



Stakeholder meeting on adaptation challenges and opportunities for the European energy system – Meeting report

Dates: Thursday, 20 September 2018 (from 9:00 to 17:00)

Venue: European Environment Agency, Kongens Nytorv 6, DK-1050 Copenhagen (Room 8.0.6)

Objectives:

1. To discuss the added value, focus, target group and structure of the planned EEA report '[Adaptation challenges and opportunities for the European energy system](#)'
2. To discuss selected comments on the annotated outline that were received during the written consultation (from 13 July to 20 August)
3. To exchange views and expertise between stakeholders and experts from international and European institutions, EEA member countries, sector organisations and academic institutions.
4. To identify climate change adaptation needs and barriers in the energy system, and how public policies and actions can help overcome these barriers

Format: In the morning, EEA presented the scope of the planned EEA report, followed by invited comments from selected stakeholders and a discussion with all participants. In the afternoon, several topics were introduced by relevant stakeholders or experts, followed by an open discussion.

[Background material](#), including among others:

- [Concept note for planned EEA report](#)
- [Annotated outline of planned EEA report \(revised draft\)](#)
- [Folder with all presentations](#)

Organizers: Hans-Martin Füssel, Andre Jol (both EEA), supported by Matthew Smith (Trinomics)

Further participants:

- Blaz Kurnik, Mihai Tomescu (both EEA)
- Michael Mullan (OECD)
- Caroline Lee (IEA)
- Claus Kondrup (DG CLIMA)
- Samuel Almond (ECMWF)
- Hans Eerens (PBL, NL)
- Ross Lowrie (Environment Agency (England), UK)
- Bernard Gindroz (CEN-CENELEC)
- Krzysztof Laskowski (Eurelectric)
- Gert de Block (CEDEC)
- Pedro Paes (EDP)
- Alberto Troccoli (WEMC)
- Simon Jude (Cranfield University)
- Marius Stankoweit (HZG)



Stakeholder meeting on adaptation challenges and opportunities for the European energy system – Final agenda

8:45-9:00	Registration
9:00-9:30	Opening <ul style="list-style-type: none"> • Welcome and workshop objectives <i>(André Jol, EEA)</i> • Tour de table, addressing briefly: <ul style="list-style-type: none"> ○ What specific experience do you bring to this meeting? ○ Which aspects of climate change are most important for your work? ○ What would you like to take home from this meeting?
9:30-10:30	Setting the scope <ul style="list-style-type: none"> • Purpose and scope of planned EEA report ‘Adaptation challenges and opportunities in the European energy system’ <i>(Hans-Martin Füssel, EEA, 15’)</i> • State of work and preliminary findings of the EEA report <i>(Matthew Smith, Trinomics, 10’)</i> • Activities and views from the European Commission <i>(Claus Kondrup, DG CLIMA, 15’)</i> • Activities and views from the International Energy Agency <i>(Caroline Lee, IEA, 15’)</i>
10:30-10:45	<i>Coffee/tea break</i>
10:45-11:45	Scope of planned EEA report <ul style="list-style-type: none"> ○ Feedback on the presentations in the scoping session ○ Open discussion with all meeting participants
11:45-12:15	Relevance of climate change for the energy system <ul style="list-style-type: none"> ○ What are the most important risks and opportunities of a changing climate for your work, both in the short term and in the long term? ○ How important are climate-related risks and opportunities compared to other challenges you are facing in your work?
12:15-13:15	<i>Lunch</i>
13:15-14:15	Barriers and opportunities for a climate-resilient energy system now and in the future <ul style="list-style-type: none"> • Barriers and opportunities for climate-resilient infrastructure <i>(Michael Mullan, OECD, 10’)</i> • Barriers and opportunities for a climate-resilient energy supply <i>(Pedro Paes, EDP, 10’)</i> ○ What are the main goals for adaptation in the energy system, both in the short term and in the long term? ○ What opportunities, challenges and barriers do you perceive related to adequately addressing climate change risks and opportunities in your work? ○ Do you have experience in, or suggestions for, overcoming barriers for action?



