

## Dr. Karlson 'Charlie' Hargroves

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Sustainable Development Fellow, *'Entrepreneurship, Commercialisation and Innovation Centre'*, The University of Adelaide

Director, Strategic Transitions Group (Sustainability Transitions Consultant)

Co-Founder, The Natural Edge Project (Sustainability Think Tank)

CEO, Natural Capitalism Solutions, Colorado, USA, 2004-05

B.E. (Civil) (The University of Adelaide, 2000)

Engineer (Adelaide Civil 1997, GHD 2000, Rogers and Jefferis 2001)

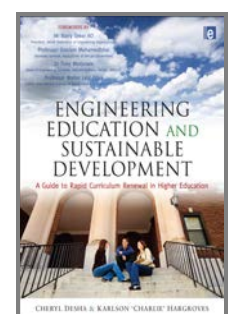
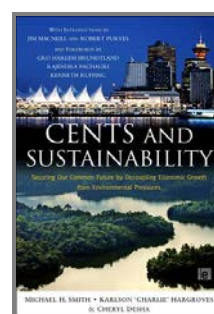
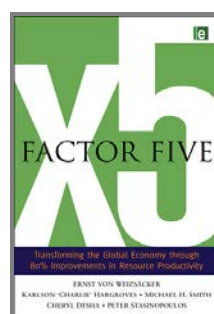
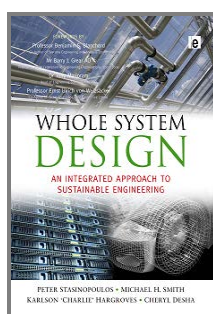
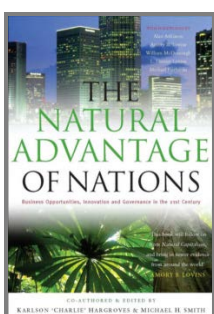


### Short Biographical Information

Charlie Hargroves is a dedicated, passionate, and collaborative action researcher focused on making a contribution to the world's low carbon transition. Charlie has worked with many of the world's leading sustainable development experts over the last 15 years and has made a strong contribution to the field through his writing, consulting, and public speaking. In 2002 Charlie co-founded *'The Natural Edge Project'* (TNEP) as an Australian based International Sustainability Think-tank, initially at the Institution of Engineers Australia, then hosted by Griffith University and now Curtin University and QUT. TNEP's mission is to contribute to, and succinctly communicate, leading research, case studies, tools and strategies for achieving sustainable development across government, business and civil society. Since the founding of TNEP and then joining the Curtin University Sustainability Policy Institute (CUSP) in 2010 Charlie has been the Chief Investigator on over \$4.5 million dollars of research grants. Charlie is an expert consultant for United Nations Centre for Regional Development.

Working with various teams Charlie has co-authored 5 books (selling over 85,000 copies in 5 languages), developed 2 comprehensive online education programs, 16 book chapters, 9 peer reviewed journal papers, and 27 conference papers. Charlie has delivered numerous high level keynote presentations and guest lectures at events and forums around the world, and has co-facilitated numerous seminars and workshops on sustainable development. The first TNEP book won the Australian Banksia Award for Environmental Leadership, Education and Training in 2005, and the two released in 2010 were ranked among the 'Top 40 Sustainability Books' in the world that year by the Cambridge Sustainability Leaders Program (with 'Cents and Sustainability' ranked 5th and 'Factor 5' ranked 12th).

As part of the CUSP team Charlie works with the CRC for Low Carbon Living and the Sustainable Built Environment National Research Centre on a number of national and international projects focused on understanding how to achieve greater sustainability outcomes. Prior to joining Curtin Charlie led a team from Griffith University to work closely with the Townsville City Council for 7 years as part of the Solar City Program supported by the Federal Government. The project involved community engagement activities in partnership with the Townsville City Council and Ergon Energy. Charlie is a full member of the Club of Rome, a member of the Decoupling Working Group of the UN International Resource Panel, and a member of the International Council for Research and Innovation in Buildings and Construction Taskgroup on Infrastructure. Charlie completed his PhD in 2015 supervised by Professor Peter Newman methods for on Carbon Structural Adjustment, looking at *'Designing, Motivating, and Delivering an Economy-Wide Transition to Low Greenhouse Gas Emissions'*.



## Authored Books

- Desha, C. 2015(2013) Higher Education and Sustainable Development: A Model for Curriculum Renewal, TNEP, Earthscan, London.

*This book will synthesise and contribute to the body of knowledge on the process of embedding sustainability within higher education curriculum, addresses key barriers to curriculum renewal to help to build momentum for a rapid and large scale transition in the higher education sector. The authors have relied on the extensive experience and wealth of knowledge within a network of more than 70 educators, researchers, practitioners and students from more 14 countries over 8 years.*

- Smith, M., Hargroves, K., and Desha, C. (2010) *Cents and Sustainability: Securing Our Common Future by Decoupling Economic Growth from Environmental Pressures*, Earthscan, London.

*Funded by the Purves Environmental Fund and Griffith University, and carrying forewords from the most eminent leaders in the field of sustainable development, Dr Gro Brundtland and Prof. Rajendra Pachauri, this book focuses on how to decouple economic growth from environmental pressures. Written as a response to the seminal book 'Our Common Future' the book focuses on merging economic growth with an environmental pressure reduction agenda, focusing on greenhouse gas emissions, air pollution, water extraction, waste production and the loss of biodiversity and natural system decline.*

- Von Weizsäcker, E., Hargroves, K., Smith, M., Desha, C., and Stasinopoulos, P. (2009) *Factor Five: Transforming the Global Economy through 80% Improvements in Resource Productivity*, Earthscan, London. (Translated into German and Chinese)

*In this update to the 1997 International Best Seller, Factor Four, Ernst von Weizsäcker works with a team of young Australians to present a compelling case for sector wide advances that can deliver significant resource productivity improvements over the coming century. The purpose of this book is to inspire hope and to then inform meaningful action in the coming decades to respond to the greatest challenge our species has ever faced – that of living in harmony with our planet and its other inhabitants.*

- Stasinopoulos, P., Smith, M., Hargroves, K. and Desha, C. (2008) *Whole System Design - An Integrated Approach to Sustainable Engineering*, TNEP, Earthscan, London.

