ENERGY & INTERNATIONAL SECURITY

Drs. Adam N. Stulberg & Elizabeth Sherwood-Randall
Habersham 203
(404) 385-0090
adam.stulberg@inta.gatech.edu
Office Hours: Mon. 4-6pm & by appointment

INTA 3042
Fall 2019
Weds. 3:00-5:45pm
Habersham G-17

DESCRIPTION & OBJECTIVES

This course examines issues at the intersection of national energy security/sustainability and international conflict/cooperation. Is oil import dependence a foreign policy liability or cause for war? Do globalization and the interdependence of energy markets favor international cooperation and peace? More specifically, can Saudi Arabia and Russia use hydrocarbon exports as energy weapons? Or, will low oil prices, as well as the promise of natural gas exports lock in a strategic pivot away from the Persian Gulf and reinvigorate U.S. global leverage, if not "dominance," especially amid growing local demand across the Middle East and East Asia? Will this give grist to future U.S. energy sanctions on Russia, Iran, Venezuela and other strategic rivals, or stoke instability across the Middle East and Eurasia? Are the U.S. and China doomed to compete for access to global energy supply? Will there be a nuclear energy renaissance, and if so, will it increase the likelihood of weapons proliferation and/or regional conflict? Similarly, do innovations that ease distribution of renewable energy, promote local sustainability, and fuse energy with information systems reduce risks of resource wars or lower barriers to cross-border conflict?

Students are introduced to major theoretical and policy analytical lenses used to examine critical geopolitical and geoeconomic issues associated with national pursuits of energy security and sustainability. The above questions and others will be probed by dissecting the complex interaction between resource endowments, technologies/innovation, economics, politics, power, and strategy in the oil, natural gas, nuclear, and alternative energy sectors; and by analyzing the implications for broader themes and concepts of security and statecraft in international relations. Accordingly, the course is structured around historical and comparative analysis of core issues in each sector that cut across different states and regions related to resource scarcity, market dynamics, trade vulnerability, corporate behavior, policymaking, national welfare and threat perceptions, and strategic interaction.

Learning Outcomes

Students will demonstrate proficiency at critiquing alternative explanations for international energy competition/conflict/war and assessing systematically the respective policies, institutions, and technologies adopted to bolster energy security and sustainability by different actors across the international system. In studying energy systems across different sectors, they also will acquire knowledge about the relationship between science,

technology, and international affairs, more broadly. In addition, students will enhance their professional development by learning to communicate effectively in applying critical analysis for generating concrete policy recommendations on international security issues at the nexus of energy resources, technologies/infrastructure, trading, governance, and sustainable social systems at the local, national, and global levels.

FORMAT & REQUIREMENTS

The course consists of lectures and discussion, with in-class documentaries and prominent guest speakers/panel discussions occasionally interspersed. Students are expected to complete the required reading before each class and to contribute actively to all in-class discussions/activities. Most classes will begin with a lecture on the designated topic, and conclude with a structured discussion/activity of a major theoretical puzzle and attendant policy debate.

In addition to the in-class *midterm exam* **(October 2nd)** and regular *class participation*, each student will be responsible for drafting one short (3-4 pages, double-spaced) critical review of official and/or expert commentary on the international security implications of the changing energy landscape or related climate developments. This can include presentations on campus (e.g. public talks, in-class guest lectures), government statements, expert blogs or other on-line commentary, articles in policy journals/outlets, etc. The review should consist at least of a brief summary of the main argument of the targeted commentary, and an analytical and empirical critique. Critical reviews can be turned in at the student's discretion **on or before November 20th**.

Moreover, each student will have the choice of writing a *research paper* (30 pages, double-spaced) OR participating in a dynamic *policy simulation.* The research paper will seek to explain the history and challenges related to a particular country's energy diplomacy. Attention will be devoted to describing patterns or trends in respective energy specific diplomacy; analyzing underlying political, economic, technical, and/or cultural causes; and assessing associated strategic implications. Students are expected to conduct extra-curricular research on the topic. However, with approval, they can use this assignment to complement or extend research or analysis conducted for another course. A preliminary one-page outline will be due on **October 23rd**; final papers will be due on **December 3rd**.

