

**Transcript for #71. Reforming Transportation Through Electrification, Ride Sharing and Automation, Part 1  
July 18, 2022**

**Guest Dan Sperling, Founding Director, Institute of Transportation Studies**

Intro ([00:01](#)):

You're listening to Fueling the Future of Transport hosted by Tammy Klein, the founder and CEO of Transport Energy Strategies. We'll talk all about the fuels and energy. It takes to keep the world moving forward.

Tammy Klein ([00:16](#)):

I had the pleasure recently of speaking with Daniel Sperling, who is a legend in our field. The interview was so good. I didn't want to stop. So I'm gonna split it into two episodes. Here's part one, and be sure to join me for the second episode to hear the rest of this wonderful interview.

Tammy Klein ([00:32](#)):

Hi everyone. Welcome to the show. This is Tammy Klein with Transport Energy Strategies. I'm super excited to have with me today, Dr. Dan Sperling. Let me tell you...I kind of feel like he needs no introduction...but let me tell you a little bit about Dan. Dan is a professor of civil engineering and environmental science and policy and founding director of the Institute of Transportation Studies at the University of California Davis. The Institute has over 150 faculty, staff and student research, and it really is on the forefront of every topic you could potentially imagine everything from Low Carbon Fuels Standards, which I feel like Dan has written the book on that, to fuel economy, to biofuels, to most certainly and most definitely, electrification. And ITS has really, I think been at the forefront of all of these issues, not just in California, not just in the US, but around the world and contributing to a lot of good work that's happening around the world on all of those different topics. So Dan, I could go on and on about your bio and your many achievements, but I really want to get right into welcoming you to the program, so welcome to the program and right into the questions.

Daniel Sperling ([02:03](#)):

Well, thank you. And you're so gracious.

Tammy Klein ([02:04](#)):

<laugh> I appreciate that. You caught me on a good day. So, oh gosh, I hardly know where to start, but maybe, we can talk a little bit about the Three Revolutions work. So for the listeners who may not be familiar, can you talk a little bit about that, about the work that you've been leading and do you see states, cities, both here in the US and others, looking at that work, responding to that work, maybe beginning to set some policies around that work. And the third question is, how does the pandemic, where we are right now in the world, has that affected the thinking behind the work? So let's get right into it. Three Revolutions.

Daniel Sperling ([02:56](#)):

Three Revolutions. Okay. So big, big topic <laugh> but you know, there's been this confusion about all these changes taking place in transportation, which are important, which are less important. So I actually got together, some people wrote a book called Three Revolutions and the Three Revolutions are electric vehicles, which is a pretty obvious one. The other is sharing, which is perhaps a little less obvious. And the third is automation. And I highlight those three because the goal is, the need is, to bring those together, to integrate them. And if you bring them together, we really can

transform transportation and create really sustainable what we call sustainable transportation, sustainable cities. So these and some people like to add in some others, they talk about connectivity but that's really just part of connected up with automation. It's not by itself going to have big changes in our society or our cities.

Daniel Sperling ([04:10](#)):

Okay. So the first one. The electric vehicles that's really launched. That's really happening. That's globally. And, you know, it's faltering in a few places, especially in the US, but, you know, Europe is about to adopt a requirement for a hundred percent ZEV, zero-emission vehicles, by 2035. California's actually going to do that even sooner. We have a board, CARB. So part of my bio that you didn't mention is I'm a board member for the California Air Resources Board. And, you know, we're the ones that oversee all of the...and adopt all of the climate...most of the climate air pollution rules and policies in California, which are also adopted by other states. So on June 9th, we will be adopting...the board will be entertaining the proposal to go to a hundred percent ZEVs and will be adopting it in August. So that's kind of that one's the most obvious it's clearly transformational...

Tammy Klein ([05:18](#)):

And I think other states will follow they're already following with ACC 1, which is Advanced Clean Cars. Yeah. They're already adopting what, 15, 16, 17 states. I do see them following ACC too, so the E part of the Revolutions, I think we already see that happening?

Daniel Sperling ([05:40](#)):

And the change in the US is going to happen because of California and the other states, the Feds are really lagging behind. And, you know, it's going to get to a point where there's so many states and so much of the market has gone zero-emission that the Feds and the industry will say, okay, we get it. <laugh> We'll tag along. And so, and by the way, we're talking light duty, there's a parallel happening with the truck...heavy duty. And in fact, California CARB, we adopted a rule two years ago, requiring that starting in 2024, that an increasing number of truck sales also be zero-emission. And that goes up through 2035 and it requires that 70% of most truck categories be zero-emission in 2035. And we're gonna be extending that shortly, getting it up to a hundred percent, sometime around 2040.

