

Laura Segafredo

Climate Works Foundation

Francisco Posada Sanchez International Council on Clean Transportation

Vickie Healey: Hello, everyone. I'm Vickie Healey with the National Renewable Energy Laboratory. Welcome to today's webinar hosted by the Clean Energy Solutions Center. Our discussions today are focused on policies that improve energy efficiency of passenger vehicles and we are fortunate to have two great speakers, Dr. Laura Segafredo and Dr. Francisco Posada Sanchez presenting today.

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Okay, one quick note before we begin our presentation. I have a disclaimer that says 'Clean Energy Solutions Center does not endorse or recommend specific products or services and the information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources that are reviewed and selected by technical experts.'

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Real quickly from Housekeeping Items. For audios, you have two options. I'm just going to go over a couple of the webinar features here. You can listen either through your computer or over your telephone and if you choose to listen through your computer, please select the "mic and speakers" option on the audio pane. By doing so, that will eliminate the possibility of feedback and echo. Also if you choose to select the telephone option, a box on the right side will display the telephone number and audio PIN you should use to dial in. We ask that you please mute your audio devices before the presentations begin. If you're having any technical difficulties with the webinar, please contact the GoToWebinars Help Desk and the phone number to that is (888) 259-3826 and we'll be happy to assist you.

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We welcome you to introduce yourself and you may do so. There should be a chat pane located on your screen and you can just type in that little chat pane your name and the organization where you're from and things of that nature to introduce yourself. If you'd like to ask a question, we ask that you use the questions pane where you may type in your question. If

you're having any difficulty viewing the materials through the webinar portal, then you will find PDF copies of the presentations at cleanenergysolutions.org/training and may follow along as our speaker present. Also, I do want to let you know that an audio recording and the presentations will be posted to the Solutions Center Training page within a few weeks. So, you will have access to the presentation and then in the near future, we'll have an audio recording where you can go back, review, and listen to today's proceedings.

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So real quickly, I just want to go over our exciting agenda that we prepared for you today that is focused on the improvements of policy to improve the energy efficiency of passenger vehicles. Dr. Laura Segafredo and Dr. Francisco Posada Sanchez will discuss the main concepts and consignees from the "Policies that Work: How Vehicle Standards and Fuel Fees Can Cut CO2 Emissions and Boost the Economy." This is a recent report that was published by the ClimateWorks Foundation and co-authored by experts at the ICCT.

So, before our speakers begin their presentations, I'm going to provide a short informative overview of the Clean Energy Solutions Center initiative. Following the presentations, we will have a question and answer session where you can ask your questions and our presenters will provide answers and then we'll wrap up with discussion and some closing remarks.

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So, this slide provides a bit of background in terms of how the Clean Energy Solutions came to be. The Solutions Center is an initiative of the Clean Energy Ministerial and is supported through a partnership with UN-Energy. The Solutions Center was launched in April of 2011 and is primarily led by Australia, the United States, and other CEM partners. Outcomes of this unique partnership includes for the developing countries through enhancement of resources and policies related to energy access, offers no-cost expert policy assistance, and peer-to-peer learning and training tools such as the webinar you're attending today.

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So, the Solutions Center has four primary goals. It serves as the clearinghouse of clean energy policy resources. It also shares policy best practices, data, and analysis tools specific to Clean Energy policies and programs. The Solutions Center delivers dynamic services and enables expert assistance, learning, and peer-to-peer sharing of experiences. Lastly, the center fosters dialogue on emerging policy issues and innovation occurring around the globe. Our primary audience is energy policy makers and analysts from governments and technical organizations

in all countries, but we also try to engage with the private sector, NGOs, and civil society.

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So, this is a [Indiscernible][0:05:49] feature that I want to talk about. This feature of the Solutions Center provides its expert policy assistance and we call this Ask an Expert. It's a very valuable tool that's offered through the Solutions Center. We have established a broad team of over thirty experts including those from the ClimateWorks Foundation as practice network such as ICCT and these experts are from around the globe who are available to provide remote policy advice and analysis to all countries and, best of all, at no cost. So, I am pleased to inform that if you have a need for policy assistance on clean transportation or any other clean energy sectors, we welcome and encourage you to use this service. Again, the service and the assistance are provided free of charge and to reflect the system, it's very easy. You can submit an e-mail to me or you may submit your request by registering through our Ask an Expert on our Expert page at the Solutions Center website and that web address is cleanenergysolutions.org/expert. We also invite you to spread the word about these services to those in your networks and organizations. Just some of the broad sectors covered by our experts include energy access, energy efficiency, renewable energy, Smart grid, Micro grid, of course plain transportation, and also regulations of utilities.

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So, a few ways of how you can get involved with the Solutions Center, we encourage you to explore and take advantage of the Solutions Center resources and services including the expert policy assistant that I just mentioned. You can subscribe to our newsletter and also continue to participate in webinars such as the one you're attending today. We have many lined up in the coming months and we hope to see you at those as well.

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So, we also encourage you to read and comment on blogs that are located on our policy forum. You will see a little bit of a screenshot on this particular slide of what that policy form looks like. On our policy form you will find many interesting and informative articles assessing progress of clean energy policy development and implementation occurring in countries all around the world. So, we also follow similar articles posted by some of our partners at renewable energy and energy efficiency partnership, also known as [Indiscernible][0:08:30]. We follow articles and information webinars posted by Leonardo energy. We also link over the podcasts that are very interesting that have been developed by Bloomberg New Energy Finance. So, you'll find a lot of great information on this Policy Forum page.

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So now, I'm going to introduce our speakers. This is a brief introduction for both of our distinguished panelists. So, I'm pleased to introduce Dr. Laura Segafredo. She's a Senior Global Research Associate at the ClimateWorks Foundation. We are also joined by Dr. Francisco Posada Sanchez who is a Passenger Vehicle Researcher at the ICCT. With that, I would like to go ahead and hand over our proceedings to our speakers and so I believe Laura is going first or...

Laura Segafredo: Yeah.

Dr. Francisco Posada Sanchez: Sure.

Vickie Healey: Okay great. So, with that, Laura welcome. Thank you for being with us today.

Dr. Laura Segafredo: Well, thank you so much, Vickie. Thank you so much for giving us an opportunity to present today and thank you for all those that found the time to just connect to the Clean Energy Solutions Center and follow this webinar.

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So, let me start by introducing the ClimateWorks Foundation which is a philanthropic organization that supports the adoption and implantation of policies that prevent dangerous climate change, so climate change that would essentially cause global average temperatures to increase over two degrees Celsius while also promoting global prosperity.

