

KEMAL SARICA

University: Isik University
Dept. of Industrial Engineering
Işık Üniversitesi 34980
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EDUCATION

2004- 2010: Ph.D. '*Modeling and Analysis of a Decentralized Electricity Market: Integrated Simulation / Optimization*'
Boğaziçi University, Dept. of Industrial Engineering, Istanbul, Turkey

Advisor: Prof. Gürkan Kumbaroğlu, President of Turkish affiliate of IAEE (International Association of Energy Economics), IAEE Council Member (Vice President),

Co – Advisor: Prof. İlhan Or, Director of Institute for Graduate Studies in Sciences and Engineering, Leading Researcher in Energy

- Scope of the thesis is to develop an agent-based simulation framework of a decentralized liberalized electric power market
- Transmission network is embedded into simulation.
- Optimum power flow is solved during simulation for the dispatching of loads to generators after bidding.
- A day-ahead market structure is simulated.
- Adaptive self learning agents are designed and implemented.
- Hourly bidding strategies are developed and implemented with possible limited information to the market actors.

2001-2004: **M.S. Thesis:** '*Efficiency Assessment of Turkish Power Plants using Data Envelopment Analysis*'

Boğaziçi University, Dept. of Industrial Engineering, Istanbul, Turkey

Advisor: Prof. İlhan Or, Director of Institute for Graduate Studies in Sciences and Engineering, Leading Researcher in Energy

- First multi input-output performance analysis of Turkish power plants
- Use of ExternE project results for accounting of emissions (www.externe.info)
- Extensive use of basic and advanced DEA models.

1997-2001: Boğaziçi University, Dept. of Mechanical Engineering, Istanbul, Turkey (Bachelor of Science.)

EMPLOYMENT RECORD

- since 04/2010 Post-Doctoral Research Associate at the Department of Agricultural Economics, Purdue University, West Lafayette, IN, USA
Mentor: James & Lois Ackerman Prof. Wallace E. Tyner
- Designed ways of linking GTAP-BIO and US EPA MARKAL models
 - Modeled land use in MARKAL in conjunction with first and second generation biofuels.
 - GTAP-BIO is used as a resource for producing land supply curves.
 - Modeled ethanol fuels (E10, E85) in detail to capture blend wall effect
 - Carrying on research on current US climate policy (CAFE, CES and RFS) in conjunction with hybrid modeling techniques.
- 07/2003-03/2010 Research & Teaching Assistant at the Industrial Engineering Department, Boğaziçi University, Istanbul, Turkey

PROFESSIONAL ACTIVITIES

- Since 02/2005 Founding Member of the Turkish Energy Economics Association (www.traee.org), Affiliated to the International Association for Energy Economics (IAEE)
- 06/2008 Organization Committee Member, *31st IAEE International Conference*, Bridging Energy Supply and Demand: Logistics, Competition and Environment (www.iaee08ist.org), June 18-20, 2008, Istanbul.
- 02/2005 Organization Committee Member, International Workshop on Business Opportunities for Clean Development (www.cdm-tr.net), February 16-18, 2005, Istanbul
- 07/2003 Technical Support, *EURO/INFORMS Joint International Meeting*, Istanbul, July 6-10, 2003.
- 09/2002 Organization Committee Assistant, Euro-Med Energy Policy Training Network, Energy Decision Makers' Workshop, September 23-27, 2002, Istanbul

SUPPORTED ONGOING RESEARCH

Analysis of Policies Aimed at Increasing Use of Natural Gas in the Transportation System, Nexttrans Center / USDOT, Project No: DTRT12-G-UTC05.

SUPPORTED RESEARCH

Analysis of the Global Impacts of Second Generation Biofuels in the Context of Other Energy Technologies and Alternative Economic and Climate Change Policy Options, Joint Biomass Research and Development Initiative (DOE and USDA).

Analysis of Effects on Turkish Economy due to Emission Restrictions parallel to KYOTO Protocol, State Planning Organization (DPT) (in close collaboration with AEA Technologies, www.aeat.co.uk).

Analysis of Possible Effects on Turkish Energy Industry due to Emission Restrictions parallel to KYOTO Protocol using MARKAL Model, Scientific Research Council (BAP), Project No: 09A303P (Main model developer).

An Integrated Simulation/Optimization Approach to the Modeling and Analysis of the Decentralized Turkish Electricity Market, Scientific Research Council (BAP), Project No: 07A301D.

