



Transcript: FAS Podcast “A Conversation With An Expert,” Featuring Lindsey Marburger, Manager, Earth Systems Program

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Katie: Welcome everyone to a special edition of the FAS podcast: “A Conversation with an Expert”. I am your host, Katie Colten, Membership Coordinator here at the Federation of American Scientists.

My guest today is Lindsey Marburger, Manager of the Earth Systems Program here at FAS where she oversees work in building technologies, energy efficiency, energy technology training and safety, and systems resource analysis. Prior to joining FAS in June 2009, she worked as an energy security and economics researcher at a U.S. based non-governmental organization, as a grant manager at the Indo-U.S. Science and Technology Forum, and as a technical editor at Environmental Quality International. She received her Bachelor's degree from American University, where she studied environmental politics, environmental science, and applied anthropology. Welcome Lindsey.

Lindsay: Thank you, Katie. It's great to talk with you today.

Katie: Let's begin. Lindsey, can you briefly explain the connection between issues covered by the Earth Systems Program (such as water, energy and building technology) and security?

Lindsay: This is an area that traditionally, is not thought of as part of the security mentality, not as obvious of a connection necessarily as say nuclear security and small arms. There is a growing recognition that environmental issues can play a compounding role in existing instabilities and can often at times be factors that kind of pressure something from a tense situation to a situation that is either a major humanitarian disaster, or that leads to armed conflict. You look at places like Somalia or Kenya, where you are seeing civil unrest and often times the precursor to that is a 1-3 years or longer periods of drought through insecurity.

On a more tangible side, if you look, for example, at the U.S., we spend a vast amount of our military resources (for example the Fifth Fleet in Bahrain), protecting oil ways, making sure that in many cases that the oil in the Middle East is making it out of the Middle East, while protecting the straights and the canals that they go through, or making sure that the regions stay stable. So, oil is the most obvious example of the link between energy and security.

But at the smaller world level (for example the household level, like with our building technologies project), the house is the smallest level of social organization, essentially the household. People as individuals are far more secure and that they feel safer when they have a house that meets basic

functions and they can afford to live there. They feel secure and safe within their home both because of the structural stability; because they can keep outsiders that they don't want inside the unit. At that very basic level, there is a direct connection between human security and one of the components that is the sustainability and the efficiency of that house, because for the simple fact that most highly efficient homes are also less expensive to operate.

Katie: One aspect of the Earth Systems Program is the Building Technologies Project, which provides policy analysis on federal and state energy and building programs. A focus on this project is how to make disaster relief housing more efficient and sustainable. With recent natural disasters in both the United States and abroad, this topic is extremely timely. In your opinion, what are some ways that the U.S. government can make this housing more sustainable?

Lindsay: Well, what we are actually looking at here is the concept called high performance building. And high performance building has several attributes- one of which is sustainability; the other key issue is energy efficiency. And in high performance building, you have sustainability equally weighted with the factors like safety, cost effectiveness, livability, all of these things that make houses better for the occupants, and that's really what we are focusing on- looking at ways to make the disaster relief housing (from the national emergency shelter to transitional shelters to the permanent housing after reconstruction), more sustainable- but also more livable, and ways to reengineer communities to make them better places to live, neighborhood by neighborhood as well as house by house.

The first thing that you want to look at in making housing more sustainable is to set performance standards. We originally got involved in this work after Hurricane Katrina, looking at all the FEMA trailers (which as many people know, were experiencing problems with formaldehyde making the occupants sick). And so the first step would be to make performance standards related to not using formaldehyde in trailers, minimum energy efficiency standards and integrating these high performance concepts from the traditional building environment (everything from renewable energy in the shelters to better insulation, etc).

First, you set up the performance standards and then, the second thing (that we are focusing on) is looking at the processes. Because the U.S. has so many levels of government involved in disaster relief, (we have the federal effort led by FEMA, we have HUD, we have the state level), and often times you have multiple local levels all involved in one disaster relief effort. What we noticed is that there tend to be a lot of gaps between emergency shelter and what is called transitional housing; and then between transitional housing and permanent housing.

Now, transitional housing (such as the FEMA trailers) are intended for short term occupancy, no more than eighteen months generally, and then in theory it is picked up, gotten rid of, put away and replaced with something more permanent (intended for 30-40 years of occupation). But in many areas you have people continuing to live in their transitional housing, still occupying the shelter five-ten years later. And it raises the problem because they are not designed for permanent habitation, often times they don't lock well, occupants feel very unsafe, people are being resettled in neighborhood where they didn't traditionally live and they don't know their neighbors. The work we are doing right now is focusing on how to better meet the needs of the local community, how to get rid of some of these gaps between the emergency transitional and permanent housing. One of the ways that we are finding to do this is to look more at the model of the international disaster relief community, which has done a much better job involving local communities and working with them to determine what their capacity is, what their needs are, and how to use their capacity to drive the reconstruction effort rather than just saying, "oh here's our one solution to all of your problems, here is your transitional housing, you can upgrade it if

you want to, get rid of it after eighteen months.” It’s really more looking at ways to enable people to rebuild themselves and hopefully in a more sustainable manner, looking at things like: how can you relocate to make it safer for the residence, to reduce the cost of having to rebuild the community again and then ways to make houses more sustainable, everything from building back with more insulation to integrating new transportation in location options so that people don’t have to depend on cars for everything.