ClimateWorks' goal is to reduce global greenhouse gas emissions by about a quarter below business-as-usual projections by 2020, which is equivalent to roughly six billion metric tons of CO₂ equivalent of six gigatons and by about half below business-as-usual by 2030, which is roughly equivalent to eleven gigatons of CO₂. Now, these targets are obviously pretty ambitious and in order to be met, they require rapid and widespread adoption of smart energy and land use policies, which is no small task and it's the reason why ClimateWorks partners with an international network of affiliated organizations, the ClimateWorks network, to promote these policies in the regions and sectors that are responsible for the vast majority of greenhouse gas emissions of roughly eighty percent.

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So, as I just mentioned, ClimateWorks is built as a network and among the organizations that may cut this network are what we call the Best Practice Networks. Sorry for using the word "networks" so many times. Our Best Practice Networks or BPNs are essentially global experts in the economic sectors produce the greatest greenhouse gas emissions.

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Francisco, who will speak right after me, represents one of our BPNs, the International Council for Clean Transportation. The mission of the ICCT is to improve the environmental performance and efficiency of vehicles, so cars, trucks, buses, and transportation systems in order to protect and improve public health, the environment, and the quality of life. As the chart shows, the ICCT works on the top-eleven vehicle markets worldwide which covers roughly eighty percent of total new vehicle sales every year.

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Now, to the main point of our presentation, as policy makers around the world look for solutions to energy challenges, we think that they can benefit from understanding which policies have worked and which haven't and why. Many energy sources have been around the world, but only a small number had been really successful. Those one are those that save money, but also of course boost the economy and the environment. Acting these policies, governments can not only reduce greenhouse gas emissions, but also foster innovation and economic growth. They can bolster national security. They can improve public health and they can put the world on a path to a livable climate future. Much more importantly, failure to do so will actually cause more and may lead to a massive [Inaudible][0:13:08]. Now, while the number of important policies is relatively small, getting them right and getting them adopted soon or within the timeframe that we actually need to prevent dangerous climate change is actually a big job. So, the Policies That Work series which is a joint effort of the ClimateWorks Foundation and the Best Practice Networks essentially attempts to analyze energy and climate policies from around the world and to identify the top characteristics of success.

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Now, policy makers have three types of tools to shape energy policies, economic signals, performance standards, and support for research and development. Now, economic signals or prices are a very efficient way for wise-buying decisions. For example, in order to reduce waste, which affects the overall efficiency of the economy, energy prices should reflect the cost of externalities such as pollution. Economic signals have many other [Inaudible][0:14:12] in the sense that the levels of playing field let the markets find the lowest cost solutions and require minimal government intervention. However, some sectors of the economy are particularly resistant to press signals and I'm thinking of buildings for example where the owner and the occupant are usually two different entities. Also, some consumers are just indifferent to energy prices because they are rich enough that they can afford to pay more. Finally, political difficulties are actually a problem especially when you're actually getting something that used to be free such as [Indiscernible][0:14:54]. So, the second instrument

that we're talking about which are performance standards, they have actually been extremely effective at saving money.

They stimulate technological innovation and they can quickly reach a hundred percent market saturation; however, they also have some disadvantages and in particular, one of the design standards can't actually be productive. They may induce unreasonable prices if their sat is too high and they confuse technology at low levels if their sat is too low. The center is that they can also encourage consumers to consume more energy because they make energy cheaper. Technology can dramatically expand our energy options and emerging markets have structural to actually invest in research and development because scale of the capital investments that are put in risk involved their time for just a private company there. One form of the supply is usually needed. Why we essentially wound all these three because they all have different strengths and weaknesses, but if they are well designed and coordinated, they can actually complement and reinforce each other and they can offer a balance of markets and government intervention while also accelerating the deployment of new technologies and lowering overall costs for the economy. These three instruments are intrinsically connected and they should all be part of the policy-makers today.

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Specifically, these three instruments can be articulated into a number of wise policies that can help nations reduce their greenhouse gas emissions, but also reap extensive environmental and economic benefits. Now, we sort of identified ten of these policies as the most critical to accomplish this objective and you have the list in front of you, but today, we'll highlight examples from the transportation sector by focusing on the first two on vehicle performance standards and on fuel and vehicle taxes and with that, I'll just leave the floor to Francisco who will talk about vehicle performance standards.

Dr. Francisco Posada-Sanchez: Thanks Laura.

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So, overall, it has four sectors. It accounts for almost a quadrant of global energy-related greenhouse gas emissions. Road transport contributes the largest portion with over seventy percent, most of it from light-duty and heavy-duty vehicles. Even though vehicle ownership continues to grow at a global scale, the policies that were reported on transportation presented today presents recommendation for reducing the greenhouse gas emissions from the cycle and presents an example of estimated total CO2 reductions from vehicle standards and fuel fees for a few selected countries.

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So, there are several regulatory mechanisms for reducing greenhouse gas emissions from the transport sector, but the policies that show the greatest potential are vehicle standards and fuel and vehicle fees and rebates. Our report policies are worth to present a series of general recommendations for effectively employing this type of measures. Performance standards require manufacturers to build efficient vehicles at a low cost, which is enhanced by the economy of the scale created by this type of measure; however, making driving less expensive might encourage drivers to drive a bit more, which is a phenomenon known as the “Rebound Effect.” On the other hand, fuel and vehicle fees and rebates encourage customers to buy the most fuel-efficient vehicles, but the drawback is that fees and rebates do not encourage improvements over time. If well designed and coordinated, as Laura mentioned awhile, these two policies complement and reinforce each other. They create demand for vehicle technology innovation with immediate effect in their economy and jobs and so aligning auto makers and customers with global greenhouse gas targets.

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So, in the report, we present five recommendations for a successful greenhouse gas -- these are general recommendations for successful greenhouse gas reduction policies. First, set vehicle standards and fees based on greenhouse gas emissions allowing the market to choose the technology. Second, require a constant rate of improvement above three percent per year in terms of greenhouse gas reduction for a vehicle fleet. Third, cover all vehicles and fuels to avoid circumventing of the standards. Fourth, the greenhouse gas goals should be set over many years allowing manufacturers to develop and deploy the technology under prescribed improvement rates. Fifth, reward performance. Combine fees for high emitters with rebates for the lowest ones.

