

SEAI first Energy Education Forum

At Richmond Barracks, Inchicore, Dublin, on the 25th October 2023.

*Keynote by Duncan Stewart:*

## **A case for embedding Environment, Climate & Energy– a core subject in Ireland's school curriculum.**

### **Role for Environmental Education in Irish Schools to Empower Youth to Motivate Citizen Engagement & Behavioral Change:**

I feel honoured to be invited to perform the keynote speaker role at SEAI's, and Ireland's, first Energy Education Forum. I welcome the opportunity to participate together with key influencers and facilitators, and with State agencies, in collaboration with core voluntary organizations in Ireland dedicated to 'environmental education'.

Environmental NGOs are performing a critically important role in informing school students and supporting their teachers in many schools across Ireland, where some are supported by State agencies. They engage in practical projects to replace fossil fuel, by sustainable use of energy through efficiency measures, home retrofits and renewable energy, for heat, electricity, transport and active travel for school journeys. Other NGOs focus on the wider environmental issues that range from biodiversity and water source protection, circular economy, prevention of waste and single-use plastics, promotion of public transport and active travel, etc.

I'm looking forward to learning from the presentations, discussions and outcomes from their workshop, which are planned for later today.

It is very reassuring that SEAI has conceived and established this new Energy Education Forum. I believe it is a vital initiative, with the potential and ambition to lead to pivotal positive changes in our school education system.

Teachers play a critically important role in informing, engaging and inspiring their students by exploring the above topics through the lens of 'critical thinking', evidence based knowledge and 'collective dialogue', empathy, shared understanding and social inclusion.

Teachers who are concerned about issues relevant to their students future life, who engage in efforts to become well-informed on specific environmental themes, both at global and local level, will be essential in performing a key influencing role. They especially need to relate environmental issues to aspects relevant to their local school catchment area and community, and likewise, to the global, European and national issues, with regard to climate change mitigation, restoring nature, etc.

Student group projects can also play a key role, which can apply to fieldwork exploration, surveys, research, co-creating solutions, and communicating knowledge about environmental pressures and restorative solutions. Student groups can also inspire and enable the implementation of positive evidence-based actions and advocacy campaigns in their local environs and community.

A sufficient number of well-informed teachers will clearly be required for every age group /class year in both primary and secondary schools, to enable their students to well-consider and seek consensus on the various environmental, energy and climate related information they learn, explore and share with their class of students

It is clear that school students need to understand the relevant pressures and their wide-ranging environmental impacts and future projections and long-term consequences, if left to continue without remediation. They must also be sufficiently informed and enabled to grasp the practical methods required for their improvements.

By achieving this, it would facilitate the communication of this knowledge, which could they could share with their families, and on online with their peers in other schools. They can also filter this knowledge and awareness into their local community, to achieve a more widespread understanding of the need for compelling behavioral change, which can likely result in real sustainable actions by the students and their families, in their homes, their transport, their consumption norms and in their local communities.

The number of teachers concerned about their students' future lives which are exposed to risks of 'climate breakdown' is clearly increasing across schools in Ireland. Many of these teachers make significant efforts to inform and inspire positive environmental initiatives, often supported and encouraged by their school principals. But unfortunately, the number of environmentally engaged teachers are still in a minority, where most teachers, especially those in post primary schools, consider their workload to be overstretched and the curriculum to be over-burdened. Many teachers lack confidence, competence or qualification to bring environmental issues into their classroom, as practically all teachers have not had the opportunity to study environmental topics during their teacher training course.

Teacher CPD courses on environmental topics are sparse, or non-existent. However, environmental studies and climate action in schools performs an essential and positive role, but its content tends to be superficial and treated as peripheral to the main school curriculum. The amount of knowledge they acquire is not commensurate to the severe challenges that these students face in their lives from 'climate breakdown'. Students' emphasis on environmental topics has noticeably increased in recent years, but its provision in class content remains deficient in most post primary schools, particularly in the senior cycle.

