

A Burning Question

[Transcript]

Part 1

Woman: Climate change? I don't know. That's an iffy one, that is.

Woman: I think it's real, and I think that if we don't do something about it now, we're gonna pay for it later.

Man: Climate change? Biggest fraud ever perpetrated.

Woman: I actually don't know. I honestly don't know. I feel like I don't know the answers because there's so many different theories.

Title Screen: "A Burning Question"

Narrator: There seems to be a lot of confusion and mistrust around climate change in the public domain. It's a difficult story to take on board and to understand what it means for all of us. So what do the public think about climate change compared to what scientists are telling us? And how has the media dealt with this story?

Computer Voice: As scientists, we are learning how human activities and technologies are affecting climate systems in ways that may forever change life on Earth.

News Montage: Those were some of the stark transit images which have inspired an historic worldwide movement: the battle against climate change. / The biggest challenge our civilization has ever had to face up to... / Global warming is a political construction. / The climate change summit in Copenhagen appears to be in a state of crisis on several fronts. / The scientists are worried because [fighting]... / I'm afraid it is a total scam and is breaking very, very rapidly.

Mary Robinson: I'm involved in an active network of people who are interested in these issues on climate justice. And we keep saying to ourselves, in most countries, of Europe and the United States, why are people not more aware?

Justin Lewis: It is a very difficult one, because I think this is a kind of an issue that journalists haven't had to deal with in the past. It's a level of magnitude and the kind of risk they are not used to dealing with.

John Gibbons: I think most journalists understand there is something going on. The people in the media have some awareness, but I think it is a very difficult story. It doesn't follow the classic media model of having a beginning, middle and end.

Declan Murphy: I think the public are very tired of hearing this message. It is compounded by the fact that the public has been told time and time again that it is their fault, and their responsibility to fix it. And frankly, that's wrong.

Newscaster: Despite the recent cold snap and the warm summer last year, Ireland really isn't seeing the change in global temperature that some people may have come to expect.

News Program: If you look at the real data, which is the sunspots on the sun, we are heading for 30 damn cold years.

Woman: I am a bit confused at the moment because there is a lot of differing messages coming out about whether all the damage we are doing is actually affecting the climate. We've had a very cold winter this year, and it seems to be contrary to what environmentalists were predicting.

Man: There seems to be a wicked change this year because, in my memory, frost on the average lasted about 4 days, and tons of rain. This year we have had 16 weeks of frost.

Man: From our experiences the last month, you could interpret that the climate is getting colder. But we are led to believe it is getting warmer, believe it or not.

Newscaster: For the past 3 summers, we have had extremely anomalous weather. And we have had two anomalously cool winters.

Narrator: Doubts about our changing weather patterns and how they reflect global predictions are understandable. So what is the relationship between climate change and the weather we are experiencing?

Prof. Peter Lynch: The climate is the long-term average behavior of the atmosphere, where the weather is varying on a day-to-day basis. So the events we normally experience like the severe winter, we think of as weather.

Declan Murphy: I think we can see on our own shores that weather is changing. Unfortunately, I think we put the wrong names on this challenge, maybe. It shouldn't have been called global warming, because it is not going to be warming for everybody.

Prof. Peter Lynch: As the climate changes, the weather patterns -- the day-to-day weather patterns -- will also change. For example, we've had extreme weather in the last decade: Hurricane Katrina was weather, the heat wave in 2003 was weather.

John Gibbons: We call it climate change. I believe we should call it climate chaos. And we have seen it again through the flooding events in Ireland. While we can't say definitively that this is climate change in action, what it shows you is an intensification of weather patterns.

News Program Man 1: We had a consensus of a BSE. We had a consensus of killer bees that were to going to kill us all. We've had these scares before.

News Program Man 2: This isn't a scare. This is a fundamental reality. We are dealing with a huge amount of scientific evidence.

Man: I've got a feeling that it will turn out the same way as it always does with these catastrophes that are going to happen. It will be like the millennium bug, nothing will happen.

Man: To be fair, I don't really notice it as much as it is made out to be. It's more like a newspaper thing. Tend to notice it in a lot of newspapers, more like scare mongering, as opposed to actually noticing it in day-to-day life.

Narrator: Major shifts in our climate may not as be as apparent to us as changes in our daily weather. So how do scientists record and measure global climate trends, compared to local weather fluctuations?

Prof. Peter Lynch: Ok, well, the global mean temperature is calculated by taking measurements from covering the entire globe, the entire earth. Surface temperatures are measured by satellites and by a range of instruments on ships and on land stations. But on top of that of course is the weather. The large variations in temperature from place to place and time to time.