Tammy Klein ([06:46](#)):

And we know states are also going to follow the Advanced Clean Trucking Program, which is the program that you're talking about. So we see more and more states beginning to announce the intention to follow that. So it does seem like, yes, perhaps there's maybe some lagging behind China, maybe some lagging behind Europe, but I think the efforts of California and the other states, I almost kind of think that the federal government, and I don't wanna say irrelevant, but, you know, there are things that the government can do, but I think it will be the states that do more, I think in some sense to push the electrification part of the Three Revolutions rather than, or in the absence of, let's put it that way, Federal action.

Daniel Sperling ([07:35](#)):

It's so clear that that's the case. You know, President Biden did issue an executive order saying he wanted 50% of sales to be electric or zero emissions by 2030, but there's no regulations, there's no incentives. There's nothing behind it. So it's a nice aspiration, but California and these other states are actually adopting the rules and, they're also adopting the...creating the incentives and the investment in charging infrastructure to go along with it. So the one thing the Feds are doing is they are putting some money into charging infrastructure. So that's the electric vehicle story,

Daniel Sperling ([08:21](#)):

And then we have the automation story. So there's been a lot of hype on automated vehicles, autonomous vehicles. And actually, when I wrote the book on the Three Revolutions, I wrote it in 2017, it was published in 2018. And even at that time, I was talking about all the hype. And the hype has continued, but I think it's dissipated a little bit. And now there is more questioning, is it real? When's it gonna happen? And I guess I look at it from two different perspectives is that the investment by industry is continuing some of the leading companies. They continue to improve the technology. They're continuing to pour billions of dollars into this. So there's a real commitment and it's going to happen. There's no doubt about it. The question is how fast and exactly how. And the question of exactly how is a really critical one.

Daniel Sperling ([09:24](#)):

Because there's basically two paths. One is it could be, these could just replace our conventional vehicles. You know, we just own 'em, you know, we park 'em in our garage, and we just use them. Now that scenario is what I describe as the "hell scenario" <laugh> <laugh>. And you know, perhaps it's a little overstated to say that, but the reason behind that is that if people own it, they're going to be using these vehicles much more than their conventional manually operated vehicles. Because you just think about it. You can sleep in the car, you can work in the car, you can text, you can watch movies. And so there's nothing holding you back from spending more time in the vehicle. You know, in transportation, we look at the cost of travel time, like how much we assign a cost to people.

Daniel Sperling ([10:25](#)):

But in this case there's not much cost because you're using that time in a very productive way. So people will live...like I'm in California...people live up at lake Tahoe and the mountains. And get in the car and go three hours to get to San Francisco, you know, who cares? You know, they sit there, they're doing work, they're reading books, watching movies and so on. Okay. So all this study...and we've done a lot of research at UC Davis and others have too, and we're talking about at least probably a doubling of vehicle miles through that scenario. The other scenario.

Tammy Klein ([11:08](#)):

So that is hell.

Daniel Sperling ([11:11](#)):

Now we're moving to heaven. And I'll say this other scenario, I see it as the only credible strategy for making our cities and our transportation truly sustainable coupled with electrification. And that is that these automated vehicles would not be owned by us individuals, but would be owned by mobility service companies, think an Uber-type company. And coupled with that is that they would feature shared rides in it. In other words, there'd be more than a single occupant, single-passenger, or more than even a zero occupant. So actually with the personally owned vehicles, there's gonna be a lot of zero occupant miles accumulated, because, you send...

Tammy Klein ([12:09](#)):

They'll be driving around.

Daniel Sperling ([12:11](#)):

Like why pay for parking in San Francisco? Send it back home. So the shared part of it is really critical because the way it would work is it's like what Uber Pool and Lyft Line used to be. And that is, but it's automated. So you don't have the

driver. And so it reduces the cost. And if you have enough people doing it, it's a really efficient process. And there would be, you know, the detours would be minimal and the cost would go way down. So now we have a situation. So this is really attractive from an equity, a social justice perspective because now we can provide service to many more people. So, to back up a second, we've created this car-centric transportation system. It started in LA, spread through California, spread to the world and it's provided tremendous value and benefit to many people, but it's also marginalized, huge numbers of people, huge swaths, swaths of our population. You know, people that its...and it's not only people that don't have money, it's people that are physically disabled. It's people that are old, people that are young.

Tammy Klein ([13:35](#)):

Yeah. Highways have chopped off communities and cut through communities. And there's lots of writing about that at this point the impact of our national highway system on communities.

