

INTRODUCTION

Imagine the year 2030. You wake up in your vacation rental apartment, which is cooled perfectly by an air conditioning service that charges the landlord by the hour. After freshening up and throwing on a top recommended by and rented from a wardrobe service, you slide into a pair of Fairtrade sewn trousers that had been 3D printed to your exact measurements. Your requested autonomous, electric rideshare vehicle shows up at the door, and you zoom off to begin your day of work.

This imaginary scenario of a low-carbon lifestyle can in fact become a reality today. There's no question—the technology and solutions for societies to reduce their carbon footprint already exist.

But [sustainability experts assert](#) that it is breakthrough business models, not breakthrough technology, that will change markets: "Business models are what connect a technology's potential with real market needs and consumer demand."

Traditional take-make-waste patterns of production and consumption have fuelled the extraction of natural resources and generated massive amounts of waste, greenhouse gases that drive climate change, and environmental degradation. But companies that operate this way are, today, under threat.

Climate change, the Paris Agreement and the Sustainable Development Goals are spurring governments to implement environmental regulations at a speed never seen before. Carbon taxes, levies for plastic bags and China's ban on low-quality waste imports that had been poisoning its environment collectively point to a future in which polluters will be punished.

Considering big business' vast resources and networks, and the creativity exhibited by start-ups, the private sector is in the sweet spot to drive behaviour change and low-carbon lifestyles through innovative business models.

Asia alone is home to more than 4,000 businesses worth a minimum of US\$1.6 billion, which is set to grow as income levels rise to drive more consumption and economic activity. This gives them an immense ability to influence the way people live, work and play, especially in developing countries the region where the middle class and consumption are growing. It is a window of opportunity to set them on the path of low-carbon living.

Sustainable development also represents a trillion dollar opportunity for businesses. For companies that are able to bring value to people and the environment, Asia represents a [US\\$5 trillion business opportunity](#) and could potentially generate 230 million new jobs in Asia by 2030.

Given that climate change will cost the world between US\$12 and \$60 trillion, there is a huge opportunity for businesses to innovate and deliver low-carbon solutions.

But what does a low-carbon business look like, and how can companies today operate sustainably?

BUSINESS MODELS FOR CARBON PRODUCTIVITY AND THE CIRCULAR ECONOMY

If businesses want to thrive in the 21st Century, they must begin to separate their emissions production from growth. Scientists have estimated that at current rates of emissions, humanity could cross the threshold for 1.5 degrees Celsius of global warming, the more ambitious aim proposed under the Paris Agreement, in as soon as four years.

This means that companies keen to survive must begin to minimise resource use while increasing the value generated from each unit of emission produced, as outlined in a concept known as carbon productivity.

The circular economy is one way to achieve carbon productivity and meet other sustainability goals. A circular economy is one in which energy is renewable and all raw materials are recycled endlessly in production or returned harmlessly to the natural environment.

A report by global consultancy Accenture outlined five aspects of a circular economy:

- Circular supplies: Using renewable, bio-based or completely recyclable raw materials
- Resources recovery: Recovering useful resources or energy from production by-products or waste
- Product life extension: Increasing the lifecycle of products by designing them for repair, or upgrading or reselling existing products
- Sharing platform: Allowing shared use or access to assets
- Product as a service: Selling the use of the product rather than the product itself

Each represents a distinct, but not mutually exclusive, business model that slashes the carbon footprint of production and consumption.

Growing internet penetration across Asia Pacific has meanwhile allowed more companies to take their businesses online, and digitalisation has enabled them to connect with new buyers and markets.

Implementing new business models, however, is inherently disruptive and challenges the status quo. Completely overhauling how a company works overnight may be impossible, but businesses can progressively incorporate features of disruptive business models as a start. Initiative Project Breakthrough has outlined six features that can help businesses progressively shift towards more sustainable business models.

They are:

- Agility: Testing new ideas quickly and reworking them when they fail
- Personalisation: Meeting the unique and unmet needs of the individual customer
- Closed-loop: Where more value is created for less input, and resources are kept within the production loop as much as possible
- Asset-sharing: Most commonly seen in the sharing economy
- Usage-based pricing: Fees are paid for use rather than ownership
- Collaborative ecosystem: Forging partnerships across different industries and different partners in the value chain

Some of these features can be mapped squarely onto the five circular economy business mentioned earlier, and are obvious in some of the most disruptive businesses in Asia Pacific. In the next section, examples of innovative, low-carbon companies have been provided for six business models: **asset-sharing, product as a service, closed-loop, resource recovery and circular supplies, digitalisation, product life extension**.

Each company described may have more than one feature that makes it low-carbon, but they have been classified according to the business model that each most closely resembles.

Digitisation is underpinning these trends. As information sharing, financial transactions, and communication all go online, this can bring about new business models and processes that make society more resource-efficient. Digitisation enables the sharing economy, which can slow down consumption and ease resource demand; smart homes which can be controlled remotely; and online travel bookings, which are more streamlined than booking individual legs of a journey separately. This latter shift is expected to cut 250 million tonnes of emissions between 2016 and 2025.

The World Economic Forum says the digital transformation could unlock US\$100 trillion in value for society over the next decade. The applications in Fin Tech and eCommerce are most evident. Funding for fintech companies is on the rise globally. Fintech start-ups received \$17.4 billion in funding in 2016 and were on pace to surpass that sum as of late 2017, according to CB Insights. Asia is the region with the second highest number of fintech start-ups, after North America. eCommerce is seeing a similar boom.

LOW-CARBON BUSINESS MODELS

1. Share economy

In this business model, consumers are given direct access to items that are owned by the company and pay for their use. It also encourages peer to peer sharing, unlocking latent value of assets already in our society.