Narrator: So temperature fluctuations due to changing weather conditions all over the world can be huge. But the global mean average temperature varies on a much narrower range. If a global mean average temperature was 5 degrees lower, or even 5 degrees higher than it is today, what sort of difference would that mean?

Prof. Peter Lynch: Well it could mean very significant change. It doesn't sound like very much, but when we remember that the average global temperature during the last ice age was only 5 or 6 degrees lower than it is today, we can see that this is very significant. And a rise of 5 degrees in temperature would be catastrophic, with major impacts.

News Montage: We are told that the earth's climate is changing. But the earth's climate is always changing. / I agree, our climate is changing. Our climate has always changed. It cooled in the middle of the last century, it has risen again and it is now static. It hasn't gone up in the last 6 years.

Man: What I have seen on television about the Arctic and Antarctica and the drought in Africa and various other places, there seems to be something going on all right. But whether it's a natural cycle or not, I'm not quite sure. I don't know whether the sums add up.

Man: Half of me thinks it is happening naturally anyway. Which is, you know, a pretty common view out there.

Man: Maybe we are contributing to what's happening. And then again, maybe we are not. Maybe it's a natural process.

Newscaster: The climate has always changed, the climate is changing, the climate will continue to change.

Narrator: There are so many conflicting views in the public domain. So how do scientists respond to the popular perception, that climate is changing but that it's a natural cycle?

Prof. John Sweeney: Well I think it's true to say that climate has always changed and it's part and parcel of the climate system to undergo change. Where we are standing at the moment was once buried in several 100 meters of ice after all. This is a normal part of the climate system: over long periods of time very dramatic changes do take place.

Prof. Peter Lynch: We have observed many ice ages over the past hundred thousand years. These are known to be associated with changes in the earth's orbit, and they occur over long periods. And at the moment, the overall trend due to the changes in the orbit should be for a very gradual cooling of the planet, as I say over the coming thousands of years. However, what we are actually observing in the last hundred years is a warming, so it raises a question of course as to what is going on.

Woman: I heard that it's a bad thing, I guess, due to the ozone and all that type of thing. But I'm not well informed about that subject at all.

Man: You hear all the stuff that is thrown out: 'protect the ozone layer,' CFC gases, whatever. But to man on the streets, we don't actually know what I can personally do.

Man: I remember in the early 90's, it was all about the ozone layer. Where is the ozone layer?

Narrator: So what did happen to the ozone layer?

Prof. Peter Lynch: Well, the ozone and the stratosphere, the other atmosphere, was broken down by chemical reactions. And the chemicals in question were Chlorofluorocarbons, or CFCs. These are artificial chemicals which are used in air conditioning systems and fridges, and so on. It took some brilliant scientific research to find out what was going on. But once we found out, we put in place an international ban on the manufacture and distribution of these harmful chemicals and that was agreed in the Montreal Protocol. So this really is a success story of environmental action. The ozone hole, as it was called, is now gradually recovering. It will take about 100 years to get back to the level it was at before this event but we are going in the right direction.

Prof. Frank Convery: Most of us have an intuition that the planet is kind of finite now in what it can absorb. We've had a few wake up calls: We had the first kind of shock that was the ozone depletion problem, and we realized that ozone protects us basically from

radiation, which causes skin cancer. I'm missing a piece of my ear here because I got a melanoma, for example, which could well have been induced by ozone depletion.

Narrator: Most people knew about the problem with the ozone layer but very few of us seem to know how it was resolved. Frank's story is a reminder that we may not always be aware of how we are being affected by the world around us. Climate change is an even bigger science story and given the complex nature of it, I headed back to see John Sweeney to revisit the basics of the science behind it.

Prof. John Sweeney: And perhaps the best way of explaining it is to actually look at some of these processes in terms of what the earth's atmosphere is composed of. Well, you can see here that the earth's atmosphere is composed mainly of nitrogen, in fact about 80% with about 20% oxygen. But there are some trace gases in it, most notably water vapor, carbon dioxide and methane. These are the green house gases, which exert a disproportionate amount of influence on the flows of energy to and from the surface. You can see they allow the incoming short wave radiation from the sun to make it all the way down to the surface and keep us warm down at the surface. But they stop the outgoing long wave radiation from the earth from actually escaping. Without them, the earth would be a very cold place, it would be at a temperature of about -18 degrees centigrade. So they are natural, they are essential and without them we wouldn't really have a habitable earth. But if we have too much of them, if the concentration increases too much, then we begin to get problems because we begin to trap too much heat close to the surface. And this can cause the surface air temperature to warm up.

Narrator: So how much has the planet actually warmed up?

Prof. John Sweeney: Well, when we assemble all of the observations of temperature on the planet over the past century, we find that it has warmed up by about 0.7 degrees. That's important because we know once we get to certain levels of temperature increase, things may happen that may surprise us.

