that this paper is a deliberately “generalised” reflection article, one that aims to bring together arguments for and against hydropower development promoted as a climate change intervention. Taking the case of the Eastern Himalaya region, the objective is to present an overview of the contentious links between climate change and hydropower development and set the stage for further discussion rather than provide a comprehensive analysis of these developments. We will specify this objective more clearly in a revised introduction section of the paper.

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### Reviewer #1

**Literature** We appreciate the comment to review a wider range of dam-related literature and also to incorporate and refer to texts that promote dam development. The purpose of this paper is to identify the issues at play in the context of dam development in the Himalayas. To do so, we examine the plans for hydropower development and its reasoning, and subsequently discuss to what extent this is convincing and which questions it raises. We identify the justifications for developing these dams such as the assertion that they are climate friendly, enhance economic development and bring energy to the poor. Our paper is not a general critique of dam development, but an analysis and application of the issues central in the debate to the Himalayan case. The Himalayas is currently not only the focus of dam development but also of climate change research and insights. With this paper we hope to contribute to both issues by raising the questions that the tensions and contradictions accompanying these developments.

**Financialisation** We would like to point out, that our perspective on financialisation is not new, but in this article we want to emphasize the role it plays in the promotion and construction of dams in general and also in this region. Most of the new dams in the region involve private sector financing, and seem to have been approved through processes and mechanisms that appear less stringent than dams financed (earlier) by IFIs.

With regard to the opinion of the people in the trade, this is an increasingly diverse group involving construction engineers, economists, hydraulic engineers, geotechnicians, but also insurance agents, finance consultants, lawyers. We are grateful for the reviewer in posing this question as it gives us the opportunity to call for urgent further research that includes a more diverse array of key informants. Unfortunately, for the deadline of this paper, we have not been able to do this but will definitely do so for the remainder of the project.

**Downstream impact in Bangladesh** We certainly agree with the reviewer that potentially

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enormous impacts downstream on Bangladesh are very significant and often ignored in dam-related literature. In response we have included some key issues from contextually relevant studies such as The Asia Foundation's 2013 report. Because both 'upstream' and 'downstream' actors are diverse and will benefit or lose out in diverse ways, and in trying to keeping a tight focus on this paper, we have not included a detailed analysis of the downstream impacts in Bangladesh.

Finally, the issue of dams as promoting stability or insecurity is intriguing. Our take on this issue is very much in line with the work of Allouche and others on the water-energy-food nexus at the STEPs centre. It is precisely the issue of "[security] for whom, by whom and from whom, security of what and for what?" (Brauch, 2011: 62 in Middleton et. al. 2015; 641) that we intend to highlight and ask through our analyses of the global-local links and divides. In terms of planning, for example in the Bank-led Equator Principles – a certain homogenisation is assumed of political, economic and social contexts where dams are being implemented. Our paper raises the issue of context, and how local context matters. We will, if necessary point these issues in a more articulate way in a revised paper.

Reviewer #2

More evidence and explanation on the linkage of CDM, CC and HD in the Himalaya.

Referring to the general response (above), the purpose of this article is to identify the issues at stake, and their linkages rather than provide in depth empirical data on each issue. However, within our means, we do try to explain the probable impacts of climate change in the Himalayas, as well as the "ungreen" characteristics of construction and reservoirs and provide the references to the empirical data available on these issues.

The reviewer asks for exactly those insights that sorely need further research. The paper is a response to the rather unquestioning approach of policymakers and financial institutions to the unbridled development of large scale interventions. Where in the Mekong, for example, much more research has delivered detailed insights in construc-

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tion, financial and political actors and interests, as it has also been done in the case of the Central Himalayas, this is not the case for the Eastern Himalayas, atleast not yet. We hope our paper will encourage further research on the details of drivers, interests, and implications.

Contribute to the wider debate on climate change, CDM and hydropower development  
The purpose of our paper is to contribute to this debate, with the perspective that the developments taking place in the Himalaya do translate into lessons that can travel beyond the region. In response to the reviewer we have included this in the concluding section of the paper.

The two examples provided by the reviewer extend far beyond the purpose and focus of this paper: each would make for a wonderful new article. With regard to CDM, we want to make the point that these measures did encourage renewed financial interest in hydropower development, and has been mobilized by China in particular. However, given contemporary carbon credit rates, this is unlikely to continue. With regard to Corporate Social Responsibility, current dam development involves a large number of different actors, quite a few of them difficult to track down because private contracts are not open to public scrutiny. Hence, the standards available for CSR only refer to those actors traditionally or formally involved and not the emerging or subcontracting actors (be they construction, financial, or legal). This is a topic that needs further study, certainly for this particular region and that could learn from work already available on the Mekong. Further research on specific cases would allow for more visibility of the (unknown) actors involved and how they mobilize CSR. In response to the reviewer, we have elaborated somewhat on CSR and its limitations.

