

# What have we learnt and what have we missed?

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## Abstract

Some 15 years ago (2007) the eceee started a session called “The foundations of a future energy policy. Longer term strategies” with the ambition to see if our work with eceee summer studies could serve as a sort of crystal bowl for the future. This session has been repeated throughout the years even if the name and number has changed slightly. The ambition remains.

Have we managed to discover trends, have we managed to enhance knowledge about energy efficiency policies to a higher degree, are we capable of predicting and guide future policies? Or are we still walking in the dark? This paper will browse through the past 7 sessions (2007–2019) and check if there are any patterns that could reasonably be seen as a sort of “distillation” of knowledge. I will be looking at the challenges the authors have tried to meet and to which audiences they have been addressed. There will be a comparison with the general trend for energy efficiency on a global scale, in particular by use of the IEA energy efficiency reports, but also the EU ambitions to make energy efficiency “the first fuel”.

We have no doubt managed to discover a lot about the nature of the work to improve energy efficiency by gathering experiences from across the globe. Extracting, comparing and analysing attempts to make policies work and the work better seems successful. But what impact have these discoveries had?

It is obvious that something must be done. The IEA reports show that energy efficiency worldwide is shrinking rather than improving. We have learnt a great deal, but maybe about the wrong thing? Or is it just so that we are not good enough to tell

the story about what we have learnt? I will attempt to trace indications of what we could have overseen or lost.

## The challenges

The challenge was described as twofold for the first session of eceee 2007 (Wilhite and Nilsson 2007), see quote below. Energy efficiency is however not a straightforward and self-explanatory concept and needs some elaboration. Many of us in eceee have a general and common idea about what we mean and when we have different opinions we often add an explanation e.g. in the sessions of the summer studies. We talk about buildings, transportation, built environment, consumption etc. If we should make it simple it means that in most cases we could do “more with less”. We can get more out of the available amount of energy by making use of better equipment and/or using equipment in a more clever manner.

Many in our surroundings could have more exotic interpretations. I have met politicians who find energy efficiency unpleasant since they think that it means sacrifice of comfort rather than maintaining comfort, but with use of less resources. A recent US president in several speeches told about energy efficiency as a method that was requiring inferior equipment.

It needs still to be remembered that giving priority to energy efficiency has both a geographical and an intertemporal dimension that could trick us. We may import energy saving equipment that requires energy use in another place or at some other time.<sup>1</sup>

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1. We may all have met people who brag that their lighting decoration for Christmas is energy efficient even if they did not have any such lighting before.

So eceee in its effort to persuade audiences to change still has an obstacle in finding ways to change behaviour and policies. It was firstly that the importance of energy efficiency was clearly laid down in evidence by eceee, but still attracted too little attention by the actors concerned (1). It was secondly that the importance of energy efficiency was more far-reaching than only being good for the local economy, but also had impact for environment and climate in a global sense (2).

Further, it was stated that current thinking about the importance of energy efficiency could go beyond the traditional economic paradigms that actors normally recognise in width and depth (3 and 4).

Those of us who have been working at the interface between energy efficiency research and policy for a while share a double frustration.

- The first (1) is that, in spite of solid evidence that energy efficiency saves money, pollution and carbon, many sound policies and projects have long been collecting dust on the shelves of policy makers, energy suppliers, businesses and consumers. In other words, we still face the hugely important task of finding ways to get economically viable and technically feasible projects out into everyday practice.

The second frustration derives from

- (2) a timid reaction in the energy community to the increasing importance of environment and climate change. These lay down a gauntlet for deep changes in both energy policy and research agendas. We have been far too slow in adjusting our thoughts and actions to address these changes.

For a long time, we have been held hostage by a peculiar form for economic thinking which, from the inside of its box, has viewed the resolution to the energy problem in optimising resources perceived as scarce in the short run but infinite in a long run. We should have moved out of this box earlier, but our imaginations have been captured by the promises of efficiency and optimisation. We have been slow to recognise that environmental carrying capacities are in-

different to efficiency but rather react to the volume of pollutants and emissions. For many categories of pollutants, especially CO<sub>2</sub>, these continue to increase in most parts of the world, or at least not decrease at rates necessary to avoid potential catastrophic changes.

There have been altogether 182 contributions accepted for oral presentation during these years. Many of them are addressing several of the aspects mentioned. The number of presentations for each summer study have varied but the trend is growing.

