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Autumn Voyage to Provence
10th to 14th September '25

The start of the journey for the 32 voyagers travelling from St Pancras Station was threatened by a London Underground strike together with an unofficial strike in France. Would we get to the South of France on Day One? We need not to have worried, as our organisers had coordinated the journey to Avignon flawlessly, well in time to settle into the hotel before our evening meal.

Thursday 11 September
From Roman Arc de Triomphe & Theatre Antique to a dramatic new building by Frank Gehry

Our visit started at the **Arc de Triomphe in Orange**, our first UNESCO site of the day. Our guide informed us that this arch is the oldest surviving example of a design that was used later in Rome.

The arch was part of the town's protection system guarding entry to the town. Made of large limestone blocks, it has three arches, the central one being larger than the two outer ones.

Our guide was very keen to point out the significance of the messaging in the well-preserved carvings from military scenes to a wolf to bees, to hexagons that could be honeycombs, roses (in bud, bloom and faded), and a specific carving that had been interpreted to say "you are welcome here but obey our rules or else!!"

Naturally we obeyed and dutifully followed our guide to the most impressive Roman Theatre still existing in Europe which is located beside a monumental temple complex and a forum with original Roman walls. In 1869, the Roman theatre was restored and is now famous as an international opera festival. We were guided around the site, up the steps of the arena and through the system of gallery tunnels. It was explained that in the past, people were allocated different areas in the theatre depending on their status with the most important person being at the very front so that everyone knew how important they were.

After a lovely light lunch back at the hotel, it was off again to **Arles**, about 40 kms south west of Avignon and we had time for a walk before our next guided tour at Luma.

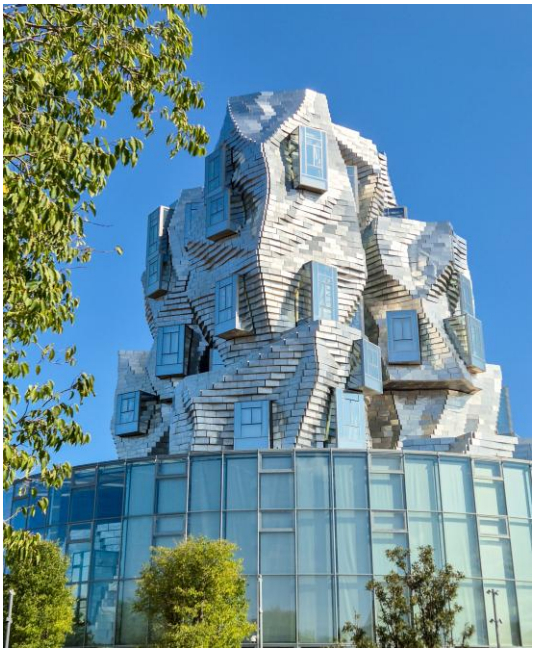
William Powles guided us to the UNESCO Roman amphitheatre which is the showpiece of Arles, surrounded by lively restaurants and tourist shops. Apparently, the arena is used regularly for horse and bull racing events in Summer. On passing, we viewed the nearby Roman theatre (Théâtre Antique) through the fence. These impressive Roman monuments date back to the 1st century B.C.

Théâtre Antique

Arles is not only a good example of the adaptation of an ancient city to medieval European civilization but now, as we were about to see, also contains an ultra-modern, impactful, creative building set in the Parc des Ateliers, a former railway wasteland covering an area of 27 acres on the south east of Arles.

Now, seven old factories from the 19th-century industrial heritage are being transformed around the new Frank Gehry Tower, **the Luma**, which has a twisted façade decorated with 11,000 large stainless steel bricks and 53 glass boxes.

Inaugurated in June 2021, this striking new building now houses various multi-purpose spaces, from exhibition halls to work and research rooms, and event venues. We were fortunate to have Peter Terrell, structural engineer to the project and IESF member, with us to give some additional insights into the role he played in bringing the vision into reality.



