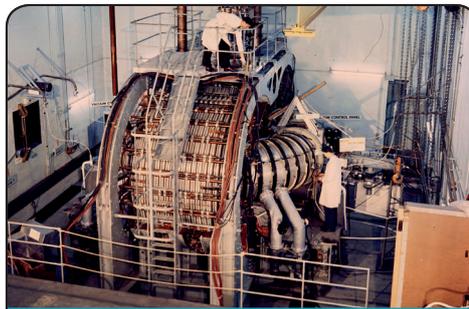


# ELECTRO ⚡ TRUMPS

## Playing Cards



### ZETA FUSION REACTOR

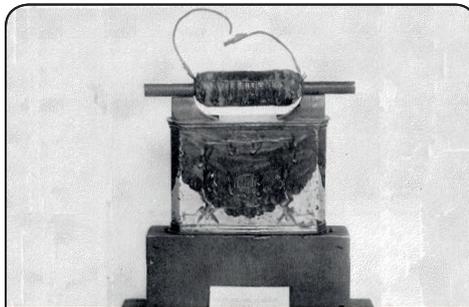
OXFORDSHIRE, ENGLAND

DATE	1958
RENEWABLE	NO
DANGER	7
SUCCESS	3
SIGNIFICANCE	7

ELECTRO ⚡ TRUMPS

Known at the time as "Britain's Sputnik" this experiment sought to develop Nuclear Fusion through the Z-Pinch technique. Carried out against the backdrop of Britain's decline as a world power and the Suez Crisis, this experiment signaled a shift in the way science and technology were deployed to exert global influence. The press hype did not match the end result, and was seen as a PR disaster – although the experiment laid foundations for important developments in nuclear energy to come.

1



### FARADAY'S INDUCTION EXPERIMENT

ENGLAND, HERTFORDSHIRE

DATE	1831
RENEWABLE	NO
DANGER	1
SUCCESS	9
SIGNIFICANCE	1

ELECTRO ⚡ TRUMPS

Using two wires wrapped around an iron ring, Faraday noticed that when he repeatedly plugged and unplugged one wire into a battery, attaching a galvanometer to the other wire, it produced a "wave of electricity." This was caused by a change in magnetic flux. It is this fundamental operating principle that many generators, engines and inductors rely on.

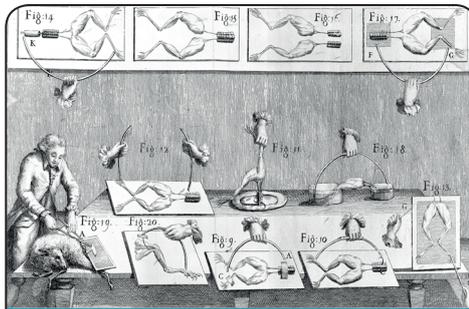
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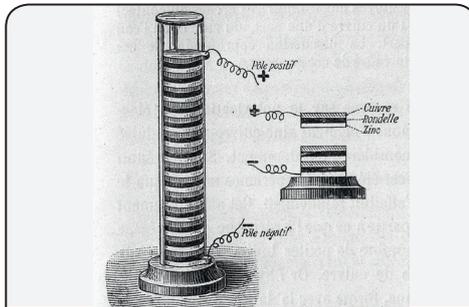
### LUIGI GALVANI'S TWITCHING FROG'S LEG EXPERIMENT BOLOGNA, ITALY

DATE	1794
RENEWABLE	NO
DANGER	1
SUCCESS	3
SIGNIFICANCE	5

ELECTRO TRUMPS

In 1780, the physician, physicist, biologist and philosopher Luigi Galvani was dissecting a frog's leg when his steel scalpel accidentally brushed the brass hook holding the amphibian's leg in place. The leg twitched. Galvani believed that he had discovered what he coined "animal electricity" - the life force that resides in the muscles of animals. This theory would later be discarded by Galvani's friend, and rival, Alessandro Volta.

