THE SOLENT CLUSTER | Ada Mode

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HOW TO...

USE ARTIFICIAL INTELLIGENCE TO HELP INDUSTRIAL DECARBONISATION

Artificial Intelligence (AI) offers a powerful toolset to help industries achieve their decarbonisation goals, from optimising energy use to improving efficiency and predicting emission reductions.

AI methodology is rapidly growing and is applicable for a wide range of applications. The integration of AI across operations can lead to more sustainable, cost-effective industrial practices.

STEP BY STEP GUIDE

1. UNDERSTAND THE ROLE OF AI IN DECARBONISATION

Before you begin searching for feasibility consultants, it's important to clearly define the scope of your decarbonisation project. Consider the following:

- **Energy Optimisation**
  AI can monitor energy usage patterns within systems. Using long-term data from components, this can identify inefficiencies or abnormal consumption. AI can help pinpoint areas where energy waste is occurring, thereby improving the system efficiency.

- **Predictive Maintenance:**
  Data sensors and predictive AI algorithms can detect early signs of equipment wear and tear, which can lead to inefficiency and higher emissions. By optimising maintenance schedules, businesses can ensure machinery runs at peak efficiency.

- **Smart Grid Management**
  AI can help with the integration of renewable energy sources like solar or wind into industrial processes by predicting energy supply fluctuations and adjusting operations accordingly to better match energy demand and supply.

- **Carbon Capture and Storage (CCS) Enhancement:**
  AI can improve the monitoring of carbon capture technologies, analysing data from various sensors and models to predict and mitigate operational issues. Machine learning can predict when an operator should adjust operational parameters such as pressure and temperature, to maximise the efficiency of CCS systems, ensuring more CO_2 is captured and stored.

2. IDENTIFY KEY AREAS FOR AI IMPLEMENTATION

Focus on areas with the highest potential for impact for your business:

- **Manufacturing:**
  Use AI to monitor and optimise production processes, reducing waste and energy use. AI can assist in improving the design of products that require less energy to manufacture or that utilise more sustainable materials. AI-driven process control systems can enable industrial manufacturing processes to reduce energy use and waste, by identifying sub-optimal temperatures, pressures, and speeds.

- **Transportation:**
  I can optimise the routing of deliveries, reducing fuel consumption and emissions in transportation. Algorithms can consider variables like traffic, weather, and fuel type to minimise environmental impact.

- **Circular Economy and Waste Reduction:**
  AI can help identify ways to reuse materials from waste streams, reducing the need for new raw materials and reducing emissions from production.

3. DEVELOP AND DEPLOY AI SOLUTIONS

- **Data Collection and Analysis:**
  Gather data from various sources such as sensors, IoT devices, and historical records. Use AI to analyse this data and identify patterns and opportunities for improvement. AI tools can automate the aggregation of data across multiple sources, including energy usage, supply chains, and raw material inputs. This enables accurate and timely tracking of carbon footprints. AI systems can monitor carbon emissions from industrial processes in real time, giving businesses the ability to adjust operations dynamically to reduce their environmental impact.

- **Pilot Projects:**
  Start with small-scale pilot projects to test AI solutionsin your business. This helps in understanding the feasibility and impact before scaling up.

- **Scaling Up:**
  Once pilot projects show positive results, scale-up the AI solutions across the organisation. Ensure

- **Decision Support and Policy Guidance:**
  AI can create detailed models of different decarbonisation strategies, helping decision-makers evaluate the effectiveness and cost-efficiency of each approach before implementation. AI can simulate the impact of various environmental policies on a business, enabling more informed decisions when adopting sustainability measures.

4. COLLABORATE AND INNOVATE

- **Partnerships:**
  Collaborate with AI startups, research institutions, and other industries to share knowledge and resources. The Solent Cluster works to bring industry partners together to decarbonise the area.

- **Government Support:**
  Leverage government funding and support for AI and decarbonisation projects. Innovate UK has supported the Local Industrial Decarbonise Plan, and could be a useful source of future funds.

- **Continuous Innovation:**
  Stay updated with the latest AI advancements and continuously innovate to improve decarbonisation efforts.

5. MONITOR AND REPORT PROGRESS

Once you have identified a shortlist of consultants, reach out to them to request proposals for your decarbonisation feasibility study. A strong consultant will offer a clear and structured proposal. Consider the following:

- **Methodology:** Does the consultant's approach align with your goals? Ensure they use the latest tools and techniques in decarbonisation feasibility studies.

- **Experience and Expertise:** Do they have experience in the area of decarbonisation you are focusing on and familiar with regulations and industry standards?

- **Cost and Timeline:** Compare costs and timelines among consultants to ensure you're receiving value for money without compromising quality.

- **Communication and Support:** Is the consultant clear in their communication or are they using jargon you don't yet understand? What support and advice do they offer?

TIPS AND TRICKS

- Install smart sensors throughout machinery and infrastructure to collect real-time data.

- Implement predictive algorithms to predict when equipment needs maintenance to avoid inefficient operation.

- Use AI to simulate various process configurations to find the most energy-efficient production methods.

- Employ generative design algorithms to develop sustainable product designs that minimise resource usage.

- Implement AI-powered logistics software that can plan the most efficient delivery routes.

- Use machine learning to predict demand and optimize production schedules to minimise excess production and unnecessary emissions.

- Deploy AI systems that can analyse historical and real-time data to predict energy needs.

- Leverage AI-powered scenario modelling tools to evaluate the potential impact of different decarbonisation strategies.

LINKS AND FURTHER INFORMATION

The Solent Cluster Working towards a lower carbon future

Innovate UK UKRI

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