*Whole System Design is increasingly being seen as one of the most cost effective ways to both increase the productivity and reduce the negative environmental impacts of an engineered system. Published in partnership with the Australian Federal Government, UNESCO, and the World Federation of Engineering Organisations (WFEO), this book provides a clear design methodology, based on leading efforts in the field, and is supported by worked examples that demonstrate how advances in energy, materials and water productivity can be achieved through applying an integrated approach to sustainable engineering.*

## Edited Book

- Hargroves, K. and Smith, M. (eds) (2006) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London. (To be released in Mandarin in 2010)

*Funded by many sponsors, and carrying forewords from the likes of Amory Lovins and William McDonough, the central message of the book is that it is possible for economies to achieve high economic and job growth rates while dramatically reducing their negative impacts on the environment. Integrating a vast array of literature, it demonstrates that, far from harming economic growth and jobs, the smart application of sustainable development can yield higher economic prosperity for all economies. The book was awarded the 2005 Banksia Award for Environmental Leadership, Education and Training.*

## Online Publications

- Smith, M., Hargroves, K., Stasinopoulos, P., and Desha, C (2010) *Water Transformed: Sustainable Water Solutions for Climate Change Adaptation for Australia*, The Natural Edge Project, Australia. (24 lectures)

*Funded by the Australian Federal Government, this online education resource offers a suite of freely available online training resources to support and assist education and training of students and professionals. This project will bring together leading research and practice in urban and industrial water resource management and supply to address key knowledge and professional skills training gaps. It will also bring together an up-to-date resource to provide professionals in the field with easy access to latest innovations and proven technologies in these areas.*

- Smith, M., Hargroves, K., Stasinopoulos, P., Stephens, R., Desha, C. and Hargroves, S. (2007) *Energy Transformed: Sustainable Energy Solutions for Climate Change Mitigation*, The Natural Edge Project, CSIRO, and Griffith University, Australia. (30 lectures)

*Funded by the CSIRO, this online education resource offers a suite of freely available online training resources to support and assist education and training of students and professionals. This training package provides industry, governments, business and households with the knowledge they need to realise at least 30 percent energy efficiency savings in the short term while providing a strong basis for further improvement. It also provides an updated overview of advances in low carbon technologies, renewable energy and sustainable transport to help achieve a sustainable energy future.*

**Book Chapters**

- el-Baghdadi, O., Desha, C., and Hargroves, K. (2014) 'Engaging Decision Makers in the Business Case for Biophilic Urbanism', in: Kabisch, N., Larondelle, N., Reeve, A., and Artmann, M. (eds) (2014) *Human-Environmental Interactions in Cities: Challenges and Opportunities of Urban Land Use Planning and Green Infrastructure*, 27-47, Cambridge Scholars Publishing, United Kingdom.
- Reeve, A., Desha, C., Kramer, C., Hargroves, K., and Newman, P. (2014) 'Considering Research Enquiry into Biophilic Urbanism and Office Worker Productivity', in: Kabisch, N., Larondelle, N., Reeve, A., and Artmann, M. (eds.) (2014) *Human-Environmental Interactions in Cities: Challenges and Opportunities of Urban Land Use Planning and Green Infrastructure*, 27-47, Cambridge Scholars Publishing, United Kingdom.
- Desha, C., and Hargroves, K. (2012) 'Fostering rapid transitions to education for sustainable development through a whole-system approach to curriculum and organizational change'. In: Leal Filho, W. (ed.) *Sustainable Development at Universities: New Horizons*, Peter Lang Publishing Group, Frankfurt am Main, pp. 29-46.
- Hargroves, K. and Smith, M. (eds) (2006) 'Waste streams to value streams', in: Marinova, D., Annandale, D., and Phillimore, J. (eds) (2006) *The International Handbook on Environmental Technology Management*, Edward Elgar, Northampton, MA, USA.
- Hargroves, K., and Smith, M (2005) 'Natural Advantage of Nations', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Smith, M and Hargroves, K. (2005) 'Risks of Inaction on Sustainable Development', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'Asking the Right Questions', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'A Dynamic Platform for Change', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'Thinking Locally, Acting Globally', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'Natural Advantage and the Firm', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'The Political and Social Context: A Sixth Force on Business?', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Smith, M., Paton, B., Saka, C., Burritt, R., Hargroves, K., Lovins, H., Schaltegger, S., Link, W., and Hahn, T. (2005) 'Accelerating the Sustainability Revolution', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Hargroves, K., and Smith, M (2005) 'Operationalizing Natural Advantage through the Sustainability Helix', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.
- Smith, M., Hargroves, K., Burritt, R., Paton, B., Sutton, P., McLean, R., and Pillia, J. (2005) 'The Role of Government', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan.
- Smith, M., Hargroves, K., and McKenzie, A. (2005) Changing Hearts and Minds: The Role of Education, Chapter 22 of Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of*

Nations: Business Opportunities, Innovation and Governance in the 21st Century, Earthscan, London.

- Hargroves, K., Smith, M., AtKisson, A., Paten, C., and Palousis, N. (2005) 'Achieving Multi-stakeholder Engagement', in: Hargroves, K. and Smith, M. (eds) (2005) *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*, Earthscan, London.

### Referred Academic Articles/Journal Papers

- Desha, C. and Hargroves, C. (2014) 'A Peaking and Tailing Approach to Education and Curriculum Renewal for Sustainable Development', *Sustainability*. 2014 (6): pp. 4181-4199. [IF 0.942]
- Wilson, K., Desha, C., Bucolo, S., Miller, E., and Hargroves, K. (2014) Emerging Opportunities for "Design Thinking" to Deliver Sustainable Solutions in the Built Environment. *The International Journal of Design Management and Professional Practice*, 8(1), pp. 1-10.
- Byrne, E., Desha, C., Fitzpatrick, J., and Hargroves, K. (2013) Exploring sustainability themes in engineering accreditation and curricula. *International Journal of Sustainability in Higher Education*, 14(4), pp. 384-403. [ERA2010: B]
- Mulder, K., Desha, C., and Hargroves, K. (2013) Sustainable development as a meta-context for engineering education. *Journal of Sustainable Development of Energy, Water and Environment Systems*, 1(4), pp. 304-310. [ERA2010: B]
- Desha C, and Hargroves K. (2010) Surveying the state of higher education in energy efficiency, in Australian engineering curriculum, *Journal of Cleaner Production*, 18 (7), p652-658, [2010 IF: 2.425, ERA2010: A].
- Desha, C., Hargroves, K., and Smith, M. (2009) 'Addressing the Time Lag Dilemma in Curriculum Renewal Towards Engineering Education for Sustainable Development', *International Journal of Sustainability in Higher Education*, Volume 10 Number 2, 2009. [ERA2010: B]
- Desha, C., and Hargroves, K. (2008) 'Education for Sustainable Development Curriculum Audit (E4SD Audit): A Curriculum Diagnostic Tool for Quantifying Requirements to Embed SD into Higher Education - Demonstrated through a Focus on Engineering Education', UNESCO International Centre for Engineering Education, *World Transactions on Engineering and Technology Education*, Vol. 6(2), pp. 365-372. [ERA2010: C]
- Stephens, R., Desha, C, and Hargroves, K. (2007) 'The Philosophy and Practice of Water Sensitive Urban Design – is it Consistent with a Whole System Approach?', *Built Environment Design Practices (BEDP) Environment Design Guide*. [ERA2010: B]
- Paten, C., Palousis, N., Hargroves, K. and Smith, M. (2005) 'Engineering Sustainable Solutions Program - Critical Literacies for Engineers Portfolio: Putting Sustainability as a 'Critical Literacy' into Mainstream Engineering Curricula', *International Journal of Sustainability in Higher Education*, Volume 6 Number 3, pp. 265-277. [ERA2010: B]

### Peer-reviewed Conference Proceedings

- Hall, S., Sparks, D., Hargroves, K., Desha, C., and Newman, P (2013) The development of a simple multi-nodal tool to identify performance issues in existing commercial buildings, in: 19th Triennial CIB World Building Congress: Conference Proceedings, May 5, 2013, Brisbane, Australia: Queensland University of Technology.
- Reeve, A., Hargroves, K., Desha, C., Newman, P., and Baghdadi, O. (2013) 'Biophilic Urbanism: Harnessing natural elements to enhance the performance of constructed assets', in: 19th Triennial CIB World Building Congress: Conference Proceedings, May 5, 2013, Brisbane, Australia: Queensland University of Technology.
- Whistler, L., Matan, A., Wilson, K., Hargroves, K., Desha, C., Newman, P. and Farr, A. (2013) Navigating the future of roads – considering potential impacts of environmental and social trends on road infrastructure', in: 19th Triennial CIB World Building Congress: Conference Proceedings, May 5, 2013, Brisbane, Australia: Queensland University of Technology.