Frank Gehry Tower, the Luma

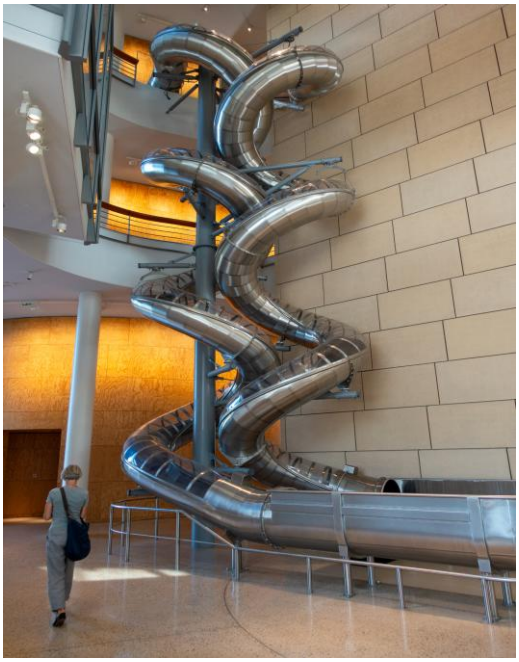
Luma - Key facts and figures

- **Height**: 56 metres
- **Floors**: 12 (10 stories)
- **Façade**: 11,000 stainless steel bricks, 53 glass boxes
- **Rotunda** (the Drum):
  Diameter: 54 metres
  Height: 16 to 18 metres
  Weight: 670 tons of glass
- **Surface area of the interior spaces**: 15,000 square metres (of which 2,000 square metres is usable for exhibitions)
  1,400 square metres dedicated to the archive programme.

We entered via the Drum; a glass rotunda inspired by the Arles Amphitheatre and had our introduction to the building seated against some of the great variety of stainless steel boxes. I was distracted by a large

motorised piston which was later confirmed as the device which opened the window.

We were guided through each floor to the top floor where we were rewarded with amazing views of Arles and the local countryside. The tour took us on a journey past art works – 'Take Your Time' by Olafur Eliasson which was a large circular mirror which slowly rotates, a wall beside the lifts covered with tiles of salt to the Isometric slides by Carsten Holler which had to be tested by most IESF members before we could leave!



Carsten Holler's two-storey Isometric Slide

A different "down to earth experience" to remember!

Isobel Pollock-Hulf

Friday 12 September
Visit to the International Thermonuclear Experimental Reactor (ITER)

After a long coach ride and following stringent passport & security checks to gain entry onto the nuclear site, classified as international territory, the group was welcomed to ITER by Yutaka Kamada, Deputy Director-General. After his welcome address, an official group photo marked the event organised by the chief communications officer, Kirsten Haupt.

Official Group Photo at ITER HQ

Three senior ITER staff presented conference papers. Michael Walsh, Head of Fusion Technology & I&C Division, described the Physics of ITER "how it works & why it matters". Margaret Graham, Fusion Technologies Section Leader, described how ITER is built with more than a million components required to form the giant 23,000 tonne Tokamak, heavier than 3 Eiffel Towers. Laurent Patisson, Project Leader of Civil Engineering & Interfaces, described the complex design & construction of the principal nuclear buildings and their challenging compliance with technical and nuclear codes to ensure totally safe shielding & confinement.

In appreciation, each ITER representative was presented with a gift and a copy of the IESF British Section centenary book. For further background information on ITER, ref https://www.iter.org/few-lines

ITER Site with Tokamak Complex & Assembly Hall

With a site in south-east France selected for construction, the ITER project protocol signed in 2005 involved 7 partners - China, European Union, India, Japan, South Korea, Russia & USA. Now with 27 EU member states, the workforce currently comprises more than 33 nationalities providing components. Although the working language is English - albeit UK will be leaving the project this year at the end of its current contract - many different languages were heard when walking through the restaurant to a buffet lunch.

Afterwards, the group donned full PPE for the site tour to the Tokamak Complex and split into two groups to enter the clean room Assembly Hall & the viewing pods around the Tokamak Reactor Pit.

Assembly Hall with gantry crane

In the former, the massive components are put together before being lifted by 750 tonne capacity gantry cranes and carried over a separation wall into the Tokamak Pit where they are lowered into place with millimetre precision.

The nine vacuum vessel sectors, each weigh 1350 tonnes, requiring tandem lifts by the two principal gantry cranes working together. Having visited the Tokamak Complex with its tritium & diagnostic buildings, the site tour passed the control building, chilling & cooler farm, secondary assembly hangers & store areas, cryostat & cryogenics buildings, power supply & heating plants before returning to the administration building to return PPE and security passes.

To learn more about fusion energy go to ITER's website.

William Powles

.Visit to Chateau Val-Joanis, Pertuis on Friday 12 September.

