OFFICE OF THE PRIME MINISTER'S CHIEF SCIENCE ADVISOR

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Analysing linkages between science and politics

I want to thank the Foundation for providing a forum to bring practitioners of science advice and academics in STS together. My own role is somewhat unusual as I think I am the only speaker who has a formal role on both of the two quite distinct dimensions of this – enhancing the use of evidence in policy as a whole and the more traditional issue of policy development for the science system.

There have been dramatic changes in science in recent decades and these changes have implications in considering the nexus between science, policy and politics.

Until recently, science and especially technology largely addressed apparently linear questions but in the last decades, fuelled by the shift to multi-disciplinarity, increased computational power, and the explosion of biological, environmental, and social sciences, science has increasingly focused on complex, nested and nonlinear systems. Thus much science is now not about seeking precision but about understanding probabilities.

Inevitably, it is the questions that are the most complex for which the public has high expectations of solutions from their elected governments. Indeed, to use the terminology of 'post-normal science', while the issues are urgent and science has added considerable knowledge, it has also highlighted many unknowns and uncertainties. In such science, there will inevitably be an inferential gap between the science and conclusions drawn. There is almost always a high values component and high public and political interest in these issues that lie at the science-policy interface.

There is an inherent tension between the world of science, that claims relative objectivity and, at least in its processes, to be as values free as possible, and the values-laden policy and political worlds. But it is the latter that is ultimately charged with integrating scientific 'evidence' with many values-based inputs into policy

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development. These include public opinion, social license, the electoral contract and ideologies, fiscal priorities, and so forth.

And so we have the challenge that is the focus of this meeting: We need to be generating quality science to help address those post-normal questions. And we need to be mobilising that knowledge – brokering it through policy development – to our social, environmental and economic advantage. It sounds straight forward, but in reality, both elements of that challenge are anything but. And there is a complex interplay between these two somewhat distinctive elements: science advice for public policy and policy advice for enhancing the science system.

We all appreciate that science and technology are at the heart of most of society's most pressing problems – as potential solutions, but also sometimes as a cause. In all of these, the potential contribution of many sciences, including the social sciences, is unequivocal, but just as important will be the role of social license for determining the use of new technologies and the application of new knowledge.

While science is a set of relatively formal processes that is ultimately the only way we have to develop relatively reliable information about ourselves and our world, social license is the product of the processes of public reason that vary across nations: these processes are changing rapidly with the emergence of the Twitter and the blogosphere. The perception of risk and trade-offs differ markedly between science and the processes of public reason; yet both must be integrated into the policy making.

There are many examples but I will simply give two from opposite ends of the political spectrum. Firstly, consider the continued framing of the GM food controversy as a scientific issue of food safety when the underlying debates are essentially philosophical about perceptions of what is natural or unnatural or they are ideological, reflecting conflicting views on the role of multinational organizations. Both may be valid societal debates but they are not scientific. A second example is the exploitation of scientific complexity in climate change modelling to obfuscate what is essentially a values debate about intergenerational economic equity: this could well create a tragedy of the global commons. In my view the core issue in both has been the inability to separate what is science from what are values–based issues. The former is the role of the scientific system; the latter is the domain of the politician. The inability of the societal debate to separate the two demonstrates the extent of complexity at the crossroads for science and politics.

The integration of scientific evidence into policy, and indeed politics, can be corrupted by advocacy manifesting as science or scientists not distinguishing between knowledge brokerage and values-based advocacy. Equally there can be

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hubris on the part of the politician or the policy maker who assumes that science can be ignored, over-simplified, or that it is not to be trusted because it might conflict with ideological policy positions. Hence the emergence of the knowledge-broker who must first distinguish between these two domains, and then bridge them.

The advisory requirements for evidence-informed policy development and for developing policy for science are themselves distinct. However, these are often within the remit of the same science advisor or advisory committee.

If science is to constructively influence public policy formation there are a number of base conditions that need to be met.

First is to understand that science is more likely to be respected by policy makers when its limits and positioning within the policy processes is understood. This means accepting that science alone does not make policy, all it can do is inform policy and it should do so iteratively throughout the policy process. It is how that is done that is at the core of a national science advisory system.

Second, that we are having this discussion at all suggests that science has some privilege in the policy process. This arises because science has a set of recognised processes that distinguishes it from other sources of knowledge such as those that may be based on tradition, belief, dogma or anecdote. So this is what gives science a privileged claim to knowledge, but its privileged place in policy development is based ultimately on trust, and that trust depends on the way science is conducted, provided and explained. This privileged place is fragile and depends on not overstating what is known and on acknowledging the limits of science.

It is this concept of trust that is the third condition of effective science advising. The science advisor, be it an individual or a committee, must sustain the trust of multiple stakeholders - the government, the policy maker, the media and public and the scientific community. The latter can be the most difficult particularly if they assume that the primary role of the science advisor is to lobby on their behalf.

As an over- simplification, maintaining trust also implies a separation and independence from the political process if the role is to stay focused on knowledge brokerage. Once it crosses extensively into the values and political space, trust is easily lost. An effective science advisor cannot be the expert on everything – indeed that is not their role. Rather they must know how to reach out to the science community for relevant expertise and importantly they must also be able to reach into the policy space to ensure receptivity. Thus a direct link to the office of the chief executive becomes invaluable, and this is my fourth base condition: effective access to the executive, but relative independence from it.