News Montage: Global warming alarm is dressed up as science. But it's not science, it is propaganda. / [Fighting] ...Let's talk about climate change, that is why we are here tonight, because there are two interesting, differing views.

Man: The debate doesn't seem to be very clear. We are getting messages that are mixed from the science and technology communities. So it's not very clear really, is it?

Man: I can't believe, really, the information we are getting. I'm not quite sure about it. I was convinced that it was having an effect, but now I'm not so sure.

Woman: I think it is kind of hard to know if we have actually been around long enough to know if there is a pattern or to understand exactly what the human contribution is.

Narrator: How long ago did scientists become aware of greenhouse gases in the atmosphere?

Prof. Peter Lynch: Well, they have been studying this issue for well over a hundred years. In fact it was an Irish scientist -- John Tyndall, who came from Leighlinbridge in Carlow -- who first looked at the effects of changes of the constitution of the atmosphere on the climate. A little bit later then, a Swedish scientist -- Svante Arrhenius -- studied the effects of CO₂, carbon dioxide, and again argued that if CO₂ levels increased, the climate would change. These were revolutionary ideas because up to then, we thought of the climate as something static. Weather changed, but average conditions remained the same. But these scientists then argued that, "No, if you change the constitution of the atmosphere, the climate will change." Now around 1950 or so, Charles Keeling felt this was a really important thing to measure. And he set up an observing program in Hawai'i to measure, on an ongoing basis, the actual background levels of Carbon Dioxide. And this has resulted in the most solid scientific evidence of how CO₂ has been increasing over the past 50 or 60 years.

Text on Screen: The Keeling Curve

Narrator: So modern science can physically measure CO₂ levels in the atmosphere over recent centuries. But what can scientists tell us about climate change in the deep past? Dr. Jennifer McElwain is one of the leading scientists worldwide, working in just one of the many disciplines of climate science. Jennifer can you tell us about the science research that you are doing here?

Dr. Jennifer McElwain: I'm a paleobotanist. So I study fossil plants, particularly fossil leaves. And my main research interest is to try and understand how climate has evolved over the history of the earth, and how the atmospheric composition, the concentration of greenhouse gases, have changed over the same time. Typically, we use fossils where there is original chemistry preserved. So here there is original organics, what we have to do is process this chemically. We put it in acid, the rock disintegrates, but the chemistry of the plant is so resistant to that acid that the leaves float up to the surface of the acid, and we pick them off. These leaves are 200 million years old, it is an extinct plant called *Lepidodendropsis*.

Narrator: 200 million years old?

Dr. Jennifer McElwain: 200 million years old. And unlike animal fossils, a lot of plant fossils, the original leaf material is preserved. The same chemistry is there from 200 million years ago. What I study in particular are the number of stomata, or breathing pores, on the leaf's surface. And there is a very simple relationship between the number of stomata on the leaf, and the amount of carbon dioxide in the atmosphere. If there are very many stomata on the leaf's surface, it tells us the carbon dioxide levels were low. If there are very few stomata on the leaf's surface compared to today, it tells us the carbon dioxide levels were much higher than they are today. So this fossil is from East Greenland and today, if anyone has been to East Greenland, it's a harsh, cold landscape. There are no trees because it is simply too cold. And 200 million years ago, we know from studying the fossils, it was

lush, subtropical forest. By studying the number of stomata on these fossil leaves, we also know that the concentration of carbon dioxide in the atmosphere was much, much higher.

Narrator: So if we had higher concentrations of CO₂ than we have today, what's the problem for us?

Dr. Jennifer McElwain: It's a really good question. The big difference between anytime in Earth history and today is the pace of change of carbon dioxide. The pace of change in carbon dioxide over the last hundred years has exceeded any natural event over the last 500 million years.

Narrator: What Jennifer explained is how millions of years of accumulated leaves and plant matter, like the ones she has been studying in her laboratory, drew down CO₂ from the atmosphere as part of nature's carbon cycle decayed to become pure pockets of concentrated fossilized carbon stored onto the earth's crust. These formed over millions of years to become what we now know as gas, coal and oil.

Dr. Jennifer McElwain: Now it takes millions of years to do that, but man is releasing that carbon within a hundred years. By burning all fossil fuels, we are releasing carbon back into the atmosphere in a really short time. Today the CO₂ concentration is higher than any other time in the last 16 million years and we know this from evidence from fossil stomata, and at least four other different proxy methods. So what man is actually doing is imbalancing the natural carbon cycle, the natural climate system. And if you cause an imbalance to the climate system there are going to be consequences, significant consequences, in our very near future.

