

**Chancellor Ryan, Dean Trahan,**

**Dr. Rastgoufard, members of the faculty and staff, parents, relatives, friends and, of course, the graduating class of 2008 ...**

**Thank you for inviting me to speak at your graduation ceremony today. It is truly an honor to be here.**

**Congratulations to each of you for your achievement in obtaining an engineering degree; a field of study that is exhausting, rewarding, challenging and extremely important to every fabric of society.**

**It is truly an honor to be surrounded by such an accomplished group as this; in what I believe, is an integral part of our future.**

**And by that, I am not only speaking as an executive vice president at a utility, but also as a concerned father. I'll explain why that is in just a few minutes, but first I'd like to kick things off on a lighter note with an old, bad joke about engineers.**

**Back in the days of the French Revolution, a priest, a lawyer and an engineer were about to be executed by guillotine.**

**First up was the priest. He calmly walked over and placed himself in position in the guillotine, but when the executioner pulled the rope, nothing happened. The priest stood up and declared that he had been saved by divine intervention, and was therefore let go.**

**Next, out came the lawyer. He walked over, put himself in place in the guillotine, but again the rope doesn't release the blade. The lawyer then successfully argues that according to the law he can't be executed twice for the same crime and he, too, is set free.**

**Frustrated, the executioner grabs the engineer and shoves his head into the guillotine. The engineer looks up at the release mechanism and says, "Wait a minute, I see your problem...."**

**But seriously, while the priest and lawyer may disagree, Entergy feels very strongly about the increasing importance of engineering disciplines. So much so that we just recently Endowed a Chair in Power Systems Engineering at UNO to further develop this fine institution into one of the best electric power programs in the world.**

**It is our intention to help attract the next generation of engineers to study electric power. A discipline, which a lot like engineers, can often be overlooked and under appreciated. The power industry is driven by engineers.**

**And we believe that the greatest challenge of this generation is being placed in the laps of engineers. Whether you realize it now or not, each of you can and will play a role in long-term sustainability of our planet.**

**It's a heady challenge you face, but the opportunities to make a difference are incalculable.**

**So, what exactly is the challenge?**

**It's what our Chairman and CEO Wayne Leonard has dubbed, the defining issue of our time.**

**It's global climate change resulting from human activity—activity that produces significantly escalating amounts of greenhouse gases, such as carbon dioxide.**

**As far as Entergy is concerned, the debate on the science is over. Those still calling for more study of the problem before making policy decisions are wasting their time and breath.**

**We agree with the vast majority of the scientific community, specifically the Intergovernmental Panel on Climate Change (IPCC) that consists of over 2400 scientists, that there is a direct correlation between CO<sub>2</sub> concentrations and temperature change.**

**We further agree with most of the scientific community that man-made CO<sub>2</sub> emissions are the primary cause for the increase of CO<sub>2</sub> concentration in the atmosphere.**

**Entergy has been an advocate for mandatory greenhouse gas legislation since 2001. This isn't a passing fad or the "fashionable" thing to do. It is very real to us. We have experienced first-hand, both personally and professionally, what risks we all face if nothing is done to mitigate GHG's in the atmosphere.**

**As many, if not all of you know, Hurricanes Katrina and Rita served as a wake-up call and provided the world with some insight as to the consequences of doing nothing.**

**Global climate change brings about higher temperatures, sea level rise, more frequent and ferocious hurricanes, droughts and other extreme weather events like the world has never experienced.**

**We feel this particular area serves as the prime example for the physical risks of climate change. But recognizing that we have a GHG problem, while important, is actually the easy part of the job.**

**Some of you may be asking, “Why is he telling us this?”**

**Well, because addressing the problem urgently yet rationally is the hard part, and that is the challenge to which the engineering community must respond.**

**Quite simply: you possess the education, the talent and the skills to develop and implement the solution. The business world needs you and families are counting on you.**

**I mentioned earlier that as a father, I believe engineers are integral to our future. Like any other parent, I want my children and my children’s children to live in a clean, safe environment and not have to pay for the environmental debacle created by previous generations.**

**Especially when we have the power, bad pun intended, to prevent this from happening. U.S. engineers have a solid history of rising to the challenge especially when the odds are against us.**