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While the focus of this presentation is on greenhouse gas emissions, we have chosen to take an expansive view of motor vehicle regulations to include policies directed towards conventional pollutants. There are two important reasons for this approach. First, the types of government policies that inspire the environmental transformation of the motor vehicle sector for conventional pollutants are now being harnessed to saving motion, a similar transformation from greenhouse gas emissions, many CO₂, but also N₂O and air-conditioner refrigerants. In the United States -- sorry -- the United States and Europe have a long history of emitting vehicle pollution at fuel efficiency. The first US emission regulations were established in 1966 in California where air pollution was a major public concern to control hydrocarbon and carbon monoxide emissions from passenger cars and trucks. If the involvement is to detect the [Indiscernible][0:21:12] countries two years later. In the seventies also, the US adopted the first corporate average fuel economy standards for autos and light trucks actually in response to the oil embargo. On the following

decades, [Indiscernible][0:21:32] California and US requirements were aborted leading to remarkable technology innovations. In the eighties, they saw the adoption of technologies that constitute the backbone of gasoline vehicle performance and emission control such as electronic fuel injection, deoxygenate sensors, and the three-way catalyst. European standards for conventional standards were introduced in the nineties. Since the late nineties and a longer following decade, concerns about climate change and energy availability have led to an increased focus towards lowering CO2 and improving fuel economy as well. Europe established the first voluntary standards for vehicle use -- for vehicle CO2 emissions in 1998. California adopted mandatory greenhouse gas rules in the late 2009 to move forward from stagnated fuel economy standards that were in place since '75, but ranging for twenty-five years.

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So, we have selected two examples of vehicle CO2 and fuel economy standards to illustrate the history and also to illustrate the general policy recommendation points. The upper figure shows the historic trends of sales weighted average of CO2 emissions for passenger your vehicles in Europe. Simply put, it represents the CO2 emission performance for the average car in Europe for each year. An inflection point in the European vehicle fleets CO2 performance is evident around 2008. Before 2009, the passenger vehicle performance standards were set as voluntary targets resulting in reduction rates around one percent well below the recommended practice. From 2008, their weight of reduction increased significantly to about four percent per year strongly indicating that the European mandatory CO2 regulation that was adopted in 2009 is an effective instrument to increase vehicle efficiency. The US figure with complete average fuel economy below shows all historic milestones and characteristics of policy design. Before 2012, there is actually a five-year period of mandatory target without any annual rate of improvement. The result is a fleet that becomes less and less fuel-efficient. Only after a fuel price escalation, the fleet performance improved. Mandatory long-term targets with a constant rate of improvement have been adopted starting this whole year for two consecutive vehicle performance regulations covering until 2025.

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So, the global vehicle chart that ICCT develops and maintains and is open for the public to check out shows the fleet average performance in grams per kilometer of light-duty vehicles normalized to the same testing cycle, which is the new European driving cycle. A handful of countries have already adopted the standards and a few more such as Brazil and India are joining the program. Please note the difference in starting points between the US fleet and the European fleet and how the rates are much more aggressive for the near future.

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Now, the adoption of new technologies required for improving the CO₂ performance and fuel efficiency of vehicles implies a cost and also provides benefits derived from fuel savings. The ICCT is currently presenting the results of a cost and benefit study specifically signed for European vehicle market as they work to meet that ninety-five grams per kilometer target for 2020. The ICCT commissioned this study to Ricardo, FEV, and the University of Aachen in Germany, all very well-known technical institutions. The technology potential reduction results come from extensive vehicle modeling by Ricardo while the cost study data comes from an extensive teardown study by FEV evaluating materials and production cost on a part by part level. Each point in the graph represents a technology, its CO₂ production, and its cost with respect to a baseline technology. The study used European baseline vehicles and labored costs and materials prices based in Germany. With this information, ICCT developed a cost curve that reflects very accurately the manufacturing cost and the reduction potential for technologies that are entering the market like gasoline direct injection, GDI, start-stop systems, engine downsizing, turbo charging, and hybrids.

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The resulting information is the CO₂ reduction of cost curve for European passenger cars to meet the ninety-five grams per kilometer target in 2020. Reference year in this graph is 2010. Results showed that the estimated additional manufacturing cost for attaining a CO₂ target of ninety-five grams per kilometer is approximately a thousand Euros per vehicle on average. [Indiscernible][0:27:42] to raise fuel prices and annual driving ranges and activity. The expected fuel cost savings from the proposed ninety-five grams per kilometer target are in the order of three hundred and fifty to four hundred and fifty Euros per year at the saving per vehicle. For the consumer as well as for the society as a whole, significant savings over the lifetime of a vehicle can be expected.

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So, the previous examples illustrate the history and general principles of very good performance standards and the availability of these standards -- sorry -- and the ability of these standards to trigger technology development that results in savings for customers. Tailoring the original set of general principles to vehicle performance standard design will result in the following recommendations. First, set the goal and let the market find what is most cost-effective. Go upstream regulating manufacturers rather than cost consumers. Oil measures will be resigned to keep consumers aligned with the goal. Use greenhouse gas as the metric as this already includes fuel economy and accommodates also non-CO₂ gases like N₂O and air-conditioner refrigerants. Base on standard on vehicle footprint rather than weight. Weight-based standards are lenient for

heavier vehicles and this encourages lightweight production techniques. Set the greenhouse gas standard for the long run with a constant improvement rate per year allowing manufacturers enough time to adopt and to be competitive. Design standards as linear function of greenhouse gas emissions instead of stepwise standards that lead manufacturers to meet only a minimum standard for each bean class. Now, I will draw to Laura to continue the presentation on fuel taxes.

