

**FCJJ-40**



## PRODUCT DESCRIPTION

The Renewable Energy Box provides a complete understanding of how fuel cell technology interacts with renewable energy sources to create an entirely sustainable power grid. Solar power, wind energy, kinetic energy from a hand crank and a demonstration of the incredible storage potential of a super capacitor. There's a range of fuel cells to compare: PEM hydrogen fuel cell, the salt water fuel cell and a direct ethanol fuel cell. Countless experiments, so many scientific principles at work and plenty of space for creativity.

## FEATURES

- ✓ Fuel cell science from fuel cell experts: PEM, direct ethanol, salt water and reversible fuel cells in one kit.
- ✓ Introduction to renewable energy: solar panel, wind turbine, temperature cell and hand crank.
- ✓ Includes super capacitor to demonstrate the latest in energy storage technology.
- ✓ Includes CD with curriculum content for 40 hours of classroom activities.



## LANGUAGE PACK

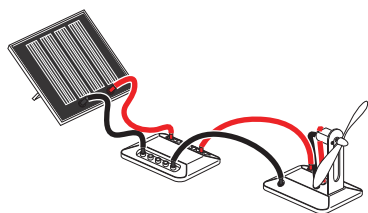
- ✓ Assembly Guide :
- ✓ Technical Support Guide:

## ADD-ON

Make your Horizon Energy Box truly energy independent with the optional addition of HYDROFILL PRO desktop refueling station.

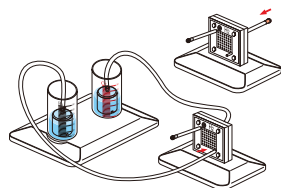


## EXPERIMENTS AND ACTIVITIES



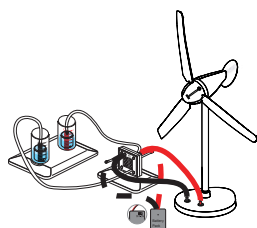
### ✓ Solar energy experiments

1. The effect of heat and cooling on solar panels
2. The effect of shade on solar panels
3. The effect of tilt angle on solar panels
4. Finding the solar panel's maximum power point



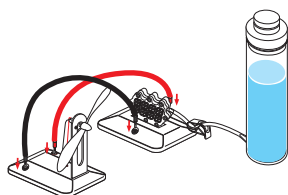
### ✓ Hydrogen energy experiments

1. Electrolysis mode: generating hydrogen and oxygen from water
2. Fuel cell mode: generating electricity from hydrogen and oxygen
3. Determining the minimum voltage for water decomposition
4. Polarization states for hydrogen fuel cells



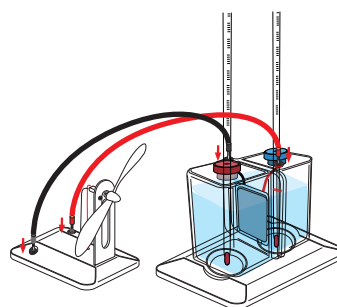
### ✓ Wind energy experiments

1. How many blades are best - 1, 2, 3 ... More?
2. Using three different curved blade shapes
3. Using blades you make yourself
4. Turbine efficiencies
5. Measuring rpm
6. Tuning for maximum power
7. How blade angle or pitch affects output power
8. The process of hydrogen generation



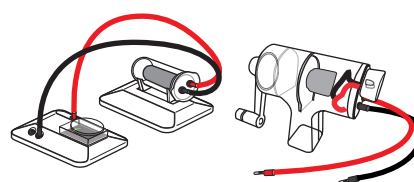
### ✓ Bio-energy experiments

1. Create electricity from ethanol and water
2. Exploring polarity
3. Ethanol fuel consumption
4. Exploring the effect of varying fuel concentrations
5. Create electricity from wine and beer
6. Exploring the effects of temperature



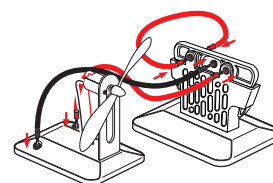
### ✓ Thermal energy experiments

1. Power a fan with two heat sources
2. Analyze power generation with the Renewable Energy Monitor
3. Understand thermoelectric effect



