

Climate change dilemma: technology, social change or both? An examination of long-term transport policy choices in the United States

Sudhir Chella Rajan*

Energy Group, Tellus Institute, 11 Arlington Street, Boston, MA 02116, USA

Available online 12 August 2004

Abstract

Time is fast running out for formulating a viable global climate policy regime even as it seems obvious that the major initiative will have to come from the United States, which currently appears indisposed to take any meaningful action at all. This paper reviews the prospects for emissions reductions in the US passenger transport sector and the technical, economic, social, and political barriers to developing policies that focus solely on technology or pricing. Using scenarios it shows that, in order to meet stringent emissions targets over the coming half-century, technology and pricing policies may have to be supplemented by strategies to change life-styles and land uses in ways that effectively reduce car dependence. In the medium to long term, bold initiatives that treat vehicle users as citizens capable of shifting their interests and behaviour could form kernels of social change that in turn provide opportunities for removing many of the social and political constraints.

© 2004 Elsevier Ltd. All rights reserved.

Keywords: Climate policy; Social change; Transport scenarios

1. Introduction

Since defecting from the Kyoto Protocol in 2001, the United States administration seems unwilling as well as politically unable to adopt genuine commitments to reduce greenhouse gas (GHG) emissions. In spite of several promising initiatives at local and state levels¹, it

appears obvious that a significant US climate policy agenda will not surface unless major changes start to occur within the domestic American political and cultural landscape. Indeed, the best way to interpret US recalcitrance on climate policy is that it is a product of several overlapping factors that go well beyond the disposition of the present Bush administration: an aggressive anti-mitigation lobby composed mainly of producers and marketers of energy-intensive goods and services (McFarland, 1984); a dominant social paradigm that places faith on material abundance, technology solutions and future prosperity (Dunlap and Liere, 1984); a relatively weak and divided polity whose policies are buffeted by short-term priorities (Skocpol,

*Tel.: +1-617-266-5400; fax: +1-617-266-8303.

E-mail address: crajan@tellus.org (S.C. Rajan).

¹Rather than proceed on a moderate path of climate stabilization as required by the Kyoto Protocol, which the US largely designed and signed but did not ratify, the Bush Administration formally rejected it in 2001. Somewhat more promisingly, in the absence of federal action, several states have stepped forward with programs of their own to reduce GHG emissions. In 2002, California signed the country's first law for reducing car and truck emissions of GHG, while Massachusetts and New Hampshire acted to curb such emissions from power plants. Governors from North-Eastern states have pledged to reduce GHG emissions by about 20% by 2020. Texas has promoted a renewable energy portfolio standard for electricity purchase and several Western and Mid-Western states are investigating carbon

(footnote continued)

sequestration. Nonetheless, these measures appear to be already too fragmented, too little and perhaps too late to bring total US emissions anywhere close to the stabilization path that was envisioned for the end of the first commitment period (2008–2012) in Kyoto (Bailie et al., 2001).

Table 1

Historical and projected sectoral emissions of carbon dioxide in the US (Source: Energy Information Administration; projections from AEO, 2003)

	Residential	Commercial	Industrial	Transport		All Sectors (MtC)
				Passenger	Freight	
1980	248	178	484	265	113	1288
1990	257	213	458	311	121	1360
2002	324	275	455	370	137	1561
2025	420	428	586	573	212	2219
1980–2002 growth	1.2%	2.0%	–0.3%		1.5%	0.9%
1990–2002 growth	1.9%	2.2%	0.0%		1.5%	1.2%
2002–2025 projections	1.1%	1.9%	1.1%		1.9%	1.5%

1993); and, perhaps most important, a fragmented electorate that remains largely misinformed about global environmental security, national interests and the economic and social impacts of climate mitigation activities (McCright and Dunlap, 2003). Evidently, a political solution involving an *informed* and *engaged* citizenry is a prerequisite for formulating an aggressive policy framework involving technology research and development, incentives and emissions standards, and mechanisms for implementation. Moreover, a complex and multi-layered set of individual and collective actions indicating commitments from key stakeholder groups needs to occur within a timeframe and at levels commensurate with climate protection goals.

This paper focuses on the passenger transport slice of the problem, which happens to be a significant sector in terms of GHG production (see Table 1). Passenger transport, perhaps more so than any other energy-intensive activity, takes place within a complex matrix of economic, political, social, spatial and technological factors. Extraordinarily deep reductions from transport will be needed over the next half-century or so, and even an ambitious timetable for achieving efficient vehicle technology policy may only be partially successful in meeting these goals. I analyse the panoply of solutions relevant to making major emissions reductions from passenger transport in US and examine the barriers to implementing many technology and pricing options. Based on the finding that attention must also be paid to the drivers of social change that could influence the development of new policies, attitudes, and behaviours, I develop scenarios to show that social change leading to life-style and land-use changes, as well as meaningful technology and pricing policies, will be necessary in order to meet long-term US climate change mitigation goals. Social change, where successful, could redefine prevailing understandings of success, well being and good citizenship, and, in so doing, actually help to overcome some of the political barriers to climate policy.

The paper is organized as follows. Section 2 provides background on the scale of reductions required by 2050

across all sectors. In Section 3, I describe the main drivers of the US transport sector with respect to carbon emissions and current expectations of growth through 2050 without carbon-specific policies. I compare the baseline scenarios against two different technology-based scenarios for transport, both of which come close to, but do not meet, an admittedly steep but important target that I set for 2050. In Section 4, I discuss the extent of the barriers to following the pure technological scenarios portrayed in Section 3 and show that in the absence of serious and early groundwork on these fronts relatively little of significance could be achieved. Section 5 explores land-use and social change research and its implications for alternative scenarios that combine modest life-style and land-use changes with technology. It also describes the types of social and political outreach and technology development that would be necessary to bring about these changes and presents additional scenarios that include the impacts of social change and technology. Section 6 concludes with an assessment of the opportunities and options for a coherent implementation of such activities.

2. Scale of the problem

The Energy Information Administration (EIA) projects that with no new climate policies GHG emissions in the US will rise from about 5.5 tons of carbon equivalent (tC) per capita in 2003 to about 6.6 tons in 2025 (AEO, 2003). Total emissions, in its *Reference* scenario, which also accounts for population increases, are expected to rise by about 40% during this period. In extending the scenario to 2050, total emissions will likely rise more modestly during the latter part of the half-century, given the normal penetration of more energy-efficient devices in buildings, improvements in industrial and vehicle technologies and of renewables and combined heat and power generation for electricity (Bernow et al., 2001). Assuming that the average annual growth in emissions beyond 2025 reduces to half as a result of these factors, and using the middle-series population

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات