



[What is the value of being first?]

A n n u a l R e p o r t 2 0 1 3

Mistra Indigo 

Instrument Design for Global Climate Mitigation

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Foreword

To seriously and effectively deal with the problems of climate change is one of the greatest challenges for humanity. A solution involves coordinated efforts among countries, politicians, business and industry, scientists, and not the least by individual citizens. While the choice of pathways and policy instruments that are best aimed for solving climate change is high on the agenda in Brussels, Washington D.C., Beijing and not the least with respect to UNFCCC, the experiences from present efforts and policy instruments are mixed.

In Europe the 2020 objectives in terms of emissions seem to be reached almost without the expected driving force from a high price on carbon dioxide. While there are several explanations for this, the low carbon price in the EU ETS risk to inhibit low carbon innovation and investments and poses a risk of lock-in of carbon-intensive industrial infrastructure, and as a consequence the EU ETS is currently under heavy debate. On the other side of the Atlantic the US emission reductions occur not as a consequence of decisions in the Congress but rather due to EPA legislation and decisions on the state level, such as the decisions in California and the trading systems in Northeast US.

How can these sometimes negative experiences from the policies in Europe and US be used in the development of new policies and to what extent can risks failures be anticipated in new policies? These and other questions are central in the Mistra Indigo

research program. The program that runs from 2012 to 2015 is looking closely both to present policies such as the EU ETS and the California cap and trade program in the US. The program also looks at climate policy options for 2030 and beyond. Issues such as how to avoid break-downs of carbon markets and how to link climate policies internationally are also on the research agenda.

In order to further develop the research agenda, the Mistra Indigo organised, together with Resources for the Future (RFF) and Climate Works Foundation, a conference entitled "What is the value of being first?" in May 2013. The aim of the conference was to present experiences of climate and other environmental policies and to discuss those experiences from the perspective of taking early initiatives. Some of these experiences are presented and further discussed in this report.

This annual report is aimed at giving hints of the outcome of Mistra Indigo research. We hope that the report will trigger the readers interest to look deeper into our publications and our research agenda, as well as taking part in our program seminars.

Åsa Löfgren
Scientific Director

Peringe Grennfelt
Program Director





Pictures from left and down: Post-COP breakfast seminar on Stockholm, Peringe Grennfelt, Thomas Nilsson, Birgitta Resvik and Anna Lindstedt on Post-COP breakfast seminar, audience and panellists at San Francisco conference, ARB Director Mary Nichols key note speaking at San Francisco conference. Pictures from right and down: Audience at San Francisco conference, Dallas Burtraw at San Francisco conference. Photos: Helena Davidsson

This is Mistra Indigo

The Mistra Indigo research aims to understand how to design and select environmental policy instruments to support long term and cost effective global mitigation of climate change, taking into account the uncertainties in international policy development.

Our focus is set on how climate policy instruments should best be designed to promote and reinforce the efforts that are effective and politically feasible nationally, while they do not rule out a future possible coordination of climate policy between countries.

The results of our research will make recommendations and assessments useful to decision makers in both the policy making arena and within the business sector.

The program focuses on three closely linked areas:

A. Globalization of carbon markets: How to create a robust and sufficiently high price signal on carbon that can be gradually spread to the whole global economy.

B. Distributional effects of climate policy.

C. Interactions among technology policies and market failures.

As a crosscutting area, we are in all our projects studying the relation to industry and the practical application of our results on markets.

We are entirely funded by the Mistra Foundation for Strategic Environmental Research, and led by a program board with representatives from both the private, public and academic circles.

The program is a collaborative research between researchers at IVL Swedish Environmental Research Institute, the Department of Environmental Economics at the University of Gothenburg, and Resources For the Future, Washington D.C.

Communication and administration are coordinated mainly through IVL Swedish Environmental Research Institute. As for communication to the European policy arena we have a well established cooperation with Centre for European Policy Studies in Brussels where we regularly hold seminars within the European Climate Platform.