**Ideas and innovation that we are counting on you to develop and implement will help solve this problem.**

**And to address greenhouse gas emissions and energy demand, it is going to take the efforts of everyone. There is no single solution, no “silver bullet” to count on. The planet is going to need everything in the playbook to address global climate impacts.**

**This includes ALL engineering disciplines ... developing efficiencies of scale/more energy per btu ... finding a way to de-carbonize and remove CO2 from burned fuel ... designing future infrastructure, and ... solving the complexities of carbon sequestration.**

**Because there are no proven solutions, engineers have a unique opportunity to help solve this challenge. That’s not to say that there aren’t a number of identified technological solutions under development and currently being tested.**

**There are ...**

**... but, you will graduate today with the chance to be a part of, or the inventor of, new technology to address the situation.**

**The U.S. economy has been built upon a history of tackling these types of issues and engineers working at various companies, will indeed solve them.**

**Jeff Immelt, the CEO of General Electric, has stated it is his vision that clean technologies and greenhouse gas mitigation may be the next big export product line for the developed and developing nations of the world.**

**So what's at stake and why should you care?**

**This is a global problem, no matter where you live or work, it will affect you and your family. To give you a brief understanding of Entergy's point of view, let's look right here in the city where we are today ... New Orleans.**

**Arguably, this is one of the most culturally-rich cities in the world. In fact, this city and engineers go hand-in-hand. Without engineers, New Orleans as we know it would not exist today.**

**Imagine a world without the food, music, commodities and necessities that New Orleans exports globally ... jazz, oil, natural gas, seafood ... even the Saints and the Hornets!**

**Without the engineering prowess behind a world-class levee system, the Mississippi River and Gulf of Mexico would have reclaimed this city ... unfortunately, we have seen that happen.**

**But that is one of the challenges the next generation of engineers face ... the modernization of infrastructure both locally and across the U.S.**

**This is one of the most populated industrial regions of the country and it must be protected by advanced infrastructure - designed by engineers to withstand multiple Katrina-like events.**

**While the effects of climate change resonate strongest when we use Louisiana as an example, let's not forget the worldwide implications.**

**There are global ramifications for water supply, ecosystems, food, personal health and coastal regions.**

**Ecosystems are particularly at risk to temperature change. A 1 degree C change increases wildfire risk and species geographic shifts.**

**With a 2 - 3 degree change, up to 30% of all species are at risk of extinction. Above 3 degrees, 40% of all ecosystems are potentially affected.**

**The forces impacting food production are also very sensitive to climate change.**

**Experts are predicting a 3 foot rise in sea level with only a modest increase of 2°C.**

**The coasts of Louisiana, Florida and the eastern US, will see significant negative impacts due to increased flooding and loss of wetlands.**

**Health issues which are manifest as increased morbidity and mortality, begin with only modest temperature increases. Global climate impacts are also expected to change the distribution of diseases.**

**Areas previously not susceptible to certain diseases could begin to experience issues with only a 2 degree rise.**

**Droughts, flooding, wildfires... regardless of geographic location, everyone will be affected. Temperature change creates a domino effect that transcends and impacts industries worldwide.**

**R&D from the engineering world, from you, is absolutely necessary. Innovation possibilities include CO2 control technology, new generation approaches, plug-in hybrid vehicles, and most importantly, discoveries and products we can only imagine today.**

**A retrofit option for post-combustion capture and sequestration on conventional coal is absolutely essential, if for no other reason than China and India's expansions of coal plants, where they are building 1 per week.**

**We can't solve the GHG problem without a design to retrofit those plants.**

**Yes, scientists have some laboratory-scale models for post-combustion capture, but they are hardly proven and they use tremendous amounts of energy.**

**In addition, an efficient sequestration process is shockingly far away. At the current pace of development, it will be at least 10 years before wide-scale sequestration becomes a reality.**

**Time is of the essence ... a sense of urgency is required!**

**For CO<sub>2</sub> concentrations to stabilize at 450 ppm (which will result in an expected 2°C rise in global temperature), emissions will peak in 2015.**

**There is a general consensus among the scientific community, that an atmospheric concentration much beyond 450 ppm, could lead the planet to a “tipping point” - where we would venture beyond the point of no return for ice melts, ecosystems and climate impacts. That gives us 7 years.**

**Because of inertia in the system, GHG concentrations will continue to rise even after emissions have been reduced. So, the emissions need to peak and then decline thereafter in order to achieve stabilization.**

