

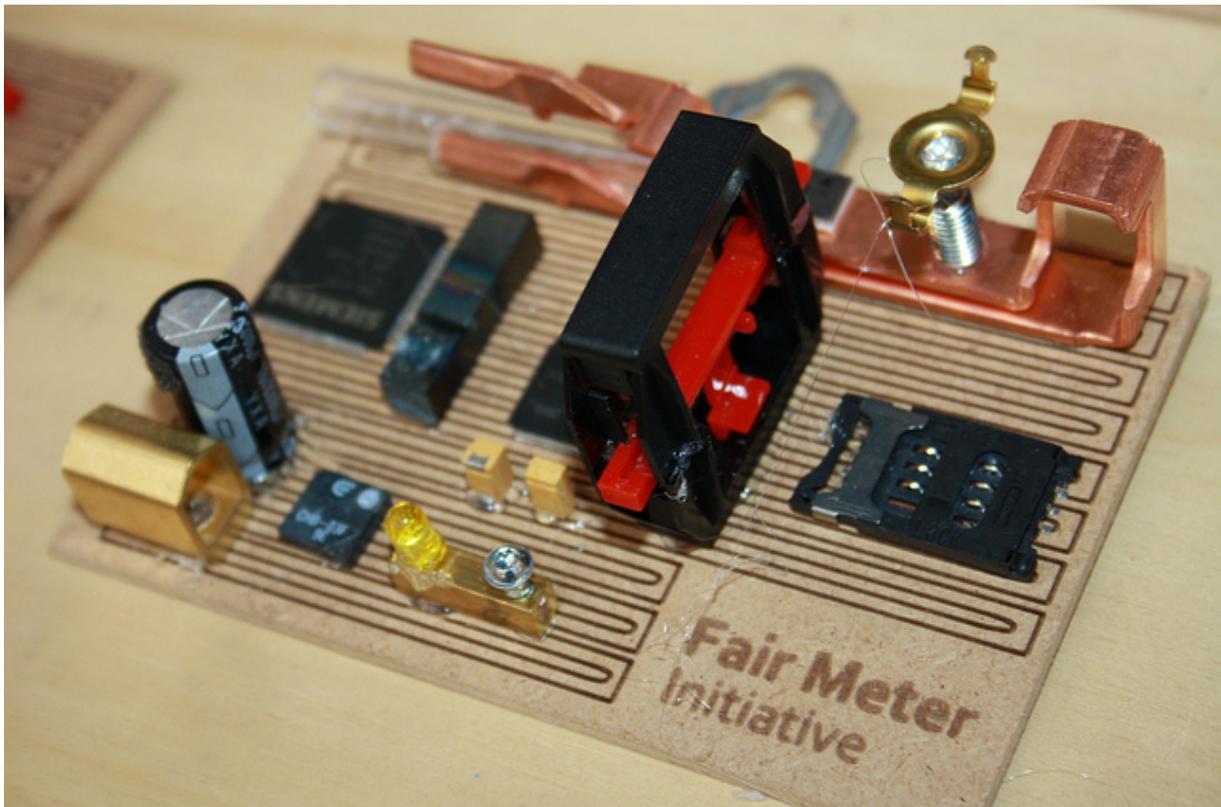
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## Smart meters need to be sustainable meters

*Economic growth, a growing population and an unprecedented demand for energy give raise to new challenges and investments all around the globe. The fast growing demand for energy and subsequent problems to social and environmental conditions stress the urgent need for sustainable energy solutions. As part of worldwide energy related innovations millions, if not hundreds of millions, smart meters are being introduced and launched to the public.*

Smart meters will help customers to save energy by offering direct feedback on actual energy consumption, billing options and comparative information on energy consumption. Many countries are on the brink of introduction of smart meters. The European Union aims at a widespread roll out: 80% of the customers in EU member states are to be served by a smart meter by 2020. The, planned, large scale introduction of smart meters has raised questions to stakeholders in several countries. Issues under discussion are for instance related to, privacy conditions, data and data ownership, electromagnetic fields, presence of a switch within the meter and the operation standards.

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Meanwhile it seemed that no or little attention was paid to legitimate questions from stakeholders with respect to these and other issues. In the end it appears that questions on sustainability affect many stages of the smart meter value chain, customer preferences and set up by contractors included.

Preparing for the first 'roll-out' of smart meters in the Netherlands, Dutch network and gridcompanies joined to discuss their approach on the introduction of smart meters. In a workshop in which the larger grid companies participated, themes with respect to social responsibility and sustainability were introduced and demonstrated in a vivid way. For instance the workshop started with a session on the contents of wasted meters and cell phones. A short documentary was shown on the problematic situation with the excavation of minerals and metals in the east Congo area. Human rights and labour conditions are very much at stake in these area's whereas the revenues of the mining activities do not contribute to local opportunities and peace.