Alternatively, each student can opt to participate in a dynamic course policy simulation that will take place during the weekend of **November 23rd – 24th**. To be clear, this is *optional* and in lieu of writing the research paper. The specific scenario and format of the simulation will be discussed in class. As part of the preparation, each student will be required to write two short background papers (3-4 pages, double-spaced) and contribute to drafting a group policy position paper (7 pages, double-spaced). For the first background paper (due **October 23rd**), each student will summarize the policy issues at stake from the respective national perspective. The second background paper (due **November 13th**) will focus on identifying the interests and strategic perspective associated with the institutional or corporate actor represented by the student. The third paper will be collectively written by respective national/transnational/corporate teams, laying out the initial policy positions

and objectives for the designated scenario (due **November 23rd**). Each student will participate actively in all group problem-solving and deliberative exercises during the two-day policy simulation. Students must notify Professor Stulberg via email of their preference to participate in the optional policy simulation by **October 9th**.

Finally, students are required to write a policy memo (8-10 pages) on a topic at the intersection of energy and national security relevant to a theme covered during October 9, 16, November 6, 13, or 20. Examples can include:

(1) How should the United States respond to continuing Russian pressure on Central and Eastern European countries?
(2) How should the United States prepare for and respond to a potential blockage of sea lanes in the Straits of Malacca?
(3) What should the United States do about the challenges affecting the nuclear power industry?
(4) What are the greatest challenges at the intersection of emerging energy technologies and national security and how can the United States meet them?
(5) Another related topic of choice with approval from instructors.

The memo will be addressed to the U.S. National Security Advisor and will: (1) succinctly frame the issue for consideration, putting it into a broader context and offering clarity about why it is important that it be addressed promptly; (2) set forth a range of policy options (optimally between three and five) for addressing the issue and discuss the pros and cons of each options; (3) make a recommendation for Presidential action among those options. The idea is not to do extensive additional research but to use the readings and class discussions as a foundation for this endeavor. A summary of the project must be submitted to Professors Stulberg and Sherwood-Randall no later than **6 pm on November 6th**. The final paper must be submitted by **December 11th at 6 pm.** No late papers will be accepted.

GRADING

Class Participation		10%
In-Class Midterm		20%
Research Paper or Simulation (Optional)		30%
Simulation Background Papers	(5% each)	
Group Position Paper	(10%)	
Participation	(10%)	
Critical Review		10%
Individual Policy Position Paper		30%

READING
(Available for Purchase at GT Barnes & Noble Bookstore)

Meghan O'Sullivan, *Windfall: How the New Energy Abundance Upends Global Politics and Strengthens America's Power* (New York: Simon & Schuster, 2017);
Per Hogselius, *Energy and Geopolitics* (New York: Routledge, 2019);
Andrew T. Price-Smith, *Oil, Liberalism, and War* (Cambridge: The M.I.T. Press, 2015);
Charles Ferguson, *Nuclear Energy: What Everyone Needs to Know* (New York: Oxford University Press, 2011); and

*Charles L. Glaser and Rosemary A. Kelanic, eds., *Crude Strategy: Rethinking the U.S. Military Commitment to Defense Persian Gulf Oil* (Washington, DC: Georgetown University Press, 2016);
*Agnia Grigas, *The New Geopolitics of Natural Gas* (Cambridge, MA: Harvard University, 2017);
*Steve A. Yetiv, *Myths of the Oil Boom: American National Security in a Global Energy Market* (New York: Oxford University Press, 2015);
*Jan Kalicki and David L. Goldwyn, *Energy and Security: Strategies for a World in Transition*, 2nd Edition (Baltimore: The Johns Hopkins University Press, 2013).

Additional Background Reading:
Francisco Parra, *Oil Politics: A Modern History of Petroleum* (New York: Tauris, 2010).

