Up-Skilling the UK Work Force in Renewable Energy Technologies

" Tell me, I'll forget. Show me, I'll remember.
Let me do it, I'll understand"

The Challenge

There is a shortfall in knowledge and direct experience of how teachers can use renewable energy technologies within a teaching environment at all key stages to strengthen students problem solving skills, raise attainment in STEM subjects and encourage careers in engineering and physical sciences

"Quantum mechanics say that photons are packets of electromagnetic energy with quantized energy levels dependant on wavelength"

"So only certain photons can create an electron-hole pair, the standard homo-junction solar cell has a band gap similar to the energy of visible light"

Addressing the gaps in a teachers knowledge and direct experience with renewable energy technologies

- There is a difference in how solar photovoltaic and solar thermal panels utilise the suns energy
- The affect of light wavelengths on the absorption and efficiency of the PV cell and what is diffuse light
- Its is necessary in a technical subject to have a sound foundation in the technical know-how to be able to pass along the knowledge

Solar cells can be designed to work with diffuse light

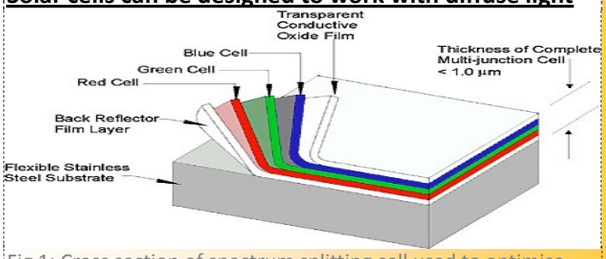

Fig 1: Cross section of spectrum splitting cell used to optimise the energy from the solar spectrum even in diffuse light

Renewable energy installations and fuel efficiency measures must take into account energy demand

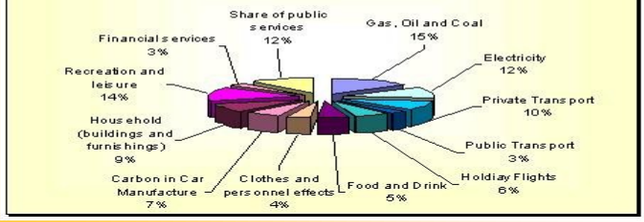

Fig 2: Resources are needed to inform students of their carbon footprint and how to reduce their carbon footprint

How can we relate the technologies to Young People?

Have to engage and excite young people, get them involved with a problem solving project to promote careers in STEM subjects

- Build solar cells
- Build solar powered cars and boats
- Off grid system
- Calculate carbon footprint

Fig3: Solar Car made from Tetra pack

Kids gain grounding in electronics as well as renewable energy whilst gaining real world employable knowledge and skills

"PV cells and solar water heaters use different wavelengths of light. PV cells absorb visible wavelengths of light to create a current by freeing negative charges in the cell to move through a circuit. This only happens when the light hitting the cell has the correct energy to push the negative charge out of its normal position"

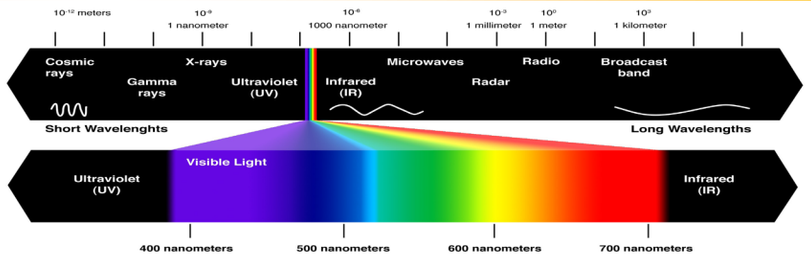

Fig 4: The Electromagnetic spectrum showing the wavelengths of visible light

Conclusions

- Renewable energy technologies have proven to be an excellent way to teach STEM
- Focus must include the UK's design and use of existing bricks and mortar infrastructure
- Practical teaching resources are essential along side self-supporting educational refresher sessions
- Professional development practical sessions need to be available to both primary, secondary and FE/HE teachers

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