LETTER FROM THE DIRECTOR:

Educating the leaders for our clean and efficient energy future through interdisciplinary studies and research.

Listening to President Randhawa’s inaugural Opening Convocation speech, we were delighted to hear a shout-out to the Institute for Energy Studies, as an example of an innovative program that addresses critical challenges for our students and our planet. As we begin a new academic year, I believe that the Energy Institute is positioned to help Western distinguish itself as a leader in education to meet these challenges.

This fall, we welcome a new Institute for Energy Studies permanent faculty member, Professor Xichen Jiang in Electrical Engineering. Professor Jiang will teach our power engineering core courses and carry on research he began at the University of Illinois on power distribution reliability.

This is the first academic year in which energy students in both of our new degree programs, the BA in Energy Policy and Management, and the energy concentration in the electrical engineering (EE) major, are in the senior year of academic standing. We anticipate our first graduations in spring 2017. We also have a growing cohort of Energy Policy minors and our first cohort of Energy Science minors.

We continue to have new courses added every quarter. This fall quarter, we have ENRG 381 (cross-listed with CHEM 381): Biofuels, taught by Professor Greg O’Neil, and ENRG 297B (cross-listed with GEOL 297B): Energy from the Earth, taught by Professor Pete Stelling and Michelle Judson, a distinguished geologist and executive from the energy industry. We also added a new Energy Studies FIG (first-year interest group), consisting of ENRG 101 Energy and Society, ECON 206 Microeconomics and a Seminar course led by Professor Sharon Shewmake. Now that we have seniors in our degree programs, we will offer our senior design project course series in electrical engineering and our spring-quarter ENRG 490 capstone course.

We continue to move forward with design of a future BS degree in energy science and technology, aided by our Advisory Board members, who are helping us define the skillset for graduates of such a program. We are developing new collaborations with the College of Business and Economics, to introduce energy content into the growing programs in Business and Sustainability and Entrepreneurship and Innovation, both of which have already attracted interest from majors and minors in our programs.

Riding the momentum from our first Energy Symposium last April, we are beginning to plan a second Symposium, tentatively scheduled for April 18th on the WWU campus. The first Symposium focused on electricity, and this event will focus on transportation energy and fuel chains. Similar to last year, students who wish to participate have the option of registering for one unit of academic credit as ENRG 397D in spring quarter, again taught by Energy Institute Professors Tim Kowalczyk and Reid Dorsey-Palmateer. Mark your calendar, and watch the Energy Institute website for more news on the agenda, speakers and related activities.

Joel Swisher, Director
Institute for Energy Studies
I am thankful to have had the opportunity to study the ins and outs of energy through this unique program. It has lead me all the way to Washington DC, where this summer I interned at SmartPower, a clean energy marking firm.

Aden Nevler

STUDENT SPOTLIGHT:

The Energy Policy Major has been the most powerful synthesis of knowledge I ever encountered. We tackle the realities of economics, politics, science and culture on a daily basis and from that has emerged a clear picture of what powers the world and the consequences of our system. Through the Energy Institute I have attended the first ever Western Washington Energy Symposium (The Future of Northwest Leadership in Electric Energy). The Energy Institute brought together leaders from around the state and those at the forefront of electrical systems and their regulation and presented not only an informative debate for students and staff alike, but also a powerful synopsis of the state of electrical power in the Northwest region.

I have had the honor and pleasure of learning from the Director of the Institute Joel Swisher, as well as professors Phil Thompson, Tom Webler and Charlie Barnhart through coursework in the institute. Each offers unique perspective on energy and as a team they build a sold foundation for all students entering the department.

I am thankful to have had the opportunity to study the ins and outs of energy through this unique program. It has lead me all the way to Washington DC, where this summer I interned at SmartPower, a clean energy marking firm. Smartpower for the last decade has built national campaigns to encourage energy efficiency and promote adoption of solar power and with their instruction I saw just how clean energy is changing the structure of our nation.

Aden Nevler, Student

PUD PROFESSORSHIP UPDATE:

Great uncertainty surrounds our efforts to mitigate climate impacts from energy use. One promising strategy for long-term climate mitigation is the use of low carbon renewable resources including wind, solar and hydropower. To that end Snohomish PUD adopted an official climate change policy that emphasizes a commitment to using natural resources efficiently and reducing greenhouse gas emissions. In June 2015 Snohomish PUD obtained licenses to develop two 6-megawatt run-of-the-river hydroelectric facilities located on Calligan Creek and Hancock Creek.