There still is insufficient dissemination of knowledge in post-primary schools and awareness about pressing environmental issues that are likely to significantly affect school students' future lives, especially where over the past 30 years, many unsustainable practices have developed at local level, and among their peers, which now have become part of their cultural norm.

This includes insufficient awareness of the need and urgency for appropriate protection measures against biodiversity loss, unsustainable food production, pollution of water/river catchments, soil, air pollutants and from disposable waste, especially plastics and micro-plastics and impacts of food and other organic waste streams.

This, along with 'climate breakdown' and the various sources and impacts of greenhouse gases, such as: a) Carbon dioxide (CO<sub>2</sub>) emissions from energy derived from fossil fuel for use in transport, heat and power. b) Methane (CH<sub>4</sub>) from ruminant livestock, plus methane (landfill gas) from food and organic waste. c) Nitrous Oxide (N<sub>2</sub>O) from farm slurry and chemical fertilizers. d) CO<sub>2</sub> from land use change, drained peatlands and peaty grassland soil and insufficient forest plantations. e) F-gases from industry & refrigerant appliances.

Student knowledge at post primary Senior Cycle needs to include:

In addition to the proposed new Leaving Certificate subject on Climate Change & Sustainable Development as one of about 26 subjects (where the content of its syllabus /specifican has not yet been published), it needs to include a core subject that all senior Cycle students study. Its content should include thye following:

- a) Climate Science: Carbon sources and sinks, radiative-forcing, global warming potential (GWP), the emissions factors of each fossil fossil, their efficiency rate of combustion and carbon intensity, ocean acidification and mitigation solutions.
- b) Way to mitigate GHG emissions in Ireland, to reach our EU targets for 2030, 2040 and net zero carbon by or before 2050.

Global carbon dioxide concentrations in Earth's atmosphere since the Industrial Revolution, has now reached more than 50% above the highest it had ever reached in over 800,000 years, where more than 50% of this increase has accumulated over the past 30years. Over that time, emissions in the Developed world, including Ireland, were required to reduce by 20%. But Ireland's emissions increased by 9.2% since 1990, which must now reduce by 51% by 2030 and by 90% by 2040.

Ominous, detrimental impacts from human-induced greenhouse gas emissions are clearly accelerating and altering Earth's climate system, which leads ever-closer towards catastrophic conditions. It therefore, is paramount that all school students be well-informed about the key environmental and energy-related pressures, which are most likely to grievously affect their future lives.

Most of our young generation feel threatened by climate change, species extinction, impacts of waste and pollution. But, the vast majority of our youth lack an in-depth knowledge about the severity posed by these ever-increasing and more extreme impacts that they are most likely to face over their future lifetime, or of the remedies that are required now and their urgency for containment. This knowledge deficiency of our school-going generation leaves our local communities poorly informed, and people often unwilling to accept the necessary changes required in their livelihoods, their behavioral patterns and lifestyles.

So, unless these pressures are rapidly abated, which appears unlikely, then surely our young generation must develop the required level of resilience that is commensurate to the severe, unprecedented challenges, and to be well-prepared to cope with the severe consequences they are destined to face over their future lives. This surely, requires our adult citizens / electorate to comprehend the inevitable consequences facing their children's future, and to be willing to accept the need and the urgency for our society and businesses to transform. This, along with a clear understanding of the effective mitigation measures and appropriate solutions that are necessary to shape their required capacity and resilience. And, to enable our most vulnerable and exposed age group to cope and to adapt to future abrupt shocks from climate breakdown and biodiversity loss.

It is now clearly evident, and is very salient, that our society must expeditiously mitigate our excessive GHG emissions with due care, effectiveness and diligence. This will only happen if our society takes due-consideration of these pressing issues, and to awaken and shape a shared level of awareness, willingness, and urgency to instigate the required transformative actions. To enable this, it will clearly require political leadership. This must be evidence-based, well-considered, responsible, fair, inclusive and be compelling to be accepted by our citizens. This leadership must also place a high value on informing our citizens, especially our young generation of the future severity of these environmental impacts and the required solutions to protect their future.

