

ACHIEVING ALLOCATIVE EFFICIENCY USING ECONOMIC INSTRUMENTS FOR POLLUTION CONTROL The case of the Indian thermal power sector

When? 3:30 pm to 5 pm | **Monday, 8 March 2021**

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Speaker

Prof. Sushama Murty

INSEE life member & Member Executive
Committee

Centre for International Trade and
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Chair

Prof. Ramprasad Sengputa

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Abstract

Allocative efficiency in a thermal power sector can be defined as the equalisation of marginal abatement costs (MACs) across power plants for a given emission cap. Computation of the MAC (loss in electricity generation per unit reduction in emission generation) requires specification of the emission-generating technology. In the context of the recent by-production approach to modelling emission-generating technologies (developed by Murty, Russell, and Levkoff [JEEM 2012]), we provide a simple demonstration of how allocative efficiency can be achieved in this sector by using three alternative economic instruments for pollution control, namely, a Pigouvian tax, market for emission permits, and a command and control instrument. This is empirically implemented in the case of the Indian thermal power sector using a non-parametric DEA approach. For the existing aggregate level of CO₂ emission by this sector, an estimate of the common value of MAC across power plants at an allocatively efficient allocation is obtained as 5443 INR (77 USD or 69 euros) per metric tonne of CO₂. This reflects both the level of the Pigouvian tax on CO₂ emission and the predicted price of a tradeable permit for alternative decentralisations of this allocation. The loss of electricity generation in this sector due to both technical and allocative inefficiency is estimated to be 43855 GWH, approximately 11% of the current level of electricity generation. Further, under allocative efficiency of this sector, the cost of reducing CO₂ emission level by say 10% in terms of loss in electricity generation is estimated to be 40211 GWH, which is approximately 9% of the total electricity generation.

About the Speaker

Sushama Murty completed her PhD from the University of California, Riverside. After a postdoc at CORE, UCL, Belgium, she joined the University of Warwick, UK, where she spent six years followed by another six years at the University of Exeter, UK. She is currently a Professor at the Centre for International Trade and Development, School of International Studies, Jawaharlal Nehru University, which she joined in 2016. Her research interests are in the fields of public economics, applied microeconomic theory, and environmental economics. She has done research on optimal taxation theory and tax reforms, the extension of the standard neo-classical production theory to incorporate generation of bad outputs such as pollution, partially decentralised externality correction mechanisms, etc. Typically her work adopts a general equilibrium framework. She has published in both national and international journals such as Journal of Environmental Economics and Management, Journal of Economic Theory, Journal of Public Economics, Social Choice and Welfare, Economic Theory, Empirical Economics, Journal of Public Economic Theory, Indian Economic Review, Indian Growth and Development Review. She has recently contributed a co-authored chapter on production of bad outputs to the Handbook of Production Economics.

About the Chair

Prof Ramprasad Sengupta is Emeritus Professor of Economics Jawaharlal Nehru University, New Delhi. He has been Mahatma Gandhi National Fellow of the ICSSR, Government of India till 2018. He is a former advisor to the Planning Commission, Government of India. He is also a former Professor of Economics at the Indian Institute of Management, Calcutta. He has had stints as a visiting professor/scholar at universities in India, USA, Canada, Germany, The Netherlands and Japan. He has also been an Independent Director on the Board of Steel Authority of India Limited (SAIL).