Dr. Laura Segafredo: Thank you Francisco for this super interesting presentation, a lot of interesting facts on vehicle performance standards and their record so far and what the connection you achieved in the future to reduce greenhouse gas emissions and actually also reduce customer costs in terms of buying fuel. Despite the fact that vehicle performance standards are actually an excellent and very effective instrument, looking ahead at the next twenty years or so, it's likely that vehicle performance standards alone will not be able to offset the growth in fuel consumption and CO2 emissions from increased vehicle use worldwide and so an additional layer of economic incentive will be needed. Well-designed lead-user taxes would be a pretty nice compliment to performance standards in terms of policy options. Now, fuel taxes in particular offer [Indiscernible][0:31:01] to reduce CO2 emissions from the transport sector. First, consumers respond to higher fuel prices by driving less and by favoring alternatives such as public transit or biking or walking. Second, fuel fees actually influence consumer's car and truck purchases and they can also encourage automakers to improve the fuel economy of vehicle fleets because consumer demand and more efficient people. [Indiscernible][0:31:32] in particular also makes sense because the additional physical revenue from increasing or imposing a tax on fuels can be used to farm infrastructure development or a clean transportation or for sustainable transport or clean energy research or alternatively, it can also be used to reimburse consumers via reductions and other taxes that have bigger of that weight losses and so they can encourage job growth because they essentially the improve the overall efficiency of the economy. If taxes are set to approximate external costs of using fuels including pollution or the price of oil activity and destructions in oil imports and oil national security concerns and so on and so forth, they can actually make the whole economy more efficient. Finally, taxes can also dramatically reduce balance of [Indiscernible][0:32:27] problems in essentially all countries that are not importers of fossil fuels and of course they can also help reduce fuel consumption and CO2 emissions as we will show in just a few minutes. Historically, fuel fees in high fuel [Indiscernible][0:32:46] in general have proved extremely effective at increasing vehicle energy efficiency. In the aftermath of the 1970 oil crisis for example, a number of studies identified increased fuel prices as the most important factor in determining the fuel economy of the new car fleets so the fuel economy of car fleets all over the world but specially in the western world improved dramatically as a result of oil price shocks in the '70s. Thanks in part to high fuel fees, the average fuel economy of passenger vehicle fees in Europe and Japan is more than fifty percent greater than the US. Average

is as Francisco just showed before. It's about 45 miles per gallon in Japan or 5.6 liters per hundred kilometers and 42 miles per gallon in Europe or about 6.2 liters per hundred kilometers versus 8.4 liters per hundred kilometers or 28 miles per gallon in the US. This higher fuel efficiency of course results in much lower [Indiscernible][0:33:52] improvement. In addition to that, report [Indiscernible][0:33:56] typically drives fifty percent less than their US counterparts as a result partially of course of higher fuel costs. It's also a result of a different urbanization pattern and land use but fuel taxes certainly play a role. As the figure in the slide shows, usual countries assess charges on transportation fuels very differently. On the vertical axis, we have fuel taxes as a percentage of the final price of gasoline and the figure shows that European tax levels are fairly harmonized, the average being just below 65% of final price so essentially in Europe for every Euro per liter of gasoline, you pay 65 cents taxes. Fuel taxes in Japan in general are a lot higher than in the US which can help explain why the average fuel efficiency in the US is so much lower than in Europe.

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Now, in addition to fuel taxes and other ways for government to influence vehicle purchase decisions is by imposing taxes on vehicles. Although very few existing policies in this regard actually meet the desired ideal, there's at least a couple that have shown some movements in a good direction and they're the ones that we're showing here. These two showed the tax on conventional and alternative vehicles in the UK on top and the Feebate program in France at the bottom [Indiscernible][0:35:41] opposes, you know, CO2 tax on private cars. Currently, the tax does not provide any additional incentive to manufacture or purchase vehicles that are more efficient and less polluting specifically that emit less than a hundred and one gram of CO2 per kilometer and that's essentially the bottom left part of the chart, nor does it penalize the manufacturing or purchase of vehicles that emit over 255 grams of CO2 per kilometer which is the top right part of the chart. The United Kingdom in order to actually improve the effectiveness of this policy should further tighten the design of this mechanism and adopt the continuous CO2 tax rather than stepwise one and also perhaps introduce an element of rebate for people that purchase vehicles that are particularly efficient so over the entire CO2 emission spectrum they should turn the tax from stepwise to continuous and just go from zero to whatever the maximum is. Now, France was the first country in Europe to introduce Feebate system based on vehicle CO2 emissions in January 2008. The program is called Bonus-Malus or Bonus-Malus in France and essentially what it does is it penalizes buyers of high-CO2 emission models but it also rewards buyers of lower CO2-emitting vehicles at the time of the first sale. This aspect of this Bonus-Malus Feebate, which comes from fee and rebate just in case it wasn't clear, this Feebate component of France's policy has certainly stimulated the domestic auto market which is a good thing from a French perspective of course but also direct consumers to buy lower CO2-emission vehicles.

However, the program structure has also still been based so like the UK, a continuous tax structure and that's the dotted line in the chart applying to the whole CO2 spectrum of vehicle fee in France would actually be ideal.

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We just said that in order to be effective policy, it should apply to greenhouse gas emissions and they should sort of be on a continuous scale rather than stepwise. Another one of the criteria for effective physical policies is that even rebates should be linked directly to CO2 emission performance and not to other things such as car engine size or things of that sort, or footprint or things like that. These other types or policies are called attribute-based and there's an example shown here of actually Chinese policy which is based on engine displacements and does not provide consistent incentive to lower CO2 emissions. The reason is that vehicles with the same attributes of the same engine size for example can actually have pretty different CO2 emission [Indiscernible][0:39:07] manufacture to change vehicle design and technology in response to indirect policies in a way that would minimize penalties without actually lowering CO2 emissions. Physical policy should be directly linked to CO2 emissions in order to provide the strongest price signal that is politically feasible in **even** [Phonetic][0:39:27] country for cover reduction from passenger cars. Now, the chart in the slide shows the difference between an attribute-based instrument on the left and a CO2-based policy structure on the right using the Chinese messenger car tax scheme as an example. The three bars of each cluster from left to right illustrate a representative low, medium, and high CO2 emission levels in the current vehicle marketing. First cluster shows the amount of tax under the current displacement-based vehicle tax in China and the second cluster shows the amount that would be paid under an equivalent tax structure but based on CO2 rather than vehicle displacement. What this figure shows is that under displacement-based, the low and medium CO2 emission models attract similar amounts of tax but having same engine size although their CO2 emissions actually differ by more than 8%. In contrast under the hypothetical CO2-based tax scheme, the tax level will be proportionate to CO2 emission. What's interesting about this is that [Indiscernible][0:40:36] from this CO2 basis would not actually lead to a significant change in total revenue from the government perspective because the tax collected from the three models under the two structures only differ by about 6% but what's different is that the tax amount for the individual models can be different by as much as 45% as is the case of the Citroen C-Elysee model which is the grey bar in the middle.