Katie: FAS recently created a high performance building guide and Rehab Right toolkit for Habitat for Humanity Affiliates for the repair of existing homes. What is the toolkit, and how will it help Habitat fulfill their mission of building safe, affordable housing?

Lindsay: Our habitat work (much like our disaster relief work), is looking at how to make housing safer, more sustainable, and also more cost effective and affordable for occupants.

With the high performance building guide (which we are calling our Rehab Right toolkit), we went to the construction team at Habit for Humanity and asked them: “what are your affiliates asking you, what are they having problems with, what are their needs in terms of building science”. What we heard back was that we have this vast market of existing houses, (and Habitat has traditionally always worked in new homes), but they are trying to look at ways to integrate the existing housing supply into their portfolio of work through programs like a “brush with kindness” which just does exterior home repairs; their critical homework repairs program which focuses mainly on safety factors; and their program called the Neighborhood Revitalization Initiative, which tries to go neighborhood by neighborhood and fix up the existing housing within those neighborhoods, to see if by changing several houses within the neighborhood, they can actually kind of lift up the entire neighborhood. With the recent foreclosures, there has been a lot of government money for Habitat and other affordable housing providers to use.

What Habitat wanted was a web base tool that teaches their affiliates how to approach existing housing, using a systems approach so that as they design their scope of work they can go through and say, “you know, I notice that in my housing inspection, there appears to be more damage here, and there appears to be plumbing issues bathroom one and two”. They can actually go through and check on the check list the construction deficiency that they noted, and they can enter them into the tool, and what comes out is a set of safety and sustainability recommendations that are suited for their particular project. It gives recommendations on everything -from where to find the Energy Star appliances that you would need to replace, to where to get a low flow toilet if you are replacing the plumbing in the bathroom to how to deal with black mold and asbestos. It will be a whole suite of safety and sustainability options to make the Habitat volunteers and staff feel safer while they are doing the project, and teaches them how to build back a better, more sustainable house with hopefully far lower costs, (especially energy and water) so that the houses are more affordable to the occupants in the long term.

Katie: How can the lessons from the Habitat guide and toolkit be applied to the average person's home?

Lindsay: I would say that one of the main lessons is the fact that sometimes it is worth it to pay the higher upfront costs for lower long term costs because, often at times, what people look at is just the initial price tag- whether it’s on an air conditioning unit with a higher SEER rating, installing a higher grade of insulation or buying new windows. It is a higher upfront cost, but what people don't look at is that over the life cycle their mortgage, (in fact most people have thirty year mortgages these days) that over the that thirty years it’s far more cost effective over the life cycle of that product to pay the higher upfront cost because it will cost you less and in the long term, your house will be more comfortable.

Katie: The International Science Partnership is also a part of the Earth Systems Program. The ISP brings together American and Yemeni scientists to solve critical social and environmental issues in both countries. How did this program originate and can you tell us about some of the achievements from this collaboration?

Lindsay: The initial concept for the ISP came about as a collaborative discussion between FAS President Charles Ferguson, myself and the Lounsbury Foundation which had previously funded some of Charles' work when he was at the Council on Foreign Relations. One of the critical deficiencies we were noting in this field of science diplomacy and global science engagement was the "one off science engagement", where a group of scientists from, let's say, the U.S. goes and meets with a group of scientists from an international country. They get together, they have a great meeting or workshop and then that's it, that's the end of collaboration. We feel that there were a lot of opportunities being lost, both for the scientists and for the actual science itself.

We wanted to create a program that has several stages and brings people together for a more long term collaboration that actual use- some specific output whether it's a pilot project or a set of research papers. We also wanted to focus on younger scientists because often times (especially when you are looking at countries in the Middle East), younger scientists have far less opportunities to advance and meet their international peers than senior scientists.

We decided to focus on Yemen because it's a country that I have a lot of working experience in the past, and it's also a country that is considered to be a critical security concern to the United States. We are interested in the long term security and stability of Yemen, and Yemen is one of the most water insecure countries in the world (of the fifteen most water insecure countries in the world, twelve of them are in the Middle East), and Yemen is certainly amongst the top. There are reports stating that the capital city of San'a might be out of water or essentially be out within the next twenty years. It's not just a long term consideration; it is of critical importance that they solve what will be a huge social crisis and what is currently a huge environmental issue in Yemen. They have a large need for the availability of clean, potable water for agricultural, urban and manufacturing use.