However, for politicians to campaign for strong, effective, new policy measures, and to succeed in their elections, they clearly require a reasonably well-informed electorate, who are adequately aware, that grasp the need, and comprehend and accept their campaign's mitigation actions. Otherwise, powerful vested-interests, that benefit from a status quo 'inertia' and 'business as usual', will seek to undermine any proposed effective policy measure. These often well-heeled, privileged cohorts who benefit greatly by the status quo, spread disinformation to discredit strong policy reforms from being enacted.

So, unless our citizens clearly understand these issues, their future consequences, and their remedies, the unscrupulous vested interests will take advantage of their weakness, and push-back against politicians and political parties who are prepared to act ethically and responsibly, based on factual evidence, and in the interest of the 'common good' and a sustainable future.

Those businesses and individuals who currently benefit from their damaging 'carbon-intensive' activities, often motivated by profit and greed, when confronted with strong policy reforms that might threaten their business, their reaction tends to fund populists and to lobby, advertise, cajole, and engage in controversial 'false-equivalence' through media outlets to create doubt and fear, and especially to propagate disinformation through social media.

If Ireland's society continues to collectively fail to grasp the severity of the precarious state of the 'climate crisis', or to ignore confronting our excessive GHG emissions, and to avoid, denigrate, malign, or deny understanding the urgency to undertake the required fundamental societal transformation, how will this complacency, intransigence and hypocrisy of today, impact on our current cohort of school students in their

future lives?

For parents to make the connection with protecting our young generation's future – which is a core sentiment of all parents and is of paramount importance and of their utmost-priority. This surely makes a compelling case for a school subject on Environment, Climate & Energy to be embedded in all classrooms, as a high priority and core issue to be embraced and adopted by the Department of Education, for implementation in all schools and with due haste.

With such a high exposure to severe risks from 'climate breakdown', persistent pollutants, and ecosystem collapse, this proposal for a new core school subject surely needs to be prioritized above all other school subjects. I am of the opinion that the Department of Education has a 'duty of care' to consider and to expeditiously implement this new core subject into Ireland's school system and its curriculum.

It is essential that school students be informed on the various themes and aspects of environmental education, climate science, and sustainable energy. They also need to be conversant with their solutions, and be enabled to coherently and compellingly influence our society and policymakers in order to mainstream this transformation, where otherwise, these pressures will continue to increase and to grievously impact their future lives.

This new subject needs to be embedded in all primary and secondary schools, for all students, in all school years. It would require treating the pedagogical teaching methods sensitively, through an incremental approach appropriate to the age group of young students. This is necessary, to avoid instilling negative responses in young minds from the severity of likely future climate impacts, such as, a sense of fear, 'doom and gloom', powerlessness, and 'climate anxiety'. But rather, to create a sense of 'constructive hope' of a positive future, once the right mitigation actions are implemented to ensure a meaningful, compelling and fulfilling future life for our young generation.

It would require a sufficient number of teachers in each and every school to be up-skilled through new evidence-based CPD courses on the various environmental themes. This will also require environmental education to be embedded in the curriculum of all primary school teacher training courses, and in the Masters degree courses for all students studying to become teachers in post-primary schools.

I feel confident that the outcomes from this 'Forum' will prove to be acutely pertinent in preparing our young generation for their future lives. The Forum should also engage with the Department of Education, in the development of the environmental/ energy content /syllabus for this new school subject, where its outcomes could potentially be disseminated and discussed with the relevant teacher organizations. It is important that the content be applicable and relevant to Ireland, where factual and statistical data that applies to each environmental theme, is supplied by independent and academic experts, and not by publishers of school books, vested interest groups, or not be politically influenced or motivated.