Narrator: So before the industrial revolution, what were the CO₂ concentrations in the atmosphere like, and what are they like now?

Prof. Stephen Lynch: Well for about a 1000 years, CO₂ concentration was about 280 parts per million. But over the last 100 years or so, it has risen steadily, and now it is about 380, 390 parts per million, and it's steadily increasing.

Narrator: Following the line of CO₂ on our current trajectory, it continues upwards on its rising path into the future. It's clear when we look back over the last 2000 years, the dramatic impact we've been having. Professor James Hansen, head of NASA Goddard Institute of Space Studies, was the first climate scientist to bring this issue to worldwide public attention. He first addressed U.S. Congress in 1988, warning that atmospheric CO₂ as a result of burning fossil fuels was causing global warming.

Prof. James Hansen: Over a million years, you can get a 100 PPM change in CO₂. But humans are now changing CO₂ by 2 PPM per year, so we are 10,000 times more powerful than the natural geologic changes in atmospheric composition. So sure, there can be much larger changes in climate naturally, but on long time scales. We are now determining the changes that will occur this century and for the next centuries as far as we can see.

Narrator: So bringing together the research in these diverse fields of climate science, what are the conclusions scientists have reached as to the cause of the increase in the global mean temperature over the last 100 years?

Prof. John Sweeney: Well the cause, of course to some extent, there is a slight contribution we believe from natural processes, from things like changes in solar activity, changes in ocean currents, for example. But overwhelmingly, the cause in recent decades has been human induced causes that we have changed the composition of the atmosphere in terms of carbon dioxide. And the trend in carbon dioxide concentrations has matched very closely the trend in global temperature. So most climatologists believe that, in particular over the past 50 years, the warming we have seen globally has been primarily driven by human action, primarily driven by those changes in atmospheric composition.

Narrator: So how is all of this scientific research brought together on an international level? Professor Jean-Pascal van Ypersele is the vice chairman of the Intergovernmental Panel on Climate Change, established by the UN as the leading body for the assessment of climate change.

Prof. Jean-Pascal van Ypersele: The IPCC was created in 1988 to sort out the information about climate change, because there were controversies at the time already. Thousands of scientists working together in assessing the quality of the scientific information published in the scientific literature.

Narrator: So can you tell us about the assessment reports that the IPCC have carried out?

Prof. Jean-Pascal van Ypersele: The first one was published in 1990. Each report is written by approximately 500 scientists from all over the world, specialists in their disciplines. But the work is also reviewed by thousands of other scientists. Every sentence that's written in an IPCC report has been reviewed several times by the international scientific community. If you read the 10,000 pages -- more than 10,000 pages -- you will get a very clear picture that the climate is warming, warming is now considered unequivocal at the human time scale. Second, that it's mostly due to the human greenhouse gases, and the emissions due to fossil fuels and deforestation. Three, that the impacts both for ecosystems and for human activities could be quite severe, if we continue on a business as usual trajectory.

News Montage: What we are facing now is a crisis that is by far the most serious we have ever faced. / The science is flawed, and the question is, is the cure worst than the disease? / ...What about that? People who talk about the cosmic rays, for instance. The chilling stars, that book which came out last week. You know, should that not be looked at seriously? / The suggestion here is that each of these things hasn't been looked at seriously. I suggest you need to look at the Intergovernmental Panel on Climate Change review.

Man: The jury is still a little bit out with me. I know we are doing something, I know we are making it worse, but it might be happening anyway.

Man: I think it is a lot of baloney. I think Al Gore is pulling the wool over everybody's eyes, and I can say that because I'm from America.

Man: Some people tell us the polar ice caps are melting, we are all gonna be underwater. I wonder.

Text on Screen: "A Vanguard of Sudden Death and Total destruction! You'll watch the world tremble in the horror-grip of..."

Voiceover from early era horror films: A metallic vampire stalking the earth, its purpose...

Prof. Justin Lewis: If you are used to reading stories in your newspaper every week that say, 'it is the end of civilization as we know it,' because of swine flu, Peter falls in the neighborhood -- whatever it is -- you start to get risk fatigue I suppose, don't you? You can't live your life in a state of constant terror and fear, there are all these threats. It's difficult for us to really understand what's a risk and what isn't because we get coverage that is alarmist about a whole range of issues. So when something is genuinely alarming, how are we to understand that?

Narrator: If we are continually exposed to this risk fatigue, combined with the increasing controversy around the science, it may feel like the wise thing to do is to sit on the fence over the issue of climate change and wait for it all to blow over.

Mary Robinson: Very often when we talk about climate change you see pictures of the melting of the ice, or polar bears, etc. But actually, it's people who are suffering far more than we had appreciated.