Charles and I took an initial trip to San'a and we met with about seventy Yemeni scientists from five universities. We sat down and asked them: "what are your major scientific unknowns, what are the things you are concerned about, what in terms of the water energy nexus is and building environmental issues, what do you want your scientists, your younger scientists to be working on, what type of projects will be useful to you"; and what we discovered is the need for a project that deals with water and energy provision in urban areas. Currently one of the plans is to de-salinate water on the Red Sea Coast and pipe that water up to San'a (which is problematic because San'a is about seven thousand feet above sea level and there's nine thousand foot mountain range between the Red Sea and San'a). Yemen is not at its most stable right now, so any investment of that sort is highly unlikely in the near future. Our project is really looking at other ways to meet the energy and water needs of the interior urban population in cities like San'a, Ta'zz and Ibb without having to resort to huge infrastructure investments (especially unlikely given Yemen's current instability and lack of essential government that functions).

Katie: With the instability in the Middle East, science diplomacy is more pertinent than ever. In your opinion, what analysis can FAS offer to policymakers as a result of the ISP?

Lindsay: Well, the ISP is still very much in its initial pilot stage but already we have realized the need for scientists to actually get involved in policy. It's not enough for scientists to do research and produce papers in academic journals. They need to actively engage with policy makers and learn to speak in language and terms that policy makers understand. For example, with climate change in the Middle East, scientists need to learn to communicate that not only is the precipitation level likely to become more erratic or drop in the next twenty-five years, they need to learn to communicate it in terms of what does that mean for the government and what can the government do to secure their water resource or their energy resources going into the future.

In terms of policy makers, our first recommendation would be to fund projects related to science diplomacy that focus on issues that are critical to both countries, and that are likely to yield some useful long term solutions. Projects like that are valuable; it builds the capacity of the Middle Eastern Institutions to carry out their own research, and it also hopefully creates a generation of scientists, engineers and technicians in the Middle East who are capable to inform policy makers in language which they understand. The second thing we would offer as a recommendation would be for policy makers to look to the scientific community for advice on understanding risks related to environmental issues and to make policies that are actually based on sound science rather than the political whims of whoever is making the policy or special interest groups.

Katie: There is a large need in the United States for clean energy investments and new technologies. With challenges in the new budget environment, clean energy renewal and development budgets are likely to shrink. What are other sources of funding and capital that policymakers should look into?

Lindsay: Well, as you mentioned, given the government's current austerity budgets and goals, it's unlikely to see huge federal investment in clean energy efficiency over the next decades or at least over the next five years. With the recent bankruptcy of Solyndra and its defaulting on a five hundred million dollar federal loan, clean energy investment and loans are not exactly high on the government's list of things to fund.

That being said, I think we will have to look far more to the private sector in the future. We are going to have to look at venture capitalists; we are going to have to look at joint projects of other countries. For example the desert tech projects in North Africa where European governments are investing in solar energy, mostly concentrated solar power in North Africa and then bringing the power from North Africa back to Europe. There are several governments involved in it, both in North Africa, the Middle East, and in Europe. We might have to look at international collaborative projects such as that and we are going to have to look to small R&D (research and development), and innovative ways to get the great research work being done from the initial R&D stage to commercialization, (the so called "value of death" that exist between R&D and commercialization). We still realistically haven't figure out how to solve the main cases, so I think it's going to take a lot of innovative new ways, both getting to the commercialization level, it's going to take cooperation from private banks and it's going to take some large companies willing to take risks.

Last year there was a proposed thirty billion dollar challenge-- over the next thirty years there will be thirty billion dollars in energy and clean energy markets. And the U.S. was (and is) in grave danger of not being any part of that; we are going to have to look to, I would say, new technologies because we can't for example, make solar PV at the same price as the Chinese manufactures can. So the U.S will have to focus on our strong point, which has always been cutting edge technologies rather than just raw manufacturing.

Katie: What are some of the upcoming projects that the Earth Systems Program will be focusing on in 2012?

Lindsay: We will be continuing the ISP and looking to expand beyond just focusing on Yemeni and U.S. scientists; to bring in other scientists from the Middle East and North Africa regions to cooperate with U.S. scientists.

In addition, we will also be focusing on the energy level and will be looking at starting a project that examines the environmental and ethological impacts of hydrofracturing, specifically in the Marcellus Shale formation which underlies Pennsylvania, New York, West Virginia and parts of Maryland in the upper north western counties. We will be looking ways to make the best science and technology practices available to policy makers and the public, make realistic environmental impact assessment on both sides (we would say there has been some confusions related to environmental impacts and some not entirely truthful conversation both from the environmental side and the industry side). We will be looking to play a role as an honest scientific broker to bring the sides together and have a reasoned discussion; and produce best practices related to environmental issues, technology deployment, and related to ways to minimize the risks to environments and to the surrounding communities associated with hydrofracturing and natural gas development in the Northeast.

Katie: Thank you so much Lindsey for spending time with us today. This has been quite informative. Again, to those of you listening, if you would like to learn more about what Lindsey discussed today, please visit the FAS website, www.fas.org.

This concludes the FAS podcast. Thank you for listening in today. Please tune in next month for another edition of "A Conversation with an Expert".