CURRICULUM VITAE

OF

DR. DUNCAN SEDDON

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DATE OF BIRTH: October 10th, 1948
NATIONALITY: Dual Citizenship - United Kingdom and Australia
STATUS: Married, three children; three grandchildren

ACADEMIC QUALIFICATIONS AND HONOURS

1967-1970 B.Sc. Sp. Hons. (First Class), Chemistry; The University of Sheffield, U.K.
1970-1973 Ph.D. (Sheffield) "Some π-cyclopentadienylnitrosyl complexes of Molybdenum and Ruthenium".
1973-1974 Personal Fellow of the Science Research Council; Fellowship held at Imperial College, London.
1987 Fellow of the Royal Australian Chemical Institute.

EXPERIENCE AND STATUS

Principal of Duncan Seddon and Associates Pty. Ltd.

Consultancy services in the energy, petrochemical and legal sector on all aspects of coal and hydrocarbon processing, energy utilisation and technology. Consultancy services cover four main areas:

1. Advice as an expert to legal and government regulatory bodies concerning the hydrocarbon processing industry - refineries and petrochemical operations and their products and use. Recent projects are detailed below.

2. Coal to Liquids (CTL) and Gas to liquids (GTL) advice concerning specific options or proposals for development of coal and gas reserves. This includes both methanol and methanol derivatives - DME, methanol to gasoline and methanol to olefins as well as the Fischer-Tropsch route to fuels and chemicals (ammonia). Activities in this are fully described below.

3. Consultancy services concerning the economics of hydrocarbon processing and product delivery including the supply and cost of alternative feed stocks.

4. Training seminars and workshops on the above subjects. These are detailed below.

As an independent consultant I am on the panel of consultants for the “Gerson Lehrman Group – Consulting Management Platform” with the status of “Leader” (top 5%). This platform provides rapid advice to finance and investment company staff (telephone

conversations). Some of the assignments expand to Due Diligence advice involving extensive analysis of particular companies and projects. Because of the nature of this investment advice the projects are confidential.

1988-2000 Founder and Managing Director of Hindsford Pty. Ltd.

The objectives of Hindsford were to promote the development of a natural-gas to synthetic fuels industry utilizing under used gas and pipelines in Australia and elsewhere. Activities included the worldwide promotion of the use of small specially designed modules to convert gas into synthetic crude, diesel or wax, and the promotion of the use of fuel methanol as a vehicle for converting large gas reserves into electric power at distant sites (see recent conference publications).

Through Hindsford, I provided consulting services to the energy sector, including performing detailed technical and economic appraisals of, and give courses on competing technology and perform feasibility studies of prospective energy developments. I also acted as a consultant to groups and individuals in the patents field and organizations concerned with increasing R&D effectiveness and with the environmental impact of chemicals and hazardous materials.

1982-1987 Broken Hill Proprietary Co. Ltd., 140 William Street, Melbourne.

Coordinator of a research team (of 10 graduates and 5 support staff) at the Company's Melbourne Research Laboratories. This was a wide ranging position, since I was the prime-mover responsible for both the technical development and management of the Company's gas conversion research program.

1980-1982 : ICI (Australia) Pty. Ltd., 1 Nicholson Street, Melbourne.

I was seconded to ICI (Australia) Research Department to build a team aimed at research and evaluation of new routes to petrochemicals from coal or natural gas. I was responsible for the transfer of "know-how" on heterogeneous catalysis (zeolites) methods of evaluation and economic models for the evaluation of results. In the latter, regard, I developed an interactive computer model for the economic assessment of various coal, natural-gas or oil based technologies utilising Australian resources. In this period the research involved close collaboration with CSIRO, which taught me the methods of operation, strengths and weaknesses of Government sector research and development.

1974-1980: ICI (Petrochemicals Division), The Headquarters, Wilton, Cleveland, United Kingdom.

1974: Research into the fundamental properties of polymerisation catalysts.

to 1978: Promoted to lead a team (of ten staff) in the development of new catalysts for the aromatics business

Energy Manager, Oil Works, Billingham. My prime role was to define the Works energy saving strategy aimed at saving 5% per annum for 5 years of the Works GBP 10m energy bill.

PROFESSIONAL ACTIVITIES

As a professional scientist, I am a Fellow of the Royal Australian Chemical Institute. I have served as the Chairman of the Institute's Solid State Division and have served on the Institute's Executive Council.

I have acted as a referee on two international journals, Applied Catalysis and Journal of Catalysis and have served a period as a member of the editorial board of The Australian Journal of Chemistry from 1987 to 1993.

I am a member of the Society of Petroleum Engineers (SPE).

From June 1998 to 2001, Committee Member of the Biological Committee of the AusIndustry IR&D *Start* Program.

From June to November 2002, served on the "CRC (Co-operative Research Centres) - Technical Panel" (Department of Education, Science and Training (DEST).

I am the author of over 120 scientific papers, patents and articles. I act as a peer reviewer for the *Journal of Catalysis.*

OTHER ACTIVITIES

I am a trustee for a DIY superannuation fund. I am an active member of the Australian Shareholders Association and serve in its Victorian Monitoring group as the Monitor for Rio Tinto Ltd, BHP Billiton Ltd., Karoon Energy Ltd., and Syrah Resources Ltd.

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PUBLICATIONS

Commercially published books:

"Gas Usage and Value - The Technology and Economics of Natural Gas Use in the Process Industries", PennWell Books, Tulsa OK, 2006 ISBN 1-59370-073-3

"Petrochemical Economics - Technology Selection in a Carbon Constrained World," Imperial College Press, London, 2010, ISBN-13 978-1-84816-534-2

" Hydroprocessing Catalysts and Processes- The Challenges for Biofuels Production" edited by Bo Zhang and **Duncan Seddon**, World Scientific Publishing, 2018, ISBN 978-1-78634-483-0

"The Hydrogen Economy, fundamentals, technology, economics" World Scientific Publishing, 2022

"SAF and Biofuels - technology, economics and prospects", World Scientific Publishing, to be published 2025

Book Chapters:

D. Seddon "Methanol and dimethylether (DME) production from synthesis gas" in *Advances in clean hydrocarbon fuel processing*, (M.R. Kahn ed.) Woodhead Publishing , 2011

D. Seddon and M, C. Clarke, "Energy Security in Australia" in *Next Generation Disaster and Security Management*, (Clarke & Griffin eds.), Australian Security Research Centre, 2014

Peer Reviewed Technical Papers

1. Chemistry of π-cyclopentadienyl nitrosyl molybdenum complexes; III, Dichloro and dibromo compounds and their Lewis base adducts.
   J.A. McCleverty, **D. Seddon**.
   J. Chem. Soc. Dalton Trans., 1972 **(22**) 2526
2. Chemistry of π-cyclopentadienyl nitrosyl molybdenum complexes; IV, Compounds containing bridging sulphur ligands.
   J.A. McCleverty, **D. Seddon**.
   J. Chem. Soc. Dalton Trans., 1972 **(23)** 2588
3. Electrochemical oxidation of thio-bridged binuclear π-cyclopentadienyl complexes of molybdenum, iron, cobalt, and nickel.
   P.D. Frisch, M.K. Lloyd, J. A. McCleverty, **D. Seddon**.
   J. Chem. Soc. Dalton Trans., 1983 **(21)** 2268
4. Molybdenum nitrosyl complexes containing bridging hydrazido groups. X-ray analysis of the structure of bis (π-cyclopentadienyl) - μ-(dimethyl hydrazido) diiododinitrosyl dimolybdenum.
   W.G. Kita, J.A. McCleverty, B.E. Mann, **D. Seddon**, G.A. Sim, D.I. Woodhouse.
   J. Chem. Soc., Chem. Commun., 1974 **(4)** 132