Environmental Consultancy of Electricity Production Facilities for the Privatization, Republic Of Turkey, Prime Ministry, Privatization Administration (ÖİB) (Green House Gases Working Group, Expert).

Business Opportunities for CDM Project Development in the Mediterranean, the European Commission, Project Synergy No: 4.1041/D/02-003, 10/2003-04/2005. (Project Member).

Sustainable Clean Development Options for Turkey: Assessment of Prospects for the Diffusion Potential of Renewable Energy Technologies, and Development of Projects to Utilize International Funds and Flexibility Mechanisms, Scientific and Technical Research Council of Turkey, Project No: 104M291, 04/2005-04/2007. (Project Member).

Petroleum Products Demand Forecasting, Petrol Ofisi Co., 2007. (Project Member).

Bottom-Up Electricity Demand Forecasting for Turkey, Fraunhofer Institute for System and Innovation Research, 2007 (Project Member).

TECHNICAL SKILLS

Optimization	GAMS, Cplex (via API), Knitro (via Java api), Conopt (via LINDO Api)
Programming	Java, Matlab, Fortran, Visual Basic, Maple
Simulation	Stella, Powersim, Anylogic
Packet Programs	SPSS (Including macro programming), Microsoft Office (Highly Advanced with VBA)
Operating Systems	Windows 7, XP, Vista, Windows Server Family, Active Directory and Group Policy (Advanced level domain planning)
Other	ANSWER (ETSAP Family), DEA Solver Pro (Saitech inc.), FRONTIER 4.1 (SFA software by Coelli 1996a) , GemPack, RunGTAP

CERTIFICATES

August 7-13, 2010	18 th Annual Short Course in Global Trade Analysis, Center for Global Trade Analysis, Purdue University
October 8-13, 2010	Short Course in Dynamic Global Trade Analysis, Center for Global Trade Analysis, Purdue University

REFEREEING

- *Applied Energy*, Elsevier Science, Amsterdam
- *Energy Policy*, Elsevier Science, Amsterdam
- *Energy*, Elsevier Science, Amsterdam
- *European Journal of Operational Research*, Elsevier Science, Amsterdam
- *System Dynamics Conferences*, System Dynamics Society, USA

ASSISTED COURSES

- IE312 *Facilities Design and Planning*, Boğaziçi University
- IE341 *Engineering Economy*, Boğaziçi University
- IE441 *Planning for Engineers*, Boğaziçi University
- IE503 *Methods of Industrial Engineering*, Boğaziçi University
- IE506 *Statistical Data Analysis*, Boğaziçi University
- FE501 *Optimization Models in Economics and Finance*, Boğaziçi University

AWARDS

Best Paper Award, “Commitment for sustainable development” for Outstanding Contribution during 2006/2007, June 12, Florence, 2007

AFFILIATIONS

- Turkish Association for Energy Economics (Founding Member)
- International Association for Energy Economics (Member)
- INFORMS (Member)

LIST OF PUBLICATIONS

Journal Articles

- O’Rear, E. G. *, **K. Sarica** , P. L. Paarlberg , W. E. Tyner, “The Impacts of the Rebound Effect on U.S. CAFE Standards for Light-Duty Vehicles” , *Transportation Research Part A: Policy and Practice*, 2012 (under review).
- **Sarica, K.** and W. E. Tyner, “Comparison of Current and Proposed U.S. Energy Policies with an Equivalent Carbon Tax”, *Energy Policy*, 2012 (under review).
- Yang, Lin., W. E. Tyner and **Sarica, K.**, “Evaluation of the economics of conversion to compressed natural gas for a municipal bus fleet”, *Energy Science & Engineering*, 2013, (<http://dx.doi.org/10.1002/ese3.14>).
- **Sarica, K.** and W. E. Tyner, “Alternative Policy Impacts on US GHG Emissions and Energy Security: A Hybrid Modeling Approach”, *Energy Economics*, 2013 (Accepted).

- Kumbaroğlu, G., **K. Sarica**, I. Or, Y. Arıkan, and N. Karali, “Energy Use, CO₂ Emissions and Emission Reduction Costs: Results from the Turkish MARKAL Model”, *Energy Policy*, 2013 (accepted).
- **Sarica, K.** and W. E. Tyner, “Analysis of US Renewable Fuels Policies Using a Modified MARKAL Model”, *Renewable Energy*, Volume 50, Pages 701-709, February 2013.
- **Sarica K.**, Kumbaroğlu G., Or I., Modeling and analysis of a decentralized electricity market: An integrated simulation/optimization approach, *Energy*, Volume 44, Issue 1, Pages 830-852, August 2012.
- **Sarica K.** and I. Or, “Efficiency Assessment of Turkish Power Plants using Data Envelopment Analysis”, *Energy*, Vol.32, No.8, pp. 1484-1499, August 2007.