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It became clear to the participants: as an important link in sustainable energy grids, energy efficiency and customer relationship, the smart energy meter itself should be demonstrably sustainable and socially responsible. 'The millions of smart meters we are going to introduce in the next decade also mean that we need to take responsibility to deal with their disposal' was the clear conclusion at the end of the day. Considering the massive flow of meters in the Netherlands, Europe and globally one could conclude that a big difference can and should be made!

## The impact of the smart meter chain

*The impact of the smart meter chain deserves clear investigation. With respect to the Fair Meter Initiative we collected data by searching the internet for publications and studies. We spoke to local experts and were inspired by the evidence, material, approach and enthusiasm of, for instance, the Dutch Fairphone organisation.*

Fairphone is a social enterprise that started by 2010 and aims at raising awareness about conflict minerals in electronics. By now Fairphone has launched a first smartphone that meets social and sustainable standards. The participation of large telecom companies, such as Vodafone and KPN, is conspicuous. Information can be found at [www.fairphone.com](http://www.fairphone.com). Subsequently: what is the impact linked to the smart meter chain? We identified five areas that deserve attention from the perspective of sustainable and social responsibility.

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## Impact: raw materials

A wide range of raw materials and elements are used at the production of smart meters. Especially the electronic components of the communications module may include rare and disputed materials. These concern: tin, copper, steel, iron and parts such as polycarbonate, glass fiber, ABS, printed circuit board, electronics components. Tantalum may also be found within the electronic parts. The impact of the most disputed materials are elaborated. Besides the excavation of raw materials, production, and labour, human rights practices need special attention.



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## *Tantalum*

Tantalum is a rare, conflict mineral. In Eastern Congo, tantalum is mined illegally for low costs. The raw material (Cobalt) is often found in the deeper grounds of rainforests. Therefore mining is very harmful to the flora and fauna in Africa. Tantalum is used as a capacitor and enhances the development of smaller devices. Prices have increased 6 times in the last 3 years.

## **Impact: emissions**

Nearly all stages of the smart meter life cycle give rise to emissions. Most of the emissions are CO<sub>2</sub> and NO<sub>x</sub> due to transport and energy usage. Furthermore, emissions to the air due to excavation and production processes and pollution of water at mining sites are reported. Exposure to electromagnetic fields and its potential health effects are a topic in the media. This media raises public concern and uncertainty, not only about electromagnetic fields emitted by mobile phones, but also about electromagnetic fields emitted from base stations and other wireless networks.

## **Impact: use of energy**

Energy use is related to excavation of raw materials, production, stock, set up, use and end of life processes. A lot of energy is used for transport at all stages of the meter chain.

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## Impact: labour

This is about excavation and mining conditions, labour conditions at production and assembly lines. Human rights are at stake in conflict regions. On the other hand there are chances for social return on investment for example at the redundancy phase of meters. Results at a Dutch Alliander project on recycling old mechanical meters show that recycling figures are best when the meters are dismantled by hand. This contributes to jobs for less qualified workers.

## Impact: data exchange

The way data are dealt with is an issue that is publicly questioned. In different countries public discussions have unrolled on privacy of customers, as well as the management and ownership of data. The involvement and needs of stakeholders and customers are an important and necessary input in this. As the smart meter is intended to serve clients and contributes to a sustainable energy system it may reasonably be expected that transparency about data and data exchanges meets high standards.

## From impact to action

*Considering the impact of the smart meter life cycle and value chain the Dutch DSO (Distribution System Operators) concluded that they should call for action. Therefore the Fair Meter Initiative was introduced calling for fair and sustainable standards. Four domains are identified as relevant to action from a DSO point of view:*

1. Fair mining and production of raw materials, and the fair production of smart meters; Suppliers make supply chain and the source of materials transparent. Suppliers are willing, together with partner organizations, to actively work on improvements in the material chain, especially in circularity and production conditions.
2. Fair use and handling of waste processing;  
The supplier is transparent about the energy consumption of the meter. The aim is an energy neutral meter.  
The meter design meets principles of circularity. The starting point is maximum reuse of the meter at the end of its lifecycle. Meters can be disassembled at the end of their lifecycle with raw materials fully recognizable and separable.
3. Fair tendering and procurement principles including co-creation with suppliers; Supplier is willing to cooperate with DSO, customers and suppliers on innovation giving way to improvements of the meter.
4. Fair offer to our customers;  
The reciprocity principle: aspects of the meter, such as EM radiation, privacy and functionality as part of energy management for the customer can be tailored and made consistent with the wishes of customer. Including the ability to not use certain options (opt-in, opt-out). Packaging of the meters ensures minimal resource consuming and minimum transport volume, package material is fully recyclable.