14:15-15:15	<p>Adaptation in the energy system: Activities at the European level</p> <ul style="list-style-type: none"> • Consideration of climate change risks and opportunities in existing and proposed EU legislation related to the energy system <i>(Claus Kondrup, DG CLIMA, 10')</i> • Relevance of the Copernicus Climate Change Service for the energy system <i>(Alberto Troccoli, WEMC, 10')</i> • Adapting European infrastructure standards to climate change <i>(Bernard Gindroz, CEN/CENELEC, 10')</i> ○ Have existing EU activities (e.g. legislation, direct funding, research activities and climate services) improved the consideration of climate change risks and opportunities in the energy system? ○ How could the EU further support a climate-resilient transition to a low-carbon energy system?
15:15-15:30	Coffee/tea break
15:30-16:45	<p>Adaptation in the energy system: Activities at the national level</p> <ul style="list-style-type: none"> • Country experience from the Netherlands <i>(Hans Eerens, PBL, 10')</i> • Country experience from the United Kingdom <i>(Ross Lowrie, Environment Agency (England & Wales), 10')</i> • Role of public policies for adaptation in the energy system – UK experiences <i>(Simon Jude, Cranfield University, 10')</i> • Climate change risks for the electricity grid infrastructure in Germany <i>(Marius Stankoweit, GERICS, 10')</i> ○ How have national (and sub-national) policies addressed climate change risks and opportunities in the energy system? ○ How can public policies facilitate adaptation by private actors in the energy system? ○ How could national governments further support a climate-resilient transition to a low-carbon energy system?
16:45–17:00	<p>Wrap-up and next steps</p> <ul style="list-style-type: none"> ○ Further involvement of stakeholder group (written contributions, review) ○ Possible launch event (in Brussels or at ECCA2019 conference in Lisbon)



Key notes from presentations and discussions

9:30-10:45 - Setting the scope

Presentation: [Purpose and scope of planned EEA report 'Adaptation challenges and opportunities in the European energy system'](#) (Hans-Martin Füssel, EEA)

- Q: Can you describe further the purpose of the work? Is it a study mandated by EC?
- A: It's primarily awareness raising among key stakeholders, developed through EEA management plan, not EC mandated.

Presentation: [State of work and preliminary findings of the EEA report](#), (Matthew Smith, Trinomics)

- See slides

Presentation: [Activities and views from the European Commission](#) (Claus Kondrup, DG CLIMA)

- Evaluation of EU Adaptation Strategy (EUAS) to be published towards the end of 2018 (tentatively 5 November), but revisions to EUAS will be decided by the next European Commission (after Oct 2019)
- Country fiches for adaptation preparedness scoreboard will be published ([drafts were previously published](#)) with the evaluation.
- Q: We understand a sectoral approach was taken in the Strategy, but what about cross-sectoral links?
- A: Current and future EU adaptation strategy include cross-sectoral links, but in future there may be further attention to the transition to a low-carbon economy. For DG CLIMA, it is important to understand where we can steer action and use funds most effectively.

Presentation: [Activities and views from the International Energy Agency](#) (Caroline Lee, IEA)

- IEA previously engaged primarily on decarbonisation, but in last 5 years has engaged more on climate resilience
- Current impacts on energy system are already important. E.g. Hurricane Florence – big power system damages. Summer heatwave in California – big impacts on demand, leading to load shedding (not only peak increase, but also the duration of event was a big problem). In France nuclear plants shutdown on Rhone due to cooling water temperature limits. In Pakistan, hydro reservoirs fell below 'dead lows'. Germany – the Rhine was at such low levels that it disrupted transport of fuels on inland waterways (leading to price increases).
- Greater energy system resilience needed, even if 1.5 degrees climate target is met, but the perception of policy makers is not always aligned with this (i.e. some perceive that if Paris climate target is achieved then not much action is needed on adaptation)
- Decentralisation trend – need to be careful, can increase the risk of local outages unless there are good interconnections between new local networks
- Drought and heatwaves combined – drives emissions increases globally (hydro production reduced, peak demand for cooling)