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Essentially, these old physical policy instruments can be really effective at mitigating CO2 emissions from passenger cars and trucks but they can be a lot more effective when they follow some basic criteria for smart policies and we saw some examples of policies that were perhaps not ideal

or suboptimal but we identified the elements of successful physical policies and [Indiscernible][0:41:35]. For one is that the fixed structure for the [Indiscernible][0:41:41] revenue fixed so the idea is that increased fuel and vehicle taxes don't necessarily have to translate into higher overall taxing. Vehicle and fuel fees could support the development of mass transit or finance research and clean transportation or clean energy in general but it can also be returned to consumers by decreasing income taxes for example or payroll taxes. The people point which is the point at which rebates become fees for example in a feebate scheme can be adjusted without impairing the effectiveness of feebate. Each country can really adjust to **people** [Phonetic][0:42:16] point to reach its own revenue goal. They may want to raise money. They may want to invest in incentives or improvements or they just may want to be revenue-neutral and just appropriate efficiency of the [Indiscernible][0:42:27] element is that [Indiscernible][0:42:31] on greenhouse gas emissions because fees based on emissions such as an assessment program of greenhouse gas per kilometer for example can be applied across different vehicle technology and fuel price. In order to [Indiscernible][0:42:47] taxes should cover all vehicles and fuels because these are to exempt some vehicles where fuels can actually shift consumer demand to untaxed options and circumvent policy goals. Taxes should also be able to send a long-term price signal [Indiscernible][0:43:07] by being transparent and well publicized and maybe set ahead of time that can actually provide a clear signal to consumers and allow automakers enough lead time to actually invest new technologies and make vehicle technologies [Indiscernible][0:43:25]. Their element is that good physical policies in this sector should also try to combine a piece with rebates for example for vehicle taxes, governments can create feebates that offset charges with rebates. The pricing structure would be designed not just to penalize high-emission vehicles but also to reward low-emission models with rebates, really sort of encourage the markets to shift in that direction. Rates would increase annually and predictably because consistently increased fuel taxes can serve continued pressure on the market to develop new technologies. Finally, as we showed before this should increase on a continuous rather than a stepwise basis across vehicle classes because stepwise fees really encourage consumers to purchase and manufacture to produce vehicles that only meet the minimum requirement for each class and don't really encourage them to go anywhere beyond that.

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As effective as performance standards and fees are when they're implemented as standalone policies their complimenting nature actually makes a combination of the two a pretty good almost tax-perfect, I would say, climate policy. Performance standards increase the fuel efficiency of the fleet and high-fuel and vehicle taxes offset the resulting lower cost of driving and encourage consumers and manufacturers to pursue ever more efficient technology options.

So when they implemented [Indiscernible][0:45:08-0:45:15] and this figure on the right shows the results of our own modeling exercise which are calculated based on existing and proposed target standards for each of the regions that we looked at, European Union, the United States, and China. In these target standards, we essentially tighten them by about four percent a year beyond the sort of the last advertised target and we combine them with higher fuel fees and we sort of produce an estimate of result in reduction in greenhouse gas emissions would be [Indiscernible][0:45:48]. Before I talk about numbers, just a few sort of disclaimers, obviously, these estimates are based on several assumptions just like every projections and their accuracy versus real world results will vary depending on the number of factors. This is obviously [Indiscernible][0:46:04] leave that alone until a kind of recent [Indiscernible][0:46:09] because more efficient vehicles cost less profit and it can encourage more driving. That's the rebound effect that Francisco was talking about. We just counted these emission reductions by about ten percent but because high fuel fees can counteract this effect, we actually attribute this ten-percent reduction to the higher fees. Also, in driving expense that will discourage driving in more efficient vehicles, we estimate that for every ten percent increase in fuel taxes, fuel consumption will be reduced by about five percent. That's enough fees to give about 0.5 but because of differences in household incomes, these will likely have less impact in the US where obviously, consumers afford disposable income but impact perhaps in places like China. In addition, the efficient cars become the less fuel they need so they reduce revenue fuel fees and they lower cost to consumers on taxes. Raising fuel tax overtime would moderate this effect and this is something that we didn't really model in our exercise. But anyways, based on all these disclaimers and when a pretty conservative projection of the effects of combining a stringent vehicle performance standard and high fuel fees, we estimate that the EU, US, and China could reduce their combined annual CO2 emissions by more than one billion metric tons of CO2 in 2030 and their cumulative reductions from 2010 through 2030 would total almost ten gigatons of CO2. A gigaton of CO2 saved in [Indiscernible][0:47:55] is equivalent to about two and a half billion barrels of oil that is saved in 2030 and the cumulative would be a reduction of about twenty-three billion barrels over the period from 2010 through 2030. That's a lot of oil that we're getting enough ground here and this is, like I said, a pretty conservative estimate. Now in about a hundred dollars per barrel, this would essentially mean gross savings of about 2.3 trillion dollars over twenty years. This is US dollars. Depending on the cost of additional investments and efficiency improvement like Francisco showed before obviously, any type of efficiency improvement, it fills some upfront investment. Depending on the magnitude of these investments, we estimate that the net savings will amount to roughly one hundred and thirty billion dollars in 2030 alone and would accumulate to approximately eight hundred billion to one and a half trillion dollars in 2030. Last point I wanted to make before [Indiscernible][0:48:57] is that though high fuel fees can be a tough sell politically especially in the current landscape level in the US but I would

say all over the world, they can actually be structured as the shift from other taxes with higher deadweight loss like I was mentioning before. So, that's something that can be done even politically, we feel, and even these days. Another thing I wanted to say is that these results of course are not limited to these three regions and that these are just examples but nations all over the world can essentially enjoy very similar substantial climate and economic benefits by implementing these policies.

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Just a few words to conclude the presentation...so as we saw throughout this webinar, designing effective policies that reduce emissions from motor vehicles in a way that is also cost-effective, certainly requires a lot of technical experience and knowledge of international results and also a pretty sub-economic analysis and a deep understanding of local conditions. Unfortunately, badly designed transportation policies can actually cost a lot of money but produce certainly insufficient results, sometimes unintended results, and they may fail to capture opportunities to reduce emissions and they also may require further political effort to reform them which can be certainly pretty difficult. Now, these challenges can and must be overcome however and specifically by following the best practice that we best describe and that are also described in the report and that the ICCT is striving to essentially propagate all over the world. Government leaders can accelerate the design adoption and enforcement of these like effective vehicle policies. To summarize just a few points, number one, emission performance standards really are effective at increasing the efficiency of vehicles without dictating the specific technology solution and although the development and the adoption of this that actually can reduce greenhouse gas emissions from all inflated cost like an out front cost, they also promote investment and cost savings essentially during the life of the product while providing fuel savings to consumers. The third point is that fuel and vehicle fees actually compliment performance standards very well and that they can really help align market forces with social benefits. Finally long-term, these are [Indiscernible][0:51:52] manufacturers and investors the reliable signals that they need to invest in R&D, that deploying the technology and to really transform the market. Just to remind you the numbers, our very conservative analysis shows that we could actually reduce CO2 emissions from the transportation sectors, actually from vehicles in the US, China, and the EU by more than one gigaton of CO2 in 2030 with well-designed policies and that the net savings would amount to something around one hundred and thirty billion US dollars in 2030 in these three regions and that cumulative savings would approximately be equal to about eight hundred billion dollars to one and a half trillion dollars in 2030. With that, I thank you and I look forward to your questions.