5. Chemistry of bis (cyclopentadienyl) nitrosyl molybdenum complexes. Hydrazide derivatives.
   W.G. Kita, J.A. McCleverty, **D. Seddon.**
   J. Less-Common Metals, 1974 **(36)** 203
6. Arylazo, aryldiimide, and isocyanide complexes of ruthenium.
   J.A. McCleverty, **D. Seddon**, R.W. Whitely.
   J. Chem. Soc. Dalton Trans., 1975 **(9)** 839
7. The Chemistry of cyclopentadienyl and related nitrosyl complexes of molybdenum. Part V. Dihalogenonitrosyl (tris (pyrazolyl) borato-molybdenum complexes, their alcoholysis, and the crystal structure of chloronitrosylisopropoxytris(4-chloro-3,5-dimethylpyrazolylborato) molybdenum.
   J.A. McCleverty, **D. Seddon**, N.A. Bailey, J.N. Walker.
   J. Chem. Soc. Dalton Trans., 1970 **(10)** 898
8. Dicarbonyl η^5-cyclopentadienyalnitrosylmolybdenum and bis (dihalo-η^5-cyclo-pentadienylnitrosylmolybdenum) derivatives.
   D. Seddon, W.G. Kita, J. Bray, J.A. McCleverty.
   Inorg, Synth., 1976 **(16)** 24
9. The chemistry of cyclopentadienylnitrosyl compounds of molybdenum. Part 13
   E.A. Rae, **D. Seddon**, D. Swann, J. Williams
   J. Chem. Soc. Dalton Trans., 1979 **(11)** 1819
10. Chemistry of bis (cyclopentadienyl)nitrosylmolybdenum complexes. Hydrazide derivatives.
    W.G. Kita, J.A. McCleverty, **D. Seddon**
    Chemistry and Uses of Molybdenum, Proc. of Conf. (1st) P.C.H. Mitchell (ed.) 1974, 109. Climax Molybdenum Co. Ltd. London.
11. The Effect of Aromatics on Methanol Conversion over Zeolite Catalysts.
    T. Mole, J.A. Whiteside, **D. Seddon**.
    J. Catal. 1983 **(82)** 261
12. The Properties of Magnesium and Zinc Oxide Treated ZSM-5 Catalysts for Conversion of Methanol into Olefin Rich Products.
    R.J. McIntosh, **D. Seddon**.
    Applied Catal. 1983 **(6)** 327
13. The Conversion of Aromatics over Dealuminised Mordenites.
    D. Seddon
    Applied Catal. 1983 **(7)** 327
14. Conversion of Methanol to Hydrocarbons over ZSM-5 Zeolite. An Examination of the Role of Aromatic Hydrocarbons using 13Carbon and Deuterium Labeled Feeds.
    T. Mole, G. Bett, **D. Seddon**.
    J. Catal., 1983 **(84)** 435
15. Ketones, Carboxylic Acids and Esters from Conversion of Aqueous Methanol over H-ZSM-5 Zeolite.
    S. Deane, K. Wilshier, R. Western, T. Mole, **D. Seddon**
    J. Catal., 1984 **(88)** 499
16. The Conversion of Natural Gas to Transport Fuels: An Appraisal of Present Technology.
    D. Seddon
    BHP Tech. Bull., 1983 **(27)** 84
17. Channel Arrangements and Activity of Some ZSM Zeolites
    K. Foger, J.V. Sanders, **D. Seddon**
    Zeolites, 1984 **(4)** 337

18. The Mechanical and Thermal Expansivity of Fu-1 Zeolite Pellets and a Method of Determining the Strength of Pellets under Simulated Full Scale Operation.
    P.M. Paxton, **D. Seddon.**
    Applied Catal., 1984 **(12)** 179
19. The Hygroscopic Properties of H-ZSM-5
    S.G. Hill, **D. Seddon**
    Zeolites, 1985 **(5)** 173
20. Further Comments on Aromatic Hydrocarbon Participation in Methanol Conversion
    T. Mole, **D. Seddon**
    J. Catal., 1985 **(93)** 207
21. Selectivity for para-Xylene in the Isomerisation of Xylenes Catalysed by Zeolites with Ten-Ring Windows
    D. Seddon
    J. Catal., 1986 **(98)** 1
22. The Design and Construction of a Multichannel Microreactor for Catalyst Evaluations
    J.G. Creer, P. Jackson, G. Pandy, G.G. Percival, **D. Seddon**
    Applied Catal., 1986 **(22)** 85
23. The Conversion of Ethene and Propene to High Hydrocarbons over ZSM-5.
    S. Bessell, **D. Seddon**
    J. Catal., 1987 **(105)** 270
24. Equilibrium Sorption of Paraffins in HZSM-5
    R. Arbuckle, S.G. Hill, **D. Seddon**
    Zeolites, 1987 **(7)** 438
25. The Crystal Size and Morphology of Silicalite as Influenced by Gel Nucleation Temperature, Alkalinity and Sodium Chloride Concentration.
    S.G. Hill, K. Kinson, **D. Seddon**
    Aus. J. Chem., 1988 **(41)** 783
26. The Conversion of Propylene into Gasoline and Middle Distillate using Alkalised ZSM-5 Zeolite Catalysts.
    J.M. Baker, S. Bessell, **D. Seddon**
    Applied Catal., 1988, **45**, L1
27. The Conversion of Natural-Gas Condensate into Aromatics using Promoted Zeolite Catalysts.
    G. Berti, J.E. Moore, L. Salusinszky and **D. Seddon**
    Aus. J. Chem., 1989, **42,** 2095
28. Paraffin Oligomerisation to Aromatics.
    D. Seddon
    Catalysis Today, 1990, **6**, 351
29. Economics of Gas Conversion Projects in the North Sea and Barents Sea.
    D.D.J. Antia and **D. Seddon**
    Society of Petroleum Engineers paper SPE 20937, presented at Europec 90.
    The Haag, Netherlands, 22-23 October 1990.
30. Comparison of the Sorption of Benzene in ZSM-5, Silicalite-1 and Silicalite-2
    S.G. Hill and **D. Seddon**
    Zeolites, 1991, **11**, 699
31. Reformulated Gasoline Opportunities for New Catalyst Technology
    D. Seddon
    Catalysis Today, 1992, **15**, 1
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Conference Proceedings and Grant Reports

1. New Fischer Tropsch Routes for the Conversion of Australian Natural Gas to Transport Fuels.
   P.J. Jackson and **D. Seddon**
   12th Australian Chemical Engineering Conference, CHEMICA 84, Melbourne, 1984, p.641.
2. The Conversion of Light Hydrocarbons to Liquid Fuels.
   S.G. Hill, G.G. Percival, **D. Seddon** and S.C. Thompson
   National Energy Research, Development and Demonstration Program; End of Grant Report NERDDP/EG/84/337, June 1984
3. Technologies for the Conversion of Natural Gas.
   P.J. Jackson, **D. Seddon**, and N. White
   Proc. Aust. Inst. Energy Nat. Conf. Melbourne 1985, p.233.
4. A Comparison of Process Routes for the Production of Transport Fuels from Natural Gas.
   P.J. Jackson and **D. Seddon**
   13th Australian Chemical Engineering Conference, CHEMICA 85, Perth, 1985, p.7.
5. Catalytic Conversion of Light Hydrocarbons to Liquid Fuels.
   D. Seddon
   National Energy Research, Development and Demonstration Program; End of Grant Report NERDDP/EG/87/664, December 1986
6. The Conversion of Australian Natural-Gas into Transport Fuels
   D. Seddon
   Chemistry in Australia, 1987, **54**, 202
7. Australian Research on the Conversion of Natural Gas Condensates and LPG into Aromatic Gasoline
   D. Seddon
   Chemistry in Australia, 1988, **55**, 281
8. Opportunities and Economics of the Mass Production of Methanol in South East Asia.
   D. Seddon
   National Conference on the Clean Air Act and Reformulated Fuels, October 1990, Washington DC
9. Maximising Profit from LPG Streams
   D. Seddon
   Offshore Australia (2nd Australian International Oil, Gas and Petrochemical Exhibition and Conference), Melbourne, November 1993
10. Offshore Refining: A Cost Effective Approach for Treating Associated Gas
    D.D.J. Antia and **D. Seddon**
    Society of Petroleum Engineers Paper No. SPE 28858, presented at EUROPEC 94
11. Technology and Economics of Gas Utilization: Methanol
    D. Seddon
    Society of Petroleum Engineers Paper No. SPE 28790 presented at SPE Asia Pacific Oil & Gas Conference, Melbourne 1994
12. Exploiting New Opportunities for Cost Reduction and Addition of Value through Conversion of Offshore Gas to Oil.