- Synergies between mitigation and adaptation are important: (1) Energy efficiency; (2) Distributed RES – reduces disruption of outages given good interconnectivity; (3) Energy storage – critical back-up, supporting intermittent RES.
- There are also trade-offs between mitigation and adaptation: Dry cooling (e.g. significant retrofitting in China) addresses water scarcity issues but reduces power plant efficiency
- IEA report: Future of cooling ([see report](#), 2018)
 - Looks at the GHG impact of cooling – and shows efficient cooling can be achieved
 - Energy Efficiency (EE) scenario – based mostly on Minimum Energy Performance Standards (MEPS – Ecodesign Directive in EU) for appliances
- IEA wants to mainstream climate impacts in all work (scenarios, market reports, country reviews), building on previous one-off studies
- Q: Was work also carried out on transmission and distribution? As climate impacts are more about the extremes and distribution of events – did IEA look at this?
- A: No, it would be interesting, but has not been possible yet. On distribution of extreme events, IEA has focused to date more on the incremental changes, e.g. water availability, temperatures/cooling.
- Q: Many system failures occur due to lack of good local weather prediction. What does IEA think of how improved weather forecasting for renewables can help this.
- A: Variable renewables have not been included yet in IEA models, difficulties to model the impact of climate change on RES production.
- Q: Are water withdrawals in IEA scenarios mostly related to extraction (primary production of fuels) or in transformation too?
- A: IEA scenarios include both upstream and transformation.
- Q: Scenario choices – e.g. what assumptions were made on centralisation, this can have decisive impacts on outcomes. Decentralisation could increase resilience.
- A: Decentralised RES can have resilience benefits. IEA modelling (so far) has limited geographical representation of supply and demand, therefore it is difficult to say more on impact of decentralisation.
- Comment: There are challenges highlighted by dry cooling – in policy context where high EE is desirable/incentivised. Dry cooling is less efficient, but more resilient. But for an investor, the existing market incentives do not support making a less efficient but more resilient investment decision. It remains a challenge to incorporate these issues into policies and/or technical guidance.
- Policy does not always support resilience, for example a case in hydropower where a group was trying to develop equipment that can work at low or high water flow extremes and was looking for H2020 research funding, but there was not the right category of funding to apply for such a project.

10:45-11:45 Scope of planned EEA report

In this session the focus was on:

- Feedback on the presentations in the scoping session
- Open discussion with all meeting participants



Notes from open discussion

Barriers

Q: Barriers – in the report how do we deal with the growth in decentralisation and therefore the dispersion of risk, also to new (and less experienced) actors? How do we consider energy storage issues in this context? With decentralisation, moving to other energy carriers, how to deal with cross-grid issues? E.g. storage, hydrogen.

EEA/Trinomics: These are important issues for energy system, but our scope is particularly on the impacts of climate change and the resilience needs this brings, so we will describe but not focus on these issues, unless there are specific adaptation implications.

Q: Could market decisions/business models lead to decisions making the energy system more vulnerable? For example deregulated energy markets, whilst providing greater competition also leading to more fragmented systems and responsibilities, even cases of virtual companies?

A: Yes, this multiplication of actors can lead to greater risks – and at the same time potentially less capacity to deal with resilience or issues when they arise. This could present a role for policy – for example to enforce risk margins on market players to ensure some spending on resilience?

Other challenges at organisation level include:

- Organisational memory
- The ability and capacity to change
- Management culture and thinking (is it only with a short-term perspective, e.g. looking at 3-5 years, or a longer term perspective?)

