

Smart Energy

The next few decades will see great changes in the way energy is supplied and used. In some major oil producing nations, 'peak oil' has already been reached, and there are increasing fears of global warming. Consequently, many countries are focusing on the switch to a low carbon economy. This transition will lead to major changes in the supply and use of electricity. **[A]** Firstly, there will be an increase in overall demand, as consumers switch from oil and gas to electricity to power their homes and vehicles. **[B]** Secondly, there will be an increase in power generation, not only in terms of how much is generated, but also how it is generated, as there is growing electricity generation from renewable sources. **[C]** To meet these challenges, countries are investing in Smart Grid technology. **[D]** This system aims to provide the electricity industry with a better understanding of power generation and demand, and to use this information to create a more efficient power network.

Smart Grid technology basically involves the application of a computer system to the electricity network. The computer system can be used to collect information about supply and demand and improve engineer's ability to manage the system. With better information about electricity demand, the network will be able to increase the amount of electricity delivered per unit generated, leading to potential reductions in fuel needs and carbon emissions. Moreover, the computer system will assist in reducing operational and maintenance costs.

Smart Grid technology offers benefits to the consumer too. They will be able to collect real-time information on their energy use for each appliance. Varying tariffs throughout the day will give customers the incentive to use appliances at times when supply greatly exceeds demand, leading to great reductions in bills. For example, they may use their washing machines at night. Smart meters can also be connected to the internet or telephone system, allowing customers to switch appliances on or off remotely. Furthermore, if houses are fitted with the apparatus to generate their own power, appliances can be set to run directly from the on-site power source, and any excess can be sold to the grid.

With these changes comes a range of challenges. The first involves managing the supply and demand. Sources of renewable energy, such as wind, wave and solar, are notoriously unpredictable, and nuclear power, which is also set to increase as nations switch to alternative energy sources, is inflexible. With oil and gas, it is relatively simple to increase the supply of energy to match the increasing demand during peak times of the day or year. With alternative sources, this is far more difficult, and may lead to blackouts or system collapse. Potential solutions include investigating new and efficient ways to store energy and encouraging consumers to use electricity at off-peak times.

A second problem is the fact that many renewable power generation sources are located in **remote** areas, such as windy uplands and coastal regions, where there is currently a lack of electrical infrastructure. New infrastructures therefore must be built. Thankfully, with improved smart technology, this can be done more efficiently by reducing the reinforcement or construction costs.

Although Smart Technology is still in its infancy, pilot schemes to promote and test it are already **underway**. Consumers are currently testing the new smart meters which can be used in their homes to manage electricity use. There are also a number of demonstrations being planned to show how the smart technology could practically work, and trials are in place to test the new electrical infrastructure. It is likely that technology will be added in 'layers', starting with 'quick win' methods which will provide initial carbon savings, to be followed by more advanced systems at a later date. Cities are prime candidates for investment into smart energy, due to the high population density and high energy use. It is here where Smart Technology is likely to be promoted first, utilising a range of sustainable power sources, transport solutions and an infrastructure for charging electrically powered vehicles. The infrastructure is already changing fast. By the year 2050, changes in the energy supply will have transformed our homes, our roads and our behaviour.

1 According to paragraph 1, what has happened in some oil producing countries?

- A They are unwilling to sell their oil any more.
- B They are not producing as much oil as they used to.
- C The supply of oil is unpredictable.
- D Global warming is more severe here than in other countries.

2 Where in **paragraph 1** can the following sentence be placed?

There is also likely more electricity generation centres, as households and communities take up the opportunity to install photovoltaic cells and small scale wind turbines.

- A
- B
- C
- D

3 Which of the following is NOT a benefit of Smart Grid technology to consumers?

- A It can reduce their electricity bills.
- B It can tell them how much energy each appliance is using.
- C It can allow them to turn appliances on and off when they are not at home.
- D It can reduce the amount of energy needed to power appliances.

4 According to [paragraph 4](#), what is the problem with using renewable sources of power?

- A They do not provide much energy.
- B They often cause system failure and blackouts.
- C They do not supply a continuous flow of energy.
- D They can't be used at off-peak times.

5 In [paragraph 6](#), what can be inferred about cities in the future?

- A More people will be living in cities in the future than nowadays.
- B People in cities will be using cars and buses powered by electricity.
- C All buildings will generate their own electricity.
- D Smart Grid technology will only be available in cities.

6 The word 'remote' in [paragraph 5](#) could be best replace by:

- A isolated
- B crowded
- C attractive
- D alone

7 The word 'underway' in [paragraph 6](#) is closest in meaning to:

- A permanent
- B complete
- C beneficial
- D in progress

8 17 What is the main idea of the final paragraph? ([paragraph 6](#)).

- A To describe who will benefit from Smart Grid technology first.
- B To outline the advantages of Smart Grid technology.

- C To summarise the main ideas in the previous paragraphs.
- D To describe how, where and when Smart Technology will be introduced.