- Hargroves, K., Hall, S., Desha, C., Sparks, D., and Newman, P. (2012) The Performance Nexus - A framework for improving energy efficiency in existing commercial buildings by considering a whole-of-building approach', in: 10th International Conference on Health Buildings, Jul 8, 2012, Brisbane, Australia: Queensland University of Technology. [ERA2010: A]
- Reeve, A., Hargroves, K., Desha, C., and Newman, P. (2012) Informing healthy building design with biophilic urbanism design principles: a review and synthesis of current knowledge and research, in: 10th International Conference on Healthy Buildings: Conference Proceedings, Jul 8, 2012, Brisbane, Australia: Queensland University of Technology. [ERA2010: A]
- Desha, C. and Hargroves, K. (2009) An Investigation into Increasing the Extent of Energy Efficiency Knowledge and Skills in Engineering Education, in: 2009 Australasian Association of Engineering Education Conference: Conference Proceedings, p822-827, 7-9 December, Adelaide, Australia. [ERA2010: B]

### Conference Papers

- Hargroves, K., and Desha, C. (2014) The Deliberative and Dynamic model for engineering education curriculum renewal, in: *World Congress on Engineering Education 2014: QScience Proceedings*, 2015:46.
- Reeve, A., Desha, C., Hargroves, K., Newman, P., and Hargreaves, D. (2013) A basis for inquiry into policy considerations for increasing the application of biophilic urbanism, in: *11th Urban Environment Symposium: Conference Proceedings*, Springer, Karlsruhe, Germany, pp. 143-151.
- Desha, C., Hargroves, K., Dawes, L., & Hargreaves, D. (2013) Collaborative resource development for energy efficiency education, in: Lemckert, Charles & Jenkins, Graham A. (Eds.) *Proceedings of 24th Annual Australasian Association of Engineering Education Conference: Conference Proceedings*, Griffith School of Engineering, Griffith University, Gold Coast, Queensland, Australia.
- el-Baghdadi, O., Desha, C., and Hargroves, K. (2013) An exploration into retrofitting cities with natural design elements - learning from the city of Berlin, Germany, in: *8th Conference on Sustainable Development of Energy, Water and Environment Systems: Conference Proceedings*, 22-27 September 2013, Dubrovnik, Croatia.
- el-Baghdadi, O., Desha, C., and Hargroves, K. (2013) Considering the economic value of natural design elements at city scale, in: *57th Australian Agricultural and Resource Economics Society Annual Conference: Conference Proceedings*, 5-8 February 2013, Sydney, Australia.
- Reeve, A., Desha, C., Hargroves, K., Hargreaves, D., and Newman, P. (2013) Considering a whole-of-community approach to integrating nature in cities, an international case study of Vauban, Germany, in: *Sustainable Engineering Society (SEng) 2013 Conference Proceedings*, 18 – 20 September 2013, National Convention Centre, ACT.
- el-Baghdadi, O., Desha, C., Hargroves, K., and Hargreaves, D. (2013) Embedding nature into cities – a case study of economic lessons from Singapore, in: *SEng 2013 Conference Proceedings*, 18-20 September 2013, National Convention Centre, Canberra, Australia.
- Manning, C., Hargroves, K., Walker, M., Lange, J., Igloi, S., Bruce, G., and Desha, C. (2013) Dry tropics water smart: a community based approach to residential outdoor water consumption, in: *2013 Australian Water Association Conference: Conference Proceedings (OzWater 2013)*, 7-9 May 2013, Gold Coast, Australia.
- Kenny, J., Desha, C., Kumar, A., and Hargroves, K. (2012) Using biomimicry to inform urban infrastructure design that addresses 21st century needs, in: *1st International Conference on Urban Sustainability and Resilience: Conference Proceedings*, UCL London, London, UK.
- Desha, C., and Hargroves, K. (2012) Applying threshold learning theory to teach sustainable business practice in post-graduate engineering education, in: *119th American Society for Engineering Education (ASEE) Annual Conference & Exposition: Conference Proceedings*, 10 - 13 June 2012, San Antonio, Texas, USA.
- Desha, C. and Hargroves, K. (2011) Informing engineering education for sustainable development using a deliberative dynamic model for curriculum renewal, in: *Research in Engineering Education Symposium: Conference Proceedings 2011*, Madrid. [ERA2010: A]

- Mulder, K., Desha, C. and Hargroves, K. (2011) Sustainable Development as meta-context for Engineering Education, in: *6th Dubrovnik Conference on Sustainable Development in Energy, Water and Environment Systems: Conference Proceedings* (SDEWES) 2011, 25-29 September, Croatia.
- Desha, Cheryl & Hargroves, Karlson (2011) Considering the importance of a systems approach to integrating ESD with campus operations, in: *10th International Conference of Australasian Campuses Towards Sustainability: Conference Proceedings*, Melbourne, Victoria, pp. 19-25.
- Mulder, K.F., Desha, C., & Hargroves, K.J. (2011) Sustainable development as a meta-context for engineering education, in: *6th Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems: Conference Proceedings*, University of Zagreb, University of Dubrovnik, Croatia.
- Byrne, E., Desha, C., Fitzpatrick, J. & Hargroves, K. (2010) Engineering Education For Sustainable Development: A Review of International Progress, in: *3rd International Symposium for Engineering Education: Conference Proceedings*, University College Cork, Ireland.
- Hargroves, K. and Desha, C. (2009) Doing More with Less through Factor Improvements: An Emerging Engineering Education Imperative, in: *2009 Australasian Association of Engineering Education Conference: Conference Proceedings*, 7-9 December, Adelaide, Australia. [ERA2010: B]
- Desha, C., and Hargroves, K. (2008) Mainstreaming EESD: Elements of Rapid Curriculum Renewal, in: *2008 Engineering Education for Sustainable Development Conference: Conference Proceedings*, 22-24 September (Graz, Austria), EESD 2008, Graz, Austria.
- Paten, C., Hargroves, C., Smith, M. (2007) A Summary of the Engineering Education for Sustainable development- Toolkit of Information & Teaching Material, in: *The Alliance for Global Sustainability Annual Meeting 2007: Conference Proceedings*, Chalmers, Goteborg., pp. 126-128
- Palousis, N., Hargroves, K., Smith, M. and Paten, C. (2006) Re-thinking Sustainable Solutions – Innovation Inspired by Nature, in: *2006 Australian Rangelands Society: 14<sup>th</sup> Biennial Conference: Conference Proceedings*, 5–7 September 2006, Renmark, Australia.
- Hargroves, K., Paten, C., Palousis, N. and Smith, M.H. (2005) Making the Profitable Transition Towards Sustainable Business Practice, in: *ASEE/AEE 4th Global Colloquium on Engineering Education: Conference Proceedings*, 26-29 September 2005, Sydney, Australia. [ERA2010: B]
- Paten, C., Palousis, N., Hargroves, K. Smith, M.H. (2005) How Do You 'Teach' Sustainability to Engineers? Introducing the Engineering Sustainable Solutions Program, in: *Environmental Engineering Society National Conference: Conference Proceedings*, 18-19 July 2005, Sydney, Australia.