The Forum could significantly inform policymakers, and act as a 'catalyst' to stimulate, motivate and shape local sustainable energy communities across Ireland, to greatly reduce greenhouse gas emissions and to stimulate a mainstream behavioral change.. The expert 'mentors' that are currently appointed by SEAI to support local communities in the preparation of master plans for SEC strategies and actions, many of these could be up-skilled to train existing school teachers through CPD courses.

School students likewise, need to engage in class group projects that explore, research, identify and co-create to conceive and implement sustainable energy solutions for their home heating, power and transport needs, that are relevant to their family, school, locality, community, career opportunities and future needs. They need to be enabled to communicate their concerns and remedies online with their peers in other schools, and with their local communities and SECs.

It should also enable evidence-based, well-informed students to campaign collectively, to inform, and engage with their local community on the implementation of remedies for their local environs and local

activities. Students should be enabled to explore and deliberate collectively on the various environmental themes, and to strive to achieve peer-consensus on evidence-based solutions, where this knowledge can then be replicated and disseminated online across the country, in both schools in urban and rural environments.

To address the range of non-energy related environmental themes, their pressures and remedies, it would require collaboration with, and inputs from the EPA, NPWS, and the Heritage Council, and with other relevant State agencies, environmental NGOs, and well-informed academics who specialize on each environmental theme, and with lecturers in third level and teacher training institutes for both primary and secondary teachers.

I, together with a small group of experts and academics founded EcoEd4All, which is focused on engaging with and informing teachers, mainly in the Transition Year, on a range of environmental themes such as: Climate science. Energy in Transport, Heat and Power. Biodiversity, Water quality in river catchments. Air-pollution, Circular Economy, Micro-plastics, etc. Since last year, EcoEd4All has spread to about a dozen second level schools across Northern Ireland, where a number of clusters of four secondary schools, in groups of two ROI and two NI classes, collaborate in group projects on environment topics relevant to each of their localities, both in urban and rural areas. Our objective is to reach a possible 100 secondary schools in both ROI and NI by 2025.

Our ambition is to spread these short courses into all the 730 post primary schools and the 3,300 primary schools in Ireland, along with the 190 secondary schools and 800 primary schools in Northern Ireland. This will undoubtedly prove very challenging for a small group of volunteers, unless resourced with adequate funds. We regard Transition Year teachers in ROI and teachers of a similar age group of students in NI as our core target group of influencers.

The IPCC Assessment Reports clearly inform us of the stark, unequivocal, 'existential' consequences of 'climate breakdown' that is now facing human civilization.

- The disproportionate risk level that our younger generation face in their future life from ever-more challenging and grievous impacts from human induced greenhouse gas emissions.
- The ominous exposure to extreme impacts being locked in for billions of vulnerable inhabitants in vast climate-stressed regions of the Developing world, being made uninhabitable and inhospitable. Those who have least contributed to climate breakdown, and who likewise, have least capacity to cope, or to adapt to the looming extreme shocks from impacts from carbon emissions, predominantly induced by the global rich.
- The richest 1% of the world's population emit 16% of global CO<sub>2</sub> emissions, which is equivalent to 2/3rds of all humanity.
- The richest 10% (which includes most people in Ireland) account for half of all global carbon emissions, at 5 times the global average.
- The 250 richest billionaires create as much CO<sub>2</sub> emissions as the 90% poorest people.
- The poorest 50% of global population only contribute 10% of CO<sub>2</sub> emissions.
- When people in the Developing world manage to emerge from poverty and increase in affluence, they tend to adopt the Developed world's unsustainable habits and lifestyles, such as a meat diet, larger air-conditioned homes, use of fossil fuel for power, heat, vehicles and air flights. If even 10% of the population of the Developing world were to reach our average standard of wealth and follow our lifestyles, it would render climate mitigation impossible.
- Irish society and our businesses have contributed disproportionately to the excessive amount of greenhouse gases from fossil fuel energy, concrete, and beef and dairy production, it is therefore crucial that our society transforms. We clearly must switch to an efficient use of renewable sources of energy and to less production, consumption and exports of beef and dairy products, and to demonstrate, inspire and enable the Developing world to adapt sustainable solutions that are suitable to their climatic conditions.