D.D.J. Antia and **D. Seddon**
Strategy and Economics in the North Sea (SECONS94), IIR Ltd Conference, London, November 28-29, 1994

13. Gas Conversion: An Economic Alternative to Gas Reinjection
D.D.J. Antia and **D. Seddon**
Offshore South East Asia (Paper OSEA 94003), presented at OSEA, 10th Conference and Exhibition, Singapore, December 6-9th., 1994
14. Maximising Profit from LPG Streams: Economic Comparison of Alternative Use: II
D. Seddon
Refining, LNG and PetrochemAsia94, Singapore, December 7-8th., 1994
15. Offshore Conversion of Associated Gas to Synthetic Crude Oil: An Economic Option for Deep Water and Marginal Fields.
D.D.J. Antia and **D. Seddon**
Offshore Technology Conference (OTC Paper 7868), Houston, May 1995
16. Improving the Economics of Developing Very Deep Water Fields through the Conversion of Associated Gas to Crude Oil.
D.D.J. Antia and **D. Seddon**
Deeptec '95, an IIR conference, Aberdeen, February 1995
17. Feedstock Quality and Profits
D. Seddon
First Annual Condensate Forum, Penang, Malaysia, Oct 31 - Nov.1 1996
18. The Increasing Use of LPG Feedstock - Impact on LPG Pricing
D. Seddon
LPG ASIA '97, Hyatt Regency Singapore, September 15-17, 1997
19. Low Cost 10MMcf/d Gas to Syncrude Plant for Associated Gas
D.D.J. Antia and **D. Seddon**
Offshore Technology Conference, Houston May 4-7, 1998
20. What Price Hydrogen?
D. Seddon
Chemica 2004, Australian Technology Centre, September 27-30, 2004
21. Why is GTL So Expensive?
D. Seddon
SPE Asia Pacific Oil & Gas Conference, Perth, 18 - 20 October 2004. SPE Paper 88632
22. What Price Solvent
D. Seddon
SCAA Conference, Melbourne July 2005
23. Will GTL Economics and Technology Ease the Refining Sector or Compete with It?
D. Seddon
International Refinery Forum, Le Meridian Hotel and Spa, Dubai, UAE, December 2005
24. The Opportunities for Small Scale GTL for Eliminating Associated Gas
D. Seddon
Middle East Gas Summit (MEGAS), The Intercontinental Hotel, Doha, Qatar, February 19-21, 2006.
25. Hydrogen and Coal Hydrogenation - The Missing Links?
D. Seddon
Australian Journal Of Mining Coal Conference, Hyatt Perth, March 2006
26. The Hydrogen Economy: Economics of Hydrogen Production From Natural Gas
D. Seddon
SPE Asia Pacific Oil & Gas Conference and Exhibition, Adelaide 11-13 September 2006. SPE Paper 101703

27. Is LNG Competitive?
D. Seddon
Australian Journal Of Mining Coal Conference, Novotel, Brisbane, February 2008.
28. Can Gas Compete with Coal?
D. Seddon
"Gas World Australia", Terrapinn Conference, Sheraton, Perth, November 2008
29. "GTL - Where is the Industry Going"
D. Seddon
The 4th. Annual Coal to Liquids and Gas to Liquids Conference, Brisbane, February 2009
30. Some Aspects of the Impact of Carbon Pricing on Coal Based Industries
D. Seddon
World Petro-Coal Congress, Meridian Hotel, New Delhi, February 2011.
31. Naphtha from Coal: A Potential New Feedstock
D.Seddon
16th. Condensate and Naphtha Forum, Langkawi, Malaysia, March 2012
32. Selling GTL -Some Observations on Selling GTL products
D. Seddon
SMi GTL Conference, Marriott Hotel. London, October 2012
33. Some Does and Don'ts of Converting Coal and Biomass to Liquids
D. Seddon
World GTL Congress, Doha, January 2013
34. Selling GTL -Some More Observations on Selling GTL products
D. Seddon
SMi GTL Conference, Millennium Gloucester Hotel London, October 2013
35. Cleaning Underground Coal gasification Synthesis Gas, Prospects and Challenges
D. Seddon and M. Clarke
3rd. IEA Workshop on Underground Coal Gasification, Brisbane, Australia, November 7&8, 2013
36. The Value of Naphtha in Steam Cracking
D. Seddon
IRPC 2014 Verona, June 2014
37. Helium as a Driver for Gas Field Development
D. Seddon, M. Clarke and G. Ambrose
IRPC 2015 Abu Dhabi, June 2015
38. Carbon Sourcing for XTL and Gasification
D. Seddon, M. Clarke
9th International Freiberg Conference on IGCC & XtL Technologies, Closing the Carbon Cycle, 3-8 June 2018, Berlin, Germany
39. Chemical Economics in a Time of Volatile Prices
D. Seddon,
IRPC Europe, 6th June, Milan, 2018

Articles in Trade Magazines and Newspapers

1. Asian LPG - Comparing the Value of LPG Streams - Economics of LPG Use as a Feedstock for Gasoline, Chemicals and Power
D. Seddon
Hydrocarbon Asia, September 1995, p.80
2. Assessing the Value of Naphtha

D. Seddon
Singapore Oil Report, June 1995, p.8

3. Lubricating Oil Production: Selecting the Right Crude
   D. Seddon
   Singapore Oil Report, September 1995, p.8
4. Tech Problems with Emissions
   D. Seddon
   Australian Financial Review, April 7th. 1995, p.29
5. Huge Risks in Push to Lift LNG Exports
   D. Seddon
   Australian Financial Review, July 6th. 1995, p.19
6. Smog and Grog Add Fuel to the Ethanol Debate
   D. Seddon
   Australian Financial Review, April 7th. 1995, p.29
7. Fuelling the Excise Debate
   D. Seddon
   Australian Financial Review, January 17th. 1996, p.15
8. Gas Conversion to Syncrude
   David Antia and **D. Seddon**
   World Expro 1996, p.87
9. Increasing Use of LPG as a Petrochemical Feedstock - Impact on LPG Pricing
   D. Seddon
   LPG Asia 97, (IBC Conference), Singapore, 15-17 Sep., 1997
10. LPG Pricing Considered
    D. Seddon
    Hydrocarbon Asia, Nov/Dec. 97, p.38
11. The Manufacture of Aromatics in the Far East
    D. Seddon
    Hydrocarbon Asia, March 1998, p. 42
12. Can New Ethylene Plants Be Profitable
    D. Seddon
    Plastics International News, September 1999. p. 38
13. Ethylene margins in a period of Low Oil Prices: Signposts to Improving Profits
    D. Seddon
    Hydrocarbon Asia, September 1999. p. 32
14. Singapore To Become a Major Regional Force in Petrochemicals
    D. Seddon
    Plastics International News, December 1999. p. 12
15. Oil Refinery Rationalisation Will Be Risky and Costly
    D. Seddon
    Australian Financial Review, December 12th. 1999, p.17
16. Kyoto May Stall Virgin
    D. Seddon
    Australian Financial Review, December 16th. 1999, p.17
17. Other Fuel Disasters in the Pipeline
    D. Seddon
    Australian Financial Review, January 14th. 2000, p.37
18. Let's Lower Fuel Excise
    D. Seddon
    Australian Financial Review, February 22nd., 2000, p.19