The program has a total budget of 24.5 million SEK and runs on a four year period from 2012 to 2015.

Program Organization

Program Board

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The Mistra Indigo Year

January

Fischer presents *"Environmental and Technology Policy Options in the Electricity Sector: Interactions and Outcomes"* at the Swedish EPA.

Sterner publishes a debate article with nine other climate researchers: "Temperature rise of 4 degrees not unlikely" in DN Debatt.

February

Zetterberg and Grennfelt publishes a debate article "Swedish Industry will gain from higher carbon prices" in Göteborgsposten.

Annual meeting and board meeting in San Francisco.

Zetterberg a panellist at the World Bank-IETA Carbon Expo in Barcelona on the topic of Catalysing a Globally Connected Carbon Market.

June

Zetterberg presents two studies for the Minister of the Environment Lena Ek about the state of the international carbon market.

November

Zetterberg in a side event on how REDD issues can be linked to carbon markets at COP19 in Warsaw.

Zetterberg, Munnings and Fischer in an RFF side event on difficulties of linking carbon markets, at COP 19 in Warsaw.

Roth, Lindstedt, Zetterberg and Grennfelt in Post COP breakfast seminar in Stockholm with over 50 participants, followed by board meeting.

April

Zetterberg holds a presentation at the Centre for American Progress, Washington DC about prospects for linking the EU ETS and California.

May

Susanna Roth starts a one year Mistra Fellowship at CEPS in Brussels.

San Francisco workshop *“What is the Value of Being First: Perspectives from the California and Sweden Experiences”*, with over 100 prominent guests.

Sterner and Morris release the Mistra Indigo Policy Paper *“Defying Conventional Wisdom, Distributional Impacts of Fuel taxes.”*

August

Ahlroth on leave from Swedish Environmental Protection Agency, for a two year stay at the World Bank.

October

Zetterberg and Roth releases a report to the Swedish Ministry of Environment on the state of the EU ETS and future carbon markets.

December

Progress report and program plan for 2014 approved by Mistra.

Sterner returns to University of Gothenburg after 18 months at the Environment Defense Fund in New York.

Burtraw, Löfgren and Zetterberg releases the Mistra Indigo Policy Paper *“A Price Floor Solution to the Allowance Surplus in the EU ETS.”*

IPCC Coordinating lead author in AR5 WGIII Thomas Sterner:

“Above all, the process is defined by internal debate“

Human activities are warming the atmosphere, melting ice caps and raising the seas. Only decades from now children will live in a world shaped by our choices.

This is confirmed with 95 percent certainty in the first working group of the fifth assessment report of the UN Intergovernmental Panel on Climate Change, approved in Stockholm, September 2013. The second one, exploring impacts, adaptation and vulnerability is released in late March in Yokohama, and the third and last one, WGIII, which assesses options for mitigating climate change, is approved in Berlin mid-April.

One who will be there is Mistra Indigo researcher and senior scientist at the University of Gothenburg, Professor Thomas Sterner, one of the Coordinating lead authors in WGIII.

According to the report the window of opportunity and action is quickly closing. Nations have so dragged their feet in battling climate change that the situation has grown critical. Another 10-15 years of failure to limit carbon emissions could make the problem virtually impossible to solve with current technologies. Though political willingness to tackle climate change is growing in many countries and new policies are spreading, the report states that these are essentially outrun by the rapid growth of fossil fuels.

– Yes, most of the content is just depressing. The only upside is the progression of wind and solar energy, especially the latter which has grown much more than expected. Prices keep falling and installed capacity is increasing. But these gains are quickly detracted from cheap oil and coal.

A long-time advocate of higher fuel taxes Thomas Sterner still believes taxation of fossil fuels is the most effective instrument.

– Fuel taxes achieve significant behavioural change. Some say change must come from within, but I think this is to change culture. If it was five times as expensive to drive a fossil fuelled car or eat red meat people would most certainly consider other more climate friendly options. The price will always be the most determining factor.

What do you think of emission trading systems?