Scenarios discussion

Comment: Trying to define the future energy system is very difficult. It is possible to spend a lot of time on it, but can we actually imagine what the future system will be? Advice, don't try too hard to do this overall, don't go down the scenario 'rabbit-hole'. Policymakers need to focus on a few things:

1. Regulation – for resilience is needed, markets won't do it automatically
2. Defining – industry led standards, common to multiple systems

Purpose is to ensure that system can become incrementally more (not less) resilient. Government needs a vision, to point the way for the market, then the regulation to create the incentives for market actors, and definitions for clarity.

Response: but precision in scenarios and projections can help, given long lifetimes of infrastructure there are a number of things that can be relatively reliably predicted. For example energy infrastructure – has not changed that much, is very long-lived, much of this we already know will need to be adapted. These big changes are mostly in energy supply.

Scenarios, can be good to have, sensitivity approaches can show if there is a strong influence on a particular parameter then it can be flagged as something to act on. Can also help to understand



what organisations need to do, do they need to adapt current assets or would they be better to start again, maintenance vs rebuilding.

Scenarios are not predictions, and they will almost invariably be wrong. However, there are some (directional) certainties about future developments, e.g. RES (renewable energy sources) growth, decentralisation growth. Exploring these is worthwhile to understand what the impacts could be and how climate resilience could be included.

How does the resilience/adaptation challenge differ between different decarbonisation scenarios?

Discussion related to scope of the EEA report

Looking at the report outline, nothing was missing. This could be a problem – too much to take on – for example with the focus on energy system in future, IEA has done a lot on this already, the added value for this report should be the adaptation aspect. Take a focus on decision makers, and particularly reflect if they have the ability, incentives and information to make more resilient decisions. And what levers do they have to support action. It is not necessary to provide an in-depth review of the future energy system.

Focusing on scenarios and providing significant detail on these is not very valuable. Keep focus narrower than this. Example of making a (company) financial budget – you don't need to have all details to make a budget, but can be as precise as possible on clarifying the resilience implication of choices (of different scenario).

Raw materials – this can be an area to narrow focus, advise not to explore in detail.

Case studies are very interesting for understanding challenges and barriers. Framing of the case studies is important – think of long term infrastructure, more difficult climate issues, and risk of maladaptation.

Report focus is climate adaptation – we need to keep perspective that climate adaptation is only a small driver in the energy system as a whole.

Report should make clear how well we understand the cost implications of climate resilience. Also in the context of long-lived infrastructure – what soft measures can already be taken? A comparison would be very helpful – to consider what is the cost of long term resilience measures, and shorter term 'soft' measures. Acknowledging that it is very difficult to get good figures, and particularly to aggregate them across time and technologies. See Kondrup presentation for source of damage estimates.

Other

Have to think on the structuring of agencies and organisations, the EC has mostly addressed the power system, created DSO organisations focused only on electricity, or gas, or heat (ENTSO-E, ENTSO-G). Need more integrated thinking on this given the links across all parts of the energy system. Some examples:



- Sector coupling, in Denmark this is a success – district heating coupled with RES power supply. Has been a success, but not possible everywhere. Addressing sector coupling in different regions will be key to success.
- Gas – power sector is looking at hydrogen production, using gas networks for distribution to non-electrifiable sectors.
- Carbon Capture and Storage (CCS) – is more likely to be Carbon Capture and Use (CCU) in the chemical sector
- Biomass conversion – has the possibility for negative emissions, e.g. in case of Drax. This is important as some energy use (e.g. maritime, air) will be very difficult to decarbonise completely. How does this fit into the system?

11:45-12:15 Relevance of climate change for the energy system

In this session the focus was on:

- What are the most important risks and opportunities of a changing climate for your work, both in the short term and in the long term?
- How important are climate-related risks and opportunities compared to other challenges you are facing in your work?

Risks & Opportunities

Attendees were asked around the table to list their primary risks and opportunities.