2



### ALESSANDRO VOLTA AND THE FIRST BATTERY PAVIA, ITALY

DATE	1794
RENEWABLE	NO
DANGER	1
SUCCESS	10
SIGNIFICANCE	9

ELECTRO TRUMPS

Although the term was coined by Benjamin Franklin, it is Volta who is credited with the invention of the first battery. Volta's disputed Galvani's animal electricity theory, theorising that the twitching frog's leg was merely responding to the electricity - that a current was caused by the contact of two dissimilar metals in moisture. Although the two were friends, their supporters clashed in the street over the two different theories. The "volt" was officially established in 1881 as a unit of electrical measurement in honour of Volta.

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<b>generalfusion<sup>®</sup></b>	
<b>GENERAL FUSION</b> BRITISH COLUMBIA, CANADA	
DATE	2002 - PRESENT
RENEWABLE	YES
DANGER	10
SUCCESS	5
SIGNIFICANCE	9

**ELECTRO ⚡ TRUMPS**

Established in 2002, this crowdfunded project sought to use magnetized target fusion to create the most practical and quickest path to commercial nuclear fusion. It is an example of how it is no longer just national governments that fund large-scale scientific experiments.

	
<b>BENJAMIN FRANKLIN AND THE KITE EXPERIMENT</b> PHILADELPHIA, USA	
DATE	1752
RENEWABLE	YES
DANGER	10
SUCCESS	5
SIGNIFICANCE	9

**ELECTRO ⚡ TRUMPS**

Proposed, and possibly carried out, by Benjamin Franklin the "kite experiment" has become one of the most widely known experiments in the world. The experiment itself, however, did not actually advance scientific knowledge. Yet, due to its mythical nature (the inherent danger of the experiment, the elemental force of lightning and the fact that Franklin was a Founding Father), it constructed a view of science in which progress is made through moments of individual brilliance.

3

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### COLVILLE LAKE SOLAR PROJECT NORTH WEST TERRITORIES, CANADA

DATE	2013 - PRESENT
RENEWABLE	YES
DANGER	3
SUCCESS	7
SIGNIFICANCE	8

#### ELECTRO TRUMPS

The people of the Arctic face the challenge of diversifying their energy sources. Due to poor infrastructure and harsh climate, communities in the Canadian Arctic use twice as much electricity as the national average. The Colville Lake project is the first renewable system in the North West Territories benefiting the First Nation communities that live in the vicinity, especially in the summer months. However, solar currently still costs more than diesel due to the cost of the batteries needed to store excess power.

4



### RENEWABLE ENERGY AND GENDER IN RURAL COMMUNITIES OF NORTH-WEST CHINA

DATE	2014
RENEWABLE	YES
DANGER	2
SUCCESS	8
SIGNIFICANCE	6

#### ELECTRO TRUMPS

Many households in rural China rely on biomass-based energy. Collecting firewood is labour intensive - a task normally carried out by the women of the village. This study showed that by switching to renewable energy sources, women could save time and money giving them more freedom to pursue other activities. The switch to a cleaner fuel also has positive health effects as indoor smoke pollution can cause serious respiratory issues. The study shows how gender is an important, but often under-researched, dynamic of energy consumption.

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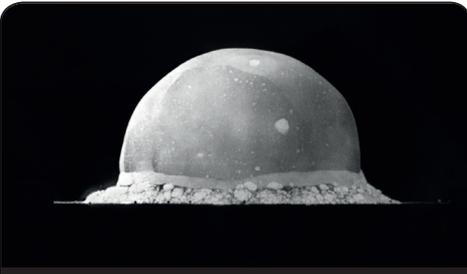


**PERTH WAVE ENERGY PROJECT**  
PERTH, AUSTRALIA

DATE	2014
RENEWABLE	YES
DANGER	3
SUCCESS	7
SIGNIFICANCE	5

ELECTRO ⚡ TRUMPS

This experiment uses submerged buoys to harness the tidal forces readily available in Australia. The experiment is the first largescale commercial use of buoys as a source of energy (rather than panels), theoretically, requiring less upkeep. It could present a viable energy alternative for island nations who's future energy security is increasingly uncertain.