– I am positive, but as long as the carbon price in ETS and other systems aren't high enough, fuel taxes will be more efficient. But considering the controversy taxation still causes, trading systems might have better chances globally. Trading systems can also be linked to create international cooperation although linking regional systems with each other will likely be quite problematic. But I am happy to see either one of these instruments, as long as carbon prices are attuned to substantial mitigation.

How will we take climate justice and developing countries into account with at best 10-15 years to break the trend?

– It is certainly one of the most difficult obstacles. The injustices are many, and the polluter pays principle is very important. But I think we have failed to communicate the very urgency of this issue. But we must not forget; many developing countries are not yet locked up in dirty energy systems.

With this pace, we'll be given the seemingly impossible task of removing greenhouse gases out of the air and storing them underground, the WGIII says.

– Anything but to touch our fuel prices. As for geo-engineering, we know far too little about costs and consequences. There are without a doubt great risks involved, but many states already see geo-engineering as a silver bullet. We do however need to prepare ourselves for a discussion about legal procedures and regulations as some countries are already pushing the issue.

Would you consider authoring another IPCC report?

– It has been tougher than I expected. We have had some difficult internal disagreements on content and wording. I would actually say that above all, the process has been defined by very tough internal debate. The good thing about this is that it deflates any accusation that the report is biased. If anything the authors have been too cautious!

What impact do you think this report will have?

– I wish I could say that I think it will be an alarm clock, but to be honest, I'm not overly optimistic at this point. Neither is it the mandate of IPCC to influence policy, but it is the scientific basis upon which policy should be made, and as such I really hope it will do the job.

