



The UK Energy Transition Centre for Masters' Training (CMT): A World Leader in Geoscience

by: Professor Bernie Vining

THE ENERGY TRANSITION IS HERE!

The Energy Transition is accelerating at a rapid pace. These exciting times call upon us to meet the challenges of a changing global energy mix. What will this new energy mix look like? How do we proactively prepare to fill the skills gap in geoscience and engineering required by these changes? The UK Energy Transition Centre for Masters' Training (CMT) will provide solutions by developing the talent needed to embrace and implement innovative technologies across the spectrum of energy types. The UK has a long, distinguished history of providing petroleum geoscience and engineering graduates, alumni of which are working across all levels of the energy sector worldwide. Building on these foundations, the CMT will be a leader in this period of change, fulfilling the need for the next generation of world-class geoscientists. Before discussing the mission statement of the CMT, let's step back to take a perspective on the principal drivers behind the Energy Transition.

A GLOBAL PERSPECTIVE

It is now just over 50 years since the crew of Apollo 11 took the first compelling photographs of planet Earth (Figure 1), vividly showing a solitary planet of beauty in space — with one



Figure 1 > Planet Earth, a single unified system. (Image courtesy of NASA)

Primary energy demand
Billion toe

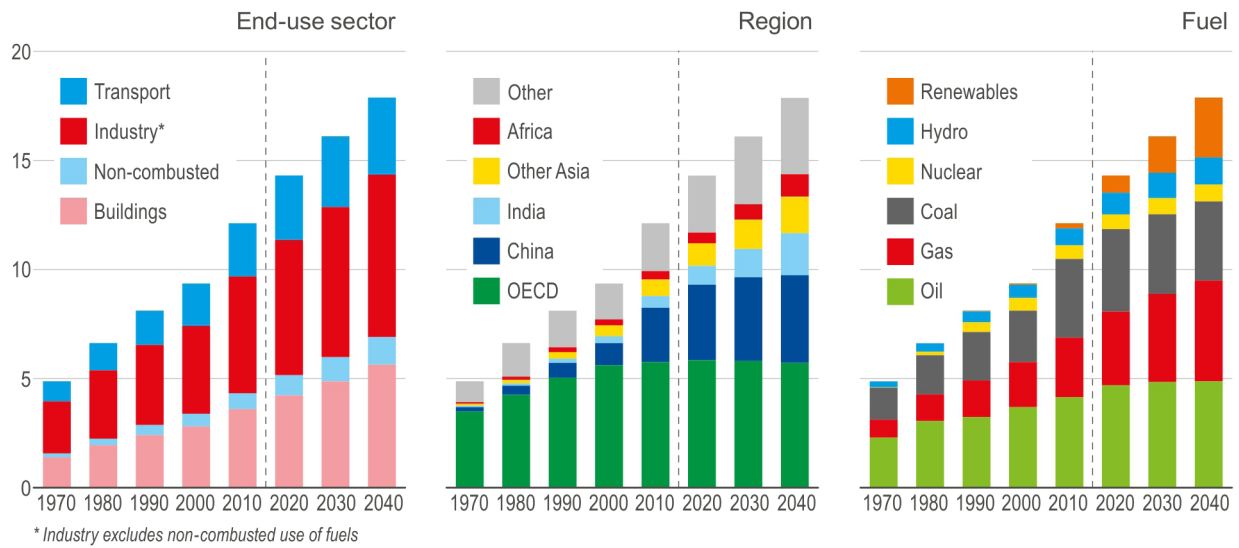


Figure 2 > Primary energy demand (source: BP Energy Outlook).

atmosphere, interdependent natural systems, and home to all life. The world’s human population was 3.6 billion at that time in 1969; more than doubling to 7.8 billion today. Current projections are for a continued increase to 9.9 billion by 2050, the target date for the UK to achieve “net zero” carbon emissions.