Risks

- Damage to physical assets from extreme events (in particular storms and flooding)
- Regulatory risks
- Reduced water availability (among other resource variability)
- Inadequate consideration of 'high-end' climate scenarios in risk management
- Water availability and biofuels
- Just and inclusive transition is big challenge
- Ensuring security of supply
- Worry over changing the energy system (for low carbon) and at the same time to adapt to climatic and societal risks
- Costs fall not only on producers, but also society – can also be opportunity, logic for public money
- Cost vs reliability of intermittent supply – i.e. if you go entirely RES, risk of windless month, need to guarantee that producers also guarantee alternative generation in this event (or demand management) – this is now feasible without subsidy, but needs government to require it
- Stress testing shortcomings - worried that as climate changes, we'll experience unexpected (negative) surprises and interactions
- As we move to 2 degrees the risk of extreme events is increasing – concern that the required adaptive capacity is not in place, risk of collapse
- Putting all eggs in one basket is a risk



- Risk – people misunderstand climate information, such as projections, and offer this as a service. Opportunity to improve services.
- Risk – non-alignment of existing policies. Still following Business as Usual.
- Alignment of risk considerations between decision makers and investors.
- Challenge (also opportunity) on how to price storage, not only for energy supply, but also the function.

Opportunities

- Good examples already there, e.g. for Flooding in UK – micro-hydro adaptation – example of flooding event, most plants were running again within 1 day
- Communication of good practice examples
- Opportunity for adaptation from incidents – stress tests should also look at unlikely scenarios
- Energy storage to increase system resilience
- Disaster Risk Reduction (DRR) and adaptation – gaps that climate services such as C3S could help with
- Consumers can contribute to resilience as a whole (residential, not only industry)
- Opportunity – in system thinking (not silo approach)
- Opportunities in adaptation to minimise damages, ensure safety

13:15-14:15 Barriers and opportunities for a climate-resilient energy system now and in the future.

Presentation: [Barriers and opportunities for climate-resilient infrastructure](#) (Michael Mullan, OECD)

- Climate resilience is about more than design and building of infrastructure– it is also about operation
- Costs – very little information available on these. Would be helpful to better understand what is the ‘extra’ cost of adaptation / climate resilience
- Benefits of resilience – response to ‘how do you pay for it’. Many benefits are social, not captured by the market, and therefore not included in (private) organisation decision making.
- Barriers – include long time horizons, market failures and policy, inequality
 - Infrastructure has always been heavily regulated – but what is the cumulative effect of this on adaptation action?
 - Inequality in adaptation – adaptation implies an ‘acceptable’ level of risk – but risks to whom?
 - Avoid stranded assets
- Project level – pipelines and pathways – thinking more in terms of pathways for system, not just individual projects would be beneficial.
- Project risks – important to consider how (and to whom) do public-private partnerships (PPPs) allocate the climate risk?

Presentation: [Barriers and opportunities for a climate-resilient energy supply](#) (Pedro Paes, EDP)

- See slides
- EDP Operational strategy looks at full life cycle of assets



- Main goals: Prevent damages and ensure supply continuity

Comments

Q: Looks like things are going well - Risks are assessed, taxonomy and plan is in place – but is this accurate, and is this normal? If not, then what can policy do (is it needed)?

A: Most other big companies have similar strategies, published.

Open Discussion

Purpose to address the following questions:

- What are the main goals for adaptation in the energy system, both in the short term and in the long term?
- What opportunities, challenges and barriers do you perceive related to adequately addressing climate change risks and opportunities in your work?
- Do you have experience in, or suggestions for, overcoming barriers for action?

Eurelectric committed to carbon neutral electricity before 2050, they are looking at what date is actually possible. Can be an enabler for entire economy decarbonisation. Electrification is not the whole solution – e.g. using gas infrastructure can also be cost-effective.

Resilience – cost is important, not one-size-fits-all, e.g. underground lines in rural areas (noted too expensive in EDP case), but some companies do this, some solutions are economically feasible. Must note that distribution is also highly regulated.