*Recommended

USEFUL LINKS

Baker Institute, Energy Forum Research, http://www.rice.edu/energy/research/
Atlantic Council (Eurasian Energy Futures Initiative), http://www.atlanticcouncil.org/programs/dinu-patriciu-eurasia-center/eurasian-energy-futures
CIA "The World Fact Book", https://www.cia.gov/library/publications/the-world factbook/index.html
Council on Foreign Relations, (Energy and Environment; Geopolitics of Energy) http://www.cfr.org/publication/20511/energyenvironment.html?breadcrumb=%2Fissue%2F17%2Fenergyenvironment https://www.cfr.org/geopolitics-energy
Energy Information Agency – Country Analysis Briefs. http://www.eia.doe.gov/cabs/
Cambridge Energy Resource Associates, http://www.cera.com/aspx/cda/public1/home/home.aspx
Energy Policy Research Foundation, Inc., http://eprinc.org/?page_id=58
MIT Energy Initiative, http://energy.mit.edu/
Harvard University, Belfer Center, Energy Technology Innovation Policy http://belfercenter.ksg.harvard.edu/project/10/energy_technology_innovation_policy.html

Harvard University, Belfer Center, The Geopolitics of Energy Project
http://belfercenter.ksg.harvard.edu/project/68/geopolitics_of_energy_project.html
International Energy Agency: http://www.iea.org/
Center for New American Security (Energy, Economics, & Security),
https://www.cnas.org/research/energy-economics-and-security
Center for Strategic and International Studies (Energy & Geopolitics),
https://www.csis.org/topics/energy-sustainability/energy-geopolitics
Oil Drum Blog: http://www.theoildrum.com/
Columbia University/SIPA Center on Global Energy Policy,
http://energypolicy.columbia.edu/
Oxford Institute for Energy Studies, http://www.oxfordenergy.org/research.shtml
Nuclear Threat Initiative, https://www.nti.org/.
Stanford University, Precourt Center for Energy Research, http://pie.stanford.edu/
White House Blog: Energy and the Environment:
http://www.whitehouse.gov/blog/issues/Energy-%2526-Environment
World Bank Energy:
http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTENERGY2/0,,menuPK:4114636~pagePK:149018~piPK:149093~theSitePK:4114200,00.html
LexisNexis accesses hundreds of energy sources: Platts, Oil and Gas Journal, Petroleum Economist, among many others.

DECORUM & INTEGRITY

Learning together requires that everyone must feel welcome and able to trust others in the class. A central aim of the course is to encourage students to think and be critical. Accordingly, all students are expected to exchange freely ideas while respecting the opinions of each other. Similarly, each student must recognize that academic dishonesty (such as cheating on a test/quiz or plagiarism on a paper) completely undermines the mission of this course, is surprisingly easy to detect, and is taken very seriously by the Institute. Do not be tempted to take a short cut to complete an assignment— consult the GT honor code/Honor Advisory Council http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code -- if there are any questions.

All lectures and discussions are not to be taped or recorded, unless approved by the professors. Students must turn off cell phones, pagers, and other electronic devices that could be distracting during class. Exceptions for emergency situations can be made upon prior consultation with the professors.

COURSE SCHEDULE

PART I: HISTORY & FUNDAMENTALS

Aug. 21: **Introduction: Energy Systems, National Security & Geopolitics**

Aug 28: **Energy Basics (Oil, Natural Gas, and the Nuclear Fuel Cycle)**

Reading:
EIA, "Energy Explained," ("What is Energy" thru "Secondary Resources"), https://www.eia.gov/energyexplained/
"Alternative Energy: Historical Time-Line" (peruse) http://alternativeenergy.procon.org/view.resource.php?resourceID=002475
Hogselius, Chps. 1-2**;**
Ferguson, Chps, 1-5, 7, 8;

Recommended Reading:
*Kalicki & Goldwyn, Chp. 1.
*"The Energy Story," Chps. 1, 2, 8, 9 (peruse) http://www.energyquest.ca.gov/story/chapter08.html