## Reports

- von Weizsäcker, E., de Lardereel, J., Hargroves, K., Hudson, C., Smith, M., Rodrigues, M., et al. (2014) *Decoupling 2: Technologies, opportunities and policy options*, United Nations Environment Programme (UNEP), Nairobi.
- Hargroves, K. (2014) *Roadmap for Carbon Structural Adjustment in the Built Environment Sector*, A Report to the Sustainable Built Environment National Research Centre, Curtin University Sustainability Policy Institute, Curtin University, Perth.
- SBEnrc (2014) *Investigating the Mainstreaming of Building Manufacture in Australia*, Sustainable Built Environment National Research Centre (SBEnrc), Curtin University Sustainability Policy Institute, Curtin University, Perth.
- SBEnrc (2014) *An Investigation into Strategies and Solutions for the Future of Roads*, Sustainable Built Environment National Research Centre (SBEnrc), Curtin University Sustainability Policy Institute, Curtin University, Perth.
- Mulder, K., Desha, C., and Hargroves, K. (2013) 'Sustainable development as a meta-context for engineering education', in: Beanland, D., and Hadgraft, R. (eds.) *Engineering Education: Transformation and Innovation - UNESCO Report*, RMIT, Melbourne Australia, pp. 93-99.

- SBEnc (2012) *The Future of Roads: How road agencies are facing a conflicted future*, Sustainable Built Environment National Research Centre (SBEnc), Curtin University and Queensland University of Technology.
- SBEnc (2012) *Can biophilic urbanism deliver strong economic and social benefits in cities? An economic and policy investigation into the increased use of natural elements in urban design*, Sustainable Built Environment National Research Centre (SBEnc), Curtin University and Queensland University of Technology.
- Desha, C., Hargroves, K. and El Baghdadi, O. (2012) A Review of post graduate energy efficiency course content, and recommendations for use of vocational graduate certificate in building energy analysis course, report to the National Framework for Energy Efficiency, Sustainability Victoria.
- Hargroves, K and von Weizsacker, E (2011) *Technology and Policy Options for Making Transport Systems More Sustainable*, United Nations Department Of Economic And Social Affairs, Nineteenth Session Commission On Sustainable Development New York, 2-13 May 2011.
- Hall, S., Hargroves, K., Newman, P., Salter, R. Desha, C., Blustein, S., and Sparks, D. (2011) 'Understanding the performance of green commercial buildings': A Sustainable Built Environment National Research Centre (SBEnc) Briefing Report, Curtin University and the Queensland University of Technology, Australia.
- Desha, C. and Hargroves, K. (2011) Energy Efficiency Graduates Attributes Project: Energy Efficiency Advisory Group – Project 1, Lead Member: Queensland University of Technology, Report to the Department of Resources, Energy and Tourism, August 2011, Canberra
- Hargroves, K. and Desha, C. (2011) Energy Efficiency Resources for Undergraduate Engineering Education: Energy Efficiency Advisory Group – Project 2, Lead Member: University of Adelaide, Report to the Department of Resources, Energy and Tourism, August 2011, Canberra
- Desha, C., Whistler, L., Farr, A., and Hargroves, K. (2011) 'Reducing Environmental Pressures of Road Building: A Sustainable Built Environment National Research Centre Discussion Paper', in proceedings of the Transport and Main Roads Engineering Technology Forum, Brisbane, 1-4 August
- Hargroves, K. and Desha, C. (2010) 'The State of Engineering for Sustainable Development', in: UNESCO (2010) *Engineering: Issues, Challenges and Opportunities for Development*, UNESCO.
- Desha, C. and Hargroves, K. (2010) 'Sustainable Development and Engineering Education', 'Environmental engineering', in: UNESCO (2010) *Engineering: Issues and Challenges for Development*, UNESCO.
- Desha, Cheryl & Hargroves, Karlson (2010) 'Transforming of engineering education', in UNESCO (2010) *Engineering: Issues, Challenges and Opportunities for Development UNESCO Report*. UNESCO Publishing, Paris.
- Desha, C., Hargroves, K. and Reeve A, (2009) An Investigation into the options for increasing the extent of Energy Efficiency Knowledge and Skills in Engineering Education, Lead Member: Queensland University of Technology, Report to the National Framework for Energy Efficiency, p1-128
- Hargroves, K., Smith, M., Desha, C. and Stasinopoulos, P. (2009) Executive Summary: Action on climate change can help business competitiveness and economic growth, in proceedings of the 10th National Business Leaders Forum on Sustainable Development, Canberra.
- Desha, C., Hargroves, K., Smith, M., Stasinopoulos, P., Stephens, R., and Hargroves, S. (2007) What is the state of education for energy efficiency in Australian engineering education? - Summary of questionnaire results, Report to the National Framework for Energy Efficiency, pp1-73.
- Paten, C., Hargroves, K. and Smith M. (2007) A summary of the 'Engineering Education for Sustainable Development - Toolkit of Information and Teaching Material', 'Pathways to our common future': Proceedings Alliance for Global Sustainability Annual Meeting 2007, Barcelona, pp126-128.