John Gibbons: As a young journalist, I was brought up really in a system where we were taught that what was important was politics and the economy. It is really subsequently that I got to figure out that politics and the economy are a subset of the environment. And without a functioning environment we can't have an economy. I think people in November 2009 in Ireland came to realize maybe, maybe for the first time in many cases, what happens when your environment ceases to function.

Mary Robinson: I'm not sounding alarmist for the sake of it. I have been following the science as much as I can, because deep in my heart I think I'm more a grandmother than anything else. I feel really concerned about what the world will be like in 2050 for everybody's children and grandchildren in our world today.

Text on Screen: End of Part 1

Part 2

Text on Screen: Part 2

Text on Screen: [headline] “Global warming case unwinding as leaks and lobbyists expose hot air.”

News Montage: A climate scientist has admitted that emails retrieved from his inbox, which questioned many accepted truths on global warming, were actually genuine...

Narrator: In the wake of mounting controversy around climate science in the past year, I spoke with professor Justin Lewis, editor of a new book called *Climate Change and the Media*.

Prof. Justin Lewis: I was very interested in how the media covered the issue generally, but I suppose, became increasingly concerned because it seemed to me there was a huge lag between what climate scientists thought and between what the public thought.

News Montage: The head of the United Nations Climate Change Panel admits errors were made in a 2007 report. It said that Himalayan glaciers would disappear by 2035, while it turns out the scientist based his prediction on one single media interview.

Interviewer: So what about the issue of the Himalayas?

Prof. Justin Lewis: Well it's a fascinating one. Here was a 3,000 page report and on one page there was a reference to a piece of research that most climate scientists in fact would say was out of sync with the rest of the research. You know, that's 3,000 pages of evidence. One page, something is a bit out of sync with the rest.

Narrator: In the midst of the media storm, the IPCC issued a public apology. But after it's all blown over, how do they view it now?

Prof Jean-Pascal van Ypersele: It is a mistake. It's regrettable the elaborated review process didn't catch that single mistake. But in reality, it was taken totally out of proportion to the real importance of the mistake made.

Mark Rutledge: The doubts over some aspects of science, whether it's a fact of how quickly Himalayan glaciers will melt, and maybe other issues, has allowed an emergence of this new denial: 'It's all a big plot. It's all a way of getting money out of people through carbon taxes, etc. It's a new religion.' And they, I think, have assumed the most vociferous aside in this whole debate and completely irrational -- to even some of the, what I would call real scientific skeptics, they have spun it off in a completely different direction.

News Montage: Packers have tried to prove global warming research is a mess up of figures. / Among some of the emails that were hacked and posted, some of them don't

necessarily support the consensus view that global warming is real. Would you agree? / No, I don't. I think it's portrayed...

Prof. Justin Lewis: Scientists are on the hull. They're used to being left alone. They go, they do their work, they produce their data. But climate scientists now have found themselves in the eye of something of a storm. So here is a group of scientists going about their business who found themselves constantly harassed, with freedom of information requests, by a group of people they increasingly did not trust.

Text on Screen: [Headline] "Hackers obtain e-mails sent by climate change scientists."

New Montage: I don't want to pick on Kevin Trenberth in particular, I think he's not one of the sort-of main gang leaders here, but he is part of a gang...

Interviewer: Was the timing of the hacking important?

Prof. Justin Lewis: It was very important on the eve of a huge summit in Copenhagen. So to be able to throw a spanner in the works before those discussions to perhaps reduce the urgency of those discussions, or at least the way they are covered, was enormously significant.

News Montage: Attempts to broker a new deal on climate change appear to be in difficulty. Talks in Copenhagen had to be suspended today... / ...safe to say that the theory supporting global warming has taken a significant blow.

Prof. Justin Lewis: Now, of course, a huge amount of controversy around it. We've had a public inquiry into it, a government inquiry into it. The government inquiry found no wrong doing on the part of the scientists at all: they did not mislead at any point. So this huge controversy -- most people will know that there was this problem -- I would be very interested to know how many people know its been resolved very much in the scientists' favor. I suspect not many, because that's the story that has not been told as much.

Woman: I used to believe in it, but it has gotten very strange at present because of all of the controversy.

Man: Climate change. I'm still not sure what to believe because I keep hearing so many contradicting ideas about it.

Man: You get one argument that will say that we are doing damage to the environment. Then you come along and they want you to know the problem that completely dismisses every argument that has ever been given.

Prof. Justin Lewis: When journalists are pushed, they've got two ethical cornerstones to the way they'll behave. One is to be balanced in their coverage and the other is to be objective in their coverage. Now the trouble is, when it comes to climate change, if you are objective you probably say, "Well actually, the huge weight of scientific evidence says that

it's happening and we are causing it so that's what we should cover." But if you're balanced, you'd say, "Well, there is a lot of people saying it's not happening, so we need to give space to them."

