

## Course Name - Energy Markets and Innovation

Credits	3.0
Faculty Name	Prof. Swagat Kishore Mishra <sup>1</sup>
Program	MBA (SM)
Academic Year and Term	2015-16 (Term-I)

### 1. Course Description:

Dear Pupil,

Energy in many forms have critical measures for economic development equipped with security, mobility, electricity, technology and many more. Among four factors of production i.e. land, labor, capital and organization, energy undoubtedly surfaces as the fifth factor admitting natural resources which offer the renewables. ‘Although useful energy is scarce and, hence, is not free, it is hard to imagine truly running out of energy ( $E$ ) any time soon, as it is all about us. Energy, as Einstein’s famous equation ( $E = mc^2$ ) points out, is strongly tied to another fundamental concept in the universe, mass ( $m$ ).’- Carol A. Dahl (International Energy Markets). An energy market is essentially pricing and distribution of energy in an economy or worldwide. Today like the stock markets, energy markets offer area-wise bids to purchase and sell in secondary market platforms like energy exchanges, renewable energy certificates, climate bonds etc. innovations in terms of product upgradation, new service facilities, technological advancement and new creation adds to the scope and utility of energy.

The coursework outline comprehends innovation in energy markets in two proportions. **First**, innovation in renewable energy reservoir particularly solar and hydro power installation. **Second**, innovation in market instruments for energy trading practices like climate bonds, climate fund, RECs and compliance mechanisms under Clean Development Mechanism in India. Here focal point is applied on the registered **CDM projects** in Odisha that has provided impetus to mitigate climate change and also fostered sustainable economic development. Simulation exercise will be conducted after a preparatory tutorial on basic econometrics using

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(For academic queries relating to the coursework **Energy Markets and Innovation**. Lectures delivered at SoS, XUB)

*E-Views* for econometric forecasting and analysis of energy prices and policies on tariffs and regulations. Electricity market flows and data structure is referred for macroeconomic indicators in our economy. And energy derivatives market dynamics is discoursed concisely. Welcome to Energy Markets & Innovation.

Best!!!

## 2. Student Learning Outcomes

*'The student is expected to discover the significance of energy economics. Apart from coursework curriculum, there is an **inclusive** short term project for blending conceptual cognition into practical experience of the student.'* - Prof. Swagat Kishore Mishra

- Observation and inquiry about value and valuation of energy consumption
- Price volatility impediments to energy security
- Methodological Economic Models in production, consumption and trade of energy
- Role of innovation in Electricity Mix (Energy efficiency and Energy dependence)
- Framework of energy market in India particularly in Odisha
- Graphical explanation on Market Coupling and Day Ahead Market Prices

## 3. Required Text Books and Reading Material

- International Energy Markets: Understanding Pricing, Policies, and Profits, Carol A. Dahl (Pennwell Publication 2<sup>nd</sup> edition) – Text Book
- Low Cost Edition Text Book

### *Key Reference*

- Principles of Economics, N. Gregory Mankiw (Text Book)
- Electricity Market Fact Book 2014-15, Energy and Economic Analysis division of the Energy Policy branch with the help of subject experts from across the Energy sector and the Minerals and Metals sector of Natural Resources Canada (e-Book)
- Market Analysis Reports and White Papers (based on empirical research) from Electricity Regulatory Commission of India (IERC) and Odisha Electricity Regulatory Commission (OERC)
- Energy Policy, Elsevier Journal (Selected Research Studies published in 2016)
- Current Developments in the energy outlook of India (Newspapers, magazines, media and other reliable and confirmed academic sources)

