

**Keywords and Concepts to Accompany
International Energy Markets
2nd Edition**

Chapter 1: Introduction to Our Journey

chemical energy	market failure	quark
$e = mc^2$	market governance	radiant energy
electric charge	mechanical energy	second law of thermodynamics
electrical energy	neutrinos	special theory of relativity
electromagnetic force	neutrons	standard model of particle physics
electromagnetic radiation	newton's second law of motion ($f = ma$)	strong nuclear force
electron	nuclear energy	thermal energy
first law of thermodynamics	photon	weak nuclear force
general theory of relativity	protons	
kinetic energy	quantum mechanics	

Keywords and Concepts Chapter 2: Energy Lessons from the Past for the Future

Bayesian estimation	extrapolating historical trends	optimization models
big bang	forecast feedback	photosynthesize
big crunch	game theory models	rebound effect
brainstorming	geological era	scenario building
bronze age	input-output models	self-defeating prophecy
cosmic inflation	iron age	self-fulfilling prophecy
econometric models	judgmental models	simulation models
end-use models	multivariate time series	stone age
energy balances	network models	surveys
engineering or process models	oil sands	system dynamics
	oil shale	univariate time series

Keywords and Concepts Chapter 3: Perfect Competition and the Coal Industry

coal hard/soft	create demand/supply from elasticities	income elasticity
coal brown/black	cross price elasticity	long ton
coal origin	price elasticity and revenue	marginal cost as supply metric tonne
ceteris paribus	excess quantity demanded/supplied	price elasticity
change in demand/supply	elastic demand/supply	qualitative/quantitative
change in quantity demanded/supplied	inelastic demand/supply	short ton
complements	forecast with elasticities	
contestable market		

Keywords and Concepts Chapter 4: Energy Taxes, Subsidies, and Social Welfare

ad valorem tax	horizontal equity	severance tax
black market	income tax	social losses
consumer surplus	incidence of tax	social optimum
corporate profit tax	indirect tax	social welfare
deadweight loss	market distortion	subsidy
direct tax	modeling taxes/subsidies	tariff
efficient market	payroll tax	taxes on products
energy subsidy	producer surplus	unit tax
excise tax	price control	value added tax
government revenues	royalty	vertical equity
government share of take	sales tax	welfare loss

Keywords and Concepts Chapter 5: Natural Monopoly and Electricity Generation

additive/subadditive	fully distributed cost	peak/off-peak demand
arms-length transaction	government regulation	peak-shifting
average/total cost	gross/net electricity	peak load pricing
average price	generation	preferred stock
bond	internal rate of return	price regulation
common/preferred stock	kilowatt	rate base
compounded interest	kilowatt hour	short run marginal cost
discounted cash flow	load curve	shoulder production
dividends	marginal cost/revenue	stand-alone costs
economic profits	mega/giga/terawatt	transfer price
economies of scale/scope	natural monopoly	unit cost
equity cost of capital	net present value	variable cost
fixed/sunk cost	opportunity cost	

Keywords and Concepts Chapter 6: Deregulation-Privatization Electricity Sector

amps	dispatch	market power
Aversch Johnson effect	double sided market	models of competition
avoided cost	efficiency in pricing	neutrons
barriers to entry	Herfindahl index	ohms
blackouts	hertz	oligopoly
brownouts	horizontal integration	power pool
contestability	independent power	reactor
cross-subsidization	producer	regulatory stability
degrees Celsius/Kelvin	independent system	turbine
deregulation	operator	vertical integration

vertically integrated	single sided market	ring fenced
voltage	stranded costs	tax free bonds
x-inefficiency	investor owned utilities	

Keywords and Concepts Chapter 7: Monopoly, Dominant Firm, and OPEC

multiplant monopoly	quota	OPEC price elasticity of demand
dominant firm model	target revenue model	pro-rationing
competitive fringe	high absorbers	netback pricing
marginal efficiency of investment	low absorbers	
cartel	OPEC	