Sept. 4: **Hydrocarbon Century & Geopolitics: From "King Coal" to the Rise of "Big Oil" & OPEC**
(In-class Film & Discussion: *The Prize*, Part 6)

Reading:
Price-Smith, Chps. 1 & 4;
James D. Hamilton, "Historical Oil Shocks," unpublished draft (February 2011), http://econweb.ucsd.edu/~jhamilton/oil_history.pdf
Kalicki & Goldwyn, Chp. 3 (on-line, CANVAS)
Brian C. Black, "Exxon's Rex Tillerson & the Rise of Big Oil in American Politics," *The Conversation* (January 31, 2017). http://theconversation.com/exxons-rex-tillerson-and-the-rise-of-big-oil-in-american-politics-70260
O'Sullivan, Chp. 1

Recommended Reading:
*Parra, Chp. 3-4, 12-14.
*Watch "The Prize" Parts 2, 5 & 7.

Sept. 11: Energy & National Security Policymaking

Reading:
Barack Obama, "Presidential Policy Directive 1," The White House February 13, 2009 https://fas.org/irp/offdocs/ppd/ppd-1.pdf
"The National Laboratories: US Powerhouses of Science and Technology," https://nationallabs.org
Sara R (Rose) Rinfret, Denise L. Scheberle, and Michelle C. Pautz, *Public Policy: A Concise Introduction* (Washington, DC: Congressional Quarterly Press, 2018), Chp. 10 (CANVAS).

Sept 18: Different Faces of Energy Security

Reading:
Hogselius, Chp. 4
Klare, Chp. 1 (CANVAS).
"President Donald J. Trump is Unleashing American Energy Dominance," (May 14, 2019), https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-unleashing-american-energy-dominance/
O'Sullivan, Chp. 2
Campbell-Lynch Debate, *Oil & Gas Journal*, 14 July 2003 (CANVAS).

Recommended Reading:
*Benjamin K. Sovacool and Marilyn Brown, "Competing Dimensions on Energy Security: An International Perspective," GT/IAC Public Policy Working Paper #45 (13 January 2009) http://www.spp.gatech.edu/aboutus/workingpapers
*Roger Stern, "Oil Scarcity Ideology in US Foreign Policy, 1908-97," *Security Studies* 25:2 (2016), pp. 214-257. (Library: e-journals).
*Jason Bordoff, "The American Energy Superpower: Why Dominance is About More than Just Production," *Foreign Affairs* (July 6, 2017) (CANVAS).

Sept. 25: Resource Nationalism & Beyond

Reading:
Hogselius, Chp. 3
Price-Smith, Chp. 2;
Michael Ross, "Does Oil Hinder Democracy," *World Politics* 53 (April 2001), pp. 325-61) (CANVAS)
EIA, "What Drives Crude Oil Prices: Overview," (From spot prices-Demand OECD), https://www.eia.gov/finance/markets/crudeoil/

EIA, "What Drives Petroleum Product Prices: Overview," (From price balance), https://www.eia.gov/finance/markets/products/
Yetiv, Chp. 2 (CANVAS).
Robert McNally, "Crude Volatility," Chps. 9-10 (CANVAS)

Recommended Reading:
*Yetiv, Chps. 3 & 4;
*Parra, Chp. 17
*Andre Mansson, "A Resource Curse for Renewables?: Conflict and Cooperation in the Renewable Energy Sector," *Energy Research & Social Science* (2015) (CANVAS).