The 182 papers have been handled by 12 panel leaders. Three of the panel leaders have been leader in more than one panel, which guarantees for some continuation and consistency. Four of them have also been board members of eceee which allows for that the work reported have been part absorbed and seen in the light of policy-development in e.g. countries, EU and the IEA. Four of the panel leaders serve as professors at universities in member countries.

There have been a certain growth of presentations over the years. Several of the contributors have been “regular and returning customers”. Being accepted for peer-review and oral presentation have been the “gold-standard” but in later years poster presentations have been upgraded and made more attractive which could explain the growth.

#### DISSECTING THE CHALLENGES

To be able to see trends in the material I have made a rough and extended classification. I have tried to see which aspect, mentioned above, each are primarily addressing.

The first two observations in the presentations are focused on **technology aspects**. Are the energy efficient technologies fully understood and recognised, Are the alternatives and combinations with energy supply understood e.g. that renewable supply could be more widely used if the use is less “demanding”. Those are the ones Willhite and Nilsson call “frustrations” in the quote above:

1. The *superior characteristics* of energy efficient equipment itself is not sufficiently observed by the market actors. The author(s) of the papers is/are trying to outline these superior aspects further. Mostly in terms of quantities or in terms of that certain types of equipment is insufficiently recognised.

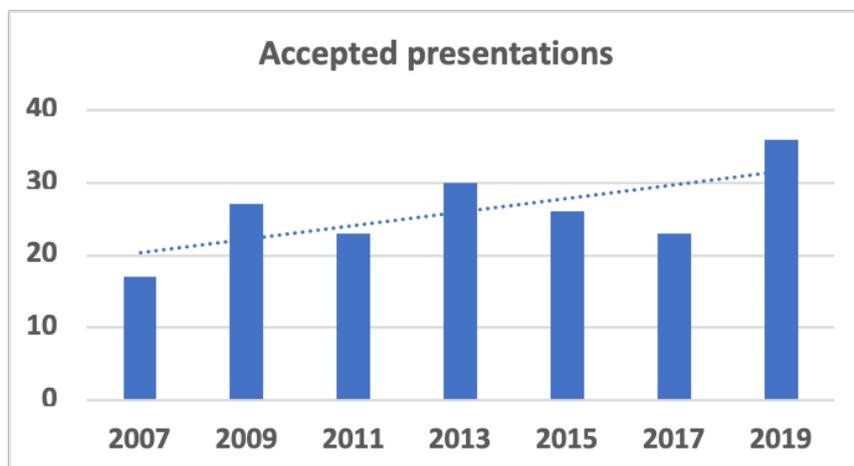


Figure 1. Accepted presentations.

Table 1. Panel Progress over the years.

Year	Panel Name	Panel Leaders	Number of presentations
2007	Longer term strategies	Wilhite, H. Nilsson	17
2009	Initiating changes and breaking walls	Cooremans, Douzou	27
2011	Cutting the Gordian knot	Wilhite, H. Nilsson	23
2013	Foundations of future energy policy	L. Nilsson, Pett	30
2015	Foundations of future energy policy	Gomes Martins, Wade	26
2017	Foundations of future energy policy	Repenning, Schumacher, L. Nilsson	23
2019	What's next in energy policy?	Bach, Schломann	36

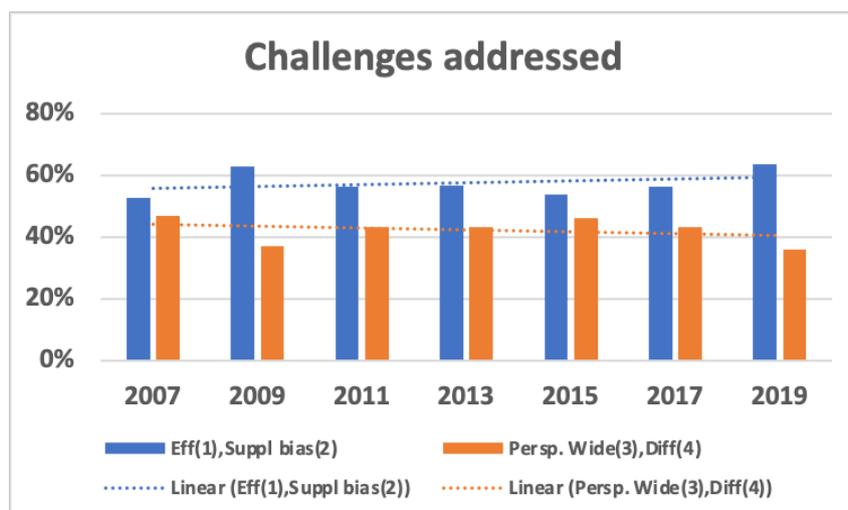


Figure 2. Challenges addressed.