#### 4. Tentative Session Plan

Session Number	Topics	Reading Essentials
1- 4	Macroeconomics of Energy Markets <ul style="list-style-type: none"> <li>○ What are Energy Markets?</li> <li>○ How do they operate?</li> <li>○ Introduction to Energy Economics</li> <li>○ Energy Derivatives Market Dynamics</li> <li>○ Climate Change Mitigation Instruments</li> </ul>	2 3 Lecture Note - 1
5-7	Energy Modeling <ul style="list-style-type: none"> <li>○ Perfect Competition (Coal Industry)</li> <li>○ Energy Demand and Supply</li> <li>○ Energy Intensity and Equivalence</li> <li>○ Price Determinants of Electricity</li> </ul>	2 3 Lecture Note - 2
8-10	Renewable Energy Certificates (RECs) <ul style="list-style-type: none"> <li>○ Renewable Energy Sector</li> <li>○ Floor price and Market clearing price</li> <li>○ Renewable Purchase Obligation (RPO)</li> </ul>	Lecture Note - 3
11	Revision of Lectures 1-10 with Quiz/Simulation Exercise	
12-15	Innovation <ul style="list-style-type: none"> <li>○ Economics of Solar and Hydro Energy</li> <li>○ Potential and Contribution of each sector</li> <li>○ Clean Development Mechanism in Odisha</li> </ul>	4 Lecture Note – 4
16-19	Natural Monopoly <ul style="list-style-type: none"> <li>○ Electricity Market in Odisha</li> <li>○ Role of DISCOMS</li> <li>○ OERC Reforms on Electricity Market</li> </ul>	5 Lecture Note - 5
20	Revision of Lectures 12-19	

<sup>2</sup> International Energy Markets: Understanding Pricing, Policies, and Profits, Carol A. Dahl (Pennwell Publication 2<sup>nd</sup> edition) – Text Book

<sup>3</sup> Principles of Economics, N. Gregory Mankiw (Text Book)

<sup>4</sup> Electricity Market Fact Book 2014-15, Energy and Economic Analysis division of the Energy Policy branch with the help of subject experts from across the Energy sector and the Minerals and Metals sector of Natural Resources Canada (e-Book)

<sup>5</sup> Market Analysis Reports and White Papers (based on empirical research) from Electricity Regulatory Commission of India (IERC) and Odisha Electricity Regulatory Commission (OERC)

## 5. Evaluation:

- I. Quiz/Simulation Exercise Set – 20 Marks
- II. Online Mid-Term Exam – 20 Marks
- III. Short Term Project Assignment – 30 Marks
- IV. End Term Examination – 30 Marks

## 6. Academic Integrity:

- Broad Course Guidelines

Your attitude towards the course material will influence your learning and performance. The skills you will acquire in this course will be very useful, irrespective of your future roles in any business. You are responsible for all of the materials covered in class and in the textbook, even if you were absent for the classroom session. You are free to meet your instructor in connection with homework assignments and to clarify any concepts from the lecture, with appointment.

- Assignments Submissions

All homework/group assignment topics will be intimated in class or by email or uploaded on the Course Web/AIS. Assignment submissions are due at the beginning of class. Late work will not be accepted. All assignments must contain the following information on the cover page: Course name; roll number, Assignment number; Group number; Group members' names (for group projects), and the Due date.

- Course Conduct

You will not indulge in any disruptive activities during the class lecture and discussions/presentations. If the instructor discovers any such activity, you will be adequately penalized. Students not attending classes should ensure responsibility for the class coverage and announcements. *Mobile phones are not allowed inside the class room. Laptops may be brought to the class when instructed to do so (for the specific class/es). Adopting unfair means or mal-practice/s, or plagiarism in any form will make you eligible to get an F grade in the entire course.*

- Class Participation

Class participation is an important component for the class to be engaging and meaningful. Obviously, you must attend classes in order to participate. You should provide meaningful contribution to the class through comments and discussion during case study discussions throughout the course. Attendance will also be used to decide on the marks for your class participation component.

- Course Transparency

You are free to meet and ask your instructor regarding any discrepancy as regards evaluation of any component/s with appointment via email. You will be shown the answer scripts and any discrepancy will be sorted out.

The quiz answers will be available in the AIS. After evaluation of the End Term and publication of the grades, the End Term answer scripts will be available with the instructor's secretary for two days. A notice will also be put up to this effect. Any discrepancy observed should be reported to your instructor, through his secretary, or through the Dean (Acad)'s office using the 'application form for re-evaluation'. Either way, all issues of concern brought to the notice of the instructor will be duly addressed.

**Note:** Case handouts will be given to all the students separately at the beginning of the session. Your instructor reserves the right to alter any of the above. All change/s will be announced in class, via e-mail, or will be updated on the course AIS. Additional reading material may be uploaded to the AIS or sent by group email, if required.