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Book review

Sustainable Aviation Futures, L. Budd, S. Griggs, D. Howarth. Emerald Group Publishing, Bingley, UK (2013). £62.95, Hardback, ISBN: 978-1-78190-595-1.

Sustainable Aviation Futures is the fourth volume in the *Transport and Sustainability* series. Set against a backdrop of persistent growth in demand for air travel, threats of peak oil and climate change, *Sustainable Aviation Futures* grapples with two key prospects for the aviation sector – as both economically promising and environmentally ominous. Despite accounting for only 3% of anthropogenic CO_2 emissions in 2012, air transportation is one of the fastest growing sources of CO_2, with 170–480% growth predicted by 2050 under current conditions (Bows-Larkin and Anderson, 2013). Concurrently, as airports in wealthier developed countries increasingly face capacity limitations, a continental shift has taken place over the last fifteen years: from markets in Europe and North America to middle income countries in Asia, South America and Africa – countries whose governments are investing in massive new airport developments to stimulate economic growth. This is paralleled by a shift in wealth from oil-importing to exporting nations, especially in the Middle East, where petrodollars and other government subsidies are able to overcome the extraordinary costs of aviation infrastructure and rising oil prices. Potential economic benefits thus marginalize the many environmental concerns associated with the aviation sector's growth.

Sustainable aviation poses a complex set of interconnected economic, political and social challenges that require a multifaceted solution. This text highlights the intensely political nature of the sustainable aviation debate, outlining the ways in which an increasingly fractured set of actors and stakeholders construct, perceive and thereby act upon a given set of issues. Consequently the key contradiction between development and sustainability is emphasised, where aviation growth and its many environmental impacts are arguably "incompatible if not wholly contradictory with government policies to tackle climate change" (Budd et al., 2013, p.7). Utilizing a 'predict-and-provide' discourse, many governments and stakeholders have naturalized the need for the aviation sector's growth given its perceived economic and social benefits: growth is made paramount, displacing debates about whether development should take place, to issues of where and how it might occur. Meanwhile prospects of an aviation crisis mount. Indeed, for the authors, it is not a question of whether or not a crisis will occur, but how it will be defined and for whom it will be a crisis.

The book is divided into three sections: context, challenges, and prospects for change. Each chapter begins with a concise overview of the purpose, originality, methodology, and/or findings. The context outlines four potential scenarios for the future of the aviation sector (1) an 'aviation apocalypse', where the social stigma associated with air travel will result in reduced public demand; (2) a 'high-modernist' scenario where technological developments will enable sustainable aviation growth; (3) 'market-regulation' where corporations are self-regulated and the role of government is limited to enable growth while reducing or allowing for environmental impacts; or (4) 'demand management' where governments actively reduce the overall demand for air travel. While scenario three is proposed as the most likely, doubts are cast onto the market's ability to produce sustainable growth. Ultimately, growing demand tethered with a predict-and-provide approach will likely translate efficiency-gains into further growth at the expense of the environment. It seems unlikely, therefore, that the cultural shift necessary to achieve climate change mitigation targets – from mass aeromobility to a lowered demand for flights – will take place without co-ordinated policy interventions from co-operative governments.

Though chapters are rich in empirical evidence and illustrative figures, several are rendered illegible due to poor visual formatting (i.e. contrast, colour, and size of depicted data). Nevertheless, the authors succeed in laying out the key challenges within the sustainable aviation debate. 'Crisis' (Ch. 9), 'noise annoyance' (Ch. 7) and, more broadly, 'sustainable aviation', are deconstructed to demonstrate how various actors frame aspects of this complex debate according to divergent aims. This ultimately results in contradictory policies where economic imperatives are not fully reconciled with sustainability objectives. While improvements in aircraft design, fuel, and management systems may incrementally reduce CO_2 outputs, existing policies and stakeholder interests constrain their feasibility and implementation (Ch. 4). Route substitutions with high-speed rail technologies (Ch. 8) have limited application potential despite initial promise as a sustainable alternative. Moreover, opportunistic airlines and airports will likely use efficiencies gained from management, technology, fuel, and design improvements, or from route substitutions with high-speed rail, to facilitate yet more growth and thwart efforts to reach mitigation targets. Within EU policy, the Emissions Trading System (Ch. 5) is the only international policy that addresses aviation-induced CO_2 emissions; however, non-CO_2 impacts are omitted and, since the trading system is open, governments may need to depend more heavily on other sectors to reduce emissions at higher or potentially unfeasible rates. This raises challenging questions regarding the responsibility placed on other sectors to bear the burden of decarbonisation – a burden borne for the sake of an industry that arguably reproduces and intensifies social inequalities (Budd et al., 2013). Existing policies and surging passenger numbers ultimately mean that the cost of a ticket does not adequately reflect the real social and environmental costs of flying.

The volume concludes with two chapters that delve into systemic limitations for change within policy arenas and the failure of public mediation when dealing with issues of airport expansion and noise annoyance. While this reaffirms the political nature of existing divisions within the sustainable aviation debate, a final synthesis that revisits the four future scenarios, with a concise

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outline of conditions needed to move towards greater sustainability, would have been appreciated. Though the title and context chapters explicitly point towards the future of aviation, a summation of possible directions for continued research is lacking, as is a clear position on future policies or possible solutions to key contradictions. Given the multifaceted nature of this debate, a concluding section to bring these complex narratives together and readdress the 'future' is critical. Nevertheless, this multi-disciplinary text brings together important positions, aims and contradictions that shape the aviation debate. Policy-makers, geographers, transit planners and students will find *Sustainable Aviation Futures* an excellent collection of debates highlighting how the complex and fragmented issues surrounding aviation sustainability have evolved, with hints as to where the industry may be headed next.

References

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