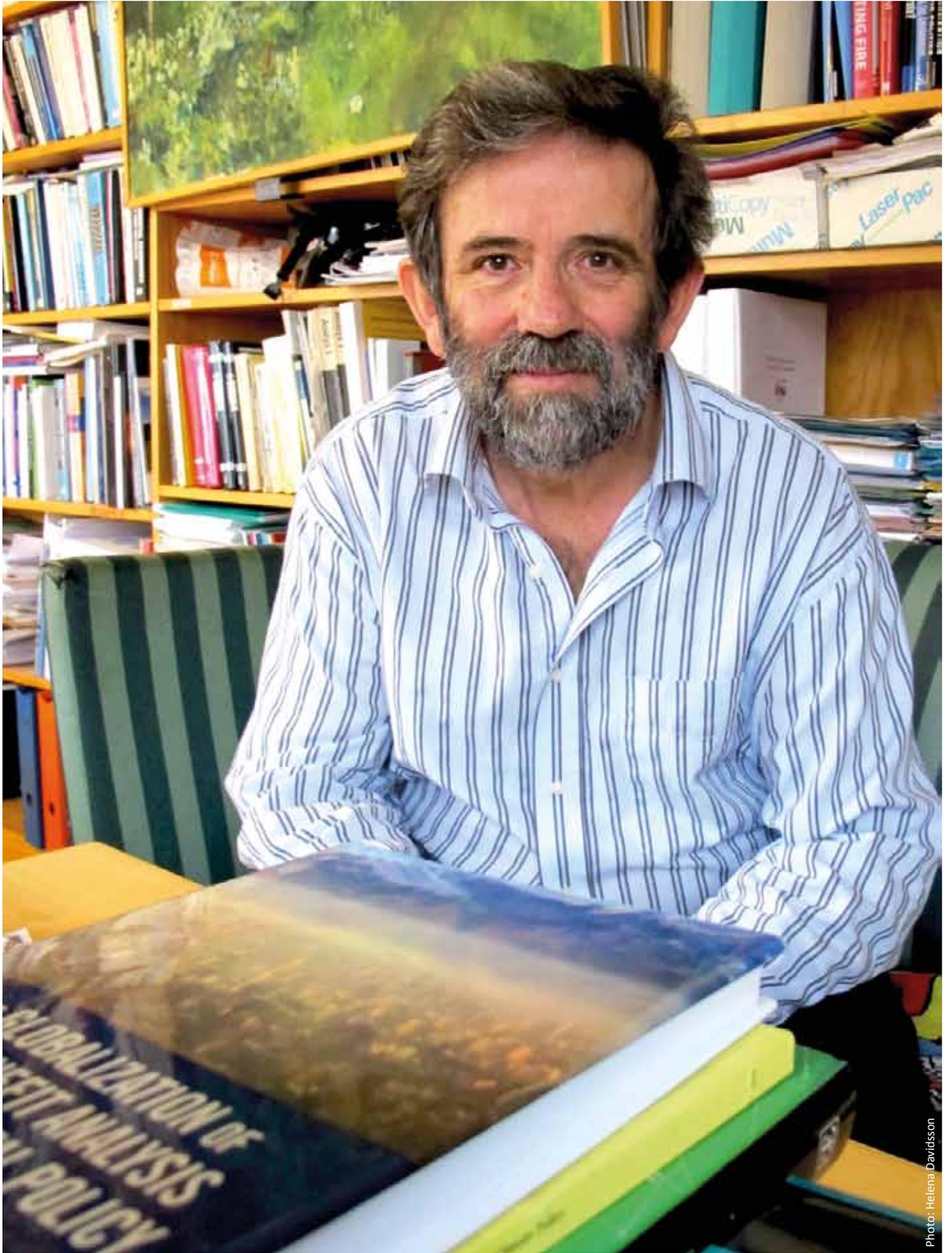


Photo: Helena Davidsson

The Sunshine State takes the lead

In January 2013 California launched its own cap and trade program for greenhouse gas emissions. The cap and trade program is a key element in California's climate plan. It sets a state-wide limit on sources responsible for 85 percent of California's greenhouse gas emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy.

Likewise, the EU emissions trading system (EU ETS) is a cornerstone of the European Union's policy to combat climate change and its key tool for reducing industrial greenhouse gas emissions cost-effectively. The EU ETS covers more than 11,000 power stations and industrial plants in 31 countries, as well as airlines.

Having been the first, and by far, the biggest system for trading greenhouse gas emission allowances, the EU ETS now seems to be losing its leading role to California. At a time when the EU ETS reached an all-time low price on allowances, €3/tonne CO₂ (approximately \$4), California embarked with a floor price of \$10/tonne CO₂ that increases at 5 percent per year, plus inflation. (Please read the column by Lars Zetterberg on page 13 for a full review). In addition, while the EU and California at one time explored far-reaching plans to eventually link their two systems, California has already implemented a link with a cap and trade program in Quebec, starting January 2014.

Price volatility observed within the EU ETS is troublesome and it deeply challenges the authority and credibility of the system. The EU-ETS might have been first out, but it no longer holds the position of the most stringent trading system. Does this make California the new leader in climate policy?

A forerunner in US environmental policy the state of California has historically paved the way for both federal and state policy, especially with respect to air pollution. What happens in the sunshine state is followed closely by researchers, regulators and policy makers nationally and internationally.

In light of this development, Mistra Indigo arranged in early May 2013 a workshop in San Francisco entitled "What is the Value of Being First?: A Comparison of the California and Sweden Experiences." The seminar was organised in close collaboration with Resources for the Future and the Climate Works Foundation.

The meeting was attended by approximately 100 invited representatives for government, industry, NGOs and academia. In attendance were the top environmental and top energy regulators in the state. The workshop evaluated challenges and accomplishments in climate policy and also in related policy areas including energy, air quality, water and land use.

It is fair to say that the workshop also stimulated and widened the scope of the Mistra Indigo approach. Not only did the core researchers join the meeting but also several board members and the Executive Director of Mistra.

Many speakers testified to the advantages of being first, but inevitably it was noted that for California, the value of being second should not be underestimated. Had it not been for the EU ETS ups and downs, cap and trade programs to follow wouldn't have anything to learn from. The introduction of a price floor mechanism in California is one example.