Daniel Sperling ([13:50](#)):

Exactly. It's had some really negative effects on many people. So now we're talking about, okay, so we're not gonna fix where the freeways are, at least not, not with this automation scenario, but what it's doing is providing low-cost transportation to all these people, to all the people that have been marginalized. And you know, if you think about mass transit and you know, in New York city, in San Francisco, downtown mass transit works very well, very efficient. But if you look at the whole US, overall mass transit accounts for two less than 2% of passenger travel less than 2%, and actually, it's much less than that now because of the pandemic and people reluctant to go back. But before the pandemic, it was close to 2% and there's many, many more people than that have been marginalized.

Daniel Sperling ([14:52](#)):

So now we create a system that serves a lot more people that has..and its electric. So it's zero-emission or it could be hydrogen. So it's zero-emission and it also requires much less parking space, less road space. So it reduces the cost of our road infrastructure. It creates more space in our cities because now we don't have to devote all that space to parking and roads. So it really is a heaven scenario. Now the challenge...so the problem is so, and that's combined with sharing, right? And so that was implied in this, the third revolution. So the sharing has been really suffering the last <laugh> couple years through the pandemic.

Daniel Sperling ([15:40](#)):

People don't want to share. You know, they're starting to come back,, but transit use is way down, air travel is down, Uber and Lyft have gotten rid of their pooling services and hopefully will be bringing it back.

Tammy Klein ([16:01](#)):

Do you see sharing coming back as we...I don't know if we wanna say emerge from the pandemic because I think we've all declared ourselves done with it, although <laugh>, I don't think it's done with us, but do you see as maybe more normalcy returns to people's lives, do you see sharing as sort of back in the equation?

Daniel Sperling ([16:25](#)):

Yeah. I mean, one way of looking at you look at air travel, air travel is coming back very strong.

Tammy Klein ([16:31](#)):

Oh yes, absolutely.

Daniel Sperling ([16:33](#)):

And that is, I mean, you talk about being stuck next to someone close for a long time. So the point of that is that everyone has a price it's kind of crass to say that, but everyone has a price. So with air travel, what's the alternative? If you want to go visit someone or go somewhere, then this is...there's not any good options if you're going more than a few hundred miles. Okay. So people do it. And I think the same thing has to happen with surface transportation. We have to make, and this is where policy comes in. So I've become a real policy wonk in my later in my older years, just because, you know, we need much more focus on how we make good policy. Yeah. And so this is a case where we need policy to encourage sharing and discourage single-occupant vehicles and single-passenger services. And, we can do that it's...we know how to do that and lots of places in the world do that.

Tammy Klein ([17:50](#)):

Do you think, do you see California through CARB or also other states moving in that direction? Because I think that's the only thing that's really going to, I mean, yes. You'll have electric vehicles. Yes, there will be targets to me. Yes, there will be more model availability. But the fact of the matter is that, you still sort of have congestion, even if you have a hundred percent electric vehicle sales and eventually penetration, you still have congestion as an issue. But also the driving, the habitual tendency toward driving in, I just don't see, unless you find policies that either incentivize drivers away and I mean really incentivize them into sharing or you set policies that flat out find ways to remove vehicles from the roads. I mean kind of not allowing people to drive. I mean, that's a real...it's like the policy frontier that <laugh> probably has to happen. But it is a real tough one to take on it's like gas taxes. Like nobody wants to touch that, but you kind of do to get the behavior going the way that you need to, to get greenhouse gas, emission reductions, to improve air quality, to improve public health. What's your view about that?

Daniel Sperling ([19:32](#)):

It's important we do this because you know, all these benefits, you just said, Tammy, they're so important, in terms of quality of life, our environment equity. So I think the answer is we do this gently and slowly and, you know, because there would be a backlash even talking about reducing vehicle miles, travel, reducing vehicle uses, even in California, that's a tough sell just by itself. So we have to work it in gently in different ways. And, the reality is a lot of this responsibility falls on the local governments, you know, the cities and the counties, you know, because this is local issue and there's some things the federal government to can do for sharing...we're talking about sharing...there's some things the federal government can do some things, the state government, but a lot of it's gonna be local. So it's gonna be metropolitan areas making decisions. And it's just like a lot of the cities they do have the congestion is horrible. The cost of infrastructure is monumental. And it's disruptive and no one likes it. So I think there's opportunities to start gently moving in that direction. And in these cities...Washington, DC, Los Angeles, San Francisco, New York, Boston, Chicago, Philadelphia, you know, the cities that are experiencing the most congestion and are burdened by these costs. It's both travel time, it's just there's the cost, the economic cost, but there's the cost of people just sitting in their car.

Daniel Sperling ([21:29](#)):

No one likes that.

Tammy Klein ([21:30](#)):

Right. No.

Daniel Sperling ([21:30](#)):

And so, you know, we have to figure this out. So, you know, it's not really urgent right now, but it will become urgent when we have these automated vehicle services, then it's going to be urgent because it's gonna make it much, much worse when we get to that. We don't want that "hell scenario."