- Schools can and should play a leading role in influencing this transition, by twinning online with schools in the Developing world, where school class groups share knowledge, understanding and solutions through projects on environmental remediation and climate justice issues that are relevant to their region and locality.
- The impacts of climate change to Earth's biosphere, its habitats, wildlife, insects, plant species, fungi, microbes, and ecosystems clearly exacerbate Earth's already stressed biosphere from human activities. The natural world is vital to our food production, water purification, plant pollination, soil nutrient recycling, disease control, carbon sequestration, all of which are interconnected, interdependent and essential to our very survival.
- It is evident that severe unprecedented impacts from 'climate breakdown' are rapidly increasing and depleting freshwater resources and food production across the planet. Millions now face shocks from extreme climate events (droughts, heatwaves, wildfires, hurricanes, floods, coastal inundation and erosion, disease, health damaging sanitary conditions, etc).

This poses some grievous questions:

Will millions, or possibly billions of climate-stressed people over the coming decades, who lack the capacity to cope, or the time, know-how and resources to adapt, or, the capability to avail of any viable alternative choice, other than to abandon their territory and relocate?

Already large numbers of desperate climate-stressed people, in a quest for their survival, either migrate into over-crowded, poorly resourced, or corruptly governed cities, or to adjoining territories, to seek and compete for precious life-sustaining food, freshwater, and other essential but ever-depleting resources, which can trigger violent conflicts or wars.

- As climate impacts intensify and they manifest in abrupt shocks over the coming years, how will those billions of people exposed to extreme events cope (from extreme prolonged droughts, freshwater depletion, record breaking heatwaves, hurricanes, marine and pluvial rain floods, staple food collapse and disease), with no choice but to abandon their regions?
- Where will be safe and capable to sustain these billions of people who must migrate?
- What age will our current generation of school students be if or when these threats become widespread ?
- If the developed world does not build sustainable capacity and education in the vulnerable regions, could such high risks of mass migration of desperate people suddenly and surreptitiously unfold as a reality to manifest and overwhelm Europe, including Ireland?
- What future lies ahead for the vast majority of diverse plant and animal species that we share Earth's biosphere with, and for essential functioning ecosystems, where they, including humans, depend on for their sustenance and very survival?
- What adverse impacts will this have on Ireland and on global food production?
- What increased level of extreme impacts from these environmental pressures will these have on our current cohort of school students? (4 -18years) by 2050? (26 years from now). By 2075? By 2100?
- How critical /angry will this cohort of students feel about their school education system when they reach 2050 and global emissions have created a +3 to +4C mean surface temperature world?
- When reflecting back from 2050 to now, what core school education reforms, in hindsight, would they have sought in 2024?
- It is clear that we can and must avert the worst impacts from happening, so what reforms must urgently occur in our school system to help ameliorate these impacts?

Surely, these are questions that we in the Developed world need to ask ourselves, before it becomes too late.

## **Rationale for a new core school subject on Environment, Climate & Sustainable Energy: - Politics & Leadership:**

Ireland must align its GHG emission reductions with all other EU nations by 2030 in our share of the effort, if we are to have any chance of reaching our 2030 and 2040 targets, and to achieve zero emissions by 2050. Currently, Ireland's total GHG emissions are 60% above the EU average per capita. If we include Ireland's 'land use change' it increases our total GHG emissions to 2/3<sup>rd</sup> above the EU average per capita.

Our society has shown little sign of reacting responsibly to this challenge, such as accepting strong policy measures that induce effective mitigation actions to avert this existential catastrophe. This is evident in the short duration effect of the 5-year election cycles, combined with our electorate's lack of a coherent understanding of the imperative for transformative actions and their urgency.