- The market actors do not make correct evaluations of energy efficiency in comparison with their traditional options and e.g. they give *undue priority to supply side*.

Secondly another set of presentations are focused on the **conceptual aspects** on how planning is made and for what purpose. Market actors are primarily supposed to act according to traditional neo-classical economic theory and optimise (to make a profit). They are doing so with limited knowledge on how they could improve their result by making better use of energy efficiency. Education both for economists and engineers have such a limited focus and therefore the most usual concept is limited.

- They could (should) have a *wider* view of how market and individuals work. Economic priority does not take into account human bias but should be extended – e.g. by application of *Behavioural Economics*.
- Economic priority should be applied from a *different* perspective – e.g. by *application of sufficiency* instead of economic optimisation

Already this rough classification gives us an instrument to search for possible omissions in our material and look for gaps in terms of technology and/or conceptual treatment.

The entries vary greatly over time but when taken together the technology aspects (1+2) and conceptual aspects (3+4) some trends can be observed. There is a majority for the tech-

nological aspects (1+2) which is also slightly growing and the conceptual aspects (3+4) which have a downward trend.

### The audiences

The reason for giving a paper to the eceee is naturally to provide important information to an audience who could use it to impact their action for a change. These audiences and their cases could be characterised as was made in the introduction to panel 1 (Wilhite and Nilsson 2011), in the quote below:

... the authors provide new thinking on economy, technology and reducing consumption. They are covering three cases of societal views, namely:

- The political case:** People are prepared for change, but politicians are not. How can we provide them with the motivation and instruments to make the change?
- The social case:** Energy efficiency vs. energy sufficiency; the theory and practice of (making) change. How do we deal with energy rebound in societies in which consumption is unbounded?
- The business case:** How can we use the market as an instrument? Development of new business models that combine efficiency and renewables and that reward sustainability.

It would of course be nice, but presumptuous, to assume that the eceee had such an impact as to swing large audiences around and shift their modus operandi. It would however be of importance to see if we are acting in manner that at least appeals to some of the audiences. In their search for evidence of the superiority of energy efficiency the people, be they politicians, common men and women or business people, are following the same pattern. They are thinking fast or slow, they are testing their result against beliefs/habits common for their group, they test the outcome with knowledge available and sometimes filter away (forget about the whole thing) the result (Nilsson 2013, 2015, 2016, 2017).

Even if the categories mentioned above are fairly easy to observe and distinguish as targets the problem is that they are in reality intertwined and hard to reach with one simple message. The World bank (2015) made a simple model that illustrates the problem.

The World Bank model interprets and describes how the decision process depends on:

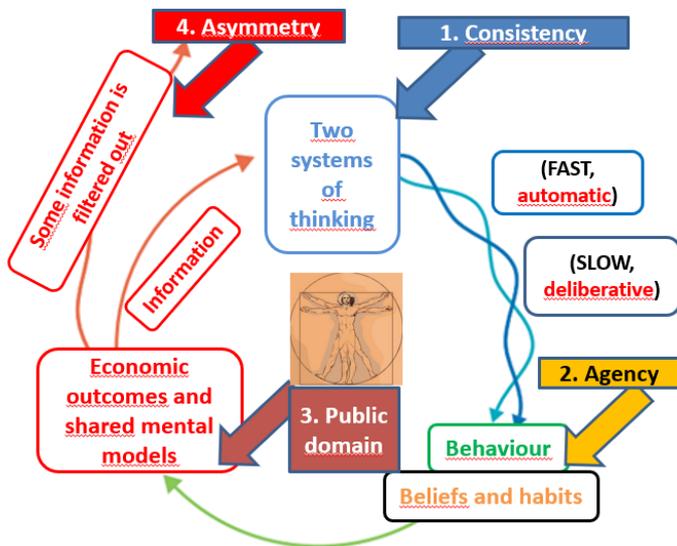


Figure 3. Behavioural economics recognises that the process for making decisions is not consistent (Based on World Bank 2015).