19. Indonesian Petrochemicals: Down But Not Out
    D. Seddon
    Plastics International News, March 2000. p. 14
20. Japan Still Leads in Asian Petrochemicals
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21. Plenty in the Kitty for Fuel Cuts
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    Australian Financial Review, August 23, 2000
22. Excess Polyolefin Capacity in South Korea
    D. Seddon
    Plastics International News, September 2000. p. 16
23. Time to Stop wasting Money on Rebates
    D. Seddon
    Australian Financial Review, October 4th., 2000
24. Sell Low, Buy High: Its Good Business
    D. Seddon
    Australian Financial Review, December 5th., 2000
25. Price Rises Spur Growth in Thailand
    D. Seddon
    Plastics International News, December 2000. p. 28
26. Plastics and Biotech - A Tale of Two Industries
    D. Seddon
    Plastics International News, March, 2001,. p. 27
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    D. Seddon
    Plastics International News, May 2001, p. 21
28. Singapore Revisited
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    Plastics International News, August 2001, p. 18
29. Australia has the potential for an export-based petrochemical operation
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    Plastics International News, September 2001, p. 30
30. Major Ethylene Plants planned for China
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    Plastics International News, March 2002, p. 22
31. India Now a Major Regional Petrochemical Force
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32. Polymer Supply in Australia: Where to Now?
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    Plastics International News, October 2002, p. 6
33. Big Projects Torpedoed by Lack of Expertise
    D. Seddon
    Australian Financial Review, June 6th., 2003
34. China Gas Deal will Snuff Kyoto Protocol
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    Australian Financial Review, November 5th., 2003
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36. Gas to Olefins...a potential new industry for Australia
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37. Resin Prices Higher in Australia....
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38. Petrochemical Plants in the US
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39. US Driving Season Pumps up Fuel Prices
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40. A 2004 Review of Ethylene Production in the Far East
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41. How is the rise in oil price affecting olefin and polymer prices?
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42. Long Distance Pipelines in the Petrochemical Industry
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43. The impact of oil price on olefin and polymer prices...an update
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44. Rising oil price puts pressure on coal
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45. Coal industry bedevilled by lack of information
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47. Is the import of ethane into Australia feasible?
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48. Free Trade with China - opportunities and threats to the Australian plastics industry.
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Plastics International News, July 2005, p. 34
49. Oil blame game is too crude
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Australian Financial Review, September 26th., 2005
50. A future for the Australian petrochemical industry
D. Seddon
Plastics International News, September 2005**,** p. 47
51. West powerless as energy policy decays
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Australian Financial Review, February 2nd, 2006
52. Middle East set to dominate world supply and price

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Plastics International News, June 2006**,** p. 21

54. Chemical production in China 2006-
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Plastics International News, December, 2006, p. 4

55. Chemical and resin prices 2006
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56. Proposals won't stop emissions
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Australian Financial Review, September 20th. 2007

57. Coal holds the carbon trading ace
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Australian Financial Review, May 12th 2008

58. Electricity Prices Set to Double
D. Seddon
Australian Financial Review, Sep. 24th 2008

59. Black Power - or why carbon trading will not work
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Australian Power Technologies - Energy Generation, July- September 2009, p. 32

60. Gas Push will inflate emissions
D. Seddon
Australian Financial Review, Feb 8th, 2011

61. Status of DME as an alternative fuel
D. Seddon
Australian Power Technologies - Energy Generation, October-November, 2011

62. Do Wind Farms/Gas Turbines Save Carbon?
D. Seddon
Australian Power Technologies - Energy Generation, October-December, 2013

63. The cost of wind/gas generation at a time of rising gas price
D. Seddon
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64. Do wind-farm/gas generators emit more carbon dioxide than coal generators?
D. Seddon
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65. Helium, will it be the next mineral to boom in Australia
M. Clarke, **D. Seddon** and G. Ambrose
AusIMM Bulletin, No. 6, December 2014, p.83-85

66. Characterising competitive advantage
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Chemistry in Australia, March 2015, p. 36

67. Mineral processing at the margins
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68. Steam cracking: how do we stack up?
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69. Biofuels and biochemicals
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70. New coal chemistry
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71. Biodiesel and by-products - glycerine
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72. Declining refineries
D. Seddon
Chemistry in Australia, September 2015, p. 36
73. Are LNG exports more valuable than the chemical industry
D. Seddon
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74. Fuel, chemical and commodity prices
D. Seddon
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75. Lithium production
D. Seddon
Chemistry in Australia, March 2016. p. 34
76. Graphite and graphene production
D. Seddon
Chemistry in Australia, April 2016. p. 36
77. Lessons learned from underground coal gasification technology
D. Seddon
Chemistry in Australia, October 2016. p. 36
78. Montreal and Kyoto - a personal view of two protocols
D. Seddon
Chemistry in Australia, November. p. 38
79 Ammonia - Fertilzer Production at the Crossroads
D. Seddon
Chemistry in Australia, February 2017
80. Hydrogen: Fuel of the (Far Distant) Future
D. Seddon
Chemistry in Australia, March 2017
81. Volatility in the Methanol Market
D. Seddon
Chemistry in Australia April 2017
82. Controlling Petrol Additives
D. Seddon
Chemistry in Australia, May 2017
83. The Energy Saga
D. Seddon
Chemistry in Australia, July 2017
84. The New World of Electric Cars
D. Seddon
Chemistry in Australia, October 2017
85. Separating CO2 in Industry
D. Seddon

Chemistry in Australia, November 2017

86. Removing CO2 from Flue Gas
D. Seddon
Chemistry in Australia, December/January 2018

87. Carbon Dioxide Disposal
D. Seddon
Chemistry in Australia, February 2018

88 Research, Development, Demonstration and Commercialisationl
D. Seddon
Chemistry in Australia, March 2018

89. Growth in Lithium Demand
D. Seddon
Chemistry in Australia, April 2018

90. Reducing Landfill
D. Seddon
Chemistry in Australia, July-August 2018

91. Lithium, Graphite and New Technology
D. Seddon
Chemistry in Australia, November-December, 2018

92. Helium in Australia
M.C. Clarke, **D. Seddon,** G. Ambrose, C. Boreham and D. Warner
PESA News, January-March 2019

93. Gasoline (petrol) additives - update
D. Seddon
Chemistry in Australia, March/April 2019

Patents and Patent Applications

(Open for Public Inspection)

1. Transalkylation of alkylaromatic hydrocarbons over a silica containing catalyst, Fu-1.
D. Seddon
GB 1,599,423 (ICI Ltd)
2. Isomerisation of alkylbenzenes using a catalyst comprising Fu-1 zeolite and antimony oxide.
D. Seddon
GB 2,006,262 (ICI Ltd)
3. Alkylbenzene isomerisation using ion-exchanged Fu-1 zeolite as catalyst.
D. Seddon
GB 2,006,818 (ICI Ltd)
4. Hydrocarbon synthesis from methanol - using zeolite catalyst and hydrocarbon promoter.
D. Seddon, T. Mole, J. Whiteside
WO 8201866 (ICI Australia Ltd and CSIRO)
5. Ferrierite type synthetic zeolite Fu9
D. Seddon, T.V. Whittam
EP 55,529 (ICI plc).
6. Alkane and oxygenate production from alcohols by reaction with water and aromatic cpd. on zeolite catalyst.