9 In paragraph 6, what can be inferred about the introduction of Smart Grid Technology?

- A The technologies which produce most benefits will be introduced first.
- B The cheapest technologies will be introduced first.
- C The technologies which are most difficult to put into place will be introduced first.
- D Technologically advanced systems will be introduced first.

Risk-Taking and the Monkey Economy

Humans are uniquely smart among all the other species on the planet. We are capable of outstanding feats of technology and engineering. Then why are we so prone to making mistakes? And why do we tend to make the same ones time and time again? When Primate Psychologist Laurie Santos from the Comparative Cognition Lab at Yale University posed this question to her team, they were thinking in particular of the errors of judgement which led to the recent collapse of the financial markets. Santos came to two possible answers to this question. Either humans have designed environments which are too complex for us to fully understand, or we are biologically prone to making bad decisions.

In order to test these theories, the team selected a group of Brown Capuchin monkeys. Monkeys were selected for the test because, as distant relatives of humans, they are intelligent and have the capacity to learn. However, they are not influenced by any of the technological or cultural environments which affect human decision-making. The team wanted to test whether the capuchin monkeys, when put into similar situations as humans, would make the same mistakes.

[A] Of particular interest to the scientists was whether monkeys would make the same mistakes when making financial decisions. [B] In order to find out, they had to introduce the monkeys to money. [C] The monkeys soon **cottoned on**, and as well as learning simple exchange techniques, were soon able to distinguish 'bargains' – If one team-member offered two grapes in exchange for a metal disc and another team-member offered one grape, the monkeys chose the two-grape option. [D] Interestingly, when the data about the monkey's purchasing strategies was compared with economist's data on human behaviour, there was a perfect match.

So, after establishing that the monkey market was operating effectively, the team decided to introduce some problems which humans generally get wrong. One of these issues is risk-taking. Imagine that someone gave you \$1000. In addition to this \$1000, you can receive either A) an additional \$500 or B) someone tosses a coin and if it lands 'heads' you receive an additional \$1000, but if it lands 'tails' you receive no more money. Of these options, most people tend to choose option A. They prefer guaranteed earnings, rather than running the risk of receiving nothing. Now imagine a second situation in which you are given \$2000. Now, you can choose to either A) lose \$500, leaving you with a total of \$1500, or B) toss a coin; if it lands 'heads' you lose nothing, but if it lands 'tails' you lose \$1000, leaving you with only \$1000. Interestingly, when we stand to lose money, we tend to choose the more risky choice, option B. And as we know from the experience of financial investors and gamblers, it is unwise to take risks when we are on a losing streak.

So would the monkeys make the same basic error of judgement? The team put them to the test by giving them similar options. In the first test, monkeys had the option of exchanging their disc for one grape and receiving one bonus grape, or exchanging the disc for one grape and sometimes receiving two bonus grapes and sometimes receiving no bonus. It turned out that monkeys, like humans, chose the less risky option in times of plenty. Then the experiment was reversed. Monkeys were *offered* three grapes, but in option A were only actually *given* two grapes. In option B, they had a fifty-fifty chance of receiving all three grapes or one grape only. The results were that monkeys, like humans, take more risks in times of loss.

The implications of this experiment are that because monkeys make the same irrational judgements that humans do, maybe human error is not a result of the complexity of our financial institutions, but is imbedded in our evolutionary history. If this is the case, our errors of judgement will be very difficult to overcome. **On a more optimistic note however, humans are fully capable of overcoming limitations once we have identified them.** By recognising them, we can design technologies which will help us to make better choices in future.

1 What was the aim of the experiment outlined above?

- A To investigate whether monkeys could learn to use money
- B To investigate where human mistakes come from
- C To find out whether it is better to take risks in times of loss
- D To determine whether monkeys make more mistakes than humans

2 Where in paragraph 3 could the sentence below be best placed?

The team distributed metal discs to the monkeys, and taught them that the discs could be exchanged with team-members for food.

- A
- B
- C
- D

3 Which of the following statements is the best paraphrase of the highlighted sentence?

On a more optimistic note however, humans are fully capable of overcoming limitations once we have identified them.

- A Hopefully, humans will soon be able to solve these problems.
- B Fortunately, humans can solve problems that we know about.
- C Luckily, humans do not have many limitations which have been identified.
- D We are happy to note that we can solve the problem which we have identified.

4 The words 'cottoned on' are closest in meaning to:

- A learnt
- B knew
- C completed
- D concluded

5 Which paragraph addresses why monkeys were chosen for the experiment?

- A Paragraph 2
- B Paragraph 3
- C Paragraph 4
- D Paragraph 5

6 What can be inferred about Laurie Santos?

- A She thinks that both humans and monkeys are greedy.
- B Her job frequently involves working with monkeys.
- C She believes that humans should never take risks.
- D She prefers monkeys to humans.