- The **two systems of thinking** we all have where one part is **fast and automatic** and the other is **slow and deliberative**, Kahneman 2011.
- Which guides our **behaviour**, which is also dependent on **beliefs and habits** where we tend to trust some sources/authorities and have less trust in others, Kahan and Braman 2006, Kahan et al. 2007.
- That finally results in **economic outcome** that depends on **shared mental models** from which some **information is filtered away** and some is accepted, used and results in input for new decisions. In this last stage it might be that some things that I would like to do is made impossible because the option is not available on the local market.

**ALLIES TO MAKE THE CASE**

Technology has in general developed with a greater uptake of the better standard even if only slowly. Have the authors managed also to impact policy-makers and -making in the political arenas? Have they managed to have impact on the business cases? Have we managed to make a dent on the economic paradigms?

The IEA has reported since 2013 about energy efficiency progress and gradually stepped up the tone and raised their voice in the message.

It is not a pleasant reading. In the years up until 2018 the overall judgement in the annual IEA reports was gradually made more and more severe pointing out that energy efficiency is a huge untapped resource but also that energy efficiency is gradually declining. From 2019 the overall judgements from the IEA gets more detailed. They are raising the voice and it looks more and more desperate. One could even spot a sort of puzzlement of the same sort as is often heard at eceee summer studies. “How come that such a cheap resource is not recognised and used more?” The IEA says in their latest report, 2020 that:

Energy efficiency should be at the top of to-do lists for governments pursuing a sustainable recovery.

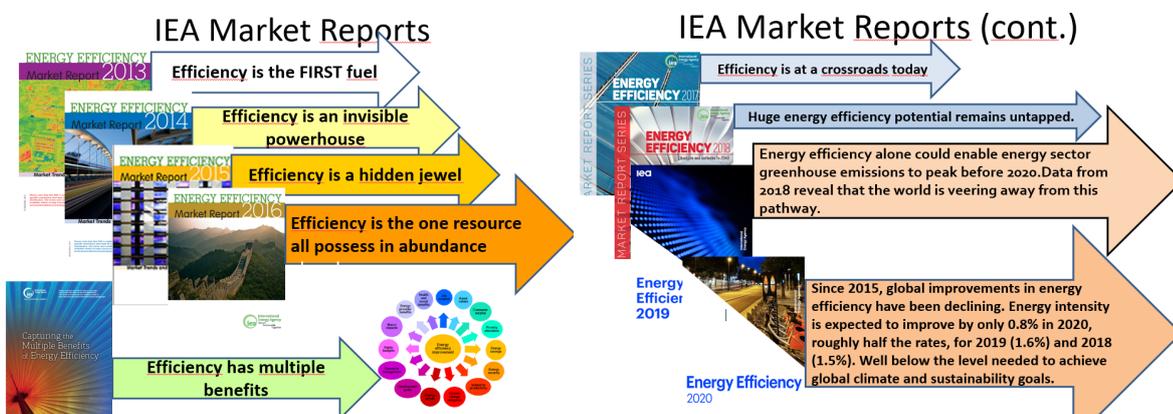


Figure 4. IEA characterisation of Efficiency Markets 2013–2020.

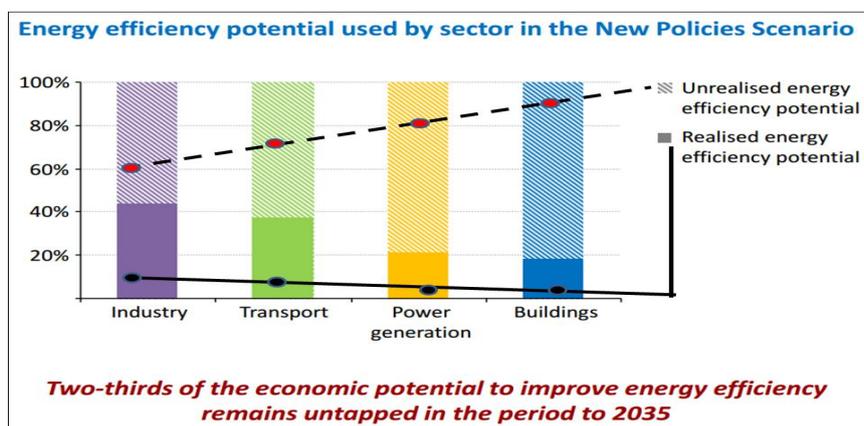


Figure 5. The IEA World Energy Outlook 2014.