D. Seddon, T. Mole, K.G. Wilshier
AU 8313449 (ICI Australia Ltd and CSIRO)

7. Conversion of methanol feedstock to hydrocarbon compounds - using H-ZSM-5 zeolite, forming high proportion of ethylene.
   D. Seddon, T. Mole
   AU 8285988 (ICI Australia Ltd and CSIRO)
8. Catalytic conversion of lower olefins to gasoline - using catalyst containing modified zeolite having basic cationic sites.
   D. Seddon, S. Bessell.
   GB 2,136,013; US 4,675,460; AU 24554/84
9. Olefinic gasoline preparation from light olefinic feedstock - by contacting with ZSM-5 zeolite containing sodium or potassium with added diluent to lower processing costs.
   D. Seddon
   GB 2,156,380; US 4,695,670 (BHP Ltd and CSIRO)
10. Kerosine and distillate range fuels oligomerised for propylene - using atmospheric pressure below 300^{o}C with H-ZSM-5.
    D. Seddon, G.G. Percival
    GB 2,156,381 (BHP Ltd and CSIRO)
11. Production of Gasoline
    D. Seddon
    US Pat. 4,695,670 (to BHP Ltd and CSIRO)
12. Metal-Zeolite Catalysts
    D. Seddon
    Aus. Pat. Appl. 52153/86
13. Methanol to Distillate
    K. Kinson and **D. Seddon**
    Aus. Pat. Appl. 61171/86
14. Methanol and Directly Reduced Iron Production
    D. Seddon
    Aus. Pat. 582897
15. An Improved Fischer-Tropsch Process
    D. Seddon and S.G. Hill
    AU PI5969
16. Catalysts for Olefin and Paraffin Conversion
    D. Seddon.
    PCT/AU89/00173
17. Natural Gas to Liquid Products
    D. Seddon
    AU 35090/89
18. A Process for Producing Wax
    D. Seddon
    AU 29777/92
19. A Process for Recovering Crude Oil
    D. Seddon
    AU 57666/94

Other Publications

Through Hindsford and Duncan Seddon & Associates, I have published the following Monographs and Books.

1. The Conversion of Natural-Gas into Chemicals and Transport Fuels - A Guide to Opportunities in the Australian Region. October 1988
2. The Conversion of Natural-Gas into Chemicals and Transport Fuels - A Guide to Opportunities in Australasia. (2nd. Edition) April 1990
3. Methanol - Economics of Production - Comparison of Energy Transport by Gas pipeline, LNG and Methanol, Opportunities on the Pacific Rim, June 1991.
4. Ethylene - Economics of Production, Comparison of Technology from Ethane, LPG, Naphtha and Gas-Oil; April 1992
5. MTBE - Technology and Economics of Production: June 1992
6. LPG - Comparing the value of LPG Streams: Economics of LPG Use as a Feedstock for Gasoline, Chemicals and Power; July 1993
7. LPG - Comparing the value of LPG Streams: Economics of LPG Use as a Feedstock for Gasoline, Chemicals and Power; Second Edition; November 1994
8. Gas Utilization, November 1997
9. Gas Usage and Value, April 2004

SEMINARS, WORKSHOPS AND COURSES

1. "NAPHTHA PRICING", IBC Asia Ltd., Omni Marco Polo. Singapore, November 1995

2. "ETHYLENE - SELECTING FEEDSTOCKS TO MAXIMISE PROFITS", IBC Asia Ltd., Regent Hotel Bangkok and the Omni Marco Polo, Singapore, November, 1995

3. "SELECTING FEEDSTOCK FOR THE THAI PETROCHEMICAL INDUSTRY", Petroleum Institute of Thailand, Hilton Hotel, Bangkok, March 1996

4. "VALUING AND PRICING GAS TO DOWNSTREAM USERS", IBC Asia Ltd., Hilton International, Jakarta, and Hilton International, Kuala Lumpur, July 1996

5. "REFINERY OPERATIONS AND ECONOMICS", Woodside Energy Ltd., 1 Adelaide Tce., Perth, February 1997

6. "THE PRICING AND MARKET OF NAPHTHA: IMPACT ON ETHYLENE SUPPLY", IBC Asia Ltd., Hilton International, Bali, November 1997

7. "ETHYLENE - SELECTING FEEDSTOCK TO MAXIMISE PROFIT", IBC Asia Ltd., The Regent, Bangkok, September 1998

8. "REFINERY AND PETROCHEMICAL PROCESSING", RMIT University, Swanson St., Melbourne, July/August 1999

9. "FEEDSTOCK PRICING - LPG, NAPHTHA AND ETHYLENE", IBC Asia Ltd., The Oriental Hotel, Singapore 1999, December 1999

10. "REFINERY AND PETROCHEMICAL PROCESSING", RMIT University, Swanson St., Melbourne, July/August 2000

11. "FUEL HARMONISATION" IBC Asia Ltd., The Oriental, Singapore, November 2000

12. "THE ASIA ETHYLENE, DERIVATIVES AND PETROCHEMICALS STRATEGIC SEMINAR", IBC Asia Ltd., The Oriental Hotel, Singapore, April 2001

13. "REFINERY AND PETROCHEMICAL PROCESSING", RMIT University, Swanson St., Melbourne, July/August 2001

14. "CLEAN FUELS - FUEL HARMONISATION - FUEL CELLS -CNG", IBC Asia Ltd., Sheraton Towers, December 2001

15. " LPG STRATEGY SEMINAR", IBC Asia (S) Pte. Ltd., Sheraton Grande Sukhumvit, Bangkok, May 2002

16. "HYDROCARBON PROCESSING", RMIT University, Swanson St., Melbourne, July/August 2002

17. "CLEAN FUELS 2002", IBC Asia (S) Pte. Ltd., JW Marriott Hotel, Kuala Lumpur, December 2002

18. "IMPROVING BOTTOMLINES & OPTIMISING OPERATIONS IN PETROCHEMICAL PLANTS AND REFINERIES 2003", IBC Asia (S) Pte. Ltd., Swissotel Merchant Court Hotel, Singapore, December 2003

19. "GAS-TO-LIQUIDS (GTL)", IBC Asia (S) Pte. Ltd., JW Marriott Hotel, Kuala Lumpur, Malaysia, November 2004

20. "FEEDSTOCK AND PRODUCT PRICING, COST ECONOMICS & PRODUCTION OPERATIONS IN A TIME OF HIGH OIL PRICE" , IBC Asia (S) Pte. Ltd., Sheraton Grande Sukhumvit Hotel, Bangkok, March 2005

21. "GAS-TO-LIQUIDS (GTL)" IBC Asia (S) Pte. Ltd., Conrad, Bangkok, June 2005

22. "REFINING ECONOMICS", IBC Gulf Conferences, Le Royal Meridien Beach & Spa Hotel, Dubai UAE, December 2005

23. "GAS-TO-LIQUIDS (GTL)", IBC Asia (S) Pte. Ltd., Crown Plaza Mutiara Hotel, Kuala Lumpur, December 2005

24. "FEEDSTOCK AND PRODUCT PRICING, COST ECONOMICS AND REFINERY REVAMPS", IBC Asia (S) Pte. Ltd., Renaissance Hotel, Kuala Lumpur, December 2005

25. "GTL ECONOMICS", IBC Gulf Conferences, The Intercontinental Hotel, Doha, Qatar, February 2006

26. "GAS-TO-LIQUIDS & COAL-TO-LIQUIDS MASTERCLASS", Australian Journal of Mining (AJM Conference), Hyatt Regency, Perth, March 2006

27. "FEEDSTOCK AND PRODUCT PRICING, COST ECONOMICS AND REFINERY REVAMPS", IBC Asia (S) Pte. Ltd., Crowne Plaza Mutiara, Kuala Lumpur, July 2006

28. "GAS-TO-LIQUIDS (GTL)", IBC Asia (S) Pte. Ltd., Crown Plaza Mutiara Hotel, Kuala Lumpur, July 2006

29. "VALUING COAL SEAM GAS IN THE PROCESS INDUSTRIES" Australian Journal of Mining (AJM Conference), Novotel Brisbane, November 2006

30. "GAS-TO-LIQUIDS (GTL)", IBC Asia (S) Pte. Ltd., The Westin, Kuala Lumpur, March 2007

31. "GAS-TO-LIQUIDS (GTL)", UNI Training (Singapore), Grand Hyatt Hotel, Cairo, June 2007

32. "COAL SEAM GAS TO LIQUIDS" Australian Journal of Mining (AJM Conference), Hilton Brisbane, November 2007.