**MANHATTAN PROJECT/TRINITY TEST**  
NEW MEXICO, USA

DATE	1942-1945
RENEWABLE	NO
DANGER	10
SUCCESS	9
SIGNIFICANCE	10

ELECTRO ⚡ TRUMPS

Arguably one of the most significant and far-reaching scientific experiments ever, the Manhattan project saw the development of the first nuclear bomb, which was tested in an isolated corner of the New Mexican desert on July 16, 1945. Its development paved the way for nuclear energy as well as fundamentally changing the nature of warfare, setting the geopolitical stage for the century to come.

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**TENGEH RESERVOIR  
FLOATING SOLAR PANELS  
SINGAPORE**

DATE	2014
RENEWABLE	YES
DANGER	1
SUCCESS	8
SIGNIFICANCE	6

ELECTRO ⚡ TRUMPS

Land constraints can be a significant obstacle in transitioning to solar power. The Tengeh Reservoir Solar Test Site is the largest floating solar photovoltaic cell test-bed in the world. The reservoir allows for easier cooling as well as allowing Singapore to build its solar capacity despite its dense urban environment.



**THE TRANSACTIVE GRID  
PRESIDENT STREET,  
BROOKLYN, NEW YORK**

DATE	2016
RENEWABLE	YES
DANGER	0
SUCCESS	8
SIGNIFICANCE	10

ELECTRO ⚡ TRUMPS

This is widely cited as the world's first blockchain based, peer to peer energy trading network. Five homes that generated their own electricity from rooftop mounted solar panels on one side of a New York street were connected to five homes on the other side of the street, enabling them to sell electricity that was surplus to domestic consumption. The experiment demonstrated how domestic energy producers (prosumers) can trade electricity with their neighbours without the need for third party utility companies, catalysing further projects in the Netherlands, Australia and Tanzania. Blockchain technologies promise to remove the "middle man" in electricity distribution but depend on the mediation of software engineers.

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### RECHARGEABLE LITHIUM ION BATTERY

OXFORD UNIVERSITY, UK

DATE	1980
RENEWABLE	NO
DANGER	5
SUCCESS	9
SIGNIFICANCE	7

ELECTRO TRUMPS

In 1980 John Goodenough demonstrated a rechargeable lithium ion battery cell. Lithium ions move from the negative electrode (anode) to the positive electrode (cathode) during discharge. First and popularly used in portable electronics lithium ion batteries are now a vital part of decentralised, solar energy systems. At the beginning of the 21st century companies like Telsa have pioneered the expansion of lithium ion batteries for domestic and industrial use. Yet lithium is a finite resource. So too is cobalt, the material used to make most positive electrodes in lithium ion batteries. As our dependency on lithium ion batteries increases new questions emerge about the terms and conditions under which these raw materials are extracted from the earth.

7



### KIVU WATT METHANE PLANT

LAKE KIVU, RWANDA

DATE	2016
RENEWABLE	YES
DANGER	9
SUCCESS	8
SIGNIFICANCE	3

ELECTRO TRUMPS

Harvesting the methane resource submerged beneath the waters of Lake Kivu, Kivu Watt is a unique experiment in industrial scale power generation. The project has proved an enormous success for Rwanda, fuelling the country's ambitions for accelerated economic growth. However rising methane levels are a result of the Lake Kivu's geology and pose a risk of explosion. The nature of the resource and the specificities of the location mean that this exemplar of clean, power generation is difficult to replicate.

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### THE SOLAR SUITCASE ABUJA, NIGERIA

DATE	2008
RENEWABLE	YES
DANGER	0
SUCCESS	8
SIGNIFICANCE	8

### ELECTRO ⚡ TRUMPS

The Solar Suitcase is a portable power unit that 'aims to improve health outcomes for childbearing mothers and their families by supporting health workers with equipment powered by the sun.' It was designed in 2008 by Laura Stachel, an American obstetrician, and her husband Hal Aronson, a solar energy educator, to provide obstetric care during frequent blackouts at a hospital in Abuja, Nigeria. In 2009 it won \$1000 in a University of California Berkley innovation contest and a nonprofit company 'We Care Solar' was founded to promote it. The Solar Suitcase is assembled in California and has been deployed as part of the emergency response to natural disasters in the Philippines, Nepal, and Puerto Rico, and the Ebola outbreak in Sierra Leone and Liberia.