Hopefully, this should stimulate the EU ETS to pick up the value of being first and strengthen its role in future climate action.

> On the following four pages Mistra Indigo researchers and board members elaborates on the theme of the value of being first.

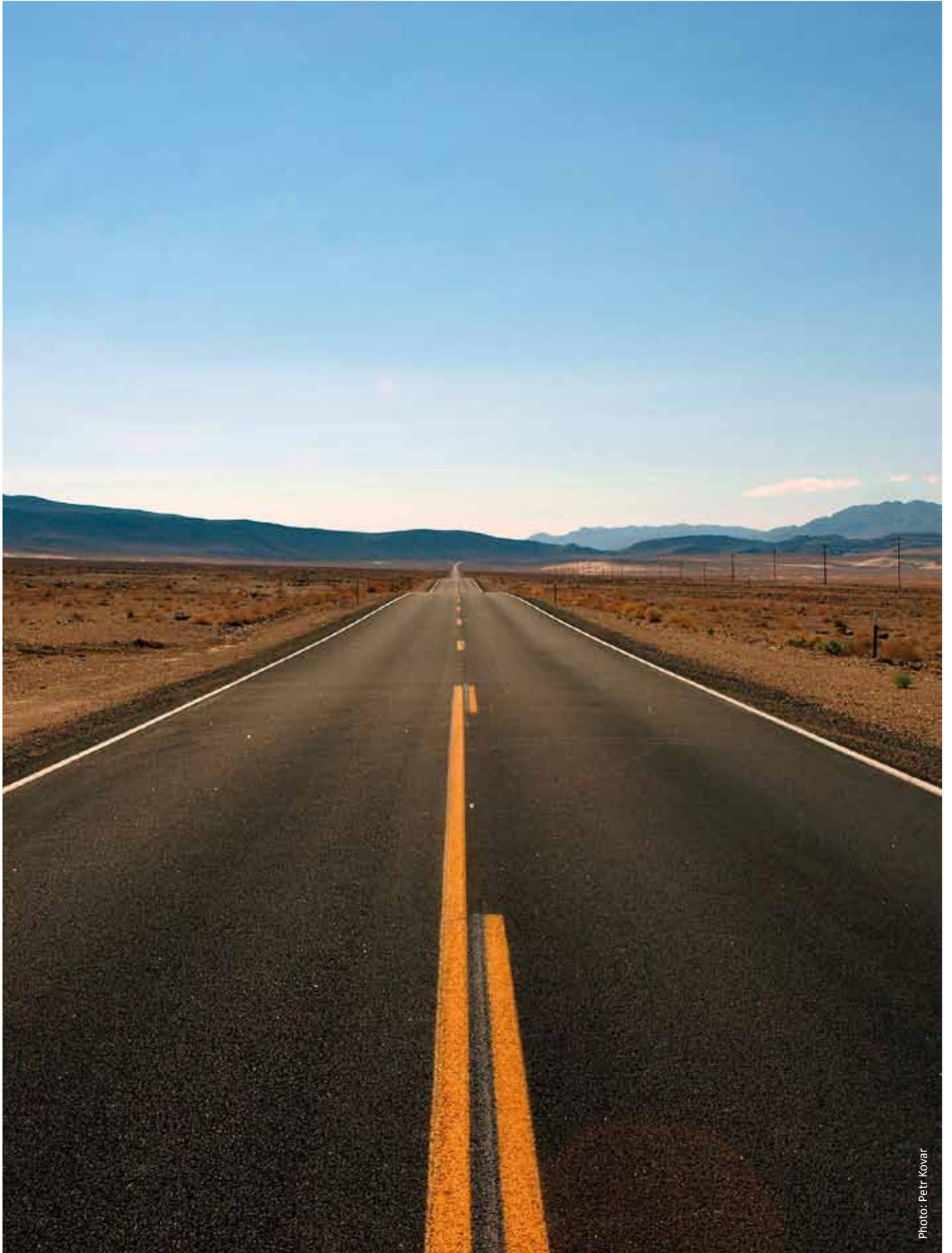


Photo: Petr Kovar

The Californian impact on US legislation



When Republican Governor Arnold Schwarzenegger signed California's Global Warming Solutions Act of 2006, the legislation added momentum to the possibility of comprehensive national policy. By 2010, a comprehensive national legislative solution had failed. However, California's many policies continue to have an influence.