Construction of these projects provides a unique research opportunity. As the Snohomish PUD professor Charles Barnhart and undergraduate Joshua Ullerich are conducting a life cycle assessment (LCA) of the construction of these facilities. They travel to Hancock and Calligan creek to collect primary, first-hand data on land use change, material use and fuel use. The figure to the right shows some of the materials and energy being used to construct the penstock at Hancock Creek. Direct data like this is rare in LCA literature on hydropower and will allow robust calculations of the carbon and energy footprint while construction takes place. This information will allow comparisons to other hydro projects and renewable projects in general for supplying low carbon power to society. Analysis like these—calculating carbon and energy costs, not just financial costs—represent the core of Barnhart’s research and will help guide energy policy for the transition from fossil fuels to low carbon energy.

Aden Nevler, Student
The Institute for Energy Studies continues to benefit from generous support from a truly committed group of advisory board members and friends. Private philanthropy has played an essential role in the development of the program, including the creation and teaching of new courses; supporting student projects, activities and scholarships, supporting faculty research, and sponsoring extra-curricular learning experiences.

The philanthropic highlights from the 2015-2016 school year include generous gifts from Puget Sound Energy and Phillips 66 to sponsor the Institute’s inaugural Energy Symposium, “The Future of Northwest Leadership in Electric Energy”. The event featured nationally recognized energy experts and thought leaders and attracted nearly 200 students and faculty from WWU and beyond. Another important gift was received from board member William “Bill” Hurley to support the activities of the “Women in Energy Mentoring Network” student group which provides an opportunity for professional women in the energy field to provide mentorship and share knowledge with women students while creating a network of connections between women who are working in, and learning about field of energy.

At the June board meeting the Institute celebrated a major gift from the University Mechanical Contractors Charitable Foundation (UMCCF) to support continuing program development. Jerry Bush, President and CEO of University Mechanical Contractors is a member of the Institute’s advisory board. “My participation on the Energy Studies Advisory Board has given me good perspective, not only on the curriculum, but the quality and ingenuity of Western as an institution. Our business and passion is to create an energy-smart world. Western is aligned with our vision and we are thrilled to partner with them.” Asked what inspired the UMCCF gift of $30,000 to support the Institute, Bush stated, “Western has created a unique and impactful program, and they’re not done yet! We are more than pleased to help Western move the Institute for Energy Studies to the next level. The next phase of program development focuses on energy science and technology with a strong focus on building science and energy efficiency.

“Women in Energy Mentoring Network”
https://www.facebook.com/groups/wwuwomeninenergy/

“...My participation on the Energy Studies Advisory Board has given me good perspective, not only on the curriculum, but the quality and ingenuity of Western as an institution. Our business and passion is to create an energy-smart world. Western is aligned with our vision and we are thrilled to partner with them.

Jerry Bush
I am thankful to have had the opportunity to study the ins and outs of energy through this unique program. It has lead me all the way to Washington DC, where this summer I interned at SmartPower, a clean energy marking firm.

The National Academy of Engineering listed electrification as the 20th century’s greatest engineering achievement. Now, one hundred years later, energy research is more active than ever. It is paramount for the engineers of today to design the next generation of the power grid that is efficient, reliable, and resilient.

Xichen Jiang

MEET OUR NEW FACULTY: Xichen Jiang:

Xichen Jiang has joined the Institute for Energy Studies this year as a faculty member in the Electrical Engineering Department. Born in Shanghai, China, he immigrated to the United States along with his family when he was three years old. His family then relocated to Illinois when he was 10 and has stayed there ever since. Being an Illinois native, Xichen Jiang received his B.S., M.S., and Ph.D. degree all in electrical engineering from the University of Illinois, Urbana-Champaign. While a student there, Xichen has interned with Coilcraft, Proctor and Gamble, Exxon Mobil, and Viasat.

His research interests include power system reliability and cyber-physical systems. In particular, his research applies statistical and set-theoretic methods to detect and mitigate attacks or faults on the power system network. Recently, his research involves characterizing uncertainty that results from the growing number of renewable resources penetrating into the existing power grid.