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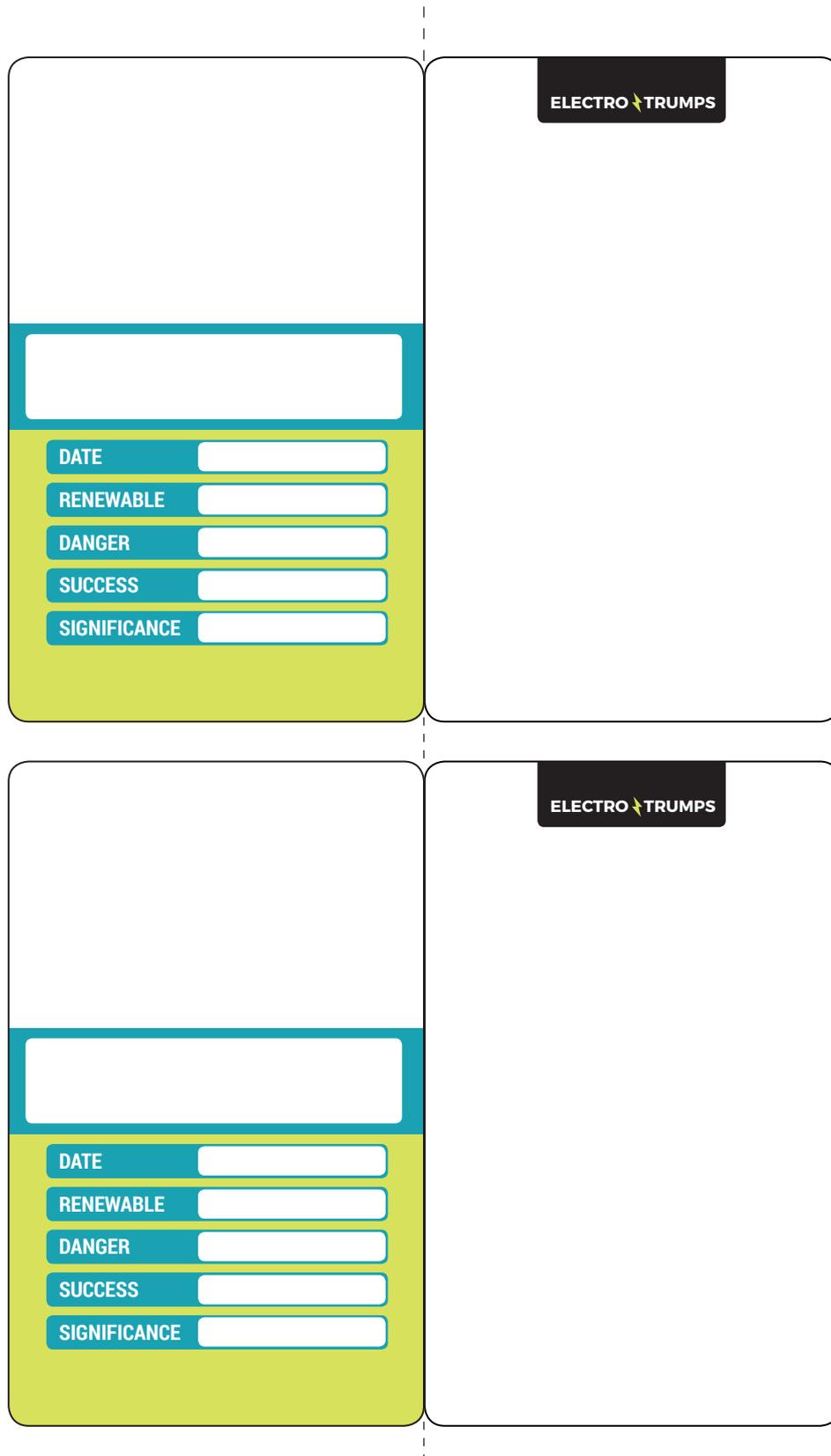


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DIY

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2. Glue front and backsides together.
3. Trim the card templates.
4. Compose your cards

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