The growth in the world’s population is having a profound influence on the planet, our ability to meet primary energy demand, and improve quality of life globally. As a consequence, the exponential increase in greenhouse gases (GHG) over recent decades is driving climate change. Total primary energy demand is projected to continue its increase, as shown in Figure 2, for the end-use sector, region, and fuel type. However, the proportionate mix in energy sources is projected to change. Renewable energy sources will grow, but hydrocarbons will continue to constitute the majority of the energy mix for some time.

It is of paramount importance to recognize that different parts of the world will have different starting points on this Energy Transition journey. The oil and gas industry will evolve to meet the demand for cleaner fuels, notably gas, while developing increased capabilities with regards to sustainable resources in parallel with other sectors. To be successful, this evolution will require a new blend of skills for geoscientists in particular.

MEETING THE SKILLS GAP

To meet the existing skills gap, a better understanding of geoscience “solutions” is required. Building a high-quality, skilled workforce will require continued training of petroleum geoscientists into the future. However, this will occur hand in hand with the complementary subsurface skills required for sustainable resources (e.g. carbon capture, utilization, and storage (CCUS), and geothermal) in a decarbonizing world. This means an increased emphasis on themes, such as fluid flow in porous media, optimizing geothermal resources, hydrogeology, environmentally sensitive oil and gas production, and hydrothermal mineralization for energy-critical minerals. In addition, a better understanding of seals is required for CCUS and nuclear waste management.

Although jobs in the low carbon sector are not there yet, they will be in the near future and we need to be prepared! Students are enthusiastic and can look forward to exciting career opportunities across the evolving energy sector. Similarly, industry wants its staff to be prepared for the acceleration of the Energy Transition and for the requisite research and development (R&D) to be in place. The positioning of the CMT is pivotal, at the center of three overlapping spheres of influence — student desire, low carbon jobs, and innovative R&D — as shown in the Venn diagram in Figure 3.

The key players are in place to support the CMT initiative:

- » Leading UK universities, specializing in energy-related courses, have come together collaboratively to share their wealth of experience and expertise.
- » A wide range of companies across the energy sector are contributing their own respective experience and expertise, both “in kind” and monetarily.
- » The UK government is engaged with a particular emphasis on meeting the skills gap, in alignment with their commitment to net zero emissions by 2050.

It is well known that there is a strong interdependency between research and teaching. In this respect, the concept of the CMT has a strong synergy with the highly acclaimed Centre for Doctoral Training in Oil & Gas (CDT), hosted at Heriot Watt University, launched in 2014, and

which has entered a second phase in 2021 that is focusing on decarbonization, or “GetNetZero”.

A distinguishing feature of the CMT is the provision of a single entity to access Energy Transition training. Currently, the CMT is progressing with advanced web development and populating its data repository with materials from universities and industry. For example, Halliburton is providing on-line training materials and software support through its University Grants Program. RPS, leveraging their impressive Learning Hub expertise and experience, is sponsoring “in kind” the development of the platform. Access is by an “Open Site” and a “Member Site”; the latter being at no cost to academic institutions, and funded by industry and government to administer the CMT and, at the same time, providing a Scholarship Fund for students worldwide. Course offerings are at three levels — Foundation, Intermediate, and Advanced — designed to attract students with a range of capabilities.