33. "GTL, Methanol or LNG?" NeoEdge (Singapore) Workshop, J.W. Marriot, Dubai, January 2008

34. "BIOFUELS AND CLEAN FUELS" Australian Journal of Mining (AJM Conference), Novotel, February 2008.

35. "BIOFUELS & CLEAN FUELS 2008 & BEYOND", NeoEdge (Singapore) Workshop, J.W. Marriot Horel, Kuala Lumpur, March 2008

36. "GAS-TO-LIQUIDS (GTL)", IBC Asia (S) Pte. Ltd., Crowne Plaza Mutiara, Kuala Lumpur, March 2008

37. "GAS-TO-LIQUIDS (GTL)", SEAAOC 2008, IIR Conferences Holiday Inn, Darwin, June 2008

38. “GAS-TO-LIQUIDS (GTL)”, “Gas World Australia”, Terrapinn Conference, Sheraton, Perth, November 2008

39. “Coal to Liquids (CTL)” IBC Asia (S) Pte. Ltd., Grand Copthorne, Waterfront, Singapore, November 2008

40. “ADDING VALUE TO GAS”, “Queensland LNG Developments”, IIR Conferences, Novotel, Brisbane, March 2009

41. “Coal to Liquids (CTL)” IIR Conferences , Novotel, Brisbane, September, 2009

42. “Coal to Liquids (CTL)” IBC Asia (S) Pte. Ltd., Traders Hotel, Singapore, September 2009

43. “COAL-TO-LIQUIDS (CTL)” IBC Asia (S) Pte. Ltd., Shereton Towers, Singapore, April 2010

44. “COAL-TO-LIQUIDS (CTL)” IRR conferences, Brisbane, May 2010

45. “ADDING VALUE TO GAS”, IRR Middle East, MEGAS Conference, Radisson Blu, Abu Dhabi, April 2010.

46. “COAL-TO-LIQUIDS (CTL)”, Magenta Global, Peninsula Hotel, Cape Town, South Africa, June 2010

47. “PETROCHEMICAL ECONOMICS” Magenta Global, Peninsula Hotel Cape Town, South Africa, June 2010

48. “PETROCHEMICAL ECONOMICS”, Magenta Global, Marriott, Bahrain, July 2010

49. “ADDING VALUE TO COAL AND GAS”, World Petro-Coal Congress, Meridian Hotel, New Delhi, February 2011.

50. “COAL TO LIQUIDS AND POWER – STUDIES IN CO-GENERATION”, IBC Asia, Mandarin Oriental, Singapore, February, 2011.

51. “CHALLENGES TO LNG – GTL, UGC and SHALE GAS” Magenta Global , Seoul, South Korea, February, 2011

52. “PETROCHEMICAL ECONOMICS”, Magenta Global, Novotel, Dubai, June. 2011

53. "PETROCHEMICAL ECONOMICS", CDMC, Hilton Shanghai, April, 2014

54. "THE HYDROGEN ECONOMY" on-going workshop for Informa Group, January 2020 to date.

55. "BIO FUELS" for Argus media, march 2021.

56. "CARBON DIOXIDE CAPTURE, UTILISATION AND STORAGE" for Capgrow, Singapore, 2022

57. "THE HYDROGEN ECONOMY" For Informa, Sydney. Ongoing course since 2021 to date for public and private clients.

Private Clients:

1. "PETROCHEMICAL ECONOMICS" SPE Chemicals, Taixing China, September 2006

2. "GAS-TO-LIQUIDS (GTL) and COAL GASIFICATION", Aker Solutions, Melbourne, October 2008.

3. "GAS-TO-LIQUIDS (GTL) and COAL GASIFICATION", Aker Solutions, Brisbane, December, 2008.

4. "XTL (Coal, Gas and Biomass to Liquids)" Department of Environment, Canberra, March 2009.

5. "COAL TO LIQUIDS" BMT-WBM, Brisbane, December 2009

6. "GTL" Air Liquide, Houston, February 2013

7. "The Hydrogen Economy" Tailored for specific clients via Informa Group
8.

MAJOR PROJECTS AND ASSIGNMENTS

(A) Legal and Expert Witness Assignments

- Advice relating to Australian Fuels Standards and Petrol Additives (ACFA, Singapore) July 2015 to date
- Expert witness depositions concerning gas pricing (Watson Mangioni for Pankaj. Oswal), July 2015 to July 2016
- Expert witness depositions concerning petrol (Watermark Patent Attorneys), November 2014
- Expert witness statement to AAT, (Maddocks Solicitors for ATO), September 2014
- Expert opinion concerning diesel fuel composition, Maddocks Solicitors (for ATO), December 2013
- Further, expert opinion in opposition to a fuel composition patent for Watermark Patent Attorneys, March-June, 2013
- Advice relating to contract dispute concerning the value of liquid hydrocarbons, confidential client, November 2010 and November 2011.
- Continuation of opposition to fuel composition patent for Watermark Patent Attorneys, February 2011.
- Expert opinion in opposition to a fuel composition patent for Watermark Patent Attorneys, April 2009.
- Expert Technical Witness for Australian Government Solicitor in Australian Taxation Office v. Caltex, September 2008.
- Expert opinion in opposition to a fuel composition patent for FreeHills, September 2005
- Expert opinion concerning workplace fume for ExpertExperts, March 2005
- Expert Technical Witness in litigation over Diesel Additives for Phillips Fox (New Zealand), June 2002
- Expert Technical Witness in litigation concerning a lubrication oil fires for Phillips Fox (New Zealand), September 2002
- Advice concerning R&D tax concession eligibility of several refinery operations (AusIndustry and ATO), October 2001
- Advice concerning R&D tax concession eligibility of an oil field development operation including an expert witness mediation session (AusIndustry and Australian Government Solicitor), October 2001
- Estimation of value of certain coal gasification technologies, for Leadenhall Australia (on behalf of ATO) August 2000
- Expert opinion and advice concerning a refinery fluid cat-cracker operation for AusIndustry and the ATO, March 1998.
- Advice relating to actions vs. Esso Australia and the Longford Royal Commission to Maurice Blackburn & Co., December 1998

- Advice relating to project R&D eligibility of several industrial projects to AusIndustry (and ATO), November 1997 to June 1998
- Expert advice concerning the prospects for a novel petrochemical technology (advice to Australian Taxation Office), July 1996
- Expert witness on behalf of the Industrial Research and Development Board and The Australian Taxation Office at Administrative Appeals Tribunal in a case brought by Mobil Australia concerning refining and blending of fuels, 1995
- Expert Witness report concerning methanol production in Russia, for ExpertsDirect, Singapore, 2023

