Good afternoon. My name is Scott Denning. I’m a Professor of Atmospheric Science at Colorado State University. I’ve published about 100 papers in the peer-reviewed climate literature. I’m a former Editor of the Journal of Climate, and I served for five years as founding Science Chair for the North American Carbon Program.

I support the proposed rules because in my expert opinion they are a step in the right direction to avoid dangerous and extremely expensive damages to the United States.

**Climate Change is Simple, Serious, and Solvable.**

You may be surprised to hear from a climate scientist that climate change is simple, but I want to explain to you that our concern about greenhouse gas doesn’t come from computer models. It doesn’t come from recent temperatures. It’s not rocket science! It’s absolutely consistent with your everyday experience of the world.

The Earth’s climate results from the balance between the heat we receive from the Sun and the heat Earth radiates back to space. If more heat comes in than goes out, it warms up. If more heat goes out than comes in it cools off.

Carbon dioxide gas absorbs outgoing heat because of the shape of its molecules. For every doubling of the number of heat-absorbing CO₂ molecules in the air, we hold on to 4 Watts of extra heat on every square meter of the planet. That’s the equivalent of one 4-watt nightlight bulb on every square meter of the Earth, 24 hours a day, 365 days a year, for centuries to come. Believe it or not, we’ve know this since before light bulbs were invented. The heat-absorbing properties of CO₂ gas were first measured over 150 years ago, in 1863, by John Tyndall. Since that time the measurements have gotten better and better, but the answer hasn’t changed.

We expect CO₂ to warm the climate for the same reason we expect day to be warmer than night, summer to be warmer than winter, and Miami to be warmer than Minneapolis. This doesn’t come from computer models. It comes from measurements. We expect CO₂ to warm the climate because we know that when you add heat to things, they change their temperature!

**Climate change is serious.** Warmer air evaporates more water than colder air. Here in the west we know how precious water is, and we can’t afford to waste what little we have by having it evaporate from our farms and ranches and reservoirs. We get almost all of our water from mountain snowpacks, and our economy would suffer tremendously if we lost that snow. The strongest predictor of wildfire in the west is summer temperatures, and we’ve seen the acreage burned double in our region in 30 years, even with the small amount of warming we’ve had so far. Without major emissions cuts, western forests may burn so frequently they’ll be completely replaced by grass and shrubs. In other parts of the US, the problem isn’t too little water but too much. Sea level rise in a warming climate could destroy
trillions of dollars worth of real estate along the coasts, though we certainly don't expect rising seas to reach the Mile High City!

**Climate change is solvable.** We have the technologies already in hand to dramatically reduce emissions while strengthening our economy and creating jobs. A complete transformation of the global economy to non-fossil energy has been estimated to cost about 1% of global GDP. Our ancestors spent about that much retrofitting the world's cities with indoor plumbing a century ago, and it was so worth it! And that money wasn't gone - it created millions of jobs for plumbers and contractors and the grocers and farmers who fed them.

Opponents of these rules claim the US is weak and that our people are incapable of meeting this challenge, of solving our climate problem. They will tell you that our feeble economy needs to be propped up by energy we dig from the ground. They are wrong. Our economy is the strongest in the world, because our people have always been willing to apply ingenuity and hard work to turn problems into opportunities.

I urge you to implement the proposed rules, because I believe our children can be as creative and hard-working as our ancestors.

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