Today climate policy in the United States is unfolding under the Clean Air Act. Mobile source regulations implemented in 2011 under the Act will lead to a five percent annual improvement in the efficiency of new cars through 2025. These standards adopt a policy enacted first by California and taken up secondly by several other states. Meanwhile, California is already looking to a new round of vehicle efficiency standards.

California also has the most stringent policy for renewable energy in the nation, requiring that 33 percent of its electricity be renewable by 2020. This policy has placed California in a leadership position in addressing related challenges of integrating such a high fraction of renewable power into its electricity system. Currently discussions in California are examining an expansion of the renewable mandate to 40 percent.

Ultimately, California's most influential policy may be its carbon market. This market will influence the form of national regulations for existing stationary sources including power plants under the Clean Air Act. President Obama directed the U.S. Environmental Protection Agency to seek a regulatory system that "to the greatest extent possible" incorporates market-based instruments and regulatory flexibility. While the agency will determine the stringency of those regulations, the states will determine their form. The California trading program is a model that many states are looking to as they will be required to implement power plant regulations over the next three years.

Dallas Burtraw

*Darius Gaskins Senior Fellow and Associate Director
Center for Climate and Electricity Policy at RFF*

The EU-ETS in need for a(nother) reform

2013 marked the year when the EU ETS entered into its third phase 2013-2020. Based on lessons learned from the first two phases the system had been reformed to gain better public acceptance and become more efficient. The national allocation plans have been replaced by centrally determined allocation rules. The much criticized grandfathering of allowances has been replaced by auctions and free allocation based on benchmarks, rewarding carbon efficient production instead of large emitters. Robust and long term rules enhance the predictability for investors.

However, after a fairly stable carbon price in phase two of about €15, the price of EU allowances dropped to reach less than €3 in April 2013. For comparison, the EU has estimated that reducing emissions by 80 to 95 percent by the year 2050, consistent with reaching the 2 degree target, would require a carbon price of at least €32 - €63 by the year 2030. This low price is due to a rapid build-up of large surplus of allowances, currently about 2 Gt of carbon dioxide, which is in the range of the yearly emissions covered by the scheme. There are several reasons for this: the economic downturn; banking of leftover allowances from phase 2; and a strong and unexpected influx of Certified Emissions Reduction credits under the Clean Development Mechanism.

A persisting low carbon price in the EU ETS inhibits low carbon innovation and investments and poses a risk of lock-in of carbon intensive industrial production infrastructure. Currently one can observe the return of coal-fired power in Europe. The problem also has a strategic dimension. The low price on carbon may lead member states to introduce complementary policies in order to meet national climate objectives. For instance, the UK has introduced a carbon price floor on electricity generation facilities, already cov-

ered by the EU ETS. In the rest of the EU, this action places downward pressure on the price of allowances. If similar actions are taken by other member states this may lead to a negative spiral of events and a fragmentation of EU climate policy.

In January 2014 the EU commission proposed a new climate and energy package for 2030, including how to reform the EU ETS. Emissions in the EU ETS are to decrease by 43 percent to 2030 as compared to 2005 without the use of international credits. This corresponds to strengthening the annual cap reduction factor from 1.74 percent to 2.2 percent. The commission proposes to create an allowance reserve where a part of the surplus of allowances is banked for future use. However, this surplus mechanism doesn't enter into force until 2021 and with an annual set-aside of maximum 12 percent it may take until 2026-27 before the surplus has been significantly reduced. But it's too early to say what the final outcome of the proposal will be. The issue will be under further debate by the EU Parliament and the Council during 2014.