Most Irish political parties and politicians fear that if they implement strong measures to protect the environment and to reduce GHG emissions, they will be undermined by irresponsible opportunists and 'populist' politicians that seek to diminish their election chances. They can easily achieve this by exploiting a poorly informed electorate, through manipulation and disinformation, where a significant proportion of our society struggle to make ends meet and housing and they tend to react to their immediate concerns. When poorly informed, these are vulnerable to being wooed by populists into resenting being over-burdened by strong policy measures.

The use of 'fear' and misinformation tactics in repeated soundbites by populist opportunists, to attract citizens that may lack the required knowledge of the behavioral impacts that amplify environmental pressures. Many poorly informed citizens can easily be cajoled by false truths, and be influenced to reject strong transformative policy measures that could negatively affect their personal lifestyle over the shorter-term.

Politicians in general, therefore lack the required motivation to show political leadership on this existential issue, by failing to place a high priority now on immediate implementation of the necessary strong effective policy measures that would significantly reduce GHG emissions over the longer-term.

The general political perception is that strong measures may prove too painful for their electorate and for business interests that support them. They may fail to comprehend the necessity for change, or be prone to reject the required reforms that may appear painful in the short-term, even though it is clear that mitigating 'climate breakdown' is acutely essential. The required transformation will also reap a myriad of benefits for our citizens over the longer-term, when compared to the severe existential impacts that will most likely arise from inaction and business-as-usual.

Policy mitigation measures must clearly go beyond rhetoric, false promises, spin and green-wash. It requires implementation measures that expeditiously achieve the required actions to stimulate a transformative new sustainable paradigm.

As our society today remains poorly informed and disconnected from the severity of our unsustainable activities. This reflects in most of our politicians being apprehensive about taking a leading role in prioritizing its solutions, as they fear it might cause them to lose votes.

Efforts by policymakers to mitigate GHG emissions tend to lack the required level of efficacy, or to underpin their proposed policy measures by calling for a level of public awareness of the acute urgency for strong actions by society and businesses required now to protect their children's future lives.

This is evidenced by the absence of effective environmental & climate abatement policy measures, or of coherent objectives by many politicians and political parties. Or, an absence of realistic, ecologically

sustainable measures and methodologies to be readily available, or where environment measures are placed at a low-level of priority on the list of political party manifestos, as most people tend to react to their current economic and social pressures.

However, the strong policies are now clearly urgent to motivate and shape a societal transformation into real actions, which are now so critically needed to realistically drive-down our GHG emissions to the fundamental reduction levels required of each sector of our society. They must be fair, and be designed to protect the poor, most vulnerable and disadvantaged cohorts. This applies to each political constituency across rural and urban Ireland, in both affluent and disadvantaged districts and regions of Ireland. Examples of avoiding legislating or regulating effective policy measures are particularly evident in the Agriculture and Transport sectors, where Ireland's emissions are grossly excessive.

But politicians fear push-back from vested-interests or from rival candidates. Or, find strong policy changes unpopular for elections by a significant proportion of their potential voters. Some politicians have a clear interest, feel responsible and are sufficiently outspoken to improve the 'common good' by measures to protect the environment for future generations, and by embracing the truly sustainable longer-term societal, equitable, and economic remedies, which would achieve a multitude of benefits and opportunities in the longer-term. However, most politicians tend to be poorly informed, and lack knowledge or awareness of the necessary environmental changes required in remedial measures, and appear to not be sufficiently aware of the level of urgency that is now necessary to steer Ireland's future onto a sustainable path.

Many career politicians who are repeatedly re-elected by a poorly informed electorate, where some are prone to influence from vested-interests, such as retail car businesses, car-commuters and road freight haulers that rely on diesel for trucks. Also, powerful beef and dairy exporters, large intensive beef cattle farmers and dairy industries, farmer lobby organizations, turf cutters, etc.

Many politicians, when sizing up proposals for new policy measures, see difficulties in trying to persuade their electorate, they therefore tend not to spend time researching these issues, where they remain poorly informed and feel incompetent, and thus avoid, or condemn these policies.