After a half hour's drive, we arrived at Chateau Val-Joanis to be welcomed by owners Manuella and Noel. Manuella gave us a brief history and description of the chateau buildings, garden and Caveau. The estate covers 400 hectares with 110 hectares of vines and has been in the family for 15 years. The garden was laid out in 1978 as a historic garden and it was awarded the Jardin de l'annee in the 'Jardin Remarquable' category in France in 2008.

We then visited the Caveau which contains ten double-walled vats of some 25,000 litres capacity.

The double walls allow the fermenting wine to be chilled by water to various temperatures to suit the various types and qualities of the wines. Manuella gave us a very interesting insight into the wine making process including an account of how white wine is produced from black grapes. On account of its age, the wine transfer system is quite labour intensive. Ideally, the equipment would be completely re-modernised with an underground pipework system. However, this is impractical as it would require every barrel to be completely drained at the same time.

Manuella also explained their appellation which applies to very local terroir* which dictates the appellation requirements very precisely [see note below]. Climate change is now a big worry because with less rain the vines start to turn yellow and the yield drops. When asked about going organic, Manuella said that the whole area would need to change. In any event they use a minimal amount of chemicals, say for example after a lot of rain when treatment is required to prevent rot.

We were then given time for a quick look around the garden and to admire the plants and the fruit and vegetables which are appreciated by the fifteen people who are employed on the estate.

We then gathered in a large hall where Manuella introduced three wines, white, rose and red which were sampled after an extensive explanation of their bouquets and technique for savouring them.

Before dinner we sat under the impressive platane (plane) trees and enjoyed a wonderful jazz concert, energetically delivered by local quartet, Group Basilic Swing, comprising a violin, two guitars and a clarinet. The performance included a wide selection of popular melodies. This was followed by an interesting, al fresco dinner washed down with copious quantities of the chateau's red and white wines.

Dining under the stars

After dinner a presentation was made to Margaret and Kirsten from ITER who were there as our guests as a thank you for arranging the day's visit to the nuclear site.

*Google - In wine, terroir is the "sense of place" that results from a unique combination of environmental factors, including soil type, climate, topography, and local flora and fauna, which influence the grapes' growth and the final wine's distinct character. These natural elements combine to create a wine with a specific identity that cannot be replicated, even with the same grape variety and winemaking technique.

Editor's Note – L'abus d'alcool est dangereux pour la santé, à consommer avec moderation!

John Baron

Visit to Pont du Gard
Saturday 13 September

The Pont du Gard is a three tier, arch bridge structure that carried an aqueduct from the springs near Uzes to the city of Nimes on the coastal plain. The bridge is over the River Gardon and is just under 50m high and the top tier was originally over 350m long. Apart from losing twelve of the top tier arches to one of the abutments, the structure has

remained intact for 2000 years and is now a UNESCO World Heritage site.

Roman engineering at its best!

The Romans used water to project both their power and civic pride. Water was used in cities with public water for fountains and baths as well as potable water for homes.

Between AD 40 to 60 Roman engineers constructed a 50km aqueduct rising in the natural springs in the hills near Uzes to provide water to the city of Nimes. The aqueduct channel internal dimensions were typically 2m deep by 1m and it had a stone lid. The lid was to keep flora and fauna out of the potable water supply, to reduce evaporation and to stop farmers on the line of the aqueduct from stealing the water for irrigation.

The difference in elevation between the springs and the coastal plain is 17m giving an average gradient of 1 in 3000. This however is not the whole story in that the aqueduct had to cross the Gardon River and if a constant gradient had been adopted, it would have required a fourth tier to the bridge at a height of 55m which was infeasibly high for engineers in the middle of the first century AD. [In comparison, the Colosseum in Rome is a similar height but was built some 20 years later]. The aqueduct engineers' solution was to have steeper gradients to the upper reaches of the aqueduct above the bridge and shallower gradients below the bridge at an eye boggling near flatness at 1 in 20,000 [1mm in 20m].

The aqueduct operated for some 500 years, but the limescale deposits from the hard limestone springs caused a reduction in the width of the channel to the point where the water flows were insufficient to supply Nimes. Originally, the deposits were removed on a regular basis, but this ceased after the fall of the Roman Empire.