With re-occurring problems, some say that it's time to place the EU ETS in the waste basket. However, although the ETS is in need of a reform, it's worth pointing out the merits of this policy. The ETS has managed to put a price on carbon, and is something that each carbon intensive industry in Europe now considers in their investment decisions. The EU ETS has been the major buyer for international credits, which has engaged the developing world in climate mitigation. The EU ETS has been followed by at least 10 other ETS around the world. Finally, although 5 euro is too low to drive investments toward a low carbon economy, its good news for the planet that emission reductions are much cheaper than expected.

Lars Zetterberg

PhD, Senior Researcher

IVL Swedish Environmental Research Institute

The EU 2030 Energy and Climate Strategy

- a challenging investigation for Mistra Fellow Susanna Roth

As a Mistra Fellow at the Brussels based think tank Centre for European Policy Studies (CEPS), my work is focused mainly on current EU climate and energy policies and proposals for the post-2020 period. It is a crucial moment for this theme in the EU, with new developments emerging continuously. The current targets for 2020 are to be replaced, focusing on both long term investment decisions and, more importantly, the upcoming deadline for a new international climate agreement to be negotiated and hopefully signed at the Paris COP in 2015.

The European Commission's 2030 climate and energy framework focuses on a binding target of 40 percent lower GHG emissions, combined with a renewable energy target of at least 27 percent. The European Parliament has passed a 2030 climate and energy framework report which calls for three binding targets: reducing GHG emissions by at least 40 percent, increasing energy efficiency by 40 percent, and increasing the share of renewable energy to 30 percent.

While the European Parliament's report is non-binding, it will feed into the future discussions on these issues at the energy and environment ministers' Council meeting in the late spring of 2014. As a consequence the de-

bate concerning whether the EU should focus on one overarching GHG target or aim for three complementing targets is heating up, as well as discussions on the targets themselves. While the 40 percent GHG target is considered weak by some, others perceive it as a statement that EU is seeking to continue its leadership role on the international climate change scene.

Two additional items on this agenda are the structural reform of the EU ETS and the competitiveness of European industries. In that light, CEPS has put its shoulders under both a taskforce on EU ETS reform and a study on carbon leakage options for the EU post-2020. These issues will remain central in the discussions on the new climate and energy framework, and my last months at CEPS will be dedicated to supporting both initiatives.



Susanna Roth

Mistra Fellow at CEPS and fellow researcher IVL Swedish Environmental Research Institute



Photo: EU Commission Audiovisual Services

Mistra Indigo Board Member Birgitta Resvik on

what it means being first with a CO₂ neutral vision

For a long time Sweden have had a stringent regulation on fossil fuel taxes and emissions requirements on plants. This has changed the energy sources in heating businesses from nearly 100 percent fossils in the 70's, to nearly 100 percent biomass today. Tough regulations are easier though to handle on a local market, where you do not meet international competition. These measures have paved the way for Fortum in Sweden to be a leader on Bio- and Waste-to-Energy combined heat and power plants - a know-how we now can export.

Fortum is a utility company with a fortunate production portfolio through a large share of CO₂-neutral energy sources. Our investments in EU countries are today a 100 percent carbon neutral. Our vision is a solar economy and we believe that the sun will directly and indirectly be the main source of energy. With indirect sun we mean wind, ocean and wave, hydro, geothermal and biomass. Along the path we see nuclear as still being an important source for many decades to come. Over the last years we have seen tremendous technical development, with a dramatic change in cost reduction for, in particular, solar cells.

However, to reach a successful solar economy we will need regulations, as the price of fossils likely will be low for decades to come. We will need politicians who take political action with stringent targets for CO₂ to 2030, and who also dare to reform the EU-ETS. And it is essential to link isolated emission trading systems and set a price on carbon on a global scale. It is possible to be first on a certain level, and we must believe that the rest of the world will follow.

Being in the forefront of development is essential to Fortum. The role of a big utility, with large central assets, might change dramatically to more local production with completely different actors coming into the market. That is why we, as a company, need to be first, not least in our mind set.



