■ FUTURE POWER

STUDENT QUICK-START

SCENARIO

Future City's power company is no longer able to supply power to the city. Residents, essential services, and industry face disaster if the power cannot be supplied! Your team's task is to ensure that the power supply is maintained.

AIM

The aim of this half-day activity is to supply power to the city and make a profit. This is achieved by supplying power to the required infrastructure as cheaply as possible.

WHAT TO DO

Your team will be given a double-sided Future Power board which has power supply controls on one side and infrastructure switches on the other. You will also be given a scenario book from which the Activity Personnel will tell you which colour to follow; each scenario will designate infrastructure that require power. For each scenario select up to 4 different power stations from the types available and plug them into the power supply side of the board.

Balance the power and load by progressively increasing both the power supply and infrastructure load. The power output of each chosen power station is controlled by the dial above it, whereas the load is controlled by the switches on the opposing side. The power balance is indicated by a row of coloured lights on the power supply side of the board. Too much, or not enough power will cause the system to overload and the scenario will have to be started again.

TIMETABLE

Half-Day Activity	
Session (1h 45m)	Following a 5-minute briefing by your Activity Personnel, your team will work through the scenarios. The last 10 minutes are reserved for completing the scenario you are working on and packing up.

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RULES

Only one of each type of power station is allowed.

The load and power shown on the display must be equal to complete a scenario.

To receive a score, power must be supplied to the infrastructure switches specified in each scenario.

Upon completing a scenario test your team **must** immediately raise your hands to have your score marked by the Activity Personnel.

SCORING

The score for each scenario is automatically calculated and displayed on the Future Power board. This is the income made by supplying power to satisfy the Load, less the Cost to generate that Power.

A positive score is only displayed once your team is making an income.

In Scenarios 1 – 4, your team is free to use any of the six types of power stations.

In Scenarios 5 – 8, your team may only use renewable power stations (Hydro, Solar, or Wind).

In Scenarios 9 – 12, your team must use at least two renewable power stations.

Work at your own pace but make sure the Activity Personnel score each scenario before moving on to the next one. If time permits, a second attempt at each scenario can be attempted once every scenario has been completed.

⚠ At the end, ensure your team's score sheet is with the Activity Personnel.

TIPS

Your team must communicate clearly and quickly as controls are on opposite sides of the board.

Try experimenting with different combinations of the available power stations. Each power station differs in maximum power output, cost to generate power and time to change power output.

Turn the dials slowly, the power stations won't turn on straight away.

When a switch is turned on, a red light appears next to it.

The power balance display moves to the right when increasing power or decreasing load; it moves to the left when decreasing power or increasing load. If one side lights up completely the system will overload.

If the system overloads turn all switches off and turn the dials down to zero before starting the scenario again by disconnecting and then reconnecting the battery.

Certain types of infrastructure consume a lot of power, be prepared for a big change in the power balance.

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ACTIVITY PERSONNEL NOTES

► Watch this activity's training video. Details in the Event Guide.

Please refer to the information contained within these notes, and the training video.
Work safely. Be consistent. Make sure everyone has fun and gets a score.

ACTIVITY OVERVIEW - EXPLAIN THIS TO THE STUDENTS

AIM

The aim of this half-day activity is to supply power to Future City at a profit. This is achieved by supplying power to the required infrastructure as cheaply as possible.

TIPS FOR BRIEFING THE STUDENTS

- **Read the rules section on the Student Quick-Start sheet to the students.**
- Explain that they must supply power to the infrastructure (switches) specified for each scenario.
- Demonstrate that the system overloads when too much power or too much load is applied at one time. Also, show the students how to reset the board in this situation.
- Demonstrate how to incrementally add some load, then some power to work towards satisfying the load requirement for a given scenario.
- Explain that team members must communicate effectively and work together to balance the power and load on opposite sides of the board.
- Demonstrate the delay before power registers on the board (coal is a good example).

