ISGAN TCP Annex7
The Smart Grid Discourse Arena
A global social network analysis
(Policy Communication)

For shaping and adapting policy agendas and institutional change towards Smart Grids, it is of utmost importance to **understand how discourses develop in the fast-changing reality of energy transition**. This policy brief provides evidence about the smart grid related topics, which create most attention by actor groups and the public.

The analysis is based on systematically observed global communication at the online social media platform, **Twitter** with with a dataset of more than 70 thousand messages between December 2015 and April 2018, which all include the hashtag **#smartgrid** and/or #smartgrids.

Main Topics around Smart Grids

The main topics around smart grids over the whole period, i.e., keywords observed among the highest ranked, were: **internet of things, smart cities, smart meter, storage, renewables, (cyber)security and big data**. As an example, the figure below shows a word-cloud displaying 50 most frequent hashtag terms in March and April 2017 based on nearly 20 thousand Twitter messages. **Blockchain** applications **as an emerging topic**, popped up for the first time in February/March 2016 among the most used keywords. often in the context of microgrids

Figure 1: Word cloud of hashtags related to Smart Grids in March / April 2017

Smart Grids as Cyber-Physical Systems

Furthermore, a hashtag-based network analysis helps to identify clusters of topics. Considering the broadness of keywords and how they are used together, discourse fields cluster, on the one side, around the physical grid issues such as integration of renewables and storage and on the other side, internet of things and big data. Smart meters, smart cities, microgrids being those terms linking the

two spheres of discourses about physical and cyber components. Thus, it seems appropriate to consider **smart grids as cyber-physical systems.**

While the number of tweets per month roughly doubled over the period observed, the growth appears more on the cyber side. How broad and differentiated this sphere is, which is commonly subsumed under digitalization, becomes obvious though the growing number of tweets including hashtags related to big data, cloud, blockchain, (industrial) internet of things etc.

From Technology towards Business

During the early phase tweets were mainly technology related and the messages came more frequently from incumbent institution in both cyber-physical spheres. However, over the whole period, a **shift from technology-related messages towards business-related messages** has been ongoing. Thus, significantly more often messages include keywords like startups and announcements of roll-outs of smart meters in several countries.

Societal Issues adressed

A third category of messages relates to societal issues**.** Most attention in the discourse arena are topics related to **data-privacy**, particularly in the connection with the roll out of smart meters, and to the mission towards the **transition of the energy system towards the sustainable development goals**. In the latter case keywords used are country specific, and the most often used hashtags are: energy-transition, Energiewende and trasition-énergétique

How did Twitter messages develop from 2015 to 2018?

The number of tweets per month has more or less doubled over the observed 28 months period, with large fluctuations between months, from 3.600 to 16.000. Tweets are mostly written in English. French is the second most used language.

Shift in dominance of authorship: In the early phase of observation, the discourse arena was mainly dominated by institutional actors and multi-national companies in the energy and ICT fields. But professionalization and automation has been leading to the dominance of Twitter accounts used by persons claiming to be "influencers".

Eco-Chamber Effect: From 2017 to 2018 a significant change in the number of hashtags per tweet took place. The increase can, at least partly, be explained by strategic behavior of authors by using as many keywords as possible per message. This leads to an echo-chamber effect, like in other discourse arenas. Further research is needed to understand this phenomenon and to filter out the "noise", before we can deepen the analysis for strategic policy-making from Twitter analysis.

The Use of Twitter Data Analysis – Recommendations

We consider this analysis as being of high value for policy makers particularly, as **traditional boundaries of sectors are broken up** in the case of smart grids transition. Likewise, potential new actors in the field, who are not deeply involved in technology development can profit from the intelligence provided. Even to those incumbent actors who have tacit knowledge and access to conventional policy analysis, the **social network analysis provides valuable new insights**, as it gives a systematic overview of the whole discourse arena.