News Montage: But it's also the sun, it's also cosmic rays. / Let me just tell you where I've heard a load of dangerous rubbish from that and frankly, and it's not often that as a scientist I'm prepared to say something like that...

Prof. Justin Lewis: I think it's a problem actually having a debate about this issue. I think we should be past debating it. The very fact that you are having the debate, I think, legitimizes a view in scientific terms that is now almost completely discredited.

Interviewer: John, as a scientist, how do you feel about all these deniers and skeptics discrediting climate change?

Prof. John Sweeney: Scientists welcome skepticism and they welcome alternative viewpoints. This is, after all, how science proceeds and how science develops new ideas and new processes and new ways of looking at things, but I think over the past couple of years in particular we've seen quite a concerted effort to try and undermine the basic science and the well-established science surrounding climate change.

Mary Robinson: Being based in New York, I saw a lot of denial of the science over the six years and then I saw less and less denial and then I noted, as others did, that the denial was coming from those who were being paid by the coal companies and oil companies for their research.

Prof. Frank Convery: Typically when you trace back who is spreading that kind of stuff, it usually comes from interests who have a strong commercial profit interest in the fossil fuel industry, and that includes countries as well as companies.

Prof. Justin Lewis: If you think of what the message of climate change is saying, it's essentially a challenge to our whole consumerist lifestyle. There are very big business interests in trying not to make a fuss about climate change. Nine of the thirteen biggest corporations on the planet are either in oil or the car business.

John Gibbons: The scientific consensus now that climate change is primarily driven by human actions is as powerful and as compelling as the science that links smoking and lung cancer.

Mark Rutledge: We've seen this in bigger scientific issues. In the seventies, when the body of evidence that smoking was injurious to human health was coming through, there was a very concerted campaign by respected scientists in the U.S. and all they had to do was cast some doubt on the findings. And what that served to do was put back the whole public health issue in smoking, and put it back years.

T.V. Commercial: Doctors in all parts of the country were asked, "What cigarette do you smoke, Doctor?" Once again, the brand named most was Camel. Yes, according to this repeated, nation-wide survey more doctors smoke Camels than any other cigarette.

Interviewer: So where is public opinion now in Britain and in Ireland?

Prof. Justin Lewis: Well, public opinion is extraordinary. If you talk to climate scientists, 99% of them think that this is happening -- well, more than 99% actually -- think this is happening as the result of human activity, and it's very serious and we need to do something about it fairly urgently. And yet when the British public were asked in a BBC poll what they thought, only 26% actually thought that climate change was happening as a result of human activity. That's an extraordinary gap between what the public are thinking and what the scientists are thinking.

Narrator: What's of all the distracting noise in the media around climate change? What are the real challenges that climate scientists are facing looking forward into the future?

Prof. Jean-Pascal van Ypersele: Indeed, we cannot predict the future climate. We can only do projections because the future of the climate depends on which emission trajectory and emission values we will decide to have as a community.

Prof. John Sweeney: While the trajectory we seem to be on at the moment, based on the current data on global greenhouse gas emissions, suggests that the 3½ degree rise in temperature anticipated by the IPPCC by the end of the century may be overly optimistic.

Prof. James Hansen: Now that we look at the Earth's history more carefully and have better data on how the Earth responded to changes in global temperature and atmospheric composition in the past. And, as we see how the Earth is responding to the present amount -- 387 parts per million of CO₂ -- we see that we have actually already passed into the dangerous range of atmospheric CO₂.

Interviewer: So what does this mean, John, for all of us on the planet, if James Hansen is right?

Prof. John Sweeney: Well if James Hansen's projections are right, we could be looking at temperature increases between 4 and 6 degrees by the end of the century. One hopes that Professor Hansen's projections are a little on the high side because if they do turn out to be correct, then the consequences would be very serious indeed for us.

Mary Robinson: The vast majority of scientists are agreed in the UN FCCC process. It's actually a consensus that is at a lower level of seeing the threat than many scientists would say, but they got consensus on that very conservative notion of how much at risk we are. Many scientists would say the tipping points are coming sooner, the risk is greater.

Interviewer: So what is meant by "the tipping point"?

Prof. John Sweeney: In the climate system, at what is meant by a tipping point, is that when we reach a certain threshold of temperature there may be changes which are almost irrecoverable, which might occur.

Prof. Peter Lynch: The climate system has many feedbacks where changes can actually have the effect of accelerating their own growth and if one of these positive feedback events takes off, then it may actually lead to a significant regime change for the entire climate, and something that we find very difficult to anticipate could happen.

