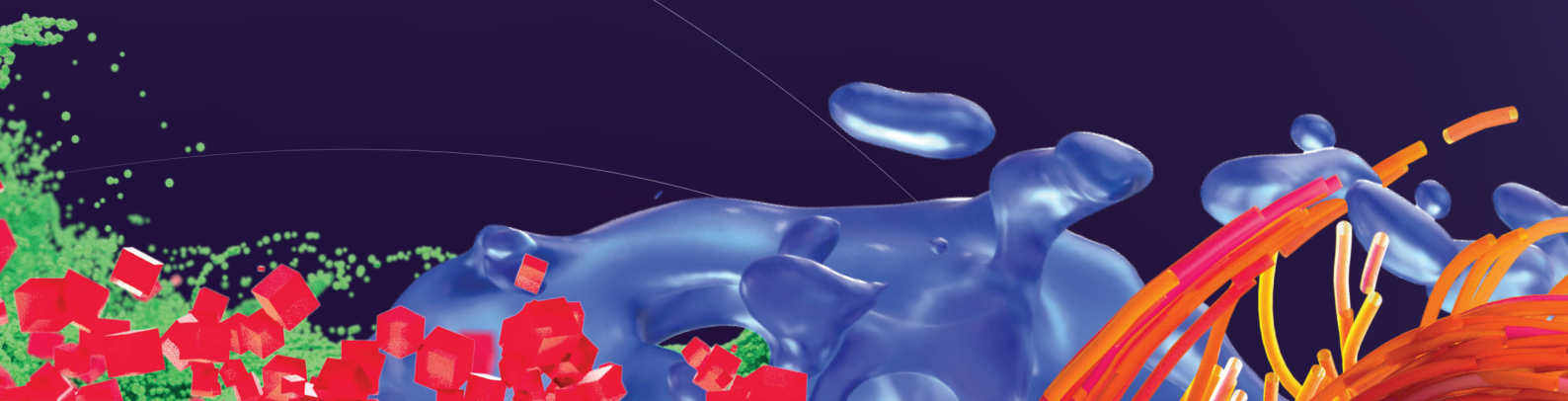




DP WORLD

# GREEN POWER - SUSTAINABLE ENERGY

SAMPLE



## TEACHING GUIDE

# WELCOME TO GREEN POWER - SUSTAINABLE ENERGY

### KEY SKILLS:

Collaboration, Communication, Critical Thinking, Problem Solving, Creativity and Innovation, Green Skills, Environmental Awareness and Data Analysis

### SUBJECTS:

Science, Technology, Environmental Studies, Mathematics, Design and Technology

## OVERVIEW

This activity pack offers students a range of engaging tasks that delve into the realm of sustainable energy and its pivotal role in achieving a net carbon zero future. The activities, which can be used as standalone task or integrated into other lessons, are centred around DP World's sustainability initiatives. Students will embark on a solar-powered vehicle experiment, delve into a port and terminal technology innovations card sort activity with a focus on electrification, and embark on an insightful scavenger hunt. These hands-on experiences will not only deepen their understanding of green power but also shed light on DP World's unwavering commitment to sustainable energy practices. Additionally, students will be introduced to diverse renewable energy sources, fostering a comprehensive grasp of the subject and its broader implications.

## CURRICULUM FIT

There are differentiated resources for students aged 11-13 (L1) and 14-16 (L2). The content of the lesson is connected to SDG 13 (Climate Action).

## INCLUDED RESOURCES

- Solar-Powered Vehicle Experiment Instructions
- Port and Terminal Technology Innovations Cards
- Factsheet, Clue Cards and Challenge Cards with Various Renewable Energy Sources

## TIMINGS

Starter & Introduction	10 mins
<b>Activity 1</b> Port and Terminal Technology Innovations Card Sort	20 mins
<b>Activity 2</b> Solar-Powered Vehicle Experiment	40 mins
<b>Activity 3</b> Scavenger Hunt – Renewable Energy Sources	20 mins
Wrap-up & Conclusion	10 mins

## OBJECTIVES

- Understand the significance of sustainable energy in achieving a net carbon zero future.
- Explore DP World technologies and innovations driving sustainability.
- Explore various renewable energy sources, their benefits, and real-life applications.
- Build a solar-powered vehicle while considering DP World's decarbonization roadmap and the Electric Terminal Tractor (e-TT) initiative
- Analyse port and terminal technology innovations with a focus on electrification for reducing carbon emissions.