Oct. 2: **In-class Mid-term & Changing Global Landscape**

Reading:
IEA, "World Energy Outlook, 2018," Executive Summary https://webstore.iea.org/download/summary/190?fileName=English-WEO-2018-ES.pdf
ExxonMobil, "2018 Outlook for Energy: A View to 2040," https://corporate.exxonmobil.com/-/media/Global/Files/outlook-for-energy/2018-Outlook-for-Energy.pdf (peruse)
EIA, International Energy Outlook 2018: Energy Implications of Higher Economic Growth in Africa," https://www.eia.gov/outlooks/ieo/africa/pdf/africa_summary.pdf

Recommended Reading:
*EIA, International Energy Outlook 2018, Energy Implications of Faster Growth in India with Different Economic Compositions," https://www.eia.gov/outlooks/ieo/india/pdf/india_summary.pdf
*BP Energy Outlook, 2019 (peruse), https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf
*National Intelligence Council, Global Trends 2030: Paradoxes of Progress" (January 2017), https://www.dni.gov/files/documents/nic/GT-Full-Report.pdf

PART II: ENERGY SECURITY & REGIONAL CONFLICT/COOPERATION

Oct. 9: Eurasian & Asian Energy Pivots

Reading:

O'Sullivan, Chps. 8-10.

German Marshall Fund "Illicit Influence: The Energy Weapon," Report from the Alliance for Securing Democracy & C4ADS, https://d2llho1jqyw8vm.cloudfront.net/wp-content/uploads/2019/04/Illicit-Influence-Pt-2_Preview-PDF.pdf

Grigas, Chps. 3, 4, 6, 7 (peruse)

Steve Levine, "The End of the Great Game," *The New Republic,* October 5, 2010 https://newrepublic.com/article/78168/obama-central-asia-great-game

Richard Morningstar et al., "Issue Brief: European Energy Security and Transatlantic Cooperation: A Current Assessment," *The Atlantic Council Global Energy Center,* June 2019 https://www.atlanticcouncil.org/images/publications/European_Energy_Security_and_Transatlantic_Cooperation.pdf

Jeffrey Ball, "Grow Green China Inc.: How China's Epic Push for Cleaner Energy Creates Economic Opportunity for the West," *Brookings Paper 8,* May 2019 (CANVAS)

European Commission, European Energy Security Strategy, *Communication from the Commission to the European Parliament and the Council,* May 28, 2014, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0330&from=EN (CANVAS)

Recommended Reading:

*Morena Skalamera, "Explaining the 2014 Sino-Russian Gas Breakthrough: The Primacy of Domestic Politics," *Europe Asia Studies* 70:1 (2018), pp. 90-107. (CANVAS)

*Jonna Nyman, "Red Storm Ahead: Securitization of Energy in US-China Relations," *Millenium* 43:1 (2014), pp. 43-65. (Library: e-journals)

* Samir Tata, "Deconstructing China's Energy Security Strategy," *The Diplomat.com* (January 14, 2017), https://thediplomat.com/2017/01/deconstructing-chinas-energy-security-strategy/

*Tatiana Mitrova, *The Geopolitics of Russian Natural Gas* (February 24, 2014), http://belfercenter.ksg.harvard.edu/files/MO-CES-pub-GeoGasGCC-102513.pdf.

Oct. 16: U.S. Energy Security & Middle East Supply (LSR)

Reading:
O'Sullivan, Chps. 4 & 11
Glaser & Kelanic, Chp. 1 (CANVAS).
Tim Boersma and Corey Johnson, *U.S. Energy Diplomacy* (February 2018), Columbia University's CGEP, https://energypolicy.columbia.edu/sites/default/files/pictures/CGEPUSEnergyDiplomacy218.pdf
Elizabeth Sherwood-Randall, *Allies in Crisis: Meeting Global Challenges to Western Security* (New Haven, Yale University Press, 1990), pp. 136-183 (CANVAS);
Jonathan Elkind, Energy, the Economy, and Geopolitics in the Gulf Arab States, *Columbia SIPA Center on Global Energy Policy,* April 2018, https://energypolicy.columbia.edu/sites/default/files/pictures/CGEPGulfArabStatesGlobalEnergyDialogue0418.pdf

Recommended Reading:
*Mr. Y, "A National Strategic Narrative," Woodrow Wilson International Center for Scholars http://www.newsecuritybeat.org/2011/04/in-search-of-new-security-narrative.html
*Kalicki & Goldwyn (Chp. 10 & peruse rest of Part III)
*Glaser & Kelanic, Chp. 8.
*Yetiv, Chps. 5-7.