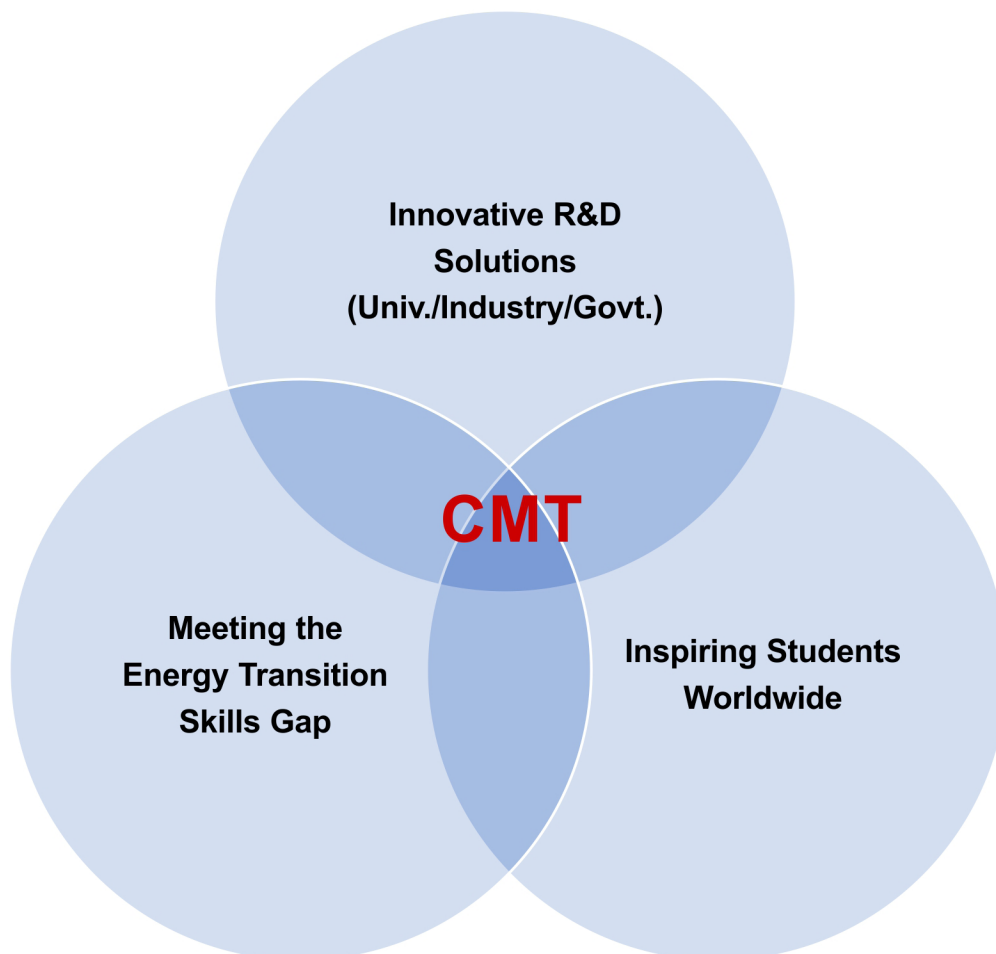


Figure 3 > Venn diagram of The UK Energy Transition Centre for Masters' Training (CMT).

ADAPTING TO THE NEW NORMAL

As we are all keenly aware, the advent of the COVID-19 pandemic has had a profound effect since 1Q 2020, causing severe disruption and major changes to the way of life throughout the world. Looking at lessons learned, there are some “forced adaptations” that we can apply positively to the CMT. New ways of working have rapidly come to the fore as we adjusted to living in a “virtual” world. New best practices are being developed, heralding improvements in effectiveness and efficiency. Virtual meetings between geographically dispersed participants now facilitate a level of collaboration that either would not have happened, or would have taken much longer to implement, in a pre-COVID world — even though all the technological capabilities already existed!

The increased fiscal constraints associated with the pandemic have resulted in tight budgetary scrutiny and discipline. For example, the modus operandi of academic institutions in the UK is showing profound change. The commencement of widespread online learning, together with blended online and campus learning, is a major shift, opening new opportunities of access that are probably here to stay. Uncertainties in future student numbers, on which revenues are heavily based, are a major driver for change. There has also been a marked change in attitude from “friendly competition” to “collaboration” in the academic sector.

The sharp decline in the price of oil in 2Q 2020 precipitated major corporate reorganizations, downsizing, and other budgetary vigilance measures throughout the energy sector. “Doing more with less” is a common mantra these days. From a CMT perspective, a fiscal landscape of tight budgetary constraints across industry, government, and academia is especially challenging. However, the increased willingness to collaborate is a positive development fully aligned with doing more with less! Global outreach through online offerings and new learning modalities is, therefore, a principal catalyst for the CMT.