Robert Capa

1. Robert Capa is a name that has for many years been synonymous with war photography.
2. Born in Hungary in 1913 as Friedmann Endre Ernő, Capa was forced to leave his native country after his involvement in anti government protests. Capa had originally wanted to become a writer, but after his arrival in Berlin had first found work as a photographer. He later left Germany and moved to France due to the rise in Nazism. He tried to find work as a freelance journalist and it was here that he changed his name to Robert Capa, mainly because he thought it would sound more American.
3. In 1936, after the breakout of the Spanish Civil war, Capa went to Spain and it was here over the next three years that he built his reputation as a war photographer. It was here too in 1936 that he took one of his most famous pictures, *The Death of a Loyalist Soldier*. One of Capa's most famous quotes was 'If your pictures aren't good enough, you're not close enough.' And he took his attitude of getting close to the action to an extreme. His photograph, *The Death of a Loyalist Soldier* is a prime example of this as Capa captures the very moment the soldier falls. However, many have questioned the authenticity of this photograph, claiming that it was staged.
4. When World war II broke out, Capa was in New York, but he was soon back in Europe covering the war for Life magazine. Some of his most famous work was created on 6th June 1944 when he swam ashore with the first assault on Omaha Beach in the D-Day invasion of Normandy. Capa, armed only with two cameras, took more than one hundred photographs in the first hour of the landing, but a mistake in the darkroom during the drying of the film destroyed all but eight frames. It was the images from these frames however that inspired the visual style of Steven Spielberg's Oscar winning movie 'Saving Private Ryan'. When Life magazine published the photographs, they claimed that they were slightly out of focus, and Capa later used this as the title of his autobiographical account of the war.
5. Capa's private life was no less dramatic. He was friend to many of Hollywood's directors, actors and actresses. In 1943 he fell in love with the wife of actor John Austin. His affair with her lasted until the end of the war and became the subject of his war memoirs. He was at one time lover to actress Ingrid Bergman. Their relationship finally ended in 1946 when he refused to settle in Hollywood and went off to Turkey.
6. In 1947 Capa was among a group of photojournalists who founded Magnum Photos. This was a co-operative organisation set up to support photographers and help them to retain ownership of the copyright to their work.
7. Capa went on to document many other wars. He never attempted to glamorise war though, but to record the horror. He once said, "The desire of any war photographer is to be put out of business."
8. Capa died as he had lived. After promising not to photograph any more wars, he accepted an assignment to go to Indochina to cover the first Indochina war. On May 25th 1954 Capa was accompanying a French regiment when he left his jeep to take some photographs of the advance and stepped on a land mine. He was taken to a nearby hospital, still clutching his camera, but was pronounced dead on arrival. He left behind him a testament to the horrors of war and a standard for photojournalism that few others have been able to reach.
9. Capa's legacy has lived on though and in 1966 his brother Cornell founded the International Fund for Concerned Photography in his honor. There is also a Robert Capa Gold Medal, which is given to the photographer who publishes the best photographic reporting from abroad with evidence of exceptional courage. But perhaps his greatest legacy of all are the haunting images of the human struggles that he captured.

1 Why did Capa change his name?

- To hide his identity
- Because he had been involved in protests
- To sound more American
- Because he had to leave Hungary

2 Capa originally wanted to be

- A photojournalist
- A writer
- American
- A protestor

3 Capa went to Spain to

- fight in the civil war.
- build his reputation.
- have a holiday.
- take photographs.

4 Capa's famous picture *Death of a Loyalist Soldier*

- was taken by someone else.
- was definitely genuine.
- wasn't even taken in Spain.
- cannot be proven genuine or staged.

5 When World War II broke out Capa

- went to New York.
- swam ashore on Omaha Beach.
- went to Europe.
- went to Normandy.

6 A mistake meant that

- only one hundred of Capa's photographs were published.
- Capa lost both of his two cameras.
- Capa's images inspired an Oscar winning movie.
- Most of Capa's images of the D-Day landing were destroyed.

7 Capa's private life was

- less dramatic than his professional life.
- spent mostly in Hollywood.
- very glamorous.
- spent in Turkey.

8 Capa wanted his work to

- be very famous.
- show how glamorous war can be.
- show the true horror of war.
- make lots of money.

9 Which sentence best paraphrases paragraph 5?

- Capa had a tragic private life and was never able to settle down and find happiness.
- Despite having many good friends and lovers, Capa always put his work first.

- Capa wanted to make friends with important people in Hollywood so that he could move into the movie industry.
- Capa's private life was very complicated. He could not choose between the two women he loved, so he went off to work in Turkey.

10 Which sentence best paraphrases paragraph 4?

- Capa never tried to avoid danger. He risked his life to take photographs of the D-Day invasion, but then destroyed most of them.
- Capa took some of his most famous photographs during the D-Day invasion, but most were tragically destroyed in an accident.
- Capa only kept the best eight D-Day photographs as the others were out of focus. These inspired the visual style of a Hollywood film.
- Capa left Europe when the war broke out and went to take his most famous photographs of the D-Day invasion.