Reviewer #3

Framing and discourse Following Foucault, we understand discourse as the establishment of a particular order of truth as 'reality' in which already established identities or subjectivities are reinforced. The discourse we discuss in this article concerns the

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development discourse that involves identifying economic growth and rural electrification leading to improved lives for all. Another discourse underlying this is that nature is there for humans to conquer and manipulate so as to serve development. Framing is a discursive strategy of getting a particular message across by linking or assigning a particular trait or perspective to a concept so as to persuade the other. Framing hydropower as green energy is what we hope to show in this paper. In response to the reviewer we have clarified this throughout the text and provided detailed evidence where possible.

However, the suggestion by the reviewer to focus only on the framing of hydropower as green energy we feel would not do justice to our attempt to present the complexity of the hydropower debate in this region. It is the intersection between hydropower and climate change in the Himalayas – as much about the ways in which hydropower may be inappropriate given the uncertainty of the effects of climate change, or because it might well exacerbate the effects of climate change – that are contentious, as much as the framing of hydropower as green energy. The article links the above different issues, rather than focus solely on one. Furthermore, we think that financialisation (and CDM as part of the financial instruments available) is essential to understand why hydropower is 1) once again a solid chapter in the development discourse and 2) reframed now as green energy. We have made this more explicit in the introduction section of the paper.

Language We have attended to the language where it tended to be convoluted.

In response to the particular questions: a. figures in the article are often not contextualised. For example, how do the large investments on hydropower (p. 1526) compare to overall investments in electricity generation? How do the emissions from hydropower dams (p. 1527) compare to that of fossil fuel plants?

While we would gladly provide the data the reviewer asks for, we are not able to do so. First, because data for these are not readily available in the region, especially in India.

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Second, this kind of data also depends on the scale of focus. Finally, our focus here is not to unpack energy investments to the extent that we can comprehensively narrow down realistic figures given the very many different components that power generation involves. Our intent is to show the substantial investment going into hydropower, to the point being that hydropower increasingly draws attention and interest of a range of financing instruments and investors.

However, for argument's sake, in Nepal and in the Eastern Himalayas, hydropower reigns. For example, in 2012, there are different figures – averaging around 90% of Nepal's power as produced by hydropower; the State of Sikkim in India is said to be 100% electrified through hydropower, whereas overall in India only 11% with 71% produced by coal (<http://www.iea.org/statistics/statisticssearch>).

Most of the available data on hydropower GHG emissions is from temperate climate locations and much of this is either from the hydropower industrial sector or the fossil fuel sector, which makes it problematic to use comparatively. Hydropower Type (run-of-river or reservoir); Plant location (tropics vs. northern climate); Energy use for building the dam; Emissions from plant construction (concrete and steel) are key issues that matter for the run-of-river type and "Alpine-type" (mountainous) reservoirs located in the Eastern Himalayas. In the paper we do provide the references most recognised in this field. We have added some recent work from the International Hydropower Association)

Data related to investments can be located for India in website like the ones below: <https://www.climateinvestmentfunds.org/cifnet/country/india>.

The government of India has drafted an investment plan that will tap US\$775 million from the Clean Technology Fund (CTF) for transformative investments to improve and expand India's hydropower operations, develop untapped solar resources, and improve energy efficiency. The plan was drafted in coordination with the Asian Development Bank (ADB), World Bank (IBRD), and key Indian stakeholders. CTF financing

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is expected to leverage nearly US\$30 billion in additional financing, and will focus in particular on catalyzing private sector development in the low carbon sectors.

However, as discussed above our intention is to show the scale of development in MW in this region and not necessarily to generate data over time.

b. Second, while the article is in general very well referenced (even over-referenced, such as on page 1528, line 6), references/evidence is curiously lacking in some other places, such as on page 1524, lines 10-16, or page. 1531, line 3. We have carefully screened the article and have attended (hopefully satisfactorily ) to over and under referencing.

If not hydropower then what? We appreciate the importance of this question and do not necessarily argue against hydropower all together. What we do argue against is the problematic framing of hydropower as green energy with economic wins at scale; as well as the planning interventions of this magnitude in an area that is also said to be highly sensitive to climate variability and geotectonics. Our purpose is not to stifle the debate on hydropower development but rather stimulate it, broaden it, invite others to contribute so as to determine more precisely and more interdisciplinary the dynamics that are inherent to hydropower development. As regards, if not hydropower, then what – our intention is to show that questions like these need to be contextualised and generated much more through local discussions than seems to be the current mode of practice.

Please also note the supplement to this comment:

<http://www.earth-syst-dynam-discuss.net/5/C722/2015/esdd-5-C722-2015-supplement.pdf>

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Interactive comment on Earth Syst. Dynam. Discuss., 5, 1521, 2014.