Prof. James Hansen: We see a tipping point now in the Arctic where the sea ice has, at the end of the summer, is only about half of what it was a few decades ago. And even without any additional greenhouse gases, we will probably lose that sea ice over the next few decades. What we don't want to happen is to pass tipping points where irreversible things happen like disintegration of ice sheets because it takes thousands of years to build an ice sheet, or extermination of species, of animal and plant species. Once they're gone, we've got a much more desolate planet.

Text on Screen: Arctic Ice in Retreat

Interviewer: With business as usual, if we continue as we're going, what will it be like at the end of the century?

Prof. Jean-Pascal van Ypersele: Where, for example, in Europe heat waves such as the one we saw in 2003, which killed 50,000 people in Europe in a few weeks, would happen one out of two summers on the average.

Man: To be honest, I don't think about it that much. I suppose the fact that it doesn't affect me directly now probably doesn't make me think about it that much.

Man: It will be a long time before it happens. It's starting to change now, but I think it will take a long time.

Man: I'm not so sure how immediate it's all going to be, you know? I read a lot into it, but I am not so sure about how quick it's going to happen.

Narrator: We hear about the implications of climate change: melting ice caps and sea level rise. But until we feel those effects in our daily lives, the consequences are difficult to comprehend. So what are some scientists saying about the predictions for Ireland?

Dr. Kieran Hickey: If you think about most of our major towns and cities like Cork, like Dublin, like Limerick, Galway -- they're all under coastline. They've all experienced a number of flood events over the last ten to twelve years or so, and this problem is only going to get worse as time goes on and as the sea level carries on rising.

Prof. Peter Lynch: There is some evidence that the extreme events, extreme weather events, will increase in frequency in the future due to the warming climate. This is much

more uncertain than the temperature and precipitation patterns, but it's something we have to be aware of.

Dr. Kieran Hickey: Well, Ireland is going to be a much more hostile place in the sense that we are going to have nastier storms, we're going to have changes in temperature of a very significant nature, so droughts in summertime, maybe more flood events in winter-time, and more natural disasters in terms of weather generated disasters. So it's definitely going to be a much more hostile place, something we are not really very much used to or prepared for.

Narrator: If those are some of the implications of climate change for Ireland, what about other parts of the world?

Mary Robinson: The implications are enormous, partly because also there is going to be the population increase. So between now and 2050, we're expecting at least 2.6 billion more people, going up close to 9 billion. The prediction is that by 2050, we could have 250 million climate refugees and they will move to Europe and I don't know how we would possibly stop them.

Ban Ki-moon: Morning, how are you?

Interviewer: How are you, Mr. Ki-moon?

Ban Ki-moon: This is the top-most important priority issue, not only for the United Nations, but for the whole international community and even for humanity.

Man: They're saying that it's going to happen, so if it happens, it happens. There is nothing really we can do about it, is there?

Woman: Like a lot of things, unfortunately, today there is more lip service than action and it's such a pity because it could be too late.

Man: Even if you didn't believe it was necessarily happening, the risks are so catastrophic that it's really not something we can afford to take a chance on.

News Montage: It's been described as an opportunity the world cannot afford to miss. Delegates from 192 countries are in Copenhagen, hoping to hammer out a landmark agreement on climate change. / Talks will be tense with deadlock on agreement between poorer and richer nations. The Whitehouse says U.S. President Barack Obama will attend and is still confident a deal can be done.

Prof. Jean-Pascal van Ypersele: Now, indeed, Copenhagen didn't solve all the problems. But still, they agreed to put a number, in terms of objective of target: two degrees. The IPCC, in its last report, says very clearly that to stay in the vicinity of two degrees, that before the end of the century, global emissions would actually need to be reduced to zero.

Narrator: Jean-Pascal explained that the need for action in cutting emissions is even more urgent if we consider the growing population and energy needs of the developing world.

Mary Robison: The poorest countries must be able to develop, which means they must be able to have the transfer of green technologies rapidly because they are going to develop anyway and if China continues on its carbon path at the moment and India does, and other countries that are emerging do, then we will have no safe world by 2050. We will have a world where it will be catastrophic -- the problems.

John Gibbons: We've created an economic model through globalization that says the only way of measuring success in business is through the bottom-line. That has driven a voracious economic model that doesn't take into account sustainability, doesn't take into account the need of future generations and is concentrated on short-termism. And Ireland, for example, our economy has been wrecked by short-termism and profit taking.

David McWilliams: We're in the universal acceptance stage now with the banks. Everyone says, "Oh, we all knew it was a bubble." Well, we didn't, right? Think about the environment in the same way. At the moment we are in the ridicule phase. People say, "Mmm, I saw David McWilliams talking about the environment... he doesn't really know what he's talking about." Or, "That's not really our concern." The next phase will be the violent opposition phase, where those who are threatened by new ideas, on the environment for example, will come out and ridicule you and oppose you.