Keywords and Concepts Chapter 8: Transaction Costs and U.S. Natural Gas Markets

asset specificity	long term contracts	outsourcing
bilateral governance	make or buy	private carriers
bounded rationality	market governance	propane /butane (LPG)
common carrier	market hub	quasi-rent
dry/wet natural gas	marketer	released capacity
Federal Energy Regulatory Commission (FERC)	methane/ethane	short term contracts
Federal Power Commission (FPC)	minimum billing	spot market
firm contracts	mixed asset	take or pay contracts
Henry Hub	natural gas liquids (NGLs)	towngas
interruptible contracts	no-notice transportation	transaction costs
interstate pipeline	non-specific asset	unbundled
intrastate pipeline	NYMEX/CME/ICE	uncertainty
liquid natural gas (LNG)	offsystem/onsystem open access or third party access	unified governance
	opportunism	vertical integration

Keywords and Concepts Chapter 9: Monopsony - Japan and the Asia Pacific LNG Market

arbitrator	internal pricing within and integrated firm	monopsony
bilateral monopoly model	Japan meti formerly miti	negotiating style
dirty tricks in negotiating	liquefied natural gas	regasification plant
distributive games	LNG vessel	reservation price
facilitator	marginal revenue product	rules manipulator
gasification plant	marginal factor cost	tax depletion allowances
greenfield project	mediator	transfer prices

Keywords and Concepts Chapter 10: Game Theory in W. European Natural Gas Market

backstop fuel	duopsony	European gas directive
Bertrand duopoly	Ekofisk oil field	European single market
bilateral monopoly	European Community	game theory
canvey lng terminal	European Energy Charter	Groningen gas field
Cournot duopoly	Treaty	limit pricing model

Lurgi process
Maastricht treaty
primary energy production
reservation price

Stackleberg duopoly
Statfjord oil and gas field
Transmed pipeline
Treaty of Rome

Troll gas field
Urengoi gas field
Yamburg gas field

Keywords and Concepts Chapter 11: Externalities and Energy Pollution

abatement
abatement subsidy
BACT
benefits of pollution
cap and trade versus
pollution tax
Coase theorem on
externalities
command and control
pollution policies

contingent valuation
costs of pollution
emissions
expected value
hedonic pricing
local pollutants
marketable permits
negative externalities
nimby
nonattainment area

oil spills
optimal level of pollution
polluter pays principle
pollution permits
pollution policy
pollution tax
regional pollutants
strict joint and several
liability
toxic waste

Keywords and Concepts Chapter 12: Public Goods and Global Climate Change

climate policy
CO₂e
demand side management
double dividend
energy conservation
feedback effects
free-rider
global climate change

greenhouse gases
integrated resource
planning
least cost planning
levelized cost
minimax
non-excludable in
consumption

non-rivalous in
consumption
no-regrets
optimal level of a public
good
public good model

Keywords and Concepts Chapter 13: Energy Accidents

average pricing
blowout preventer
chokepoints
diversification
expected pricing
ex ante incentives
ex post incentives

liability limits
MB and MC of precaution
moral hazard
near miss
nuclear power
Price Anderson Act
regulatory capture

risk preference
safety investment
standard deviation
strategic stockpiles
variance

Keywords and Concepts Chapter 14: Allocating Fossil Fuel Production over Time and Oil Leasing

backstop technology
bonus bidding
cost as a function of
current or cumulative
output
concessionary agreements
cumulative production
Hotelling rent

multi-period dynamic
model
optimal tax
private interest rate
production sharing
agreements
profit tax
property rights

prorating
proven oil reserve
reserve over production
ratio
Ricardian rent
royalty on price
law of capture
service contract

social interest rate	user cost	work bidding
two period dynamic model	well defined property right	
unitized production	winner's curse	

Keywords and Concepts Chapter 15: Supply and Costs

above ground costs	geothermal	photovoltaic (PV)
associated/non-associated	Hubbert curve	production profile
gas	hydropower flow	renewable energy sources
biomass	hydropower head	run of the river
capacity costs	identified reserves	semiconductor
coking coal	in ground costs	solar energy
compounding n times per year	learning rate	spent fuel reprocessing
continuous compounding	levelized costs	unit capital costs
decline rate	mixed oxide fuel	unit operating costs
	oil and gas resources	wind energy

Keywords and Concepts Chapter 16: Modeling Energy Demand

Bayesian analysis	Engel curve	preferences
Box Cox transformation	error correction model	primary energy source
budget constraint	factor demand	refinery processing gain
Cobb Douglas utility	homogeneity	short-run/long-run
function	income consumption curve	elasticity
conditional factor demand	income expansion path	time series analysis
demand curve	indifference curve	tonne of oil equivalent
econometrics	marginal rate of	(toe)
end-use demand	substitution	total primary energy
energy balances	marginal revenue product	supply (tpes)
energy content	marginal utility	utility function