2016 COLLEGE QUEST STUDENTS LEARN ABOUT INTERNATIONAL ENERGY:

This summer five Washington State high school students enrolled in a new one week intensive course ENRG 197: International Energy and Environmental Policy. Students spent the summer learning the basics of what energy is, how human history has been shaped by energy, and the future of energy. Each day students learned about an energy question faced on a different continent such as biofuels in South America or Carbon Cap-and-Trade in Europe. Professor Sharon Shewmake and Teaching Assistant Justin Wimmer taught students how to use and manipulate energy data in Excel and how to present and organize information as a mini-research paper. The class saw steam plants and bio-digesters up close with other IES faculty and staff, and gained presentation skills by researching and reporting on energy issues to a wider audience of their peers and parents.
WESTERN SHOWS THE WAY FORWARD ON EDUCATION TO MEET OUR GRAND CHALLENGES:

As we explore the transformational challenges and opportunities of our time (see the article on page six), let’s briefly note the role of higher education in addressing such a mission, which is central to the recent commitment by 122 deans of US engineering colleges to meet the “Grand Challenges” of the 21st century by:

• Learning experience connected to the Grand Challenges through research or design projects tailored to undergraduate students.
• Experiential learning with clients and mentors.
• Service-learning through problem-based community projects.
• Entrepreneurship and innovation experience.
• Global and cross-cultural perspectives.

As a comprehensive university (granting Bachelor and Master degrees), WWU prioritizes instruction and undergraduate experience. This emphasis obligates us to seek innovation and leadership in these areas, and the Institute for Energy Studies strives to lead by example. We are working to build a BS degree that combines rigorous technical skills with practical business and policy tools. We aim to help students build a skillset to become leaders in solving our energy Grand Challenges and realize vast opportunities in new technology, policy, and business models.

From the outset, the Energy Institute has been driven by student interest and guided by industry advice. Each of our academic programs has common strategic elements:

• Interdisciplinary the right way, broad and deep: Interdisciplinary majors are seen as lacking skills to meet pressing business needs, while technical majors are too narrow and theoretical. Our energy programs provide solid analytic tools in a context of system-level understanding.
• Focus on solutions to the key challenges of our generation: Our energy programs are unique in filling skill gaps in the demand-side of the energy system, where advancing energy efficiency is a huge business opportunity and urgent environmental imperative.
• Engaging undergraduates in research and experiential learning: WWU has a long history of undergraduate achievement in faculty-mentored research. Our energy programs emphasize collaborative, experiential learning through, for example, interdisciplinary capstone projects.
• Campus and community as a laboratory for service learning: Energy courses complement a campus-wide commitment to sustainability and prepares students to plan and execute real-world service projects such as, for example, energy efficiency upgrades in campus buildings.
• Entrepreneurship and innovation: With strong links to WWU’s program in Entrepreneurship and Innovation, we aim to prepare graduates to be founders of new enterprise and disrupters of existing business, as leaders in the Northwest’s clean energy growth and innovation.
• Global learning at all levels of instruction: Adding energy literacy and numeracy at all levels complements WWU’s commitment to global learning and can help graduates, including our prodigious cohorts of Peace Corps volunteers, to tackle complex issues in unfamiliar settings.

Reviewing these expressions of WWU’s core values reveals that we are already pursuing all five key elements of the commitment by 122 engineering deans to meet the 21st century’s “Grand Challenges.” So, our strategy parallels national goals to reform technical education – at WWU, we are doing what MIT, Stanford and others aspire to and, as a comprehensive university already focused on undergraduate instruction, we actually have a head start!

Joel Swisher, Director
Institute for Energy Studies


THE INGERSOLL RAND - TRANE SCHOLARSHIP:

As a part of its outstanding commitment to the Institute for Energy Studies, the Ingersoll Rand Foundation established the Ingersoll Rand-Trane Energy Solutions Scholarship, a permanently endowed scholarship fund. The purpose of the scholarship fund is to provide support for women students who are pursuing an Institute for Energy Studies degree (minor, major or concentration). The scholarship is awarded yearly, based on outstanding academic merit, and can be used to help pay for tuition, books, materials and related educational expenses. With this gift, the Ingersoll Rand Foundation is providing vital support for Western Washington University and the Institute for Energy Studies; helping to ensure its ongoing growth and success. We are grateful for their support and the programmatic guidance we have received from founding advisory board member, Warren Michelsen, General Manager - Northwest-Hawaii District, Trane Climate Solutions, Ingersoll Rand Corp.
THOUGHTS ON OUR MISSION TO ADVANCE THE TRANSITION TO SUSTAINABLE ENERGY:

In his memorable address at Rice University in 1962, President John Kennedy said “We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard.” Today, for many of us who see the transition to sustainable energy as our mission in this century, the mission suddenly looks harder.