PART III: ENERGY & STRATEGIC INTERACTION

Oct. 23-30: The Energy Weapon, Conflict & Security Dilemmas (Sim Paper Due)

Reading:
O'Sullivan, Chps. 5-6
Hogselius, Chps. 5-7
David Victor and Rebuttals, "What Resource Wars?", *The National Interest*, Nov/Dec 2007 and Jan/Feb, 2008 (CANVAS);
Price-Smith, Chp. 4;
Eugene Gholz, "The Strait Dope: Why Iran Can't Cut off Your Oil," *Foreign Policy* (Sept/Oct. 2009) http://www.foreignpolicy.com/articles/2009/08/12/the_strait_dope
Bud Coote, Impact of Sanctions on Russia's Energy Sector," Atlantic Council/Global Energy Center (March 2018), https://www.atlanticcouncil.org/images/publications/Impact_of_Sanctions_on_Russia_s_Energy_Sector_web.pdf

Jeff D. Colgan, "Fueling the Fire: Pathways from Oil to War," *International Security* 38:2 (Fall 2013), pp. 147-189. (Library: e-journals).

Peter Toft, Arash Duero, Arunas Bieliauskas, "Terrorist Targeting and Energy Security," *Energy Policy* 38 (2010), pp. 4411-4421. (CANVAS).

Michael Ross, "Blood Barrels", *Foreign Affairs*, May/June 2008 (Library: e-journals);

Recommended Reading:

*Glaser & Kelanic, Chps. 3 & 5;

*Kenneth A. Schultz, "Mapping Interstate Territorial Conflict: A New Data Set and Applications," *Journal of Conflict Resolution* (2015). (Library: e-journals).

*Llewelyn Hughes and Austin Long, "Is There an Oil Weapon?: Security Implications of Changes in the Structure of the Oil Market," *International Security* 39:3 (Winter 2014/15), pp. 152-189. (library: e-journals).

*Steve A. Yetiv, *The Petroleum Triangle: Oil, Globalization, and Terror* (Ithaca: Cornell University Press, 2011), Chp. 6 (CANVAS).

*ICSR Report, "Caliphate in Decline: An Estimate of Islamic State's Financial Fortunes," *ICSR Kings College* (2017), http://icsr.info/wp-content/uploads/2017/02/ICSR-Report-Caliphate-in-Decline-An-Estimate-of-Islamic-States-Financial-Fortunes.pdf. (peruse)

*Ferguson, Chp. 6

Oct. 30 **No Class/ Team Meetings/TBA**

Nov. 6 **Changing Nuclear Landscape: Implications for Energy & International Security**

Reading:

Ferguson, Chps. 3-5;

Laura S. H. Holgate and Sagatom Saha, "America Must Lead on Nuclear Energy to Maintain National Security," *The Washington Quarterly* 41:2 (2018) (library: e-journals)

"The U.S. Nuclear Energy Enterprise: A Key National Security Enabler," A Special Report by the Energy Futures Initiative (August 2017), http://www.energyfuels.com/wp-content/uploads/2018/01/2018.01.16-Exhibits-to-Petition_Part2.pdf

Nicola de Blasio and Richard Nephew, *The Geopolitics of Nuclear Power and Technology* (Center on Global energy Policy, March 2017), http://energypolicy.columbia.edu/sites/default/files/The%20Geopolitics%20of%20Nuclear%20Power%20and%20Technology%20033017.pdf

Pierre Goldschmidt, "Multilateral Nuclear Fuel Supply Guarantees & Spent Fuel Management: What are the Priorities?" *Daedalus* (Winter 2010), pp. 7-19. (library: e-journals);

Recommended Reading:

*Christoph Bluth, Matthew Kroenig, Rensslelear Lee, William C. Sailor, and Matthew Fuhrmann, "Civilian Nuclear Cooperation and the Proliferation of Nuclear Weapons," *International Security* 35:1 (Summer 2010) (library: e-journals).