It is a jobs machine, it gets economic activity going, it saves consumers money, it modernises vital infrastructure and it reduces emissions.

This is still more puzzling since the IEA is talking directly to governments and they still have limited impact! The IEA World Energy Outlook 2014 says that two-thirds of the economic potential to improve energy efficiency remains untapped in the period to 2035, see Figure 5.

The EU declared that Efficiency First should be the leading principle for their Energy Union. In their presentation of their Energy Union package in February 2015 they wrote: “It is necessary to *fundamentally rethink* energy efficiency and treat it as an energy source in its own right, representing the value of energy saved. As part of the market design review, the Commission will ensure that energy efficiency and demand side response can compete on equal terms with generation capacity.” (EU COM (2015) 80 final)

This sounded extremely reassuring and gave rise to hopes that such a mighty organisation should come up with methods that could be applied in everyday life to turn the society from being entirely focused on energy supply issues. In November 2015, we could read from their first report their first interpretation of fundamentally rethinking: “There are still numerous barriers to reaping the full potential of energy efficiency, such as information failures and a shortage of dedicated financial tools. This leads to a limited uptake of energy efficiency opportunities, products and technologies.” (EU COM (2015) 572 final)

It sounds like a joke but still 5 years later they are struggling with the rethinking – without success.

There have been launched a project called ENEFIRST with EU funding that “... will help making the E1st principle more concrete and operational, better understand its relevance for energy demand and supply and its broader impacts across sectors and markets, focussing on the buildings sector.” No doubt the EU is in dire need for assistance to live up to its own declarations about fundamentally rethinking energy efficiency.

## Evidence requested

Is the very basis for eceee leading us in the wrong direction? Even for this summer study it is declared that “We generate and provide evidence-based knowledge and analysis of policies”.

Or is there a difference between Evidence and evidence-based? Just as when we see movies that in the introduction say that they are based on a true story? Those films are not claiming to tell the accurate truth in detail.

Some challenges are more hands-on and in line with what the summer studies is about (1 and 2) improving energy efficiency and make more room for sustainable supply and some other are more obscure and difficult to handle (3 and 4) the objectives for planning and optimisation.

But even if we (ecee) and more prestigious institutions (IEA) have provided solid evidence that there is money and environmental advantages to gain, and that it can be done easily, the pace forward is slower than should be expected. Could it be that our arguments are falling for deaf ears? After all there are many ways for our message to be misunderstood by the receiver (Nilsson 2013, 2015, 2017). We should not stop providing evidence but we may have to put more attention to how we formulate our advice?

The two first challenges can easily be seen as “solutions”, even “low-hanging fruit”, that have been proven to the political case. Even if some politicians are reluctant to make the necessary changes that is not valid for all of them. There is solid evidence that energy efficiency “saves money, pollution and carbon” (challenge 1) and that is in some cases reflected in countries policies, maybe not in full but there are attempts to do so. An example is a desktop research carried out to find National Energy Efficiency Action Plans (NEEAP) for the fifty most populated non-G20 countries (Cornelis, Landry, de la Fuente, ecee 2019).

Another presentation deals with the community response to environment and climate change (challenge 2), in particular how they are making use of the combination of energy efficiency and renewable fuels (Mellvig et al, ecee 2019). Higher efficiency in the building sector is more cost-effective than the alternative approaches. Efficiency increases multiple benefits like higher building quality, better thermal comfort, which improves health and performance of the inhabitants, and reduces risks and in many cases enables the use of renewables.

What could be added (wished for) is the kind of analysis made by Peter Lund of Aalto University in Finland (Lund 2017) where he compares the aspects with the IEA conclusions and thereby adds relevance for politicians and enables them to make use of the study in a political context that they more easily could adopt.

Some conceptual topics have been raised in this panel very early. The most obvious one is *Sufficiency* (how much energy do we actually need) was introduced by several speakers and have been debated for quite some time. The topic has also been developed and given a more analytical substance throughout the years. Eceee has picked up this aspect and now created a website for those interested (<https://www.energysufficiency.org/>).