Vickie Healey:

Laura and Francisco thank you so very much for these outstanding presentations that you gave and provided our audience with some great information and some facts. With the remaining time we have left, we

have some questions that are coming from our audience and so we'd like to take the remaining time to submit these questions to you so that you can answer them. So with that, I'm just going to go ahead and toss the first question over to the both of you. The first question comes in and basically, we're addressing, you know, in many developing countries, the influx of vehicles is seen as a sign of development. So, how does the government improve vehicle standards for vehicles coming in to developing countries? How can these governments improve vehicle standards for the influx of vehicles coming in to developing countries?

Dr. Francisco Posada Sanchez: Thank you Vickie. I believe well I could think of that question. So, the experience of ICCT is -- our a main play field in these developing countries, also European Union and China and Brazil and in many countries that are trying to adopt vehicle performance standards, there are rules of negotiation between different stakeholders that are not related. You have government officials. You have manufacturers and then, you have the civil society. So, basically, the government and civil society can interact with each other and can get help from ICCT and similar organizations to set up first, let's say a draft of performance standards for the vehicle fleet and develop some programs that can be running parallel like labeling schemes where you present the performance and CO2 emissions of the vehicle and you compare against all the vehicles for their market and so, people get a feeling of what the fuel economy is and what are the benefits of having fuel economy standards and the benefits in terms of savings or money, which is very important for the people. Then, this can be articulated in an organization like ours can help create environment with the manufacturers to sit at the negotiation table and start the process of implementing these standards. Usually, it takes us several years and there is a period of that. Well, information has to be gathered and data. So, it's just an invested process, but it can be done. It has been so helpful. This has been helpful in the US, in Europe, Japan, China has adopted these standards and is moving towards more stringent ones. Countries like India, which are very important for us because their population is large. They are growing, their fleet is going very fast, and they are very interested in adopting these standards obviously because also its strategic standard that you can overview the overall fuel consumption for the country so reducing the importation -- importing oil that's important for the governments and also because some manufacturers find implementing these standards as a way to develop their own technologies and be competitive in oil markets. So, let's say Brazil had been very interested and actually has adopted energy standards which is another kind of way to approach the problem, not just by CO2, but also the energy standard. So, these energy standards adopted for vehicles in Brazil will give the Brazilian manufacturers an edge over competitors when selling these products in nearby markets -- in Latin-American markets. So, they see this as an opportunity to improve the performance of their vehicle fleet and be competitive against over technology that are low. Let's say from China, many are coming into Latin-American countries and in the African countries where vehicles can be sold to. I hope that somehow answered the question.

Vickie Healey: Okay. Thank you so much. Very good on that. So, our second question is do you have any recommendations on which CO2 emission, how the country should begin with? What is the starting point for countries trying to initiate such a policy?

Dr. Francisco Posada Sanchez: I believe specifically for vehicles, every one of the first steps is to set up the vehicle, label the structure, which in the US is managed by the Department of Energy, the fuel economy in the gulf, that something that helps trying to share the top of information that also helps - that gives some time to manufacturers and to the government to gather information of the vehicle fleet and design the specifics of the regulation in terms of vehicle categories and what type of testing would be required, under what testing cycle, the type of very specific ends. So, it's the first step then you move to gathering of data then once you have all the data for your fleets, for your local fleets and national fleets. Then, you move to proposing and drafting a standard for the incoming years.

Vickie Healey: Very good, thank you Francisco. Next question I believe this question would be best addressed by you as referring to the combining standards and this information you provided. Do you have any examples for non-OECD countries where this has been implemented successfully?

Dr. Laura Segafredo: Well China is not an OECD country. It's a good question. Now I'll be honest and it's not easy to find really convincing data on fuel taxes. This is something that for some reason is not communicated very transparently by governments understandably because the current fuel taxes turn out to be a pretty significant part of the final price of fuel, so that usually raises a lot of concern among consumers. So most of the data that we have actually pertains to OECD countries or other major countries such as China for example, so I would need to look into it a little bit more sort further in order to understand whether this has been tried elsewhere. So combining standards and fees has been tried elsewhere. I would say that from the data that we have the ICCT also covers essentially the eighty percent of vehicle sale around the world. So they have data on vehicle performance standard and I would say that that's really the markets that would essentially start regulating this type of thing because our markets are not smaller in terms of size of the fees. It just don't have such a big interest in start in doing that as of yet, but as we move towards a world where essentially larger share, where population is moving towards the middle class they will want to own a vehicles, they would want to drive cars, this just becomes a lot more interesting for governments around the world, so in transition and developing economies especially that's what I'm thinking of, but again the difficulty of this exercise is really the quality of data on fuel taxes is actually pretty low. So the OECD sample is essentially provides pretty high quality data, but aside from that it's just not an easy exercise.

Vickie Healey: Okay, thank you for that and perhaps I'll share the requesters contact information with you Laura if there is any additional information you find that you like to share with her I'll be happy to get back to you. This is a bit

of follow-up question to that. If the ClimateWorks Network able to review drought policies or non-OECD government and provide comments that was in the preview.

Dr. Laura Segafredo: Yes, the short answer is yes. ClimateWorks works on five main regions around the world which essentially like I said before represent over seventy-five or eighty percent of global emissions, so one region is the US and another one is Europe so they are certainly OECD countries, but we also work in China, in India, and Latin America especially in Mexico and Brazil and Indonesia although they mostly work on land mines and forests. So in those countries we start you can support efforts of our best practice that work in our sort of regional foundations to actually assist governments design and implement these policies. Beyond this sort of regional coverage we also support other efforts and other platforms that actually can help governments do the same thing although they're not exactly our core sort of regional focus and I'm thinking for example of the "LEDS Global Partnership The Low Emission Development Strategies Global Partnership". We support that initiative and there's a lot of governments from non-OECD countries, lots of Latin American governments, Asian and African governments that participated in the platform and we are sort of trying to actually find a way to support that and so provide our expertise with those governments, so yeah that's what were trying to do.