## WHAT DO I NEED TO MAKE IT WORK

- Projector and screen or IWB for presentations.
- Chart paper or board
- Printout of factsheets, clue cards and challenge cards
- Printout of card sets and each sustainability principle
- Materials for the solar-powered vehicle experiment (e.g., solar panels, small motors, wheels, etc.).

## WHAT THINGS WILL MY STUDENTS CREATE

- Students will create and test a solar-powered vehicle during the experiment.
- They will also work in groups to discuss their findings on DP World technologies and innovations driving a net carbon zero future.



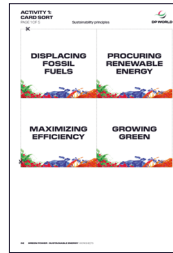
**TASK**

**ACTIVITY 1: CARD SORT  
– PORT & TERMINAL TECHNOLOGY INNOVATIONS**

 **20 minutes**

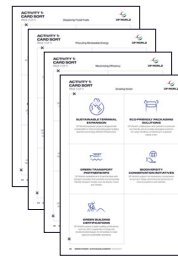
- 1 Divide the participants into small groups and provide each group with the printed cards.
- 2 Instruct the groups to read the description on each card and discuss among themselves which sustainability principle it represents and place each card under the appropriate category based on their discussions.
- 3 Each card highlights a specific aspect of DP World's sustainability initiatives related to the corresponding sustainability principle, allowing participants to gain insights into the company's efforts to promote sustainable energy practices and environmental stewardship.
- 4 Facilitate a class discussion about the importance of electrification in reducing carbon emissions in ports and terminals.

**MATERIALS NEEDED**



Printed cards with each sustainability principle:

- Displacing Fossil Fuels
- Procuring Renewable Energy
- Maximizing Efficiency
- Growing Green



Printed card sets 1-4.

Large chart paper or a board to categorize the cards.

**ANSWERS**

Card groupings

**DISPLACING FOSSIL FUELS**

- Electric Terminal Tractor (e-TT)
- Hybrid Yard Cranes
- Green Methanol and Ammonia: Future-Ready Maritime Fuels
- Electrification of Cargo Handling Equipment
- Solar-Powered Infrastructure

**PROCURING RENEWABLE ENERGY**

- Solar Farms
- Wind Turbine Installations
- Power Purchase Agreements (PPAs)
- Electric Cargo Handling Equipment
- Geothermal Energy Exploration

**MAXIMIZING EFFICIENCY**

- Smart Grid Implementation
- Energy-Efficient Lighting
- Real-Time Energy Monitoring
- Waste Heat Recovery
- Lean Process Implementation
- Overall Equipment Efficiency

**GROWING GREEN**

- Sustainable Terminal Expansion
- Eco-Friendly Packaging Solutions
- Green Transport Partnerships
- Biodiversity Conservation Initiatives
- Green Building Certifications

**ACTIVITY 1:  
CARD SORT**

PAGE 1 OF 5

Sustainability principles



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**DISPLACING  
FOSSIL  
FUELS**

**PROCURING  
RENEWABLE  
ENERGY**

**MAXIMIZING  
EFFICIENCY**

**GROWING  
GREEN**



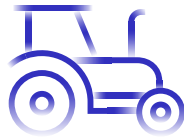
# ACTIVITY 1: CARD SORT

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Displacing Fossil Fuels

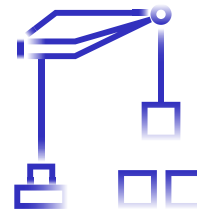


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## **ELECTRIC TERMINAL TRACTOR (ETT)**

DP World's initiative to replace diesel-powered terminal tractors with electric ones, reducing carbon emissions and air pollution in port operations.



## **HYBRID YARD CRANES**

DP World's adoption of hybrid technology in yard cranes, combining electric and conventional power sources to minimize fossil fuel usage and greenhouse gas emissions.



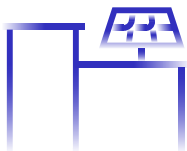
## **GREEN METHANOL AND AMMONIA: FUTURE-READY MARITIME FUELS**

DP World is at the forefront of adopting advanced maritime fuels, focusing on green methanol and ammonia as the true fuels of the future.