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Beyond these domains there is a need for transparency on the whole of the smart meter life cycle and value chain. This includes transparency on social, sustainable and human rights issues and the constituency of the meter itself. The transparency imperative is also a key element for stakeholder information and the development of fair trade practices within the value chain related to smart meters.

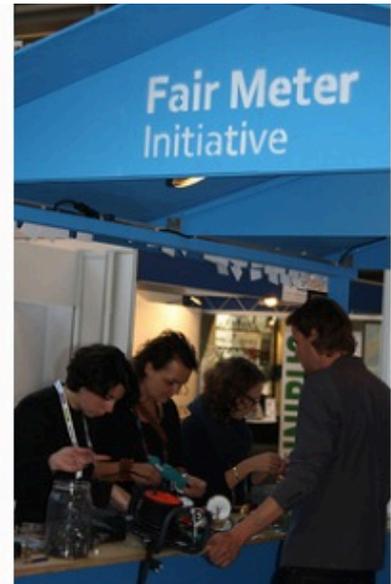
The fair meter not only complies with functional aspects (measuring, communicating, switching, etc.), but also ensures the stakeholders with a proper story. This leads to lower environmental impact and resource depletion in roll-out, better acceptance by the customer and thus a positive impact on energy saving. Parallel to the four areas on which Dutch DSO are calling for action a couple of principles have been formulated in order to provoke focus. These principles are to be further developed, in consultation with stakeholders and manufacturers.

## Shared vision

The Dutch grid operators have developed a shared ambition. They are willing to make social and environmental aspects an integral part in their own processes as well in procurement processes.

- For a broad audience the smart meter is the most visible component of the grid operators.
- Demonstrability of social value and lasting quality are key elements in the expansion of smart meters.
- If parts of the introduction are not in order, then this may increase the social backlash to the smart meter.
- The smart meter is a necessary part of smart energy networks that support energy transition.
- Congruence with other sustainability aspects is therefore of great importance.
- Corporate social responsibility is an important motivation and is part of a business driven approach.

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## The sequel: Dialogue and co creation as steps in the process

The ambitions of the Dutch DSO depend on the meaning and ambition that stakeholders, experts and manufacturers show towards this initiative. This should lead to a concrete elaboration on the ambitions and principles. We stress the importance of the contribution of knowledge and ideas of stakeholder and (market) parties. Dutch grid operators are open for further ideas and have therefore a preference for a competitive dialogue aimed at implementing Fair Meter principles.

## Stakeholder consultation

The vision of the Dutch DSO partners on the Fair Meter has been introduced to several stakeholder groups. These include smart meter suppliers united with Esmig, and European DSO. The consultation of a random selection of meter suppliers was a first test of the concept of a fair meter. Overall conclusions that were recorded showed clear interest and recognition from suppliers. As this was a first request meant for introduction and opinion this round did not give way to explicit deals or alignment to the initiative.

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As it comes to undisputed raw materials suppliers indicate that this is a complex matter at the level of specific country level. Origins of materials often are not clear and there is a lack of evidence. Information on specific countries is not well looked after or is not being used.

With respect to transparency on the supply chain it is said that first and second tier suppliers seem easy to disclose on, other stages in the supply chain seem more difficult to report on. As described in the above paragraph Fair Meter Initiative encourages suppliers to examine all stages of the supply chain and give weight to social and environmental conditions and fair trade principles. For example by actively tracking and tracing as well as auditing on mining and production locations.

Energy neutrality happens to be a theoretical concept rather than an ambition to the industry. Energy efficiency is preferred as a criterium, which of course is easier to attain at a sole company level. Probably this illustrates the need for cooperation and overarching solutions on a sector level. Prevailing European regulation can contribute to the fair concept, as suppliers are working on programmes to comply with these regulations. For example ROHS and WEEE directives are mentioned. From a fair meter perspective we encourage the absence of hazardous materials in order to support a cradle-to-cradle approach.

## References

Special thanks to:

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- Ida Lund Segnant; Assessing the Environmental Costs and Benefits of Households Electricity Consumption Management. Master of Science in Energy and Environment, Department of Energy and Process Engineering. Norwegian University of Science and Technology, pp 36.
- Information on Fairphone: [fairphone.com](http://fairphone.com)

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