Aqueduct Channel with stone lid. Three centuries of limescale build-up to the side reducing cross section

The bottom tier is six arches over the River Gardon with a crown height of 19m and a 1m thick ring over. The middle tier of eleven arches has the same profile as the lower arches but has a thicker ring to support the closer spaced piers to the smaller top tier arches. The top tier originally had forty-seven arches 5m high, but twelve of these were canabalised for their stone when the aqueduct fell into disuse after the 5th century AD. The aesthetic is purely functional; the corbel blocks used to support the formwork and cranes, pepper both elevations, but do not detract from the overall majesty of the structure.

The bridge was designed to carry water, not people. The lower two tiers were 6.5m and 4.5m wide respectively giving a 1m wide

footpath each side, but this only allowed for pedestrians. In the Middle Ages, the bridge was used for traffic crossing and consequently, the 2nd tier piers were trimmed back on one side to give a better width. Finally in the 18th century a second bridge was constructed to the side of the bottom tier to give vehicular access at which stage the cut outs in the 2nd tier piers were reinstated.

The bridge is constructed of plain stone blocks, cut to shape and placed tight without mortar. It is the durability of the stone and the quality of the original workmanship that has given the enduring structure visible today.

The Roman engineers clearly had access to computer modelling techniques and forecasts of climate change two millennia into the future in that current floods have reached close to the crown of the lower tier arches but never overtopped them.

Norman Train

Pont St Bénézet, Palace des Papes, Land Train and the Evening Cruise Saturday 13th & Sunday 14th Sept

Pont d'Avignon

Pont St Bénézet is part of the UNESCO World Heritage site designated in 1995 which also contains the Palace de Papes. During our journey from the Pont de Gard, William informed us of the history of the bridge which comprises romanticism and rhymes concerning the former border between France and Avignon.

Only four spans of the stone structure remain but the chapels have survived. The extreme and erratic flows in the Rhône were subsequently controlled upstream and are now in the form of hydroelectric schemes and dams.

The bridge is the focus of the song "Sur le pont d'Avignon" but there is some confusion as to whether the wording is actually "Sous le pont d'Avignon". Intrepid voyagers were about to explore both options.

Sous Le pont d'Avignon

The group returned to Avignon in pouring rain – a "Mediterranean" downpour. "Stair-rod" rain with lightning flashes across the city and thunder rolling around the walls created an auspicious air. Voyagers, suitably equipped with waterproofs and umbrellas, opted for the "sous" version of the rhyme and awaited the green light to explore.

Sheltering from the rain

Such was the downpour that it was suggested the visit be deferred. Common sense prevailed, especially when it was noted the tickets were valid for 24 hours. Philip Pascall gallantly volunteered to lead a group before the Sunday departure schedule began.

Palace des Papes

The Palace des Papes was the cultural highlight of the tour. Forming part of the UNESCO world heritage site, it is cited as one of the largest and most important medieval gothic buildings in Europe. It was the seat of Western Christianity during the 14th century after Pope Clement V left the violent chaos of Rome in 1305 having been gifted the original building by an Italian Countess. In total six papal enclaves were subsequently held here before a return to Rome in 1377, leading to the Western Schism and the second line of Avignon popes.

The rooms are huge and the grandeur of the papal surroundings were recreated by personal handheld tablets which were activated in each room, highlighting key features and history behind notable objects and paintings. The extent of the building is illustrated by the ongoing exploration of rooms and the further discovery of secret chambers. Most recent was the discovery in 2015 of 85 bags of gold in an underfloor safe in the Treasury which had been protected by integrated and disguised slabs.

Palace des Papes

The route continued outside to the Palace Gardens and the Benedict XII cloisters.

Land Train tour of Avignon

Departing from the plaza in front of the Palace, the land train snaked its way around much of the walled city highlighting the early history, its centre based on ship building and trade. The main road, La Rue de la Republique, displayed architecture from many centuries which had survived political upheaval and revolution. As the land train activated retractable traffic bollards, narrower streets were revealed which, at first sight, seemed unlikely to navigate. The occasional scrape mark on walls suggested less capable drivers. The tour was a fun way of encapsulating Avignon and establishing a basis for future exploration should anyone return.

Evening River Cruise and Dinner

Refreshed and dried out, Voyagers were grateful to be driven to the river boat landing stage for their cruise and dinner aboard. As the sun set and the illuminated structures over and along the riverbanks sailed past, we enjoyed another fine meal with good local wines.

The highlight of the early evening was the round-up of events and heartfelt thanks to William and Jocelyn Powles. The group's appreciation was significant, whilst the presents could only represent a token of our thanks.