Declan Murphy: The risk of course is that, while we procrastinate and debate the issue, that the planet itself will respond in its own way.

Mary Robison: We may feel that, because we're in a part of the world that won't immediately feel those effects, that we'll be all right. But we won't.

Man: There just doesn't seem to be the realization of the importance of the effects of climate change and what it will do going forward.

Man: How can you predict instability? I mean, we're already seeing it with the freeze this winter.

Man: I don't think there is anything we can do about it. I think if we think we can, it's possibly too late.

Interviewer: Many people in Ireland think, "We're a small country, we really don't matter. Why make a big fuss about us, when this is a big global issue regarding climate change?"

Dr. Mary Kelly: Well, if every country took that attitude, nobody would ever move. This is the dilemma that everybody is in, in terms of climate change. Nobody wants to move first. Everybody is saying, "Well, we are only a small part of it," and that's because it is a global issue.

Narrator: In international discussions around climate change the main buzzwords are “adaptation” and “mitigation.” But what do these terms mean?

Prof. Jean-Pascal van Ypersele: Well, “adaptation” is the taking into account that some changes are unfortunately inevitable, but we can only adapt in some sectors and only up to a point. Overall, it would be less costly to prevent than just to wait for the impact to happen.

News Montage: Stern Review in the U.K. said it's up to twenty times cheaper to prevent climate change happening or running out of control, than it is to try and clean up the mess afterwards. You can ask anyone in New Orleans...

Prof. Jean-Pascal van Ypersele: “Mitigation” is the term that covers the whole range of measures to reduce emission of greenhouse gases.

Narrator: Frank, what are the challenges facing us in Ireland to reduce our greenhouse gas emissions?

Prof. Frank Convery: Well, we have a legal challenge, first of all, in that we have a legally binding obligation from the European Union to reduce our emissions by twenty percent and that doesn't sound too much, but it's quite dramatic actually in terms of the trajectory we've been on.

Narrator: Ireland has the highest greenhouse gas emissions, per capita, in Europe. And with emissions coming from so many different sources, what will a low-carbon future be like for Ireland?

Prof. Frank Convery: Well, the changes that we'll see will be, first of all, in how we use energy and looking forward, say twenty years from now, almost everybody in Ireland should be living in a house that's almost zero energy use and zero carbon emissions. Where we're driving, we'll be driving very super-efficient cars that use very little energy and emit very little carbon. And businesses generally will have adopted, essentially, a very energy efficient, low-carbon philosophy and practice.

Narrator: It's no wonder there is so much contention around the issue of climate change since it ties into every aspect of our existence. But with the introduction of the climate change bill here in Ireland this year, one way or another, climate change will become more real for us all.

Dr. Mary Kelly: In Ireland, as in other countries, what we have to do is break our dependence on fossil fuel.

David McWilliams: The economics is based on the on-going assumption that you can continue to plunder the Earth's resources, to fuse that stuff together to create energy to make the economy grow. But if you're convinced of the argument that the Earth's resources are finite, then that turns the entire assumption of basic economics on its head.

Declan Murphy: Energy is the underlying currency of our society. It's not the Euro. If you take away energy, everything stops.

Prof. Frank Convery: If you're producing renewable energy, if you're producing technology for improving energy efficiency and so on, we can essentially create a green enterprise out of the need to cut back.

David McWilliams: People forget that the idea 70 years ago that you would build a road and on that road, you would build petrol pumps and you would put huge tanks in the ground and fill them full of petrol -- people would have thought you are crazy and yet that's what happened. That's exactly the same thing here.

Prof. Frank Convery: The other huge reason for taking it seriously, of course, is that it's not just changing the environment, but it's changing the economic structure of the world.

Declan Murphy: And guess what? By changing this country to deal with climate change, we're actually reinventing the country, we're actually adding jobs, we're adding huge investment into our infrastructure, into our energy capacity and we're creating huge wealth.

Woman: Basically, it can be fixed, as far as I know if we just change our lifestyle.

Man: I think it's safer to plan to do something about it and be wrong, than do nothing and let the world just implode.

Man: I would be concerned about it sooner in relation for my grandchildren and what have you. I would like to leave the place much the same way as I found it, seeing as plenty of other generations have done it before.

Mary Robinson: Ireland has everything to gain from being part of this discussion. It's time to change our whole mindset about how we will live and how our children and grandchildren will live in the years to come. It's also, for Ireland, an opportunity to renew ourselves and that's why I believe there is great potential in this and great hope.

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