## Workshop Facilitation

- 21-14 January 2016: Expert Workshop Participant and Team Leader, **Government of Dubai**, Road and Transportation Agency. Workshop Topic: 'The Future of Dubai's Transportation System.'
- 20 July 2015: Planning Workshop with University of Adelaide to inform the University's Sustainability Plan 2013-2020.
- 17-26 August 2015: Stakeholder workshops with **University of Adelaide** to inform the development of a 'University Sustainability Plan' involving 4 workshops.
- 04 November 2014: Transport Network Resilience Stakeholder Workshop (opened by the Mayor) in collaboration with the **Sustainable Built Environment National Research Centre**.
- 13 August 2014: TCC CitiSolar White Roof Stakeholder Workshop, facilitated by TNEP in collaboration with **Townsville City Council**.
- May/June 2013: 4 Community Focus Groups, TCC Community Energy Efficiency Program (CEEP) Project, designed and moderated by TNEP in collaboration with **Townsville City Council**.
- 8 December 2013: Stakeholder workshop with **Australasian Association of Engineering Education** to present and review energy efficiency capacity building materials.
- 6-13 August 2013: Stakeholder workshop with **Engineers Australia** on perceptions of key graduate attributes for engineering and energy efficiency, Brisbane, Melbourne, Sydney, Australia
- 02-03 June 2012: 4 Community Focus Groups, TCC Dry Tropics Water Smart Residential Outdoor Water Conservation Program, designed and moderated by TNEP in collaboration with **Townsville City Council**.
- 13 April 2012 - **Sustainable Built Environment National Research Centre**, Curtin University and Queensland University of Technology. Topic: "The Future of Roads: Prepare for future pressures and anticipate strategies for implementing roads of the future".
- 13 July 2011 - **Sustainable Built Environment National Research Centre**, Curtin University and Queensland University of Technology. Topic: "harnessing the Potential of Biophilic Urbanism in Australian Cities".
- 05 June 2011 – **Monash University**, Melbourne, Australia. Topic: "Integrating Sustainability into the First Year Engineering Curriculum".
- 03 June 2011: **Australian Government Department of Resources and Tourism**, Brisbane, Australia. Topic: "Energy Efficiency Graduates Attributes".
- 13 July 2011: **Sustainable Built Environment National Research Centre**, Curtin University and Queensland University of Technology. Workshop Topic: "harnessing the Potential of Biophilic Urbanism in Australian Cities".
- 12 July 2011: **Sustainable Built Environment National Research Centre**, Curtin University and Queensland University of Technology. Workshop Topic: "The Future of Roads: The Role of Road Building in Reducing Environmental Pressures and both Mitigating and Adapting to Climate Change".
- 11 July 2011: **Sustainable Built Environment National Research Centre**, Curtin University and Queensland University of Technology. Workshop Topic: "Understanding the performance of green commercial buildings".
- 23-25 November 2009: 12 Community Focus Groups, TCC CitySolar Community Capacity Building Program, designed and moderated by TNEP in collaboration with **Townsville City Council**, involving 75 residents.
- 16 October 200: **Asia Pacific Academy of Business in Society** Annual Conference, Singapore. Workshop Topic: "MBA Graduate Attributes for Sustainable Business Practices" and "Sustainable Business Practices and Energy Efficiency in the Industrial and Commercial Sectors".
- 15 February 2008: **6th Symposium on Accountability, Governance & Performance**, Brisbane, Australia. Workshop Topic: "Developing Effective Strategies and Policies for Organisational Sustainability".



- 12 December 2007: Invited Workshop, International Conference on Engineering Education and Research, iCEER 2007, Melbourne, Australia. Workshop. Topic: "Elements of Curriculum Renewal to Embed Sustainability into Engineering Education".
- 7 December 2007: Eighteenth Annual Conference of the **Australasian Association for Engineering Education**, Melbourne, Australia. Workshop Topic: "Emerging Engineering Education Curriculum for Sustainable Development".
- 5-10 March 2006: TCC Engineers Visioning a Sustainable Future Conference, Townsville, Australia. A full day seminar for professional engineers on sustainability and two half-day workshops for Year 12 high school students, and 1st Year Engineering students with **Townsville City Council**.
- 31 October 2006: TCC Cape Pallarenda Eco-Tourism Scoping Charrette, Facilitated by TNEP in Collaboration with **Townsville City Council**, Ergon Energy, and the Centre for Excellence in Tropical Design, on "Sustainable Design & Practice - Delivering Profitability".
- 8 November 2006: TCC CitiSolar Program "GreenT: ESD Strategies Scoping Charrette", Facilitated by TNEP in Collaboration with **Townsville City Council**, Ergon Energy, and the Centre for Excellence in Tropical Design.
- 4-5 August 2006: Sustainability Education & Capacity Building Framework Workshop, **KBR**. Workshop Topic: "KBR Sustainability Education and Capacity Building Framework".
- 16-19 November 2005: **Sustainable Living Tasmania** – Annual Sustainability Series. Workshop Topics: "The Role of Engineers in Sustainability", "The Business Case for Sustainability", "Cultural Change and Sustainability within Universities" and "Sustainability - Being Realistic AND Optimistic".
- 8 November 2005: **University of South Australia**, Formulas for a Thriving Planet Forum, Adelaide, Australia. Workshop Topic: "Youth dialog with WWF Australia CEO, Mr. Greg Bourne, on topical environmental matters and active solutions".
- 26 September 2005: **Young Engineers Australia** National Forum, Sydney, Australia. Two hour workshop with 190 young engineers focusing on their ability to effect real change in their workplace around the theme of sustainability.
- 23 October 2004: Sustainability Intensive with professionals from across a range of sectors, led by Alan AtKisson at **Imperial College**, London, UK.

### International Keynotes and Presentations

- 23-27 January 2016 – Invited Speaker, Dubai Road and Transport Authority, Dubai, **UAE**.
- 1 – 4 November 2015 – Speaker, Global Cleaner Production & Sustainable Consumption Conference, Sitges, Barcelona, **Spain**.
- 29 September – 05 October 2015 – Speaker, 2nd International Conference on Disaster Management and Civil Engineering, Phuket, **Thailand**.
- 7 – 12 November 2014 – Speaker, Engineering Leaders Conference on Engineering Education, Doha, **Qatar**.
- 14 – 19 October 2014 – Invited Speaker, Club of Rome Annual General Meeting, Mexico City, **Mexico**.
- 27-29 August 2014 - Invited Speaker, Club of Rome, Decoupling Workshop, Hamburg, **Germany**.
- 10-13 September 2012 - Invited Speaker (Skype), A Joint Workshop of UNAM-CRIM and AFES-PRESS, Morelos, **Mexico**.
- 24-27 May 2011 – Invited Keynote (with travel expenses) Friends of Europe, Green Week, Brussels, **Belgium**. Topic: "*Decoupling Economic Growth from Environmental Pressures*".
- 25-29 November 2010 – Invited Speaker (with travel expenses) Greenaccord, VIII International Media Forum on the Protection of Nature, Cuneo, **Italy**. Topic: "*Decoupling Economic Growth from Environmental Pressures*".

- 12–13 March 2010 - Invited Keynote (with travel expenses), United Nations Forum on Climate Change Mitigation, Fuel Efficiency and Sustainable Urban Transport, Seoul, **Republic of Korea**. Topic: "*Factor Five: Transforming the Global Economy through 80% Improvements in Resource Productivity*".
- 5–7 January 2009 – Invited Keynote, Fifth International Conference on Environmental, Cultural, Economic and Social Sustainability, **Mauritius**. Topic: "*Cents and Sustainability*".
- 16 – 18 October 2008 – Invited Speaker and Workshop Facilitator (with travel expenses), Asia Pacific Academy of Business in Society Annual Conference, **Singapore**. Topic: "*Energy Transformed: Responding to the complexity of the challenge of climate change*".
- 25-29 February 2008 – Invited Keynote (with travel expenses), Cooperation On Health And Biodiversity Conference, 'COHAB 2', Galway, **Ireland**. Topic: "*Business and Ecosystems: Innovation, Engineering and Biomimicry*".
- 15-18 April 2007 - Invited Speaker (with travel expenses), Engineering Sustainability Conference, Mascaro Sustainability Initiative, University of Pittsburgh, Pennsylvania, **USA**. Topic: "*Sustainable Engineering Solutions*".
- 24 January 2007 – Invited Student Lecture, Delhi Sustainable Development Summit, Delhi, **India**. Topic: "*Innovation and sustainable development*".
- 31-2 November 2006 - Invited Keynote (with travel expenses), UNESCO International Workshop: Engineering Education for Sustainable Development, Beijing, **China**. Topic: "*Engineering Education for Sustainable Development - Toolkit of Information and Teaching Material*".
- 26-28 July 2006 - Invited Keynote, Fifth World Technopolis Association (WTA) General Assembly, **Brisbane**, Australia. Topic: "*The Future Natural Capital of Smart Cities*".
- 13-15 April 2005 – Invited Participant (with travel expenses), International Dialogue on 'Providing Leadership for Sustainable Development', Beijing, **China**.
- 17-19 March 2005 - Invited Speaker, NCIAA 9th Annual Conference, San Diego, **USA**. Topic: "*Engineering Sustainable Solutions*".
- October 2004 – Invited Speaker and Workshop Facilitator - Sustainability Intensive, lead by Alan AtKisson, Imperial College, London, **UK**.
- 27-29 September 2004 - Invited Keynote, Integrating Appropriate-Sustainable Technology and Service-Learning in Engineering Education, Colorado, **USA**. Topic: "*Engineering Sustainable Solutions*".
- 26-28 May 2004 - Invited Keynote, ASEAN Australian Engineering Congress 2004, Kota Kinabalu, **Sabah**. Topic: "*Transforming Engineering Education and Practice with Whole Systems Engineering Design*".