Conference Proceedings (refereed)

- **Sarica, K.** and W. E. Tyner (2011), “Analysis of US Renewable Fuels Policies Using a Modified MARKAL Model”, *14th Annual Conference on Global Economic Analysis*, Venice, Italy, June 16-18, 2011. ISSN 2160-2115.
- **Sarica, K.**, I. Or, and G. Kumbaroğlu (2009), “Modeling and Analysis of A Decentralized Electricity Market: Integrated Simulation/Optimization”, *10th IAEE European Conference*, Vienna, Austria, September 7-10, 2009 (<http://www.aace.at/2009-IAEE/>).
- **Sarica, K.**, I. Or, and G. Kumbaroğlu (2009), “An Integrated Simulation/Optimization Approach to the Modeling and Analysis of the Decentralized Turkish Market”, *32nd IAEE International Conference*, San Francisco, USA, June 21-24, 2009 (www.usaee.org/usaee2009/).
- **Sarica, K.** and N. Karali (2008), “Modeling of the Interactions between Sectoral CO₂ Missions and Energy Efficiency under CO₂ Emission Restriction Policies”, *Proceedings of the 26th International Conference of the System Dynamics Society*, Athens, Greece, July 20 – 24, 2008. ISBN 978-1-935056-01-0.
- Karali, N. and **K. Sarica** (2008), “Diffusion Potential of New Energy Efficient Technologies Under an Uncertain Environment”, *International Conference on Policy Modeling- EcoMod2008*, Berlin, Germany, July 2-4, 2008.
- **Sarica, K.** and N. Karali (2007), “Cost Based Sectoral Analysis of CER/ERU Emission Certificate Trading”, *22nd European Conference on Operational Research*, University of Economics Prague, Prague-Czech Republic, July 8-11, 2007.
- **Sarica, K.** and G. Kumbaroğlu (2007), “Power Plant Efficiency Assessment: Case of Turkey”, *9th IAEE European Energy Conference*, Energy Markets and Sustainability in a Larger Europe, Florence-Italy, June 10-13, 2007.
- **Sarica, K.** and Y. Barlas (2006), “Verifying System Dynamics Simulation Results by Analytical Phase Plane Tools”, *the 24th International Conference of the System Dynamics Society*, Nijmegen, The Netherlands, July 23-27, 2006. ISBN 978-0-9745329-4-3.
- **Sarica, K.** and G. Kumbaroğlu (2006), “Efficiency Assessment of Turkish Power Plants Using DEA”, *19th Mini EURO Conference on Operational Research Models and Methods in the Energy Sector (ORMMES'06)*, University of Coimbra, Portugal, September 6-8, 2006.

Technical Reports

- **Sarica, K.** and Y. Barlas (2005), *Analytical & Numerical Tools for Phase Plane Analysis of System Dynamics Models*, Working Paper No: FBE-IE-09/2005-14, Boğaziçi University, 2005.
- **Sarica, K.** and I. Or (2004), *Efficiency Analysis of Power Generation Plants in Turkey Using Data Envelopment Analysis*, Working Paper No: FBE-IE-09/2004-12, Boğaziçi University, 2004.
- **Sarica, K.** and I. Or (2004), *Türkiye'deki Elektrik Üretim Tesislerinin Veri Zarflama Analizi ile Verimlilik İncelemesi*, Working Paper No: FBE-IE-12/2004-17, Boğaziçi University, 2004.