(B) Coal to Liquids (CTL) and Gas-to-Liquids (GTL) and Similar Projects

- Concept Estimates for Coal to Methanol, Stawell Corporation, March 2013
- Concept analysis for the conversion of high CO2 content gas into methanol or FT products for Apache Limited, March 2013; *this work included assessment of the use of very gas containing very high levels of carbon dioxide and nitrogen.*
- Advice to Air Liquide (Houston) regarding integration of GTL and air separation technology, February 2013; *this work involved assignment in Houston.*
- A review of Coal Pyrolysis Technology, confidential client, October-November 2012; *this work incorporated a technical and economic assessment of novel coal pyrolysis technologies.*
- Concept Study for the conversion of Coal to Urea in China, confidential Client, September-October 2012
- Mitigation of Methane in Mine Ventilation Air for Australian Coal Association low Emissions Technology (ACALET), June-September 2012; *this work reviewed the existing and emerging technology for eliminating VAM.*
- Analysis of technology for mitigating the greenhouse impact of coal mine ventilation air methane (VAM), Anglo Coal Australia, 2011 to 2013
- Market Analysis of products produced from coal, confidential client, September 2011; *this work details the market for all of the chemicals and derivatives that could be produced by coal gasification.*
- Analysis of coal to olefins and polymers for CoalWorks Limited, June 2011; *this work is continuing*
- Concept econometric analysis for development of coalfield in remote Australia, confidential client, April 2011
- Concept analysis for development of small gas field with possible helium extraction in remote Australia, confidential client, April 2010; *This also involved the concept of marrying LNG and GTL operations*
- Concept analysis for development of new coalfield at Oaklands NSW for CoalWorks Limited, June 2010
- Concept analysis and flow-sheet development work relating to underground coal gasification (confidential client), September 2009
- Concept Analysis for CTL projects in NSW and Queensland (confidential clients), June and September 2008
- Analysis of Australian Coal Industry's potential for Coal to Liquids Projects, May (ExxonMobil), June 2007 and January 2008
- FEED Study for a small GTL project using natural gas (Cooper Energy), September - November 2006,.
- Concept study for a small GTL project using CBM gas (Queensland Gas), November 2005. *This concept developed an economic case for very small plants (<10MMscfd) using pure methane as a feed.*
- Process development and modelling of refinery operations including Fischer-Tropsch conversion, (NGC Converters), August 2005. *This is work-in-progress and would lead to a revolutionary new approach to the refining of certain types of crude oil*.

- Leader of IBC Asia executive seminars: Gas to Liquids, November 2004 (Kuala Lumpur), June 2005 (Bangkok), December 2005 (Kuala Lumpur): *This seminar overviews the alternative approaches to converting gas to liquids and outlines the major issues for floating developments*.
- Gas Value and Usage: April 2004: *Desktop published reference for alternative uses for gas: 180 pages over 100 references*. Published by PennWell Books in February 2006
- Due Diligence of Novel Methanol Technology (Curtin University), December 2001. *This involved an assessment of all of the competing technologies for making methanol and producing a critical comparison on a technical and an economic basis.*
- Presentation - Methanol, An Assessment for Prospects for NWS Development, October 1999 (NWS Gas P/L). *The objective of the presentation was to overview the technical and economic hurdles for large-scale methanol and derivative development on the NWS of Australia. The presentation identified key players and reviewed the prospect of large-scale gas to olefins via methanol.*
- Concept Study for a Gas to Diesel Plant in Indonesia (for Maxus Energy), April 1996: *This involved producing the FEED for a small gas to diesel plant converting about 10MMscfd gas to about 1000bbl/d diesel. The site was a small island in the South China Sea with restricted services and footprint similar to that on a floating operation. This study included blending studies of syncrude with the crude oil being produced.*
- Basis of Design Study for a 1 bcf/d Gas Conversion Plant in Russia (confidential client), March 1997: *This involved a concept analysis and preliminary FEED designing for a very large operation in the Kara Sea. The concept centred around several barges with each barge processing between 100 to 150 MMscfd. The product was synthetic crude oil, but other scenarios, such as the production of diesel were also evaluated.*
- Basis of Design for a 40 MMcf/d Gas Conversion Plant in Nigeria (confidential client), February 1997: *A FEED study for a floating operation with three options – syncrude, diesel and naphtha, and diesel only.*
- Scoping Study for Gas Utilization, (Energy Equity), October 1997: *This comprised concept studies was for a field in Indonesia (Celebes) which could produce up to about 100 MMscfd. The concepts compared the technologies and process economics for methanol and FT liquids (diesel, syncrude etc.).*
- Advice to Maurice Blackburn & Co relating to actions vs. Esso Australia and the Longford Royal Commission (December 1998 to 2000): *This involved a critical analysis of the safety issues surrounding a very large gas-plant operations (300MMscfd).*
- Marketing Guide – Gas Utilisation – August 1997 (BP – Amoco): *Written to help gas marketer's based in the US to understand the value of gas to downstream users, including the production of methanol and synthetic fuels.*
- Leader of IBC Asia executive seminar: Valuing and Pricing Gas to Downstream Users, Hilton International, Kuala Lumpur, July 1996: *This seminar covered the approach to valuing gas to a variety of downstream users including GTL projects*.
- Monograph – Economics of Methanol Production – Desktop Published, June 1991: *Comprehensive overview of commercial technology and economics. Compares transport economics with pertinent alternatives – pipeline, LNG. Identified business opportunities on the Pacific Rim.*
- Feasibility Study to convert North West Shelf gas to gasoline. Preliminary design work for pilot plant and full scale plant. August 1988 (for Bond Corporation): *The objective was to develop a process using an alternative catalyst and reactor which would offer a considerable saving over the Mobil MTG Process. The immediate objective was to design a conversion plant for 2500t/d methanol into specification gasoline.*
- Design of a pilot plant to convert methanol to gasoline (for Western Mining Corporation, 1990). *After the demise of Bond Corporation, WMC Resources who had facilities suitable for demonstrating a 5 to 10 bbl/d plant took up the alternative MTG idea..*
- Feasibility of converting undeveloped Cooper Basin gas fields to liquids (for Queensland Synfuels, 1992 to 1994): *This was a series of concept feasibility studies for the construction of*

large modular methanol plants which could be road hauled to central Queensland. The product, either methanol or gasoline would be transported to the coast down an existing pipeline.

- Feasibility and design for a wax plant in Australia, October 1991 (for NT Government, Sumitomo and Nippon Oil): *This was aimed at producing high valued wax for the Australian market. The objective was to convert about 5PJ of gas to heavy wax (Fischer-Tropsch) and refine the wax into various marketable grades.*
- Marketing Study for ammonia, methanol and wax, February 1994 (for Ampolex, Bridge Oil and others): *This study aimed at identifying the markets for a variety of GTL products in South East Asia. Market growth, competitor position and forecast demand and price were developed for a range of scenarios*.
- An Assessment of the Rentech Fischer-Tropsch Process, March 1991 (for IPCO (Singapore) and Worley Engineering (Perth, Australia): *Technical due diligence report.*
- Assessment of gas use for South Kupe Field, New Zealand, April 1991 (for Western Mining): *This was a concept feasibility study for development of the South Kupe into liquids as an alternative to gas sales to a utility.*
- Design for a gas to syncrude plant (for Western Mining Corporation): *This was a FEED study for a small gas to diesel plant (10MMscfd) for Airlie Island offshore Western Australia.*