⚠ This activity may be subject to alteration to suit the conditions.

SETUP

Set up one table and four chairs for each team. The standard number of teams is eight but check with the Event Assistant or Team Leader. Also set up a table for the Activity Personnel.

If possible, make sure the batteries are put on charge the night before the event.

Place a Future Power board and battery on each table, ensuring the students will have access to each side of the board. Rotate the wooden supports so that the board won't tip over.

Place a Scenario Book, green laminated Student Quick-Start, score sheet, and one of each type of the six power stations on each table.

If there is a spare, set up a Future Power board at the Activity Personnel table to use when demonstrating the activity to the students.

MATERIALS

Consumables (based on 8 teams plus 2 spares)	Quantity per team	Total in the kit
-	-	-
Equipment (based on 8 teams plus 2 spares)	**Quantity per team**	**Total in the kit**
Green Laminated Student Quick-Start	1	10
Future Power Scenario Book	1	10
Future Power Board	1	10
Power Station - Coal (450MW)	1	10
Power Station - Gas (250MW)	1	10
Power Station - Hydro (150MW)	1	10
Power Station - Nuclear (350MW)	1	10
Power Station - Solar (250MW)	1	10
Power Station - Wind (200MW)	1	10
Batteries, 12V SLA	1	10
Activity Personnel Box (Clipboard, Notes & Score Sheets)	-	1
Calculator & Pens, Box	-	1
Battery Box (to fit 5 x 12V SLA, Chargers & Powerboard)	-	2

RUNNING THE ACTIVITY

Select a single set (Red or Blue) from the Scenario Book at the beginning of the session and instruct teams to work at their own pace through each scenario sequentially.

Make sure that each team writes their name on their score sheet.

Always be ready to help students with scoring as soon as they are ready. If they can't be scored, they can't move onto the next scenario.

TESTING AND SCORING

Initially check that the Load on the display matches that for the given scenario in the Scenario Book and check that the power matches the load exactly.

If this is correct, check that the required infrastructure has been switched on and whether the correct power station types have been used.

Once the scenario has been verified record the calculated score from the Future Power board display.

If time permits, a second attempt at each scenario can be attempted. Only the best score for each scenario should be included in the final score.

Calculate scores as you go, it will take too long to add everything up at the end.

Immediately after the end of the session take the completed score sheets to the Event Assistant and help them enter the results into the computer.

SAFETY

The batteries are heavy, pack at most five batteries into each battery box.

When moving the Future Power boards, lay them flat on the trolley and use two people to stop them toppling.

TIPS

These notes are provided for you on the day of the event.

At the start of the session, one of the Activity Personnel should brief the students using the TIPS FOR BRIEFING THE STUDENTS section at the beginning of these notes.

The students should have fun. If they are struggling, encourage them and ask probing questions but use your discretion and don't give them too many hints.

Remember, if you have questions about the activity or need assistance please contact the Event Assistant or Team Leader.

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SCORE SHEET

Final Score

School Name

AM | **PM**

Circle One

Power Stations Available for Use

Attempt	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1				
2				

← If time permits

Best Scores – Subtotal (A)	

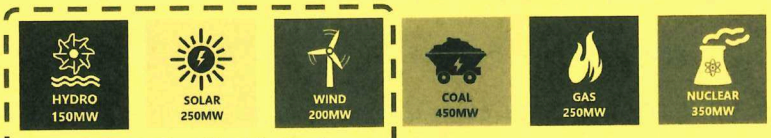
Power Stations Available for Use

Attempt	Scenario 5	Scenario 6	Scenario 7	Scenario 8
1				
2				

← If time permits

Best Scores – Subtotal (B)	

Power Stations Available for Use



At Least Two Must Be Used

Attempt	Scenario 9	Scenario 10	Scenario 11	Scenario 12
1				
2				

← If time permits

Best Scores – Subtotal (C)	

FINAL SCORE = A + B + C = _____

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