Another conceptual subject is *Multiple (Non energy) benefits* that have been on the list for several years and debated both “per se” and in opposition to the neo-classical economic concept that improvements in energy efficiency only raises the demand for energy (rebound). The IEA has picked up the subject and made an important publication with a detailed list of different benefits (<https://webstore.iea.org/download/direct/375>). These benefits have for a long time been dealt with as negative (rebound) and seldom been recognised for their positive impact on the economy.

A related subject has been diving down into the sociology and psychology of *demand and how it is constructed* and that consumers are far more complex than generally anticipated. This has also for a long time been reflected in that one panel has been named “dynamics of consumption”.

This panel has also early discussed the *prosumer* market, the fact that consumers, in some countries, engaged in also producing energy. Firstly for their own use but to a rising degree also for bigger areas and how this had an impact on their own consumption.

To a lesser extent, this panel has engaged in *behavioural economics* and so called *nudges* to change consumption.

There is a vast area for conceptual changes that sounds possible for this panel to dive into. For instance how could *energy first* be made operational. Which *environmental innovations* would be of importance for the environment (e.g. green steel and hydrogen).

### Energy efficiency is not difficult, only complicated

Has the eceee managed to address the challenges and reach important audiences with a message that could turn the tide? The answer could be both yes and no. That is because energy efficiency on the surface seems to be easy but in reality is rather complicated. And that is also since the target audiences are complex in themselves. The audiences are big and it requires deep insights in psychology to get an impact.

Energy efficiency seems simple. In many cases, it is only a matter of changing one piece of equipment from one (inefficient) to another (efficient). The problems come when the exchange also means that the new piece has different characteristics, e.g. from an incandescent light bulb to a CFL with different colour rendering and contents of mercury. Or a change to LED that people begin to use in great volumes that offset the gains.

Or in some other cases from one motor to another, but when not only the motor should have been changed but ALSO the pump that the motor drives AND the duct that connects the motor and the pump if the aim was to reap the full effect. Then it gets complicated.

It is quite reasonable that the selection of papers is to a high degree depending on the panel-leaders and their own interest and competence and therefore not revealing very much about how eceee in general serves the purposes set up. But there still

seems to be a trend that the more straight forward technological aspects are taking over at the expense of the more complicated conceptual ones.

It is however disappointing that the different audiences have not responded better and actually reduced energy use in spite of the fact that the advantages are so obvious. eceee has an important role to play to tell about what could be done and in particular, to make use of such potent material as has been developed by the IEA. Looking at the data it seems as if there is sufficient evidence gathered and supplied to reasonably well connected people to make a certain impact on policy-making. But then again it shows that facts in themselves may be insufficient. Maybe facts are not enough and maybe the people and institutions are not adapted to handle facts? Maybe facts should be packaged in a more tasty way. Into narratives that people feel are useful?

The problem we face could be that we have managed to do our job in these panels in a sufficient way but we have not managed to transmit the message well enough and/or we have not managed to get in touch with those who can. Maybe we should develop more skill of the type Greta Thunberg has?

Greta could have put heaps of scientific facts before the UN General Council but she will be remembered for the rudeness in her expressions “How dare you”. That is good communication because the message she delivered was packaged in a way that made the audience sit right up a listen. And hopefully also think about what she said.

### Are you talking to me?

So maybe the facts and the evidence are not our biggest problem. Maybe it is the delivery of the evidence, to whom it is delivered and the format of the delivery.

We sometimes forget to tell the full story and sometimes that we should tell a better story or to tell the story better. A famous Swedish poem about a person who managed to handle such situations says that he was able to talk to peasants in their own language but also with learned men using Latin.

We in eceee are no doubt able to talk among ourselves using energy efficiency Latin, but we may fail in talking to the peasants in a way that they understand!

And maybe Communication should be made the new part of this panel?

You talkin’ to me? You talkin’ to me? You talkin’ to me? Then who the hell else are you talkin’ to? You talkin’ to me? Well, I’m the only one here. Who the f\*\*\* do you think you’re talking to? Oh, yeah?

Robert de Niro as Travis Bickle in Taxi Driver

The sad thing is that politicians are so hard to reach even if the allies are important and persistent. In particular, the IEA have the muscles and should be able to reach further.

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