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NZ is somewhat unusual in the way it has constructed the role of CSA, a position that is only 5 years old. While I directly report to the Prime Minister, my constitutional and academic independence is protected by setting up my appointment as a committee (albeit of one member) rather than as a civil servant or member of the Prime Minister's staff. But there remain implied limits on how one acts because of the need to maintain trust and hence the need for other forms of input such as national academies and think tanks.

Let me now turn to the question of models for science advice, particularly for enhancing the use of robust evidence in policy development. There is no single approach and the model chosen by a given jurisdiction depends greatly on context including: the shape and maturity of the science system itself; the political structures; the processes of public reason; and ultimately, the general level of science capital - that is how the society as a whole perceives the importance and role of science.

The effectiveness of any model depends on the principles we discussed earlier and, in particular, on giving confidence to the policy maker that science advice is focused on what is known and not known and the options that thus arise; and does not usurp decisions over values dimensions and the ensuing trade-offs which are properly the domain of the policy maker and the politician. There may be no way to stop politicians cherry picking science, but we need to stop that happening during policy creation, or science being used as a proxy for other debates. Honest brokers within a robust science advisory model can try and bring the discussion back to a more constructive one.

Because evidence is increasingly accepted as key to effective policy making across all domains of government, particularly in the most complex and contentious issues that cross portfolios, governments need their most senior scientific voice to have ready access to the chief executive. Policies, processes and protocols need to exist across government to ensure the identification and use of robust evidence, which the science advisory system should develop and monitor. In Britain this has now extended into a system that includes both a chief CSA but also departmental CSAs who have many analogous responsibilities. In NZ we have moved in the same direction following a review I conducted of departmental attitudes to science in the policy process – a review with some very mixed findings. As a result, we have appointed or are appointing several departmental science advisors to assist the policy process within departments and the network which I chair, will as it develops, become an important resource for breaking down departmental silos.

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An increasing number of countries have CSAs and Europe is joining this trend, others have formal advisory panels (although these tend to focus on policy advice for the science system) and yet others turn to their national academies. All have a potential role and they are not mutually exclusive. But particularly in terms of science advice for public policy formation my bias is towards an individual CSA. Committees can have their own dynamics and may not have the level of access to deal with emergent and acute issues. The role is tough and requires simultaneously sustaining trust of the government executive, the policy community, the science community and the public. Certainly the role of a science advisor is made easier if it is hand in hand with a strong scientific academy to assist or address issues of a chronic nature with authority.

Until now, I have been addressing the issue of science for public policy. But let me now say something about policy for enhancing science and innovation, which has been the usual focus of discussion. In general most countries have fairly established policy processes and levers for their science systems and these are largely driven through ministries of industry, or science and innovation or higher education (as the case may be) supported by a variety of inputs.

But the nature and role of public science is evolving and science-funding systems need to evolve. Issues that are emerging include the potential breakdown of the classic peer review system, unanticipated consequences of the move to open publication, and the move to more private sector engagement with public science. Thus broader inputs are needed and different countries have adopted different structures to do that – often with the use of high-level panels that may or may not involve the tertiary education sector and the private sector. The science system is NOT just like any other program administered by government; deep expert policy advice from active scientists on how science works is essential.

I think similar principles, as I described earlier, still apply. But here the science advisor or panel is effectively advocating for what science can do to advance national interests. Thus the advisor is facing a delicate path of advising on the development of the science system, which does need specialist and expert input, while facing sceptical policy makers who may see the arguments as nothing more than lobbying. The key in my mind is to understand the inevitability of this perception and thus ensure the focus is on the many ways science impacts on national objectives.

I say this because another important shift that is occurring is that publically funded science is now considered in a much more utilitarian way than in the past. Once, public science was expected to generate new knowledge largely in isolation from the processes that might mobilise apply that knowledge. This is no longer the case. The contemporary turn of public science toward “relevant research with impact” has

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many implications, and these are especially intense in small science systems like my own (but also seen in the Horizon 2020 programme). For instance, there is greater prioritisation happening and in turn this has implications for structuring science systems to protect some of the core needs.

This shift in turn reflects a changing compact between science and society. Increasingly there is a critical role for the multiple actors within a society to help shape what a science system does and what purposes it can serve. There is now a broad recognition of the need for the science system to better justify itself and to demonstrate impact beyond the academic and incorrect meaning of the word.

This shift is already creating tensions. However, the utilitarian argument is not, as many perceive it, an argument between basic and applied research. Rather it is about ensuring that the ultimate funders understand the purpose of their investments across the whole ecosystem. And this must include both discovery science, which ultimately drives innovation, and mission-led science, which is designed to answer fairly specific questions for end-users.

For their part, active scientists wishing to have impact on society through their science must tell their stories better. But in doing so I would hope they would better appreciate that credibility is at risk if their claims to special expertise are used to extrapolate beyond their science -- unless their role as interested lobbyists rather than as knowledge brokers is made clear. Otherwise trust in the entire scientific endeavour may be undermined.

Scientists in publically recognised roles such as my own are in a more difficult position: We must distinguish between knowledge brokerage and advocacy but in the performance of that role, we necessarily must advocate and show how science can indeed enhance the processes of policy formation and how enhancing science can advance a nation. This is indeed a delicate position. Society's knowledge needs are too great, and there is too much at stake to get it wrong.

I look forward to the discussion over the next two days as I see this as part of a growing global dialogue. Indeed, in August this year in Auckland there will be the first global meeting on the issue of high level science advice to governments. Over 40 countries will be represented and the meeting is open to academics and practitioners alike. Details are at www.globalscienceadvice.org. Thank you.

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