#### **Australian Keynotes and Invited Presentations (Non-conference related)**

- 9-10 September 2015 - Invited Keynote, Sustainable Engineering Society, Annual Conference, Adelaide, Australia. Topic: "*Carbon Structural Adjustment*".
- 28-29 July 2011 – Invited Plenary Speaker, Healthy Cities: 4th Making Cities Liveable Conference, **Noosa**, Australia. Topic: "*Decoupling Economic Growth from Environmental Pressures*".
- 12 February 2009 – Invited Keynote, Committee for Economic Development of Australia (CEDA), 'Sustainability: The Next Economic Opportunity?', **Perth**, Australia. Topic: "*Cents and Sustainability: Securing Our Common Future*".
- 26 February 2009 – Invited Keynote, Committee for Economic Development of Australia (CEDA), 'Sustainability: The Next Economic Opportunity?', **Adelaide**, Australia. Topic: "*Cents and Sustainability: Securing Our Common Future*".
- 30 October 2008 – Invited Speaker, Advanced Manufacturing Australia 2008 International Conference, **Melbourne**, Australia. Topic: "*The Impact of Climate Change on Advanced Manufacturing in Australia*".

- 8–9 October 2008 – Invited Keynote, The Great Energy Debate, **Adelaide**, Australia. Topic: *"Greenhouse gas mitigation and economic growth"*.
- 22–23 May 2008 – Invited Keynote and Event Master of Ceremonies, Sustainability and Business Growth Summit, **Sydney**, Australia. Topic: *"Sustainability in the Era of Climate Change"*.
- 25-29 February 2008 - Invited Speaker, 3rd National Water Education Conference, Australian Water Association, **Gold Coast**, Australia. Topic: *"Education in Water Resource Management and Supply to Respond to Climate Change"*.
- 25-29 February 2008 - Keynote Speaker, Water Industry Capacity Development (WICD) Conference 2008, Australian Water Association, **Gold Coast**, Australia. Topic: *"A strategic approach to embedding sustainable development into engineering education to support the water industry"*.
- 19 October 2007 – Invited Gala Dinner Panellist, Environment Institute of Australia and New Zealand (EIANZ) 20th Anniversary Gala Ball, **Sydney**, Australia.
- 6 - 9 September 2007 - Invited Speaker, International Urban Design Conference, Gold Coast City Council, **Gold Coast**, Australia. Topic: *"Engineering Sustainable Solutions for our Urban Cities"*.
- 31 - 3 September 2007 - Invited Speaker, Asia Pacific Cities Summit (APCS), Brisbane City Council, **Brisbane**, Australia. Topic: *"Innovation and Engineering for Sustainable Development"*.
- 1 June 2007 - Invited Speaker, Greenbuild and Renewable Energy Exhibition – GREX, **Sydney**, Australia. Topic: *"Overview of The Natural Edge Project"*. (including a free booth at the exhibition)
- 26-29 September 2005. Invited Speaker, Environmental Engineering Educators' Workshop, **Sydney**, Australia. Topic: *"Transformational Change in the University Sector"*.
- 18-19 July 2005. Invited Speaker, Environmental Engineering Society 'EES' 2005 – Creating Sustainable Engineering Solutions, **Sydney**, Australia. Topic: *"Prospering in a Carbon Constrained World"*.
- 4-5 April 2005 - National Business Leaders Forum on Sustainable Development, **Melbourne**, Australia. Launch of '*The Natural Advantage of Nations*' by the Rt. Hon Sir Ninian Stephen, Former Governor-General 1982-89.
- 29-30 May 2003 - Invited Speaker, National Business Leaders Forum on Sustainable Development, **Melbourne**, Australia. Topic: Closing Words (Steering Committee Member).
- 16–19 November 2003 - Invited Speaker, International Conference of the Network of Regional Governments For Sustainable Development, **Perth**, Western Australia. Topic: *"Natural Competitive Advantage of Regions: Achieving Regional Competitive Advantage, Attracting Investment, and Encouraging Eco-Innovation through Collaborative Approaches for Sustainable Development"*.
- 16 August 2002 - Invited Speaker, National Science Festival – '*A Whole of Society Approach to Sustainable Development*', **Canberra**, Australia. Topic: *"Engineering Sustainable Solutions"*.

#### Referees:

Prof. Ernst von Weizsacker  
 Co-Chairman, International Panel for  
 Sustainable Resource Management  
 E: [ernst@weizsaecker.de](mailto:ernst@weizsaecker.de)

Prof. Peter Newman  
 Professor of Sustainability, Curtin University  
 Sustainability Policy Institute (CUSP)  
 E: [P.Newman@curtin.edu.au](mailto:P.Newman@curtin.edu.au)

Ms. Hunter Lovins  
 Natural Capitalism Solutions, Colorado, USA  
 E: [hunterlovins@gmail.com](mailto:hunterlovins@gmail.com)

Prof. Noel Lindsay  
 Director, ECIC, The University of Adelaide  
 E: [noel.lindsay@adelaide.edu.au](mailto:noel.lindsay@adelaide.edu.au)

**Endorsements for "The Natural Advantage of Nations" (Earthscan 2005):**Quotes from the Foreword Authors

"We have learned a lot of lessons since Natural Capitalism came out in 1999, that I think will make the next explications of this subject even more powerful and effective, so working with our Natural Project Edge collaborators I think shows great promise, these are very diligent and well informed people that I think are doing valuable work and we are looking forward to cooperating with them in ways that will help us all to learn faster and get more done better."

*Amory Lovins, Co-Author of 'Natural Capitalism: Creating the Next Industrial Revolution', CEO Rocky Mountain Institute*

"The continuing explosion of creative and determined efforts to build a world that is environmentally, economically, socially and humanly healthy is hope-giving...If this book's "to-do list for a sustainable civilization" is not worth the dedication of a life's work, what is?"