CONFERENCE PAPERS RELATING TO CTL and GTL

- Economics of Gas Conversion Projects in the North Sea and Barents Sea; D.D.J. Antia and **D. Seddon;** Society of Petroleum Engineers paper SPE 20937, presented at Europec 90.The Haag, Netherlands, 22-23 October 1990.
- Opportunities and Economics of the Mass Production of Methanol in South East Asia. **D. Seddon;** National Conference on the Clean Air Act and Reformulated Fuels, October 1990, Washington DC
- Offshore Refining: A Cost Effective Approach for Treating Associated Gas D.D.J. Antia and **D. Seddon;** Society of Petroleum Engineers Paper No. SPE 28858, presented at EUROPEC 94
- Technology and Economics of Gas Utilization: Methanol; **D. Seddon;** Society of Petroleum Engineers Paper No. SPE 28790 presented at SPE Asia Pacific Oil & Gas Conference, Melbourne 1994
- Exploiting New Opportunities for Cost Reduction and Addition of Value through Conversion of Offshore Gas to Oil; D.D.J. Antia and **D. Seddon;** Strategy and Economics in the North Sea (SECONS94), IIR Ltd Conference, London, November 28-29, 1994
- Gas Conversion: An Economic Alternative to Gas Reinjection; D.D.J. Antia and **D. Seddon;** Offshore South East Asia (Paper OSEA 94003), presented at OSEA, 10th Conference and Exhibition, Singapore, December 6-9th., 1994
- Offshore Conversion of Associated Gas to Synthetic Crude Oil: An Economic Option for Deep Water and Marginal Fields; D.D.J. Antia and **D. Seddon;** Offshore Technology Conference (OTC Paper 7868), Houston, May 1995
- Improving the Economics of Developing Very Deep Water Fields through the Conversion of Associated Gas to Crude Oil; D.D.J. Antia and **D. Seddon;** Deeptec '95, an IIR conference, Aberdeen, February 1995
- Gas Conversion to Syncrude; David Antia and **D. Seddon;** *World Expro* 1996, p.87
- Low Cost 10MMcf/d Gas to Syncrude Plant for Associated Gas; D.D.J. Antia and **D. Seddon;** Offshore Technology Conference, (OTC Paper 8901), Houston May 4-7, 1998
- Why is GTL So Expensive? **D. Seddon;** SPE Asia pacific Oil & Gas Conference, Perth, 18 - 20 October 2004. SPE Paper 88632
- Will GTL Economics and Technology Ease the Refining Sector or Compete with It? **D. Seddon**, International Refinery Forum, Le Meridian Hotel and Spa, Dubai, UAE, December 2005
- The Opportunities for Small Scale GTL for Eliminating Associated Gas, **D. Seddon**

Middle East Gas Summit (MEGAS), The Intercontinental Hotel, Doha, Qatar, February 19-21, 2006

- Can Gas Compete with Coal? **D. Seddon,** "Gas World Australia", Terrapinn Conference, Sheraton, Perth, November 2008
- "GTL - Where is the Industry Going", **D. Seddon,** The 4th. Annual Coal to Liquids and Gas to Liquids Conference, Brisbane, February 2009
- Some Aspects of the Impact of Carbon Pricing on Coal Based Industries, **D. Seddon,** World Petro-Coal Congress, Meridian Hotel, New Delhi, February 2011.
- Selling GTL -Some Observations on Selling GTL products, **D. Seddon,** SMi GTL Conference, Marriott Hotel. London, October 2012
- Selling GTL -Some More Observations on Selling GTL products, **D. Seddon,** SMi GTL Conference, Millennium Gloucester Hotel London, October 2013
- Cleaning Underground Coal gasification Synthesis Gas, Prospects and Challenges, **D. Seddon** and M. Clarke**,** 3rd. IEA Workshop on Underground Coal Gasification, Brisbane, Australia, November 7&8, 2013

(C) Assignments Concerning Technical and Economic Appraisals, Fuels and Chemicals

- Advice concerning development of gas field in WA, Confidential Client, November 2024
- Advice concerning photo-synthesis of hydrogen, Confidential Client, October 2021
- Advice concerning introduction of Hydrogen Economy in Australia, Arup Group, June 2021 (ongoing).
- Concept for helium and natural gas production in central Australia for Onshore Petroleum Australia, February 2015
- Concept for Bentonite Development, Plasminex, January 2013
- Analysis of Exotic Feedstocks for the Production of Biodiesel, Australian Government Department of Environment and Heritage, February 2008.
- Exotic Feedstocks for BioFuels, Australian Government Department of Environment and Heritage, September 2007
- Advice relating to the production of Green Diesel, Australian Government Treasury, June 2007
- Standardising Biodiesel Blends - prepared for the Australian Government Department of Environment and Heritage, September 15th. 2006, issued as a discussion paper, November 2006.
- Technical due diligence and advice of a petrochemical plant, WorleyParsons, July 2005
- Study of alternative supply routes for ethane to Australian petrochemicals projects, WorleyParsons, June 2005
- Advice Concerning the Precision of Some ASTM Test methods, Environment Australia, September 2002 and March 2003
- Major study on the uses of Ethanol in Diesel Fuel blends (Diesohol), Environment Australia, September 2002
- Concerning the proposed discharge of EC1157A and fluoroscein in sea water off NW Australia, GEMS (for Woodside Energy), September 2001
- Economic assessment of a large SEA petrochemical operation, WS Atkins, April 2001
- Application of Oil Industry Technology for Immediate GHG Mitigation in the Australian Coal Industry, ACARP, November 2000
- Technical Assessment of Greenhouse Gas Mitigation Projects, Australian Greenhouse Office, October 2000
- Major study of petrol octane enhancers published as an appendix in "Setting National Fuel Quality Standards; Paper 2A, Management of Petrol Octane Enhancing Additives" National Heritage Trust, November 2000
- Selection of Fuel and Pricing Forecast for Power Generation Plant in New Zealand (for Peak Pacific Energy, Singapore), August 1996.

- An Overview of the New Zealand Gas Market (for Western Mining Corporation), November 1996
- An Assessment of energy supply to Cement Works in Australia, Trifoleum Pty. Ltd. , April 1993
- Survey of waste oil collection and use in NSW and potential for re-refining in Australia (for NSW Government), 1990

RECENT CLIENTS LIST - DUNCAN SEDDON & ASSOCIATES PTY. LTD.

CLIENT	SUBJECT	YEAR
Arup Group	Hydrogen Economy	
Australian Taxation Office	Tax matter	2019
Watson Maglioni	Gas prices in Australia	2016
Asian Clean Fuels Association	Discussion with refining industry re MTBE	omgoing
Onshore Petroleum Australia	Development of remote helium reserves	2015
Asian Clean Fuels Association	Discussion with refining industry re MTBE	2014
Australian taxation Office	Expert witness (diesel fuel)	2014
CDMC (China)	Masterclass "Petrochemical Economics"	2014
Watermark	Expert advice (petrol)	2014
Air Liquide (US)	GTL	2013
Apache Energy	High CO2 gas to products	2013
Asia Clean Fuels Association	MTBE and fuel standards	2013
ExxonMobil Corporation	Expert witness statement regarding patents	2013
Informa	Masterclass CTL GTL	2013
Stanwell Corporation	Coal to methanol	2013
Anglo Coal Australia	Coal mine ventilation air methane	2012
Ashurst Australia	Expert witness statement re fuel valuation	2012
Australian Coal Association Low Emission Technologies (ACALET)	Coal mine ventilation air methane	2012
Orpheus Energy	Coal to urea	2012
Plasminex Limited	Bentonite	2012
Queensland Coal Investments Pty. Ltd.	Coal pyrolysis	2012
Central Petroleum Limited	Remote coal field development by CTL	2011
CoalWorkks limited	Coal to plastics	2011
Herman Research laboratories (HRL Ltd)	Analysis of chemical markets	2011
Alinta Energy	Fuel valuation	2010
Phillips Fox (Melbourne)	Advice regarding contaminated petrol	2010
Aker Solutions	Syngas upgrading	2009
Department of Environment , Water, Heritage and the Arts (DEWHA)	Diesel fuel standards	2009
Hancock Prospecting Limited	Coal developments	2009
Australian Government Solicitor	Expert witness report on fuels and fuel research	2008
Maintenence Technology Institute, Monash University	Diesel fuel additives	2008
WA Fuel Watch	Fuels production and fuel types	2008
ExxonMobil Research and Engineering	Australian coal operations	2007
New Hope Corporation	Coal to liquids (pyrolysis routes)	2007
Strike Oil Limited	Developement fo a coal prospect	2007
Cooper Energy Limited	Remote gas field development by GTL	2006
Department of Environment and Heritage (DEH)	Biodiesel standardisation	2006
Phillips Fox (New Zealand)on behalf of Clariant	Fuels composition and additives	2006
Woodside Petroleum	Training course	2005