Thanks were also warmly expressed to acting president Norman Train and Philip Pascall for making the payments work for everyone!

On board dancing and disco were available after the meal for those with the energy, otherwise it was a short walk back to hotel with the opportunity to reflect on an entertaining, informative and enjoyable Voyage.

Sur the pont d'Avignon – (reprise)

Once more on to the bridge! (with apologies to Henry V). Philip was accompanied by a significant number of Voyagers for the revised excursion onto the bridge. The weather gods blessed the re-timed visit with blue sky and warm weather.

Pont St Bénézet/Pont d'Avignon

The structure may only be four spans and two chapels but there was much to be enjoyed in the hour before departure. In the auditorium, the research films and

interpretation of construction details were a suitable fitting end to the 2025 Voyage.

Colin Newsome

Whilst a number of voyagers decided to extend their time in France, the majority opted to return to the UK by train; TGV and Eurostar. Waiting for the TGV in Avignon station, we enjoyed a picnic lunch with a glass of sparkling wine - Italian! Maybe the French are accepting the pan-European concept with regard to wine!

The Conundrum of Patient Safety Improvements. Why is it so Hard? by Prof Peter McCulloch, Oxford University

The Problem of Healthcare Safety, and our failure to solve it

Prof McCulloch started his lecture by comparing safety improvements in other industries. In aviation there has been a four-fold decrease in fatalities over the last 30 or so years, whilst in construction, fatalities have dropped by 88%. In healthcare, there has hardly been any improvement. He said that one of the problems is that the profession, as a whole, does not recognise it as a problem - "I see no ships" as Nelson said. This is only overcome when a significant number of deaths raise sufficient concern – à la Shipman or Letby.

Statistics are rarely taken into account mainly due to the lack of numbers making statistical analysis unreliable. If we simplify procedures by repeating operations with the same team, we can statistically assess that team's proficiency. In Prof McCulloch's opinion, a team needs to do at least 20 operations before it can start to be assessed on its competency.Over the years, healthcare has initiated various safety studies. One such study, HRO, reported that the industry was

- Preoccupied with failure, and constantly averse to risk.
- Reluctant to simplify. They do things the hard way because that is how it had always been done.
- Reluctant to change protected skills and practices.
- Reluctant to let the specialist lead instead of it being based on seniority.

Whilst the industry accepted that these should be changed, it believed, sadly, that they were impossible in the healthcare sector. When asked why not, the responses included that they were dealing with very complex issues, dealing with broken (ill) people, one at a time issue, the healthcare machine never stops…….

When asked what could work, the survey came up with three factors; resources, senior management change and clinical leadership change.

Do increased resources work, and can we afford them? The Blair-Brown years of investment improved mortality by 26% in the UK, however 70% of nurses said they were understaffed.

The reality of senior management is that Boards are bereft of medical expertise, are forced to focus on finance, regulatory demands and PR/legal threats, and are easily exploited and easily blinded by reality.

Clinicians are generally bereft of executive powers. Leadership is not easy to study but can have a striking impact.

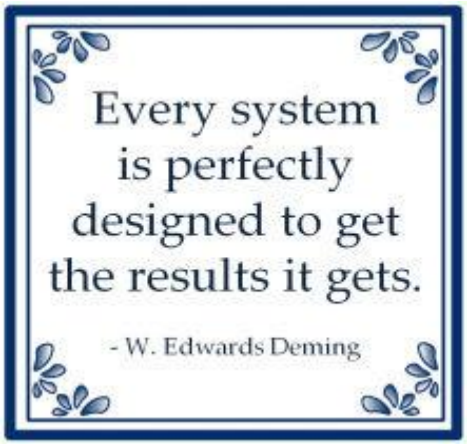
None of these factors are susceptible to experiment, hospitals only allow observation.

Can the culture be improved through team training? A teamwork experiment indicated a small improvement although the most likely explanation was that the existing system factors were more powerful and not changeable by personnel. However, promoting both culture and system improvements did produce results. This suggested that

increased teamwork training enhanced the efforts of system improvements and made them less inconsistent. However, one of the biggest findings was the enormous effort of getting staff to comply, attend or collect data. It was found that smaller groups worked best.

In a teambuilding seminar, involving the NZ rugby legend, Dan Carter, and Lewis Hamilton's pitstop captain amongst others, the following key points to achieve improvements emerged as

- Socialise together
- Train frequently and intensively together
- Celebrate success and good performance
- Have a buddy and mentor scheme
- Involve everyone, eradicate cliques
- Look to senior "NCOs" to maintain the culture
- Don't tolerate misfits and prima donnas



Think about it!