Vickie Healey: Great, thank you. Francisco, by the way this next question is for you. Is there any support for ICCT countries to implement transportation CO2 reduction policies or programs as CDM to receive money through card and credits?

Dr. Francisco Posada Sanchez: That beats me. Sorry I am not very familiar with the carbon credit structure. I don't think that ICCT is involved in the carbon credit design of policies or instruments, so...

Dr. Laura Segafredo: Yeah.

Dr. Francisco Posada Sanchez: Yeah, it reduced the [Indiscernible][1:05:51] question inside or ICCT staff members, but I think were not, yup.

Vickie Healey: Okay, well thank you. Yeah, and then the carbon credit as it keeps coming up a lot so thanks for that information. Next question is to achieve the one Gt CO2 savings in 2030, the vehicle standard in the US, the EU and China need to be stronger than currently propped standards and if so do you have recommendations on how much?

Dr. Laura Segafredo: Francisco, I'll let you address that I think.

Dr. Francisco Posada Sanchez: Okay, well we basically we have a very good perspective about what is going to happen until 2020, 2025 in the US and in Europe is very clear the target are already set. There are actually target set, so there is nothing uncertain and the technologies are already are let's say

anticipated. They want to see a lot of hybrids at the end of May of the 2025 period, certification and hybridization for those sheets. For Europe, maybe there is room before [Indiscernible][1:07:30] hybrids as an average fleet in large numbers. After 2025 and to reach 2030 we are sure we now are more similar production rates and was basically where we beat... where you can remember from the presentation we are recommend reduction rates between three and six percent. The European reduction rate is around four percent. The US around five percent, so we keep those figures and those example related at the current vehicle fleet groups. So that was the base. There's a lot of work going on technologies especially light weighting that's why we recommend moving from weight based standards to footprint standards because having introducing light weight materials into vehicles will make much easier and much cheaper to meet those standards in the future even the most [Indiscernible][1:08:47] standards. So it's going to be that. It's going to be light weighting. It's going to be a lot of electrification and continuous improvement on the performance of the internal combustion engine, the classic engine and cost reduction for hybrids and improvements on energy density of batteries to make it lighter and obviously cheaper. It's the combination of technologies for that 2020, 2030 horizon like.

Vickie Healey: Okay, thank you. Next question is not sure which of you would be best to address this to, but the question is how do you tackle the existing vehicle fleet and also the second hand import of vehicles in non-OECD countries and again I think that takes us back to a little bit about the first question about how do we address the existing fleet and the standards of those vehicles and then again the second hand import of vehicles coming in from developed countries to the non-OECD countries.

Dr. Francisco Posada Sanchez: Yeah the importing of used vehicles is always a real headache for us. It's a real headache because those vehicles not only perform... well they might not be in very good condition, they might be... the Commission on Pollution Standards might not be the ideal. It's a complicated situation with them, with those types of vehicles. The regulation for that fleet will have to involve probably a more government officers and officials, so it gets complicated. We assume here cases of basically abusing countries and importers of new vehicles that's easy to regulate and to verify. A used vehicle has a lot of complication.

Vickie Healey: Okay, thank you and this next question has a primary focus on Egypt specifically Cairo which is the capital and its very densely populated and the question is do you have any thoughts or ideas or recommendation on standard policies that could be implemented quickly and sort of a short term plan to bridge the gap to a long term policy. I think that's the next of the question.

Dr. Francisco Posada Sanchez: Yes, I believe that in Egypt and major countries you're going to start with the basic which is the label schemes. So basically when you present to a consumer the full economy of the vehicle on the

windshield, that type of information is very important as our first step. Also that has to be done with a little bit of public awareness, so people will get appointed and locate of importance of vehicle economy standards of vehicles and the savings that they're going to achieve by buying a more efficient vehicles. So that's a first step. From that you can move towards more complicated steps and start serving the market and get a feeling of the fleet performance and then after that move towards a national emission standards or for performance standards, but starting with the laboring scheme is the first step and this is good. All countries have adopted feed bait standards which is easier to implement and it can be physically neutral within the special, Laura when you can balance, the fees they pay with the rebates given so it doesn't actually affect the economy of the fiscal allocation for it. So that's one instrument that is effective at promoting cleaner vehicle social and fuel efficient vehicles. When Chile tried to implement a combine of clean vehicles plus fuel efficient vehicles, clean in the sense of conversion of pollutants plus fuel efficient vehicles a combined feed bait scheme, but unfortunately they didn't pass. There was laws who was supporting our friends from Chile during that process, but was finally we lost that battle with Chile, but it's a good option it actually -- the numbers are very good.

Vickie Healey: Okay, thank you Francisco. These questions are coming in so fast so let's see. I believe the next question is regarding sort of a technology transfer-related question that is that -- the requesters state that developing country policy makers struggle between protecting domestic manufacturers and implementing and adopting more standards and while not technology specific standards do specifically dictate available technology indirectly, so this person would like to hear or know a little bit about steps to adopt to facilitate technology transfer in relation to the issues and the struggle that this developing country had to deal with.

Dr. Francisco Posada Sanchez: That's an interesting question. Laura, do you have any comment on that?

Dr. Laura Segafredo: Yeah, I don't have a lot of insight. It's a very interesting question. I don't have specific answer on technology transfer, but my first reaction would be to associate -- I was thinking of the information that you Francisco had actually presented on the costs of imposing the standard essentially and how the costs of complying with standards actually sub-decrease dramatically within a really short period of time, so I'm thinking that what happens sometimes in other sectors and I'm thinking of the Bio sector, for example is that some countries actually -- when they decide to implement a standard on refrigerators for example, what they do is they take a standard as being implemented elsewhere. I don't know in the EU for example or in the US or elsewhere and they say 'Okay, this will become our standard' I don't know five years later for example. So, that allows for essentially caused the drop pretty significantly before the standard becomes mandatory in that country and that should somehow sort of create a bridge between the cost of new technology and the resulting fuel

saving and saving some pollution at that address so, they get a lot more interesting from a sort of an economic perspective, but secondly complex issue that not expert by any means and I would probably encourage the person who has the question to look into the work of our BPNs on that. There's still a lot of work done because it's certainly a problem that is recurrently going and interesting.

Vickie Healey: Laura, can you repeat the name of the BPN, the kind of this BPN?