This year’s campaign rhetoric threatened to reverse decades of progress in renewable energy, energy efficiency, and improving the efficiency and environmental performance of all energy supplies, just as these solutions are achieving traction in terms of scale, cost and performance.

That rhetoric may or may not be realized in policy measures in the coming years. But either way, to continue, indeed accelerate, recent progress in the sustainable energy mission is essential, and not because it is easy, but because it is hard.

Progress today and success tomorrow are essential, first because access to modern energy services, including efficient usage, is essential to realize 20th century, let alone 21st century, living standards worldwide. Meanwhile, a transition from inefficient use of fossil fuels to a clean, efficient energy system is key to mitigating urgent environmental, economic and security risks, including global climate change. Achieving the sustainable energy transition was identified by the United Nations as a “transformational challenge” for our generation.

For our students aspiring to jobs and entrepreneurial opportunities in the energy field, we must find pathways to circumvent, and potential to neutralize, political headwinds. Some good news:

• **State and local policy:** Most electricity policy and building efficiency regulations are made at the state level. The Pacific Northwest has the most progressive and successful process to harness energy efficiency as a resource in electric power planning. As we build on success in the region, we can find opportunities to export this expertise to other states and regions.

• **Technology:** New energy technologies, from low-cost solar photovoltaics and offshore wind on the supply side to LED lamps and ductless heat pumps on the demand side, open myriad possibilities for new business models and companies to harness them. And digital technology like wireless sensor networks expand the range of innovation and efficiency.

• **Business:** Private companies, ranging from Google and Microsoft to General Motors and Walmart, are becoming major buyers of renewable energy, direct from solar and wind farms, which insulates their finances from volatile energy prices and cuts their carbon footprint. And many Iowa farmers are doubling their income by leasing a small fraction of their land for wind turbines, bringing the benefits of clean energy to the heartland.

• **Incumbents:** The oil and gas industry is developing methods to reduce emissions and capture methane in production and delivery operations. We expect their leaders to act responsibly by adopting these advances, which support their social license to grow. And robust natural gas supply will make coal uncompetitive, even with weaker emission rules.

• **Common goals:** Improved fuel economy and electrification of cars and trucks is the most effective strategy to pursue energy independence, while keeping global oil prices from spiking up again. Solar-powered houses and mini-grids reduce reliance on distant, polluting sources and are supported by everyone from liberal tree-huggers to Tea Party conservatives.

• **The world:** From Europe to China to Africa, clean energy technologies are advancing, in pursuit of energy security and climate change mitigation. By competing in these markets, we can tackle the transformational challenge of sustainable energy globally and create jobs at home. The best way to compete internationally is to nurture a healthy domestic market.

We will doubtless encounter bad news too, in the coming months, but these pathways offer inspiration and motivation to forge ahead, learn from setbacks, and share our emerging insights and experience with a world that needs innovative solutions now, more than ever. Onward!

Joel Swisher, Director
Institute for Energy Studies

“...to continue, indeed accelerate, recent progress in the sustainable energy mission is essential, and not because it is easy, but because it is hard.”

Joel Swisher
WELCOME TO OUR NEW AFFILIATE FACULTY MEMBERS CRAIG DUNN AND GREG O’NEIL:

“While economists despair of differentiating between needs and wants, choosing instead to focus on the more generic category of preferences…it could rather easily be argued that energy is essential to the very existence of all species, including ours. Energy de facto fulfills a fundamental need. So…to critically study energy capture/production/distribution/utilization is to equip oneself with an enduring perspective, with knowledge, with skills that are core to life itself—and that thereby make one highly marketable to boot!

Craig Dunn

Founding Laureate
$1,000,000 to $4,999,999
Alpha Technologies

Founding Benefactors
$100,000 - $250,000
Alaska Airlines
Ingersoll Rand Foundation
John and Marcia Harter

Founding Partners
$25,000 - $99,999
Sharfstein Family
Snohomish County Public Utility District
Puget Sound Energy
APCO Worldwide
University Mechanical Contractors, Inc.

Founding Contributors
$500 to $24,999
David L. Benson
Michael Butler / Cascadia Capital LLC
Lars Johansson
William “Bill” Johnson / Sound Energy Investments
Ross Andrew Macfarlane
Warren W. Michelsen
Paul Edmund Norman
Catherine Ann Riordan
William D. Ruckelshaus
Anonymous
The Institute for Energy Studies at Western Washington University is a unique, multi-college collaboration. Our programs are designed to meet growing demand, from students and Washington’s clean energy economy, for interdisciplinary education related to the science, technology, policy and business aspects of human production and use of energy.