Overall, engagement is the key.

Prof McCulloch went on to talk about the culture in the healthcare sector. There are a number of factors, starting with the desire by its members to do good. Other factors include the professional hierarchy based on an apprenticeship model and social status together with professional and departmental divisions. This can result in poor understanding and cooperation between professions, departments and even wards. And the final factor, especially in the NHS, being a high emotional and stressful environment.

These factors result in an aspirational culture having to meet impossible demands together with hierarchical pressure.

So how do we move forward?

Start by changing the hospital board structure and its incentives. Involve clinical leaders and external clinical experts. Downgrade the role of Non-Execs, especially non-medical ones. Enhance the Board's accountability for safety and quality, giving it equal weighting with finance, with consequences for Board members personally. Future experiments in clinical level changes to be signed off at CEO level, with the Board accountable for local performance, agreed budget, a programme to incentivise compliance together with active monitoring and feedback.

The management structure should give frontline teams more autonomy together with improved communications. The use of independent expert analysis of serious incidents should be widened, and change nurse and doctor training to improve team cohesion (with possible interchange of roles?). Finally, invest in a National QI and Leadership training for clinical leaders.

The Society's Vote of Thanks to Prof McCullough was given by Richard Groome, who has in the past been a non-medical non-executive director in the NHS. Over his 30 years of experience, he has seen a massive increase in bureaucracy and complexity in the NHS, and the fear culture in many health institutions. However, he believed that changes are possible as has been demonstrated in the ambulance service in the UK with improved clinical leadership.

Paul Gerrard

Tidal power from the Bristol Channel by Chris Binnie FICE FCIWEM

With annual global temperature about to exceed the agreed target of +1.5 deg C above pre-industrial levels, UK Government policy is to eliminate fossil fuels where possible, doubling electricity generation to provide energy to replace domestic gas heating and cooking; for heat pumps, air conditioning, electric car charging; and to service power-hungry data centres and industrial demand such as electric arc furnaces.

Future demand might be met by some combination of nuclear, solar power; tidal Stream Energy and tidal lagoons; onshore or fixed or floating offshore wind generation and imported energy. Current methods have significant drawbacks. UK nuclear power projects suffer from delay and cost overrun, and shortage of suitable safe long-term storage of spent nuclear fuel. Although the UK has 17GW power output from solar panels, these are mostly Chinese made, with expected lifespan of 25 years; power output is weak at peak demand, and land use is substantial. Wind-generated energy (like solar energy) is intermittent; turbines have a life of 20-25 years, with a third of those currently installed needing to be decommissioned by 2035 and their infrastructure removed, including foundations. By 2030 total UK wind power generation is forecast to increase from 15 to 27 GW onshore and from 15 to 43 GW offshore; new north-south links are proposed to transmit power generated from east coast Scotland south to east coast England, with high transmission costs for new subsea cables. In times of high demand energy is imported from mainland Europe by subsea cables and pipelines, a potentially expensive source, open to the risk of sabotage.

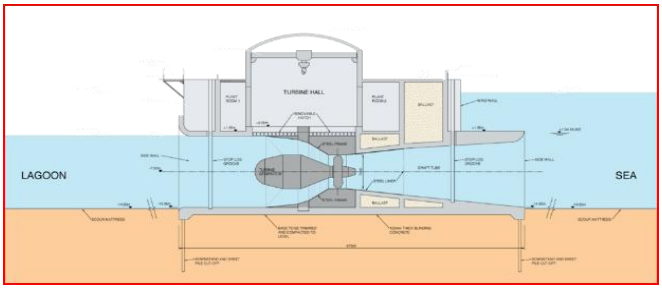
From the cost comparison below, tidal range is a significant source of alternative energy.

The House of Commons Environmental Audit Committee reported in 2023 that tidal energy should be a vital component for net zero and energy security.

Energy Source	Energy Cost £/MWh	Life in Years	Link to Grid
Solar	50	25	No
Onshore Wind	59	30	No
Offshore Wind Fixed	81	30	No
Tidal Range West Somerset Lagoon	64-85	120	Yes
Hinkley C Nuclear	130	60	Yes
Sizewell C Nuclear	110	60	
Floating Offshore Wind	140	30?	
Tidal Stream	172	30?	
Wave	250?	20?	