**The lower the stabilization level, the more quickly this peak and decline in emissions will need to occur. Delaying action now, means more drastic reductions are required in the future. This will result in substantially increased costs.**

**So ... no pressure ladies and gentlemen.**

**Remember the words of Winston Churchill: “You can always count on America to do the right thing after they have exhausted all other possibilities.”**

**We are a great nation. Many possibilities have been exhausted. We are counting on our best and brightest engineers to lead the way.**

**We are not naive enough to believe this will be easy or cheap, but we feel the “OPPORTUNITY” of Climate Change is real. We can’t afford to be wrong or miss the opportunity to do what is right.**

**Can the U.S. rally ... is it in you?**

**Wayne Leonard put it best when he said, “Future generations will look back with either admiration or despair, judging how well we, in these early years of the 21st Century, addressed critical climate change issues.”**

**But beyond climate change, engineers are going to be at the center of a series of issues facing the country. The entire electrical infrastructure will be an enormous challenge going forward.**

**For example, “smart grid” technology...**

**Think “outside the box” ...**

**Think about how to develop more efficient ways to deliver electricity ... something which will be crucial for the utility industry. Superconducting materials for transmission lines as well as other electrical devices are currently being beta tested.**

**The demand for energy is expected to increase 50 percent over the next 30 years. The ability to meet that demand will be impossible without breakthroughs in energy efficiency and the design of a “smart grid” to act as an enabler.**

**Connecting renewable energy sources to the grid is and will continue to be a challenge due to their intermittent nature. Lower cost manufacturing techniques as well as electricity storage schemes need to be developed.**

**This will allow renewables to economically compete in power production.**

**Everyone should realize that customer energy usage is substantially changing. We are using more energy than ever before. Think about all those plasma televisions, video game consoles, media center computers, etc...**

**Also, demand side energy has become a major issue the utility will have to address, not to mention more efficient design of commercial energy use.**

**The bottom line: You are all in an enviable, opportunistic position ... talk about job security!**

**Adding to the resource need is the expected baby boomer turnover that all industries are beginning to recognize.**

**Nationwide, the average age of employees in engineering companies is approximately 48. Old guys like me are looking to the new generation to take over the reigns.**

**Because we are facing major retirement levels and an aging workforce, this is a great field to be in. It isn't an overstatement when companies like ours say, "We NEED you!"**

**UNO has the only school of engineering in New Orleans and combined with the aging of the boomers and the need for new talent, there are a lot of potential opportunities both here and in other areas of the country.**

**Selfishly, that is one of the reasons why we funded a chair for power systems engineering. We firmly believe that we must develop talent to offset the oncoming wave of retirements ... retirements not just at Entergy, but throughout the U.S.**

**It sounds like a cliché, but we are relying on you. You have spent the past few years gathering a wealth of knowledge that quite possibly could change how individuals, businesses, institutions and governments operate.**

**Believe it ... believe in your abilities to make change happen.**

**As engineers, it is in your DNA to do just that. You can and will solve problems throughout your career. Think back to all those math courses.**

**All that math you've perfected since your first engineering class has prepared you for the most intimidating and difficult problems.**

**The solution exists. It's in your head.**

**The challenge will be to dig it out and put it into practice.**

**There's an old saying, "Practice is when everything is working and only the engineer knows why." Funny ... but true.**

**Don't ever doubt your ability. Think of innovation not yet imagined, that will carry us into the future and sustain us for the long term.**

**With advance apologies to the writer of the movie "Gladiator", approach your career with the mindset that what you do at work will echo in eternity.**

**Engineers actually have the skills and track record to say that with a straight face.**

**But it's not about ego, it is about the role you now play in society.**

**It may feel like a daunting challenge.**

**But think about the fact that you are here today, about to receive a diploma that attests to years of resiliency and perseverance, and how difficult it was to get to this point.**

**This is your first in a number of tremendous achievements. You belong to an elite club that most of the great engineers of our time also belong ... college graduate. No small feat, and for that, I commend you.**

**None of the challenges that I described will be easy, but if you find a path with no obstacles, it probably doesn't lead anywhere. I encourage you to find what you love.**

**Finally ... core values of life and success remain the same as when I graduated ... hard work, passion, integrity and most important, family.**

**Believe ... believe that you will make a difference. What footprint will you leave on this earth?**

**Congratulations to the Class of 2008.**