Amongst the main goals of increased resilience is to minimise disruption and damages, but trade-offs always exist. Is underground cabling always the solution? For EDF France, no, for them they judged it was better to rebuild damaged infrastructure when it occurred, with a resilience focus on arranging for technical back-ups and quick response mechanisms.

Goals – what is an acceptable type and level of risk? Sometimes this is explicit (through regulations/standards), sometimes it is implicit. Without an agreement on this then adaptation actions might not necessarily focus on most appropriate actions, risk of inequality in resilience.

Amongst barriers is the misalignment of incentives and policies, e.g. decision makers need to be convinced to revisit policy to take into account future scenarios as new information becomes available. Very difficult to get a go on a large investment with long term policy uncertainties.

Regulation and/or revised standards may be needed to build the business case for resilience investments in competitive markets.

Challenge from decentralisation, new incumbents, new actors, not from energy sector, sometimes with short term views. Communication should keep these audiences in mind.

Public procurement – must still be revisited, still too much on final price. E.g. changing weightings in evaluation could help – e.g. price 60%, technical (including resilience) 40%.



Developers find that reliability of climate data is not high enough, spatial resolution not high enough (down to project level). A single entry point to find this type of data would help, but even getting to this point requires a huge amount of awareness raising. This EEA report can play an important role.

Lack of resources – what can be done in this case to help translate societal benefits into the business cases of operators. At present there is no mechanism for this.

- What is the willingness to pay / accept? But even national processes don't really lead to societal debate. But is societal debate always necessary?
- What is the role of society in defining acceptability – idea for survey – EA (UK) decided against a survey of consumers – judging these were the wrong group to ask on this issue.

Consumers and energy storage – could be an important opportunity to improve system resilience.

Overcoming barriers – through dialogue and discussion on value. Using historical, real examples is a good way to get people to engage and reach common ground in these discussions. The role of EEA and others in this is important.

Building business cases – in liberalised markets, the role of the regulator is important. In regulated markets, prices can (and perhaps should) be allowed to increase to fund resilience.

14:15-15:15 Adaptation in the energy system: Activities at the European level

Presentation: [Consideration of climate change risks and opportunities in existing and proposed EU legislation related to the energy system](#) (Claus Kondrup, DG CLIMA)

- EU policy builds from Paris Agreement
- Energy Union Governance Regulation – legal procedures well advanced
- Recital 29 - reporting elements will effectively replace MMR commitments – important for adaptation information
- 10 year national energy and climate plan (NECP) cycle – will include adaptation/resilience
- Budget focus, climate mainstreaming 2021-2027 likely to increase climate spending requirement to (at least) 25%
- Climate Change and Major Projects – to be extended from Major Projects to cover much more infrastructure (InvestEU, Connecting Europe, DG REGIO), requirements may be simplified

Presentation: [Relevance of the Copernicus Climate Change Service for the energy system](#) (Alberto Troccoli, WEMC)

- See slides

Presentation: [Adapting European infrastructure standards to climate change](#) (Bernard Gindroz, CEN/CENELEC)