We clearly need our society and electorate to be well-informed and to coherently understand environmental pressures, their impacts, causes and future consequences. But also their viable long-term solutions, benefits, opportunities and a pathway to a sustainable and flourishing future.

The knowledge about these issues tend to be difficult to comprehend, communicate and to disseminate,, as many people choose to avoid learning about them, or reach a state of mindset of denial, a feeling of discomfort from 'cognitive dissonance', or a fear of a change that may materially affect their cultural and behavioral norms, or be persuasive to those who can easily be distracted by misinformed manipulative advertisements, PR spin, or be subject to false reassurance by cunning appealing soundbites. Others may challenge evidence-based facts, or be influenced by their peers or 'group think', or by those who perceive or fear the required strong policy measures might restrict their business-as-usual or business growth activities.

If our society continues to avoid accepting tough measures needed to mitigate our GHG emissions, we clearly are blindly, or selfishly, acting against, while possibly stealing our children's future. As we get closer to 2030, where atmospheric GHG concentrations cause global surface temperature to increase or exceed the tolerable +1.5C limit, where impacts of 'climate breakdown' grow to glaringly confront us, where anger, anxiety and a sense of panic, powerlessness, despair and blame may become the resort of many.

Surely by then, our GHG reductions will have reached a societal, economic and political imperative that beckons an abrupt halt in emissions, where a looming bubble in stranded fossil fuel assets threaten bankruptcy of global economies, while efforts to mitigate exceeds human capability and ingenuity. Ireland's



reputation across Europe will likely be severely scrutinized, frowned on, where we are pressured to act in line with our fellow EU Member States.

To steer Ireland onto a sustainable course, this 'transformation' will require strong effective measures, such as a high 'GHG price' being placed on fossil fuel for our transport, heat and power requirements, and on GHG emissions from cattle-intensive farmland, chemical fertilizer, imported feeds for livestock, aviation, and on imports of global products that do not account for or reduce their emissions.

To enable such a fundamental 'transformation' to be acceptable by our society to demand effective action, our policy measures and fiscal mechanisms must first be fair and just. This 'inflection point' must occur before it becomes too late to avoid 'planetary feedbacks' that trigger 'tipping points' which exceed tolerable thresholds, likely to ignite an abrupt, domino effect and a possible 'runaway' climate system.

To steer Ireland onto a sustainable course, this 'transformation' it will require strong effective measures. The GHG tax placed on fossil fuel use for our transport, heat and power requirements, and on GHG emissions from cattle-intensive farmland, chemical fertilizer, imported feeds for livestock.

These measures, however painful to our society and economy in the short-term, must be designed to protect the poorer and most disadvantaged sectors, while ensuring that the more privileged, wealthier, and business sectors, that disproportionately generate the lion's share of our GHG emissions, are held to account. The wealthier sector, who have the capacity and resources, can more readily afford to make the necessary changes. They, therefore, should be compelled by a progressive approach to a GHG tax. It should also be designed to compel the wealthier sector to make a significantly greater level of change in their lifestyles, and be compelled to divest from GHG-intensive investments in their income and wealth-accumulating activities to sustainable sources.

The revenue raised by this progressive 'carbon tax', where its tax rate rises exponentially to align with the more GHG emissions individuals and businesses generate, should be 'ring-fenced' to fund the required low-carbon solutions and that support the disadvantaged sectors.

It also must be placed on all products that produce 'embodied carbon' in their manufacture, such as transport vehicles, appliances, packaging, new buildings, etc. Likewise, a very high VRT and road tax should be placed on large carbon polluting cars and SUVs, which potentially lock-in disproportionate amounts of CO<sub>2</sub> emissions over the vehicle's operational life. Likewise, on air-flights, where the more air-flights people or businesses take and accumulate CO<sub>2</sub> emissions per year, the higher the tax.