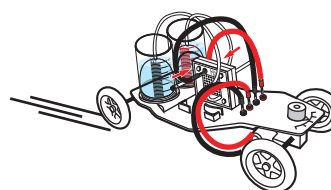
### ✓ Mechanical / electrical energy experiments

1. Explore the concept of hand crank energy generation
2. Explore the concept of super capacitor energy storage
3. Power a fan with electrical energy from the super capacitor
4. Power a fan with mechanical energy from the hand crank



### ✓ Salt water energy experiments

1. Create energy from salt water solution and power a fan
2. Analyze current and voltage variation using different salt concentrations
3. Analyze current and voltage variations using different temperatures
4. Analyze current and voltage variations using different fuel volumes



### ✓ Multi energy powered car experiments

1. Power a car with a hydrogen fuel cell (reversible and mini fuel cell)
2. Power a car with a salt water fuel cell
3. Power a car with solar energy
4. Power a car with a super capacitor and hand crank
5. Power a car with different forms of hydrogen (hydrogen gas and hydrogen hydride)



## CONTENT

- |                              |                                |
|------------------------------|--------------------------------|
| 1. Hand crank generator      | 27. Spanner                    |
| 2. Ethanol fuel cell module  | 28. Screwdriver                |
| 3. Reversible fuel cell      | 29. Water & oxygen tank        |
| 4. Salt water fuel cell      | 30. Water & hydrogen tank      |
| 5. Multi car chassis         | 31. Fuel solution container    |
| 6. Battery pack              | 32. HYDROSTIK PRO U locker     |
| 7. LED module                | 33. HYDROSTIK PRO suport       |
| 8. Mini fuel cell base       | 34. Syringe                    |
| 9. Potentiometer             | 35. Fuel cell base             |
| 10. Super capacitor          | 36. Multi connection base      |
| 11. Water tank base          | 37. Solar panel support        |
| 12. Solar panel              | 38. Heavy fan module           |
| 13. HYDROSTIK PRO            | 39. Fan module                 |
| 14. Pressure regulator       | 40. Fan blade                  |
| 15. Mini fuel cell           | 41. Ethanol fuel tank with lid |
| 16. Thermoelectrical system  | 42. Wires                      |
| 17. Rotor Base               | 43. Wheel                      |
| 18. Blade holder             | 44. Purging valve              |
| 19. Assembly lock            | 45. Clamp                      |
| 20. Main body assembly       | 46. PH paper                   |
| 21. Variable resister module | 47. Silicon tubes              |
| 22. Base assembly            | 48. Red & black pins           |
| 23. Blade A (3pcs)           | 49. Fan blade & wheel adapter  |
| 24. Blade B (3pcs)           | 50. Windpitch post screws      |
| 25. Blade C (3pcs)           | 51. Reversible fuel cell       |
| 26. Windpitch post assembly  | 52. Thermometers               |
| 27. Spanner                  | 53. REM USB cable              |
|                              | 54. REM                        |

## CERTIFICATION

CoC, ROHS, EN71:PART1;PART2;PART3, EN62115, PHTH-EU, ASTM F963, CPSIA-LEAD, CPSIA-LEAD, CPSIA-PHTHALATES, REACH.

## PACKING INFORMATION

<b>Case Pack Quantity</b> (units):	1
<b>Master Pack Quantity</b> (units):	1
<b>Packaging Type:</b>	cardboard
<b>20' Container</b> (units):	270
<b>40' Container</b> (units):	550
<b>Unit Box Length</b> (cm/in):	63 / 24.8
<b>Unit Box Width</b> (cm/in):	44 / 17.3
<b>Unit Box Height</b> (cm/in):	35 / 13.8
<b>Unit Volume</b> (Litres/Cubic Meters):	97.0 / 0.097
<b>Unit Box Weight</b> (kg/lbs):	6.6 / 14.6
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\*The cartons' size may vary between ±1-2 cm.

## LOGISTICS INFORMATION

<b>Item UPC-Code:</b>	6942503405309
<b>Item HS-Code:</b>	-
<b>Manufactured in:</b>	Shanghai, China
<b>Local Warehouse</b>	Prague, Czech Republic
<b>FOB Harbor:</b>	Los Angeles, USA
<b>First Ship Date:</b>	available now
<b>Minimum Order:</b>	1