- Energy is one of 3 key sectors for standardisation



- Reviewed more than 100 standards, including international standards – resulted in a list of 14 standards for revision, 3 of these in the energy sector (see slides)
- First step to check with technical committees on their awareness (often low) and then to go through a process with them, step-by-step, this will also define what is needed in terms of data (spatial, time).
- Still need to educate many experts on the difference between mitigation and adaptation, and on cumulative effects of climate impacts
- Q: Availability of data
 - A: So far this has gone well, good process and responses, but not all data currently available. Aligning with C3S on this point to try to establish a single data source – as a reference point.
- Target group is technical community.
- Q: How is cost-effectiveness included in the process (e.g. risk that a standard is too high in one area, too low in others)?
 - A: Cost-effectiveness comes into play at implementation stage, where there will be particular options to choose from, standard itself does not (need) to consider this.
- Process will probably adapt ISO15001, which is also being revised at international level, with modifications on adaptation for EU standards.
- Q: Is there a feedback from European work into international level?
 - A: If changes to the standard are adopted in EU, then these can be proposed also to ISO. There is considerable crossover of experts between groups.
- Important questions being considered include:
 - Have existing EU activities (e.g. legislation, direct funding, research activities and climate services) improved the consideration of climate change risks and opportunities in the energy system?
 - How could the EU further support a climate-resilient transition to a lowcarbon energy system?
- Further clarity and strength of EC messages on this issue would be helpful – to raise awareness
- For standardisation, it may be useful to draw on risk assessments, such as that presented by EDP. May be useful to compare this table of risks with barriers to EU policies – to look at potential gaps and how these can be addressed
- Bringing together adaptation community with other technical communities – Environment Agency [UK] is working with the Industrial Emissions Directive (IED) community. Asking about how current and future weather is taken into account in permitting? 46% currently do, 36% future. Only 1/3 taking climate change into account in permitting. Practitioners and regulators need to better understand this challenge, particularly at practical level.
- Work on standards, whilst with focus on technical groups, it also works through coordination groups, with much broader attendance.

15:15-15:30 Coffee/tea break



15:30-16:45 Adaptation in the energy system: Activities at the national level

Presentation: [Country experience from the Netherlands](#) (Hans Eerens, PBL)

- Cooling water – Rhein river temperature increase of 3 degrees, of this increase 2/3 due to power plants cooling water outflows
- Stress test – carried out, power failure with cascade effects – varying very high proportions of wind and solar, over 4 scenarios, testing 16 simulations, 120 years data. Tested variance in gulf stream (North Atlantic Oscillation - NAO).
- For Netherlands (NL) - heating requirements can significantly decline as temperatures increase (winter 2014 an example already)
- In worst case, climate/weather effects (e.g. such as windless month) will be Europe-wide, not just confined to a small region – so may be difficult for interconnections to compensate
- Increasing RES will increase vulnerability – NL / Europe not ready for this currently
- Over long term, and cumulative costs, the higher costs from climate change damages can be offset by lower costs of RES, if RES continues downward price trend

Presentation: [Country experience from the United Kingdom](#) (Ross Lowrie, Environment Agency (England))

- Greatest threat to energy system resilience in UK is probably judged to be cybersecurity, not climate change
- Citizens are now more vulnerable to energy system failures due to societal change – e.g. payments now all electronic
- Importance of interconnections – communication infrastructure relies on electricity too. We are moving towards an ever more complex energy system.
- Governance model – UK has a nice model, but in practice has been a bit ‘clunky’, timings with policy developments and processes have not always been ideal
- Updated climate projections will be published this year, unlikely to be substantially different from 2009. [2017 UK Climate Change Risk Assessment \(CCRA\)](#) – identified energy as an important and vulnerable sector. [Second national Adaptation Programme \(NAP\)](#) just published.
- Reporting of risk assessments for organisations in strategic at risk sectors, should help feed back in the system. Reporting has become voluntary – there are pros and cons of a voluntary approach.
- Approach - adaptive pathways – do things you can do now, build towards eventual goal (Thames barrier example)
- Good to be clear on what is meant by resilience.
- It may be that if a large part of infrastructure additions are made resilient, this lessens the need for action at system level.
- Role of consumers can be further explored.