*Alan AtKisson, Author of 'Believing Cassandra', CEO, AtKisson Group*

"The Natural Advantage of Nations... shows that what many people saw as impossible just 15 years ago is now already happening. Within these pages you will see that there is reason for robust hope, and as you read, we hope you will be inspired to contribute to this magnificent re-evolution of human enterprise, a moment in our history when the things we make and build and grow can become a truly regenerative force"

*William McDonough, Co-author 'Cradle to Cradle: Remaking the Way We Make Things', Partner, William McDonough & Partners*

"Young people often ask me what gives me hope. Many things make me hopeful, but the best answer, just now, is this book... The numerous examples given here of profitable ways to improve the environment, human well-being and the bottom line. proves a belief that has grown in me for several years that while the tipping point of environmental devastation may be frighteningly close, the people with the commitment to implement the solutions we already know can solve the problems that are at hand."

*Hunter Lovins, Co-Author of 'Natural Capitalism: Creating the Next Industrial Revolution', President, Natural Capitalism Inc.*

"It is a great book following up on findings we published in Factor Four and linking it all to the business community. I also liked the emphasis on urban planning, and that in a highly unconventional manner. I shall quote Hargroves and Smith."

*Ernst Ulrich von Weizsäcker, co-author of 'Factor Four' and author of 'Limits To Privatization'.*

"Arup's interest in The Natural Edge Project arises from wanting to be a part of an initiative that showcases sustainability success stories in the Asia Pacific Region, raises awareness of the sustainability imperative, and that encourages collaboration between industry, academia, private and public organisations. We see this project as an opportunity to further network with other like-minded individuals and organisations."

*David Singleton, Chair, Global Infrastructure Business, Arup.*

"I am finding that The Natural Advantage of Nations is the perfect text for getting this message of hope across in a very practical way. That's not to say it's short on theory. By no means!."

*Janet Graaff, Instructor, University of Colorado Leeds School of Business*

"If you only read one book on sustainable development this year, make it The Natural Advantage of Nations..."

*Waste Management and Environment (WME) - Richard Collins*

**Endorsements for "Whole System Design" (Earthscan 2008):**

"I was thrilled and impressed reading this manual that features an integrated approach towards resource productivity and, ultimately, sustainability both at small and large scale. Each chapter in this book is self-explaining and self-sufficient, making for easy reading and teaching, but taken as a whole it is a wonderful contribution to engineering design, as you would expect from a book with this title. Good luck, readers, students, and teachers!"

*Professor Ernst Ulrich Von Weizsäcker, Co-recipient of the 2008 DBU German Environmental Award and former President of the Wuppertal Institute for Climate, Environment and Energy, Wuppertal, Germany*

"The work of the Engineering Sustainable Solutions Program of The Natural Edge Project, and this publication, could not be more timely and relevant."

*Dr Tony Marjoram, Senior Programme Specialist, Head of Engineering Sciences, Division of Basic and Engineering Sciences Natural Sciences Sector, UNESCO, Paris, France*

"The Natural Edge Project's 'Whole System Design' book will provide a valuable resource that can contribute significantly to technical design curriculum in university courses and professional training. I have used a whole system design approach, as is described and demonstrated in this book, to improve resource efficiency of products and industrial processes often by a factor of 2 or better."

*Adjunct Professor Alan Pears, RMIT, Australia, Co-Director of Sustainable Solutions*

"Whole System Design provides essential, hands-on guidance to kick-start the next industrial revolution. This book moves the reader from thinking "hmmm... this is interesting" to "I'm gonna do this!" It reframes the future not as fate, but as choice. A choice each one of us can define, prioritize and execute."

*Professor Serge de Gheldere, Founder and Managing Director of Futureproofed, Belgium*

"'Whole System Design' gives a comprehensive introduction to whole system design approach as the basis for transformative action. Education for Sustainability has to be more than 'bolt on' environmental papers in existing programmes, and this is the best example I've seen of resources to support sustainability as an integrated and transformative driver."

*Associate Professor Samuel Mann, Otago Polytechnic, New Zealand*

"I am convinced that, The 'Whole Systems Design' (WSD) book developed by The Natural Edge Project (TNEP) team will, if widely used, contribute much to help societies make the urgently needed, holistic changes. My compliments and wholehearted support for the developers of this excellent material and to the organizations that are making it available to faculty and students, globally."

*Professor Don Huisingsh, Editor-in-Chief of the Journal of Cleaner Production,*

"Whole System Design is an excellent aid for teaching sustainable development to engineering student who are not exposed to sustainability in any other engineering course."

*Professor Rajaratnam Shanthini, Faculty of Engineering, University of Peradeniya, Sri Lanka*

"I was buried in Whole System Design. It's a real little gem and I look forward to using it. It's very clear, straightforward and I love the examples. The online supports are also a tremendous facility and together they can play a significant role in practical terms in helping realise a sustainability informed engineering education curriculum globally."

*Edmond Byrne, Department of Process & Chemical Engineering, University College Cork, Ireland*

"The Industrial Pumping Systems Chapter is nice example that illustrates the point well."

*Emeritus Professor Bruce R. Munson, Department of Aerospace Engineering, Iowa State University, USA, Co-Author of Fundamentals of Fluid Mechanics*

**Endorsements for "Factor 5" (Earthscan 2009):**

"As economic, environmental, and security imperatives converge, advanced resource productivity is quickly rising to the top of the global agenda. But let's make no little plans: new technologies, artfully combined via integrative design, can now quintuple the work wrung from energy, water, and other resources. Building on our 1997 collaboration in Factor Four, and cross-pollinating with new findings in Australia and around the world, this exciting synthesis combines a powerful efficiency toolkit with farsighted policy insights-vital to ensure that efficiency's gains are not offset but reinforced to create a richer, fairer, safer, and cooler world."

*Amory B. Lovins, Chairman and Chief Scientist, Rocky Mountain Institute, Co-Author of 'Factor Four'*

"This book shows once again, even to the most conservative critics, that not only are significant improvements possible, they are more profitable, and when coupled with the understanding that reducing environmental devastation is critical, provide a vital message of hope for the future, which I have dedicated my life to help achieve."

*Hunter Lovins, President, Natural Capitalism Solutions, Co-Author of 'Factor Four'*

"The scientific assessment of climate change requires urgent action in mitigating greenhouse gas emissions. These could come dramatically from technological innovation, particularly in industries like cement and steel. These sectors could reduce emissions by 80% on an economically viable basis, which would be good news for world leaders and their negotiators on climate change. Factor Five provides several such win-win strategies."

*Dr R K Pachauri, Chair of the Intergovernmental Panel on Climate Change, and Director-General, The Energy and Resources Institute, Delhi (TERI)*

"Over the last few years, politicians have got used to mouthing some of the language associated with resource efficiency, zero waste and low-carbon wealth creation. But their actions still lack their words, and they are still way off the pace that is now required. So the arrival of Factor Five couldn't be more timely - or more significant."

*Jonathon Porritt, Founding Director, Forum for the Future, UK*

"A significant contribution to the current debate on how to maintain prosperity in a carbon constrained world. Sceptical government and corporate leaders will be surprised to find that a Factor 5 transition to a robust green economy is within their grasp employing various strategies that are both politically and economically attractive."

*Jim MacNeill, Chairman Emeritus International Institute for Sustainable Development and Secretary-General, Brundtland Commission*

"The exciting thing about Factor Five is the combination of boldness and realism. An 80 percent gain in resource productivity is precisely what is needed to get civilization back onto an economic path that is environmentally sustainable. This is a book that should be translated not only into English, Chinese, and German, but all the world's major languages."