Birgitta Resvik

*Vice President Corporate Relations, Fortum Sweden
Board member Mistra Indigo*



Photo: www.sxc.hu

Key Findings

- Flexible mechanisms can improve the performance of traditional approaches to regulation such as performance standards. Patino et al. (2013) show that an alternative compliance payment that accrues in an investment fund can lead to greater profits, lower electricity prices and lower cumulative emissions compared to a traditional inflexible standard.
- The gradual alignment of climate policies in general, and carbon markets in particular, can capture most of the benefits that accrue from formal linking of carbon markets and captures some benefits that would not be captured by formal linking. Burtraw et al. (2013) describe linking by degrees as a process oriented activity that encourages transparency and cooperation that enables more stringent policy, and the broader introduction of carbon pricing, in the future.
- Straightforward principles from economic theory have often not taken hold in climate policy. Burtraw and Woerman (2013) argue one reason is inadequate recognition of the institutional context for that policy. Economic models usually do not recognize multilayered authority across jurisdictions and how the performance of market prices and regulatory approaches are affected in this context. The authors argue that economics might have its biggest impact through the infusion of incentive-based thinking into the apparatus of conventional regulation.
- The current crisis in the EU ETS with a too low carbon price requires both short term and long term actions. In the short term, the most straight forward action is to make a one-off permanent set-aside of a significant volume of allowances. In the long term, the annual reduction factor should be strengthened from today's 1.74% to at least 2.2% so the allocation matches the long term target of -80% to -95% emissions in year 2050. The suggested actions by the EU commission to introduce an enhanced reduction factor and an allowance reserve from the year 2021 is likely to be insufficient in increasing the carbon price for the next 10 years. This may result in the return of coal fired power plants in Europe and a delay of carbon efficient investments.
- Introducing price management mechanisms to the EU ETS could allow for the use of a price floor. A price floor has been mischaracterized as a tax, an instrument that has historically faced political opposition, and the commission states that an explicit carbon price objective would alter the nature of the EU ETS being a quantity-based market instrument. However, a price floor is structurally different from a tax in multiple ways, and its merits are well documented in the academic literature. This rule-based approach could reinforce the market-based philosophy and investment climate of the ETS.
- US climate policy is unfolding under the Clean Air Act, and President Obama has called for the use of flexible and market-based approaches. Mistra Indigo analyzed various approaches that would introduce a price on carbon including a tradable performance standard and cap-and-trade. Each can achieve substantial emissions reductions but they do so in different ways and have different distributional outcomes.
- Sweden as a country would benefit if the price of EU ETS allowances increases. Since the free allocation to Swedish industry is higher than current emissions, Swedish industry holds a surplus of allowances. When allowance price increases the value of this surplus increases too. Secondly, the Swedish Government has been allocated a quota of allowances to auction, in addition to the free industry allowances. The value of these auctioned allowances will also increase. Thirdly, increased carbon price leads to increased price of electricity. Since Sweden is a net electricity exporter, an increased carbon price will lead to larger revenues for Sweden. However, within Sweden there will be distributional effects. Power and heat producers will be net winners, while industry participating in the ETS will have increased costs. In addition, there may be leakage effects that reduce the mentioned benefits.

Additional involvements

- Thomas Sterner being Coordinating lead author in Working Group III of the IPCC AR5 report.
- Dallas Burtraw being deeply involved in the design and follow-up to the California climate policy program.
- Åsa Löfgren and Lars Zetterberg being involved in policy advice discussions with the Swedish Ministry of Environment on future options for emissions trading.

Scientific Publications

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Sterner T. and Morris D. (2013) *Defying Conventional Wisdom: Distributional Aspects of Fuel taxation*

Burtraw D., Morris D. and Zetterberg L. (2013) *What is the Value of Being First? Perspectives from the California and Sweden Experiences*. Proceedings from the *Mistra Indigo, RFF, Climateworks* conference in San Francisco, May 7, 2013.

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