Presentation: [Role of public policies for adaptation in the energy system – UK experiences](#) (Simon Jude, Cranfield University)



- About 100 organisations asked to report on adaptation (under Adaptation Reporting Power), to be published and assessed (by Cranfield). Guidance provided. [Report here](#).
 - Benchmarking of reports – not only energy sector – was not popular
 - Sector summaries were produced (by Cranfield)
- Energy sector summary – poor understanding of exposure to risks, particularly spatial elements. Risk assessments tended to focus on middle scenarios – not testing against extremes.
- Biggest sector challenges – lightning, multi-hazards, vegetation removal (2nd biggest cost for Distribution Network Operators [DNOs]), interdependencies
- Often even though risks identified, there was little concrete follow-up in terms of resources applied to action, or timelines, or targets – vague on practical actions
- In UK, regulators are facilitating adaptation in some ways, but information asymmetry is an important issue (firms hold most information, sometimes reluctant to share with authorities)
 - Energy sector less keen on disclosure, or to engage with process, than other sectors
- Later rounds have been voluntary – emerging risks of using a sector level report produced by the sector association, adapted minimally for individual firms
- A limit on reporting is in place (<100MW sites not included) – but with decentralisation trend this will exclude many new sites
- Reporting timed badly to feed into CCRA updates – policy disjoint

Presentation: [Climate change risks for the electricity grid infrastructure in Germany](#) (Marius Stankoweit, GERICS)

- Wind speeds in Germany – were compared with economic value risk – these can vary considerably locally. Important implications for regulators and decision makers

Discussion

Purpose to address the following questions:

- How have national (and sub-national) policies addressed climate change risks and opportunities in the energy system?
- How can public policies facilitate adaptation by private actors in the energy system?
- How could national governments further support a climate-resilient transition to a low-carbon energy system?

Stress test – mentioned a few times (NL, nuclear at EU level) – having a common definition of what it means in the energy system context would be useful. Links to National Risk Assessment? Consider the results of the FP7 project [STREST](#) (Harmonized approach to stress tests for critical infrastructures against natural hazards).

Sector stress tests or national assessments can be valuable as a starting point for others – particularly in reducing ‘transaction costs’ for different, especially new, actors in the adaptation process



Governments can reduce the burden on the energy system by sharing costs – as happened in NL with the emergency telecoms system that was developed

Q: Would the UK Adaptation Reporting Power style reporting be recommended for other governments?

- A: The process was very transparent, needed to be signed off with multiple departments, and was properly tested/piloted. Needed a lot of work through dialogue with many organisations. Mandatory reporting could be valuable to force engagement of foot-dragging sectors.
- A: Advice to other govt. (1) don't ask people to do extra reports, align with existing reporting; (2) sell the benefits of the process; (3) fund (public) organisations to do it?
- A: Authorities are seeking a learning, collaborative environment – so given that benchmarking/ comparison typically not welcomed by firms, this may not be the best option

Q: Are (EDP) targets more aspirational than actionable? A: At EDP they translate into action, annual reporting and tracking.

Company responses will be a factor of differing perspectives (e.g. proactive like EDP vs firms in reporting analysed by Cranfield) and also the institutional maturity of the organisation on adaptation, eg. Transport for London (TfL) and tube station flooding – at first TfL totally unprepared, but now has full risk assessments for all stations.

Structural and organisational resilience should be differentiated, as these are different, not necessarily the case that if all organisations are resilient that the structure is.

Privatisation in NL has fractured the data landscape – worries both firms and govt.

Is it possible to map adaptation barriers with relevant EU policies?

16:45 – 17:00 Wrap-up and next steps

Possible launch event(s):

- [Updated] There was a general consensus that a specific launch event of the report in Brussels would be very helpful to gather attention by policymakers, a wide range of stakeholders and the wider public. Possible locations would be the European Parliament or the EU Sustainable Energy Week ([EUSEW](#), 17-21 June 2019)
- [Updated] EEA, OECD, EA (England), EDP and EBRD have submitted a proposal for a science-practice session on this topic for the next European Climate Change Adaptation conference ([ECCA 2019](#), 28–31 May 2019, Lisbon)
- The 6th International Conference Energy & Meteorology ([ICEM2019](#), 24–27 June 2019, Lyngby/Copenhagen) may be another relevant venue for presenting results of this report. (The call for submission of abstracts and sessions has not been published yet.)