WHAT WILL SUCCESS LOOK LIKE?

Success of the CMT will be characterized by filling the skills gap to provide a high-quality,

skilled workforce, and meeting the societal needs to mitigate climate change through finding solutions vis-à-vis the Energy Transition. This will provide exciting and challenging opportunities in geoscience, but will also require flexibility and adaptability to change from industry, government, and academic policymakers. The key attributes of success will be a strong background in geoscience fundamentals; university curricula embracing new technologies with a cross-discipline, problem-solving mindset; all in the context of sharp commercial acumen, leadership, and management skills.

There are a number of exciting avenues the CMT aims to explore. Although initially a UK initiative, the future is global. The CMT intends to be distinguished as an independent, international organization, a world leader in geoscience for the Energy Transition. Leveraging this global outreach and using a modular approach, there is potential to instigate a new 2-year Masters’ program. This will appeal to students in parts of the world where 2-year Masters’ programs are the norm e.g. India, S. E. Asia, and North America. In addition, it will open opportunities to those early career employees who, via distance learning, can continue their education in parallel with their employment.

Another area of focus is growing the online presence of the CMT. Through the close collaboration of university, industry, and government entities, we are planning additional high-quality content in a diverse range of Energy Transition subjects and a variety of delivery mechanisms (e.g. scheduled courses, lectures, and webinars). For example, in the short term, the introduction of a module(s) on energy-critical minerals will be forthcoming and more attention will be paid to subjects currently of limited availability in academia (e.g. Artificial Intelligence and Machine Learning). It is anticipated that the diversity of offerings will expand to include policy/regulatory and economics content, as well. In addition, as soon as conditions regarding the pandemic permit, it is proposed to offer some selected residential courses, particularly field courses that include travel to classic geological locations. The emphasis on blending world-class science with “Professional Skills Development” is a high priority, and it is envisaged that a “hybrid

MBA” will be a future offering to favorably position CMT graduates in the workplace.

Truly collaborative programs may also evolve, in which each participating university would offer a selection of modules, enabling students to create their own bespoke Masters’ degree. This direction for the CMT is contingent on the participating universities agreeing to certain accreditation principles that will allow modules to be recognized by one another. We are confident that this will happen; a precedent scheme having already been piloted successfully in Europe (Netherlands, Spain, and Switzerland). This “European” style of program (ETCS) is based on a number of credits being awarded per module, and the degree being awarded upon attaining the specified number of credits. A collaborative Energy Transition Masters’ approach is believed to be readily achievable. Looking further into the future, some of the founding principles and learnings of the CMT may also be transferable to embrace undergraduate programs.

COP26 IN GLASGOW UK, NOVEMBER 2021: A GLOBAL LAUNCH FOR A GLOBAL INITIATIVE!

The CMT will be officially launched at COP26 in Glasgow, in November 2021. COP26 is the perfect platform to showcase the CMT as a forward-looking, prestigious, high-quality initiative to train the next generations of geoscientists and engineers. Hosted in the UK with a global audience, the CMT will seek maximum visibility through its alignment with the UK government’s climate change commitment and the UN Global Sustainability Goals. Partnering with The Geological Society of London (GSL), the intent is to capture social media, radio, and television coverage through the event; thereby, achieving increased public and media awareness of the strategic importance of the Energy Transition to our society. The CMT is truly global in its outreach — global students, global industries, and global governments.

HOW CAN I GET INVOLVED?

The future success of the CMT relies on the enthusiasm, commitment, and associated funding by academia, industry, and government. We are now seeking to grow the CMT through “in kind” and monetary contributions. Should your university,

company or government department wish to join us on this journey, please get in touch. We would be delighted to hear from you. Thank you!



<https://www.energy-transition.ac.uk>



<https://www.linkedin.com/company/energy-transition-cmt-centre-for-masters-training-uk>



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