Dr. Laura Segafredo: Yes, on transportation we have the International Council on Clean Transportation, the ICCT and we also have the Institute for Transport and Development Policy (ITDP). They essentially work on transport system so on public transit and urban design. We also have BPN that work on a client service, the Collaborative Labeling and Appliance Standards Program; on buildings, the Global Buildings Performance Network; on industrial energy efficiency, the Institute for Industrial Productivity; on the power sector, the Regulatory Assistance Project; and on land use chain, of course it's the collaborative Land Use Alliance, and I hope that you won't forget anyone or I'll get in trouble.

Vickie Healey: [Laughs][1:18:49] Thank you. So, it's just good that you have something to add. I think that might have interrupted you.

Dr. Francisco Posada Sanchez: Yes, I was just thinking about some -- basically option that can be implemented. I assume that for protecting the national industries is a contentious institutional issue or institutional topic especially when we are so globalized and the technology flows so weakly among markets, but I believe it will depend on and also from ability of the government to negotiate with different stakeholders and the interruption of this technologies can result in a small funding opportunity for some research and development work at university levels or findings on specific research for specific companies but I don't... this is what I think of the topic and I understand the idea of the question.

Vickie Healey: Okay thank you, and Francisco will quickly -- going back to the question you addressed on existing vehicle fleets and the second hand import markets in non-OECD countries. You mentioned that initiative, can you state that name of that initiative once again for the audience.

Dr. Francisco Posada Sanchez: An initiative.

Vickie Healey: The question came from the person who asked the question and she is asking what's the name of that initiative that you mentioned aside from addressing the correct question. We can come back to that if she could -- if there were questions, could clarify which question that was related to through the question section. I'll come back to Francisco with that again. Moving on, the next question is 'Could you explain the potential barriers that implement best policies in developing country?' and a second part to that question is 'How can climate finance help to mitigate these barriers?'

Dr. Laura Segafredo: Should I take it Francisco or?

Dr. Francisco Posada Sanchez: Yes I believe you can.

Dr. Laura Segafredo: Yeah, so I'm just thinking a number of barriers that I hear so that we currently mentioned when I talk about this stuff with people that I've experienced and in assisting countries deciding to implement these policies. So, probably the number one barrier that everybody mentions is that very often there's sort of an institutional issue. Sometimes there's just not enough capacity at the government level to sort of understand these policies, understand the benefits and come up with sort of technically sound way of designing the steps, sort of number so it's a technical capacity issue, and number two, sort of creating the coalition of institutions regulatory agencies and industries, etc. that would be actually willing to move this thing forward politically and really create the environment that would be conducive to something like this to be actually implemented, so that's another one. Of course, number three would be that any of these policies and I'm thinking specifically standards but also label their other things. They are effective only if there's a pretty good period which can last from three to seven years, sometimes even longer, sort of technical analysis, cost benefit analysis, just main purely ecological analysis data like Francisco mentioned before what does -- starting point is what the situation of such or what are we trying to do. So, that's another one. Number four would be on the actual -- so once the policy is actually designed and implemented and let's say that it comes into force, very often the political conditions changes, institutional conditions changes. There's just no willingness or there is just no really strong proponent, you actually update the policies, keep ratcheting the map like we just mentioned if those mechanisms are not built in the policy from the beginning, that certainly difficult that can affect the effectiveness of these policies over the long term. What else? Let's see, certainly the financing -- going to the financing piece, yes that can certainly be a barrier. There are some policies for which it should be relatively easier to sort of find the right financing and I'm thinking of the energy efficiency policies in general. There's a lot of offer out there in terms of organization that can assist governments essentially for free to design this kind of policy, but I think that -- yes that is a space that climate finance can also sort of support. I'm not sure under which conditions this implicates. It's a little bit unclear right now as an opportunity for climate finance, it's just the Green Climate Fund or things of that sort so -- but there's certainly an opportunity there I think and we encourage you to again sort of seek assistance and I think that form like the LEDS Global Partnership would be a good way to actually start sort of really trying to understand and see how that can be helpful.

Vickie Healey: Thank you Laura. We have many more questions and I'd note that our time is coming to an end. We only have a few minutes left so I want to be respectful of everyone's time and if it would be okay with you Francisco

and Laura, could we e-mail the remaining questions to you and you could perhaps respond or address those questions via e-mail?

Dr. Francisco Posada Sanchez: Yes please.

Dr. Laura Segafredo: Yeah.

Dr. Francisco Posada Sanchez: Sorry Laura I cut you up. I wanted to say that I just like very much the [Indiscernible][1:25:43] Laura made on barriers to implement this efficiency in Commission of Pollution Standards in our countries, and we have had experience with the -- let's say with governments of developing countries and please feel free to seek support from us and to implement these policies especially for vehicles which is our stronghold. So if you have questions and you have a plan and you need some support, please reach to us and we can certainly help you.

Vickie Healey: Thank you. So, with that -- I don't know if -- Francisco and Laura, if you have any additional closing remarks you want to make based on questions that have been received but if you can feel free to make that this time before we close out.

Dr. Laura Segafredo: I just wanted to really thank you again for the opportunity of presenting this work and thank everybody that actually took the time to tune in.

Vickie Healey: Thank you.

Dr. Francisco Posada Sanchez: Yes thank you very much to the Clean Energy Solutions Center and to all our attendees.

Vickie Healey: Thank you so much. With that, I just like to say to everyone that on behalf of THE Clean Energy Solutions Center, I'd like to extend a very hearty thank you to Laura and Francisco and also to our attendees for participating in today's webinar and had a trip of audience from great question and we really really appreciate your time. I invite our attendees to quickly check back to the Solutions Center website over the next few weeks and if you would like to view the slides and listen to a recording of today's presentation as well as previously held webinars, you can visit at the Solutions Center training page and we will have -- again we've mentioned on that but just to reiterate, we will have PDF copies of the presentations available on the Clean Energy Solutions Center website, so feel free to go there and download the presentation and also check back in a few weeks if you'd like to review the reporting of the webinar. Additionally, you'll find information on the coming webinar, another training event and we also invite and encourage you to inform your colleague and it's in your network adopt the Solutions Center resources and services including the Low-cost Policy supports that are mentioned and also to inform your colleagues about the Climate Works Foundation and great [Indiscernible][1:28:41] network that I have such as the ICCT. So with that, I just wish that you all have a great rest of your day and we

hope to see you again at future Clean Energy Solutions Center event. That concludes our webinar. Thank you.

Dr. Francisco Posada Sanchez: Thank You.