*Lester R. Brown, President, Earth Policy Institute*

"The mounting concern about climate change has distracted attention from the fact that CO2 emissions are just part of the existential problem facing humanity. We need urgently to reduce our use of ALL the resources, not just fossil fuels. This new book is the best point of departure I know for doing that. The fivefold increase of resource productivity it describes is impressive, but perfectly feasible, and it would give the world a bit more time to learn how to adapt to ecological collapse. The book has two especially important innovations. The authors deal seriously with the rebound effect, and they base their scenarios on a long term trajectory of rising energy prices."

*Dennis Meadows, Co-author Limits to Growth and 2009 Japan Prize Laureate*

"Is it possible to imagine a world where we can actually phase out fossil fuels before the climate phases us out? It's now feasible by reading Factor Five."

*Peter Newman, Professor of Sustainability, Curtin University and author of 'Resilient Cities'*

"No sustainable development without a sustainable development of companies. Factor Five provides compelling arguments and examples that sustainable business is achievable and profitable on a large scale and that companies play a key role in creating sustainable development. Factor Five confirms the crucial role of increasing eco-efficiency to foster sustainable development."

*Stefan Schaltegger, Professor of Sustainability Management, Leuphana University*

"Some may have ignored the message of Factor Four 15 years ago. We can no longer afford to ignore it, and should now embrace the strengthened message of Factor Five."

*Professor Bedrich Moldan, Senator, Czech Republic, Former Chairman, European Environment Agency, and former Czechoslovak Environment Minister*

"Our urgent imperative is to figure out how to maximize happiness while minimizing environmental impacts. "Factor Five" provides the West and East alike with a compass to set our visions and to measure our progress."

*Junko Eda, Environmental Affairs Journalist, co-Chief Executive, Japan for Sustainability*

"Factor Five is the clearest non-partisan handbook on ecological renaissance available to date. It should be read by every policy maker and practitioner irrespective of their political position on global change."

*Professor Calestous Juma, Harvard Kennedy School*

"We all know what will happen if we go on producing and consuming the same way as in the twentieth century. But we don't really know how to produce and consume in the planet-friendly way. This is why we need this book. So urgently."

*Brice Lalonde, French Climate Ambassador, former Environment Minister of France*

"Factor Five is about how to achieve the resource productivity gains that are necessary for the world to avoid a future with declining human wellbeing. It provides a clear way forward. In the past, the pursuit of efficiency gains has sometimes led to loss of resilience, resulting in unexpected and unwanted outcomes (like salinized irrigation systems). I applaud the Factor Five initiative, and urge it to embrace the equally important goal of maintaining resilience in the face of the looming global shocks confronting the world."

*Dr Brian Walker, CSIRO Research Fellow, Resilience Alliance Program Director and Chair of Board*

"There is a paucity of publications which holistically address the needs seen in pursuing the goal of sustainable development in a realistic way. Factor Five is thus a welcome addition to the body of knowledge and literature available today, since it shows to both policy makers and society as a whole the various solutions and policy options which are available. All we need to do now is to implement them."

*Professor Walter Leal Filho, Hamburg University of Applied Sciences (HAW Hamburg)*

"The Climate Exchange concept has proved that once GHG reductions programs build momentum there is no limit to the innovation and creativity that can be harnessed within companies. And of course innovation will be a critical part of the solution. Factor Five shows the potential for major resource intensive sectors to significantly reduce greenhouse gas emissions in a cost-effective manner. Whether through emissions trading or other market-based mechanisms, our experience at the Chicago Climate Exchange and the European Climate Exchange has made clear that companies that lead to confront the challenge will be leaders in their sectors."

*Richard L. Sandor, Executive Chairman of Climate Exchange plc. (CLE.L), an AIM-listed company which owns the Chicago Climate Exchange, Chicago Climate Futures Exchange and the European Climate Exchange*

"A deeply-researched report on the increasing worldwide potentials of energy and water productivity. The authors are renowned experts in this vital field and show in this book where the greatest improvements are to be found. Essential reading!"

*Hazel Henderson, Author of 'Ethical Markets: Growing the Green Economy', and President of Ethical Markets Media (USA and Brazil)*



**Endorsements for "Cents and Sustainability" (Earthscan 2010):**

"I commend the team from The Natural Edge Project and their partners for undertaking to develop a response to 'Our Common Future' to mark its 20th anniversary. The focus of this new book, 'Cents and Sustainability', is to bring together significant evidence from the last 20 years to demonstrate that environmental and social sustainability and economic growth need not be incompatible but rather can reinforce each other. The book will cover a range of efforts, studies, policies and mechanisms designed to show how effective and proven strategies of achieving social and environmental sustainability are already helping economic growth."

*Dr Gro Harlem Brundtland (Foreword)*

"It gives me great pleasure to contribute this foreword to 'Cents and Sustainability' and support a response by our next generation to the seminal publication Our Common Future, following its recent 20th anniversary. The Natural Edge Project is to be commended for tackling this vitally important issue and highlighting where in the world already communities, regions and nations are creating solutions to this great challenge of our time."

*R. K. Pachauri, Chief of the Intergovernmental Panel on Climate Change (IPCC), accepting the 2007 Nobel Peace Prize on behalf of the IPCC (Foreword)*

"The leitmotif of this book is how to decouple environmental pressures from economic growth while simultaneously making progress towards attaining the millennium development goals. It thus addresses a number of economic, social, and environmental dimensions of sustainable development. The book restates the case for reducing environmental pressures. Failure to do so will entail very high costs to ourselves and future generations; the technological means and the policy tools needed already exist and, in most cases, have been deployed in one country or another; finally, the costs of implementing a decoupling agenda are eminently affordable, amounting to only a few percentage points of future increases in GDP."

*Dr. Kenneth G. Ruffing, formerly Deputy Director and Chief Economist of the OECD Environment Directorate from 2000 to 2005 (Foreword)*

"It is not wise simply to hope that our decision makers will make the right choices, especially given the fact that there are still powerful vested interests who do not want to see a transition to sustainable development. In the end, it is up to each and every one of us to leave as positive a legacy as possible to future generations. Cents and Sustainability, with its inspiring world class success stories, our earlier 1987 report to the United Nations entitled Our Common Future, and free online education and training packages by The Natural Edge Project will help empower you to play your part in helping achieve a sustainable future."

*Jim MacNeill, O.C., Secretary General, World Commission on Environment and Development, and Chief Architect and lead author of Our Common Future (1987) (Introduction)*

"The historical assumption that that green investment comes as a cost to the economy needs to be challenged. Destroying the natural resource base upon which economies thrive, and life depends, has never made for good economics. As the world struggles to recover from one of the worst economic crises in living memory we have an opportunity to promote inclusive and sustainable development based upon green growth, energy efficiency and the sustainable use of natural resources. *Cents and Sustainability* offers a coherent argument and a collection of evidence to show how prudent policies, market innovation and sheer common sense can lead to green development solutions that cost less, destroy less and benefit all. This message of this book is clear. It's time to act!"

*Dr Noeleen Hezyer, Under Secretary-General of the United Nations, and UN Executive Secretary of the Economic and Social Commission for Asia and the Pacific*