PAPER PRESENTATIONS AT CONFERENCES

Paper Presentations at International Conferences

- **Sarica, K.** and Tyner W. E. (2012) “Alternative Policy Impacts on US GHG Emissions and Energy Security: A Hybrid Modeling Approach”, *31th USAEE/IAEE North American Conference*, Austin, November 4-7, 2012.
- **Sarica, K.**, W.E. Tyner (2012), “Comparison of Current and Proposed U.S. Energy Policies with an Equivalent Carbon Tax”, *INFORMS Annual Meeting*, Phoenix , October 14-17, 2012.
- O’Rear, E. G. *, **K. Sarica** , P. L. Paarlberg , W. E. Tyner, “The Impacts of the Rebound Effect on U.S. CAFE Standards for Light-Duty Vehicles”, *INFORMS Annual Meeting*, Phoenix , October 14-17, 2012.
- **Sarica, K.** and W. E. Tyner (2012), “Comparison of a Clean Energy Standard and a Carbon Tax”, *2012 ASSA Annual Meeting, Chicago*, January 6-8, 2012.
- **Sarica, K.**, Chen Y. and Liu A. (2011), “Long-run Analyses of Combining Climate Policies in the United States using MARKAL”, *INFORMS Annual Meeting*, Charlotte , November 13-16, 2011.
- **Sarica, K.** and W. E. Tyner (2011), “Analysis of U.S. Renewable Fuels Policies Using Modified Markal and Gtap-Bio Models”, *30th USAEE/IAEE North American Conference*, Washington D.C., October 9-12, 2011.
- **Sarica, K.** and W. E. Tyner (2011), “Analysis of US Renewable Fuels Policies Using a Modified MARKAL Model”, *34th IAEE International Conference*, Stockholm, Sweden, June 19-23, 2011.
- **Sarica, K.** and W. E. Tyner (2011), “Analysis of US Renewable Fuels Policies Using a Modified MARKAL Model”, *14th Annual Conference on Global Economic Analysis*, Venice, Italy, June 16-18, 2011. ISSN 2160-2115.
- **Sarica, K.** and W. E. Tyner (2011), “Analysis of US Renewable Fuels Policies Using a Modified MARKAL Model”, *Biofuels LUC Workshop*, Chicago, March 25, 2011.
- Or, I., **K. Sarica** and G. Kumbaroğlu (2010), “Integrated Simulation/Optimization Modeling and Analysis of a Decentralized Electricity Market”, *33rd IAEE International Conference, International Society for Energy Economics*, Rio de Janeiro, 6-9 June, 2010.
- **Sarica, K.** and N. Karali (2008), “Modeling of the Interactions between Sectoral Co₂ Missions and Energy Efficiency Under CO₂ Emission Restriction Policies”, *26th International Conference of the System Dynamics Society*, Athens, Greece, July 20 – 24, 2008. ISBN 978-1-935056-01-0
- Karali, N. and **K. Sarica** (2008), “Diffusion Potential of New Energy Efficient Technologies under an Uncertain Environment”, *International Conference on Policy Modeling- EcoMod2008*, Berlin, Germany, July 2-4, 2008.
- **Sarica, K.** and N. Karali (2008), “Modeling of the Interactions between Sectoral CO₂ Emissions and Energy Efficiency under Emission Restriction Policies”, *31st IAEE International Conference*,

Bridging Energy Supply and Demand: Logistics, Competition and Environment, Istanbul-Turkey, June 18-20, 2008.

- **Sarica, K.** and N. Karali (2007), “Cost Based Sectoral Analysis of CER/ERU Emission Certificate Trading”, 22nd *European Conference on Operational Research*, University of Economics Prague, Prague-Czech Republic, July 8-11, 2007.
- **Sarica, K.** and G. Kumbarođlu (2007), “Power Plant Efficiency Assessment: Case of Turkey”, 9th *IAEE European Energy Conference*, Energy Markets and Sustainability in a Larger Europe, Florence-Italy, June 10-13, 2007.
- **Sarica, K.** and Y. Barlas (2006), “Verifying System Dynamics Simulation Results by Analytical Phase Plane Tools”, *the 24th International Conference of the System Dynamics Society*, Nijmegen, The Netherlands, July 23-27, 2006.
- **Sarica, K.** and G. Kumbarođlu (2006), “Efficiency Assessment of Turkish Power Plants Using DEA”, 19th *Mini EURO Conference on Operational Research Models and Methods in the Energy Sector (ORMMES’06)*, University of Coimbra, Portugal, 6-8 September 2006.

Paper Presentations at National Conferences

- **Sarica K.**, I. Or, and G. Kumbarođlu (2007), “Elektrik Üretim Tesislerinin Çok Yönlü Karşılaştırılmalı Deđerlendirilmesi”, Uluslararası Doğal Gaz Kongresi ve Sergisi, TMMOB Makina Mühendisleri Odası, Ankara-Türkiye, 3-5 Mayıs, 2007.
- **Sarica, K.** and I. Or (2004), “Efficiency Assessment of Electrical Energy Generation Plants Using Data Envelopment Analysis”, Yöneyem Araştırması/Endüstri Mühendisliği 24. Ulusal Kongresi-YA/EM’ 2004, Adana-Türkiye, 15-18 Haziran, 2004.