## **ELECTRIFICATION OF CARGO HANDLING EQUIPMENT**

DP World is leading the way in electrifying cargo handling equipment, including terminal tractors, hybrid yard cranes, reach stackers, and forklifts.



## **SOLAR-POWERED INFRASTRUCTURE**

DP World's integration of solar panels in port infrastructure, utilizing renewable energy to power facilities and reduce the consumption of fossil fuels.



# ACTIVITY 1: CARD SORT

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Procuring Renewable Energy



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## SOLAR FARMS

DP World's investment in solar farms to generate renewable energy on-site, reducing the carbon footprint of its operations and promoting clean energy adoption.



## WIND TURBINE INSTALLATIONS

DP World's installation of wind turbines in port areas with favourable wind conditions, harnessing wind power to supplement energy needs sustainably.



## POWER PURCHASE AGREEMENTS (PPAS)

DP World's commitment to entering into long-term PPAs with renewable energy providers, ensuring a reliable and consistent supply of clean energy for its operations.



## ELECTRIC CARGO HANDLING EQUIPMENT

Integrating electric cargo handling equipment like terminal tractors, hybrid yard cranes, reach stackers, and forklifts, helps to support a net zero carbon future as electric equipment can be powered with renewable energy.



## GEOHERMAL ENERGY EXPLORATION

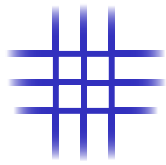
DP World's exploration of geothermal energy sources to utilize the Earth's natural heat and produce sustainable energy for specific port operations.



# ACTIVITY 1: CARD SORT

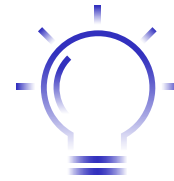
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Maximizing Efficiency



## SMART GRID IMPLEMENTATION

DP World's implementation of smart grid technology to optimize energy distribution and consumption, improving overall operational efficiency.



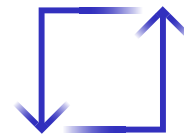
## ENERGY-EFFICIENT LIGHTING

DP World's transition to energy-efficient LED lighting in ports and terminals, reducing energy consumption and enhancing lighting efficiency.



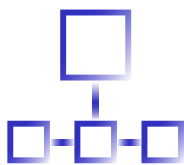
## REALTIME ENERGY MONITORING

DP World's adoption of real-time energy monitoring systems to track energy usage and identify areas for improvement in operational efficiency.



## WASTE HEAT RECOVERY

DP World's utilization of waste heat recovery systems to capture and repurpose heat generated during certain processes, enhancing energy efficiency.



## LEAN PROCESS IMPLEMENTATION

DP World's commitment to lean principles, optimizing workflows and processes to minimize energy waste and increase operational efficiency.

## OVERALL EQUIPMENT EFFICIENCY

DP World is dedicated to optimizing its operations by implementing OEE practices, a key efficiency lever. OEE focuses on minimizing idling time of equipment, such as cargo handling machinery and vehicles. By ensuring drivers switch off engines during waiting periods, like cargo loading or breaks, DP World reduces unnecessary energy consumption and emissions. This proactive approach not only enhances operational efficiency but also contributes to a greener and more sustainable future in the maritime industry.



# ACTIVITY 1: CARD SORT

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Growing Green

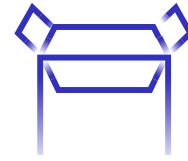


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## SUSTAINABLE TERMINAL EXPANSION

DP World's expansion projects designed with sustainability in mind, incorporating green building practices and energy-efficient infrastructure.



## ECO-FRIENDLY PACKAGING SOLUTIONS

DP World's collaboration with partners to promote eco-friendly and recyclable packaging solutions for cargo handling, contributing to a greener supply chain.



## GREEN TRANSPORT PARTNERSHIPS

DP World's establishment of partnerships with transport providers that prioritize environmentally friendly transport modes, such as electric trucks and vessels.



## BIODIVERSITY CONSERVATION INITIATIVES

DP World's support for biodiversity conservation around port areas, promoting the protection of local ecosystems and habitats.



## GREEN BUILDING CERTIFICATIONS

DP World's pursuit of green building certifications, such as LEED (Leadership in Energy and Environmental Design), for its facilities to meet rigorous sustainability standards.







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**GREEN POWER  
- SUSTAINABLE ENERGY**

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All resources are free to download,  
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