Tammy Klein ([21:51](#)):

I wanna ask you one last question before we move on. And that is how do you see the technology, the automated technology, evolving? I mean, there've been some real fits and starts. Companies have already come and gone as it were in the space. So what's your time horizon for when we'll really start to see more of a proliferation of automated vehicles or automated electric vehicles since there's a natural technology fit there.

Daniel Sperling ([22:32](#)):

Actually, California has the law that automated cars must be electric. So it's gonna start slow, in areas we refer to as geofenced areas. So that means they can operate in a certain area. So Waymo, which is the Google company, which many, so Google and Cruise, which is part of General Motors are considered the two leaders. And perhaps next is a company called Zoox, which is bought up by Amazon. So basically you have Google, General Motors and Amazon, the leading companies. So they have a lot of money, a lot of resources to do it. Anyway, Waymo, which Google started in Arizona, they had this geofenced area near Phoenix and they've been offering services to people for two or three years now. And now in San Francisco, Waymo and Cruise have gotten permission to actually offer services in San Francisco.

Daniel Sperling ([23:42](#)):

And so when they did in Phoenix, it was an area was about 10 miles by 15 miles. But you know, traffic is easy. There's hardly any bicyclists there's hardly any pedestrians. So it was pretty easy to do it there. San Francisco's a whole 'nother ball game, right? It's like chaos on the streets in San Francisco. So these companies feel like they can do it and they're gonna do it without anyone in the driver's seat. And in some cases, without anyone, even in the cars, and providing these automated services, they're just starting up very shortly in San Francisco. So I think what's gonna happen is it's gonna be these geofenced areas. You know, you map the hell out of it. That area, you get the, you know, and so the cars are well-conditioned prepared for it. And you slowly expand that geofenced area out over time. So that means from a consumer, from a rider, if you're within that zone and your destination is within that zone, then when you called in for the service, they would send you an automated car. And so I think it's gonna be, as the companies get more confident, as policymakers become more comfortable, as consumers become more comfortable, it'll gradually expand out. So I'd say by 2030, we should be seeing some pretty significant use of these automated services.

Daniel Sperling ([25:22](#)):

Its really inevitable. The artificial intelligence gets better and better. You know, the issue here, the problem is that if you take a person who's not drinking, not tired, attentive, then they do a great job, and this technology is not gonna do better than them. You know, under hardly, maybe in a few circumstances, but mostly not.

Tammy Klein ([25:53](#)):

But not, not that many of us like that out there.

Daniel Sperling ([25:58](#)):

It's not just us as the drivers, it's the other person. So even if we think we're so great ourselves, which people tend to think they're great drivers, <laugh>, you know, all the surveys show that...

Tammy Klein ([26:12](#)):

The greater the driver, you think you are probably the worst you are, it's probably like an inverse/converse sort of thing.

Daniel Sperling ([26:19](#)):

It could. It could be.

Tammy Klein ([26:22](#)):

Yes. Yes.

Daniel Sperling ([26:22](#)):

So, but you know, there's all these conditions, people driving at night that people have been drinking, people are texting, you know, not attentive. And so probably today, in most circumstances, an automated vehicle on average would be better. But we're not willing to accept that. And so there's this question of what's the threshold, how good does it have to be? Because it's never gonna be absolutely perfect, but we humans are certainly far from perfect.

Tammy Klein ([26:57](#)):

I will grant you that. Yes.

Daniel Sperling ([27:00](#)):

And, so part of it becomes, there's questions about how does the insurance and liability work, the confidence of the companies, local governments banning it because they think they're not safe enough. And then if there is a crash and something does go wrong, then what are the repercussions of that? And so that's why it's gonna be slow and everyone's gonna be moving slow on this, but it is gonna happen. And the technology is just getting better and better the sensing technologies and the technology's getting cheaper too, by the way, so it's inevitable. And that's why I'm a great proponent of getting these policies in place, starting slowly and gently, that reward pooling and sharing and disincentivize single-occupant travel. And, maybe we start at an airport...we do it at airports, we do it in downtowns and there's lots of little ways to do that. And so that's really the pathway forward.

Tammy Klein ([28:08](#)):

Like I said, in the beginning, I enjoyed our interview so much that I wanted to save the rest for our next show. Be sure to catch us on the next episode, to hear Dr. Sperling talk with us about the future of fuels, charging and the entire industry and why he sees now as the time of change.

Outro ([28:29](#)):

You've been listening to Fueling the Future of Transport. This show is hosted and edited by Tammy Klein, produced by Carolyn Schnare and engineered by Aleksander Nikolic. To hear more great episodes of this show, learn more, and sign up for a free biweekly newsletter, visit [transportenergystrategies.com](http://transportenergystrategies.com).