The primary purpose of a high-carbon price is to steer our society away from any further 'lock-in' of GHG emissions, and to place our society on a sustainable course. But, it must also ensure that the sustainable, renewable energy alternatives are made readily available across Ireland, for our homes and transport needs, and where these choices are made affordable for most citizens, especially by subsidies for sustainable energy systems being provided for the poorer, most affected, and disadvantaged sectors.

Clearly we need to level the playing field. We need to tax fossil fuel and to ring-fence its revenue to fund the sustainable solutions and to protect the poorer and disadvantaged sectors, who could be least capable of affording investments in energy retrofits, renewable energy systems or EV cars, or rent their home.

It is clear that Irish society is generally poorly informed about the damage we create to Earth's climate system, by our everyday use of fossil fuel, and by our other human induced environmental pressures. Our society appears to have failed to connect with these pressing, unsustainable aspects our everyday lifestyle norms and livelihoods and with the damage they create, by implementing effective actions. This includes farming methods and types of food production, wasteful consumption of products, fossil fuel, and energy-related activities.

This lack of knowledge has greatly caused our GHG emissions to reach 60% to 67% above the EU average, where we are now branded as an outlier and wealthy 'carbon laggards' in Europe.

The difference between Ireland's 60% and 2/3rds of GHG emissions above EU nations, per capita, arises from Ireland's drained peaty soil and peatlands, and other Land Use, Land Use Change & Forestry emissions, such as significant reductions in new forest plantations).

It is therefore imperative that our young generation are adequately informed about ways to protect their future lives from the devastating threats of 'climate breakdown' and from a cascading loss, or damage to natural habitats, ecosystems and biodiversity.

Our schools need to be enabled to inform and disseminate environmental knowledge and class content incrementally, at levels appropriate to student's age, where teachers can make it relevant to their local environs in all primary and secondary schools. This needs to be delivered by well-informed teachers who are attuned and equipped to handle this knowledge in a sensitive way through effective and inspiring pedagogic methods. This will require appropriate levels of class content, class discussions, critical thinking, and collective and well-considered actions, through practical group projects, research and field-work in each class.

It would also require a sufficient number of all current primary & secondary teachers (about 74,000 in total in Ireland) who teach about 560,000 primary and 360,000 secondary students, where possibly about 5% to 10% of these teachers would need to be up-skilled through a new set of comprehensive CPD courses on key environmental themes that could be delivered by Education Centres across the regions of Ireland.

All student-teachers who train to become primary school teachers, would also need to be effectively informed during their teacher training course. Likewise, a high proportion of all 3<sup>rd</sup> level students who study to become post primary teacher through a masters degree course, would require the new core subject on environment to be added to the two core school subjects that they currently study.

I feel confident, that despite our society's current environmental deficiencies, and my criticisms to date, that schools across Ireland, with the Department of Education at the helm, and supported by SEAI, EPA, NPWS, Uisce Eireann, Inland Fisheries, and possibly Teagasc and other key public sector stakeholders, where many are represented in this Forum.

These state bodies, along with An Taisce, ECO-Unesco and other NGOs in the Irish Environmental Network and being underpinned by specialist academics, could provide the evidence-based content, where our schools become the vanguard for mainstreaming public awareness about environmental issues and their solutions across all our local communities. This initiative has the potential to place Ireland on the cusp of a fundamental sustainable transformation.

It would be reassuring, if within five years, we looked back at this first Energy Education Forum, as the key driver that triggered an 'inflection point' which equipped and stimulated Ireland's society to reach a new responsible, sustainable and positive paradigm.

This could prove to be the key ingredient and 'catalyst' that could inform, drive and shape our future society, where collectively across all school catchments, schools undertake the required effort to inspire, inform and shape our citizens and communities.

This would go a long way to build and embed the required resilience in our society, and the capability and capacity to protect and ensure our young generation's positive future, where hopefully, many other countries may find it compelling to follow.

*Duncan Stewart.*

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