Tidal stream-energy generates electricity from turbines in tidal currents. About 25m water depth is needed for efficient operation and a velocity of 2m/sec. Within the UK the Bristol Channel has the highest tidal range, but only its deepwater shipping channels have the requisite water velocity for tidal stream-energy.

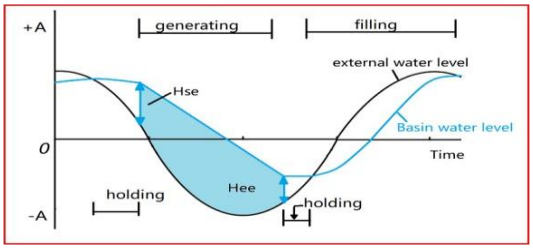
Tidal range energy from a lagoon system provides a potential solution, operating across the barrage between the sea and the lagoon by means of 6-8m diameter bulb turbines.



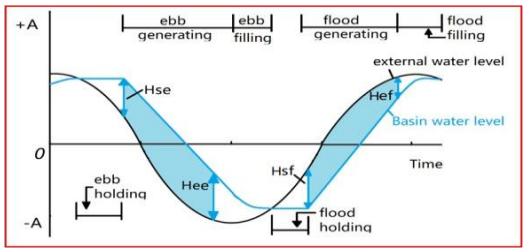
Tidal Range Power - Image from Prof George Aggidis

There are two options: ebb generation with two passes per 24 hours or, more commonly, two-way (flood and ebb) generation with four

passes per 24 hours with less intermission time (approximately 2 hours) - more suited to the electricity grid and local natural environment.



Ebb only Generation, Image from Prof George Aggidis

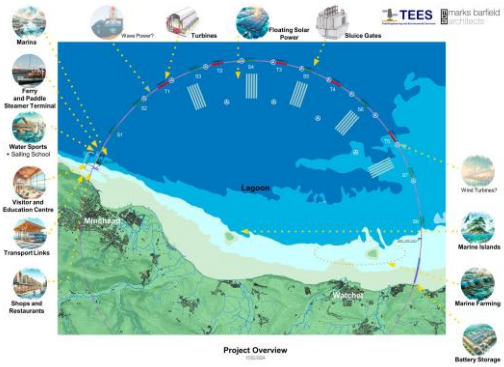


Two-way Generation, Image from Prof George Aggidis

The system is flexible, used when needed and has proven technology eg the Rance Barrage.

Rance Tidal Barrage in Brittany, France (DEA/C.SAPPA/Getty Images)

Overall benefits of tidal range power include predictability, reliability, proven technology with low risk of sabotage and no dangerous long-life waste. Around the UK, the Bristol Channel, Irish Sea and North Wales have a tidal range of 9m. Projects examining tidal power have included the Severn Barrage with ebb-only operation. However, interference with shipping access to Avonmouth Docks, and high lock cost; with migrating salmon and shad; and loss of 140km2 of intertidal habitat were significant drawbacks. By contrast, the West Somerset Lagoon (WSL) project is sited on the coast between Minehead and Watchet outside the areas of ecological and environmental sensitivity. It is proposed to be a semicircular 80km2 area bounded by a wall of concrete caissons, with a tidal range of about 10m. In total, 125 turbines will be set around the perimeter in five groups, and sluice gates in eight groups, with generating capacity of 2500MW, or 6.5TWh/yr at a predicted cost of £11 billion.



Project Overview – Image from Marks Barfield Architects/West Somerset Lagoon

Sited in an area of significant coastal erosion, the scheme will help protect the South West Coast Path and West Somerset Railway, and reduce the risk of severe coastal flooding predicted for 2100. The lagoon wall reduces storm surges, and controls the water level in the lagoon. Though detailed environmental impacts are awaited, proposed mitigations will protect local and migrating fish and eel populations and migrating birds. Calmer conditions within the lagoon offer potential benefits for recreation. Construction would entail upgrade of the A39 road.

However, with the projected development programme for WSL stretching over two parliaments, from 2025-2037, funding is an issue. The Swansea Bay Lagoon Scheme was turned down - for failure to qualify in the payback period of the Treasury. It would be a pity if WSL suffered the same fate.

Peter Blair-Fish

Our thanks are due to those who have contributed to this newsletter. The editor welcomes contributions on matters that relate to the objectives of the Société. Email:paulgerrard24@gmail.com