*Nicholas Miller, Why Nuclear Energy Programs Rarely Lead to Proliferation," *International Security* 42:2 (Fall 2017) (library: e-journals).

*Adam N. Stulberg, Internationalization of the Fuel Cycle and the Nuclear Energy Renaissance: Confronting the Credible Commitment Problem," in Adam N. Stulberg and Matthew Fuhrmann, eds., *The Nuclear Renaissance and International Security (*Stanford: Stanford University Press, 2013) (CANVAS).

*"Final Report," Investigation Committee on the Accident at the Fukushima Nuclear Power Station, Executive Summary (CANVAS), peruse.

Nov. 13: Geopolitics & the Age of Natural Gas
(2nd Sim Paper Due)

Reading:

O'Sullivan, Chps. 3, Section 2; Conclusion

Grigas, Chps. 1 & peruse 2.

Adam N. Stulberg, "Eurasia's Pipeline Tangle," *Russia in Global Affairs* (24 September 2011) http://eng.globalaffairs.ru/person/p_2445

EIA, "Oil Transit chokepoints" http://www.eia.gov/countries/regions-topics.cfm?fips=WOTC

Jonathan Elkind and Tim Boersma, Talking Past Each Other: Transatlantic Perspectives on European Gas Security, *Columbia SIPA: Center on Global Energy Policy,* May 2018 (CANVAS)

Recommended Reading:

*Kalicki & Goldwyn, Chp. 8.

*Adam N. Stulberg, "Natural Gas and the Russia-Ukraine Crisis: Strategic Restraint and the Emerging Europe-Eurasia Gas Network," *Energy Research & Social Science* 24 (February 2017), pp. 71-85. (CANVAS).

Nov. 20: Contemporary Energy Technology & Energy Security Challenges

Reading:

Department of Energy, *Quadrennial Technology Review: An Assessment of Energy Technologies and Research Opportunities* (January 2015), (CANVAS)

Department of Energy, *Quadrennial Energy Review: Transforming The Nation's Electricity System: The Second Installment of The QER*, (January 2017), (CANVAS)

International Renewable Energy Agency/Global Commission on the Geopolitics of Energy Transformation, *A New World: The Geopolitics of the Energy Transformation* (2019), http://geopoliticsofrenewables.org/assets/geopolitics/Reports/wp-content/uploads/2019/01/Global_commission_renewable_energy_2019.pdf

David Victor and Kassia Yanosek, "The Next Energy Revolution: Promise and Peril of High Technology Innovation," *Foreign Affairs*, July/August 2017 (library: e-journals)

Center for Naval Analyses, "Advanced Energy and National Security," 2017 https://www.cna.org/CNA_files/PDF/IRM-2017-U-015512.pdf

Jonathan Elkind, Toward A Real Green Belt and Road, *Columbia China Energy and Research Program,* April 2019 (CANVAS).

Recommended Reading:

*Wolfram Lacher and Dennis Kumetat, "The Security of Energy Infrastructure and Supply in North Africa: Hydrocarbons and Renewable Energies in Comparative Perspective," *Energy Policy* 39 (2011), pp. 4466-4478. (Library: e-journals).

*Meghan O'Sullivan, Indra Overland, and David Sandalow, "The Geopolitics of Renewable Energy," Working Paper CGEP/BelferNUPI (June 2017), https://energypolicy.columbia.edu/sites/default/files/CGEPTheGeopoliticsOfRenewables.pdf

*Gretchen Bakke, *The Grid: The Fraying Wires Between Americans and Our Energy Future.* Bloomsbury, 2016. (CANVAS)

*Varun Sivaram, *Taming the Sun: Innovations to Harness Solar Energy and Save the Planet*. MIT University Press, 2018. (CANVAS),

Nov. 23-24: ***SIMULATION (TBA)**
(Group Decision Paper Due, 11/23)

Dec. 3: **RESEARCH PAPER DUE 6:00PM**

Dec. 11: **FINAL POLICY MEMOS DUE 6:00PM**