Keywords and Concepts Chapter 17: Refining, Transportation, and Linear Programming

AC/DC current	distillation curve	non-linear programming
Aframax	distribution pipelines	octane
alkylation	ethanol	panamax
API gravity	flag of convenience	polymerization
asphalt	gathering pipelines	reforming
black cargoes	HVAC/HVDC	Reid vapor pressure
capacity constraint	hydrocracking	residual oil
catalytic cracking	hydrotreating	refinery blending model
cetane rating	isomerization	straight run
coking	kerosene	submarine pipeline
complexity factor	Leontief function	Suezmax
crude assay	linear programming	thermal cracking
dead weight tons	MTBE	transmission pipelines
clean/dirty tankers	naphtha	UHVAC/UHVDC
distillate/gasoil	natural gas liquids	ULCC/VLCC
distillation	nautical mile	white cargoes

Keywords and Concepts Chapter 18: Energy Futures Markets for Managing Risk

arbitrage	hedge ratio	opposite position
backward market	hedging	over the counter (OTC)
Brent forward markets	Intercontinental Exchange (ICE)	paper/wet barrel
clearinghouse	inverted market	real assets
commercials	legal risk	risk averse
contango market	liquidity risk	risk lover
convenience yield	long position	risk neutral
cost of carry	margin account	risk premium
crack spread	market risk	risk-free interest rate settle price
credit risk	marking-to-market	short position
dated Brent	maturity date	spark spread
downside risk	net change	speculator
energy forward contracts	New York Mercantile Exchange (NYMEX)	swaps
energy futures	nominations	trading strategies
expiration date	non-commercials	upside risk
financial assets	normal market	West Texas Intermediate (WTI)
financial derivatives	opening price	
financial risk	operational risk	
$F_t^T = S_t e^{(r+\mu-\delta)(T-t)}$		

Keywords and Concepts Chapter 19: Energy Options Markets for Managing Risk

American option	deep in/out of the money	put option
Asian option	Dodd-Frank act	replicating portfolio
at the money	European option	short options
binomial lattice pricing model	exercise price	spread
Black and Scholes option pricing model	in the money	straddle
call option	long options	strangle
covered call	option quote	strike price
	out of the money	
	over the counter	

Keywords and Concepts Chapter 20: Climbing the Energy/Development Ladder to a Sustainable Energy Future

access related policy	exclusivity	maximum sustainable yield (MSY)
average sustainable yield (ASY)	fiscal policy	mean average increment (MAI)
common pool resources	fuel stacking	optimal rotation model
common pool model	Gini coefficient	price driven policy
infinite natural resource	human development index (HDI)	quality driven policy
harvesting model	Kyoto clean development mechanism (CDM)	quota driven policy
commons	Lorenz curve	transferability
controllability		well defined property rights
corruption perception index		

Keywords and Concepts Chapter 21: Sustainable Wealth in Fossil Fuel Rich Developing Countries

absolute advantage	Ernst & Young's	Linaburg Maduell
backward link	renewable energy	transparency index
bio-combustible energy & waste	country attractiveness indices (CAI)	primary oil recovery
bio-fuels	foreign exchange market	production possibility frontier
carbon capture and storage (CCS)	forward link	R/P ratio
comparative advantage	Hartwick rule	resource curse
crowding out	human development index (HDI)	resource rent
Dutch disease	international renewable energy agency (IRENA)	secondary oil recovery
enhanced oil recovery (EOR)		sovereign wealth fund
		sustainable income model

Keywords and Concepts Chapter 22: Managing in the Multicultural World of Energy

achievement/ascription culture	guilt/shame based	power cultures
aesthetic culture	incubator culture	power distance
baton signals	individualism/collectivism	religious culture
Confucian dynamism	inner/outer directed	salutation displays
diffuse/specific culture	just in time (JIT)	social cultures
dominance/submission	inventories	taboo zones
economic culture	lean manufacturing	theoretical systematic cultures
Eiffel tower culture	low context/high context culture	theory x/theory y
empowerment decision making	masculinity/femininity	total quality management (TQM)
face	Maslow's hierarchy of need	uncertainty avoidance
family culture	Meworld/Jihad	universalism/particularism
guide signs	neutrality/affectation	Yin/Yang
guided missile culture	nonverbal communication	

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