Company: BlueSG (Singapore)

What it does: Runs an island-wide fleet of electric car-sharing for rent and operates a network of charging stations. The service was launched at the end of 2017.

How it is low carbon: Gives customers the comfort of driving at any time without the cost of car ownership. Cars are assets and the company is invested in maintenance and extended use.

Company: Mobike (China)

What it does: A successful bicycle-sharing scheme that has expanded globally.

How it is low carbon: Cycling is a low-carbon form of transport and the bicycles are assets. The company has a vested interest in their longevity and responsible disposal.

Company: Style Theory (Singapore)

What it does: Members of the online clothing rental service pay a monthly fee to continuously borrow and return garments. Started in Singapore, the start-up has expanded into Jakarta.

How it is low carbon: Customers get to enjoy the novelty of shopping without the wastefulness of buying and throwing away clothing they are tired of.

2. Product as a service

Companies that follow a product as a service business model own assets and sell its benefits, usually bundled together with other services. This business model avoids lock-in, where consumers are stuck using products into which they have sunk costs.

Company: GoJek (Indonesia), Grab (Singapore), Didi Chuxing (China)

What it does: Tech-enabled ride-sharing services allow drivers to carpool with strangers on their journeys.

How it is low carbon: Creates new, more affordable supply to meet demand and reduces the need for commuters to purchase cars that mostly remain idle in the day.

Company: Globetlet (Australia)

What it does: The company rents fully recyclable cups to event organisers and can provide efficient on-site washing services. Each consumer pays a deposit to rent a cup, which is partially refunded when the cup is returned.

How it is low carbon: Event organisers have the convenience of using disposable cups without actually having to throw the cups away. Similar business models have been trialled in Europe, and extending inventory to include cutlery and crockery could be the next step forward.

Company: Kaer Air (Singapore)

What it does: The first in the world to sell air conditioning as a service, the company installs and services the air conditioner, and customers pay only for the amount of cooling hours used.

How it is low carbon: Such a model incentivises Kaer to make the system as energy efficient as possible, reducing the energy consumed and minimising leaks of refrigerants, which are potent greenhouse gases.

Company: Wework (US)

What it does: The co-working space operator rents desks rather than offices to customers. The asset-sharing model spares smaller businesses the pricey overheads and cumbersome contracts in renting their own offices.

How it is low carbon: Wework maximises occupancy and the use of its space. This theoretically reduces the need for new office space to be built. Wework has introduced a no-meat policy as part of its sustainability strategy, driving lower emissions from diets.

3. Circular economy

This business model is for companies that use secondary, bio-based or fully recyclable resources in production; as well as businesses that recover value from their waste and by-product. In the case of closed loop businesses, these are businesses that are self-encompassing: resources are used at their highest levels of efficiency and there is little to no waste.

Company: Citizen Farm (Singapore)

What it does: Food waste from food and beverage outlets is turned into compost with the help of black soldier fly larvae. The compost is used in the company's gardens and those of customers, such as restaurants. Vegetables are harvested and sold.

How it is low carbon: In Singapore where the majority of food is imported, urban farming cuts transport emissions and increases the city-state's food security. Food waste is also put to better use.

Company: Closed-Loop Farming (Japan)

What it does: A low-cost, circular method to grow rice by setting up an ecosystem that includes ducks, fish, rice seedling and paddy weedy, invented by Japanese farmer Takao Furuno.

Ducks eat the insects that would feed on the seedlings and the paddling of their feet adds oxygen to the water.

The paddy weed captures nitrogen from the air and fertilises the rice, while the fish and ducks keep the growth of paddy weed in check. The duck, fish and rice harvested for sale.

How it is low carbon: This organic system is highly productive and does not use fertilisers—meaning higher profit margins for farmers. It uses less land than traditional farming methods, and Furuno's revenue from his six acre plot surpasses that of a typical Texan rice farmer with 600 acres of land.

Company: Suroboyo (Indonesia)

What it does: Customers who board the recently launched Suroboyo bus service in Surabaya are allowed to pay for their fare in plastic waste.

How it is low carbon: Public transport—a low-carbon form of urban mobility—becomes accessible to even the low-income, reducing the need for personal vehicles. Riders help to solve Indonesia's waste problem. Implemented at scale, such a business model could flourish in cities with poor public transport systems and poor waste management infrastructure.

Company: Grasiz (Thailand)

What it does: Food containers and packaging products developed from natural plant fibre. The products are leak proof, microwavable and free of cancer-causing agents and synthetic substances.

How it is low carbon: Products are made with 100 per cent bio-based materials and are biodegradable.

Company: Tada Yasai (Japan)

What it does: The name of this free web service literally means “free vegetables”. Leftover vegetables deemed unfit for supermarkets because of their shape or colour are delivered from farms in Saitama and Gunma straight to consumers, who pay only a delivery fee.

How it is low carbon: Vegetables that are “imperfectly shaped” are usually rejected by buyers, and end up thrown away.

Company: Brown Boy (India)

What it does: A line of sustainable men's clothing, Brown Boy uses only organic cotton, jute, non-toxic ink and dyes, and fabric scraps in production.

How it is low carbon: The raw materials used in production are non-toxic and natural.

4. Digitalisation and personalisation

Companies that digitalise their operations lighten their reliance on limited amounts of natural resources, and even create completely new ways to sell products based on cutting-edge technology such as blockchain.

DIGITALISATION

Company: eFishery (Indonesia)

What it does: The Indonesian start-up sells automatic fish feeders for aquaculture. Using smart sensors, the system is able to tell when fish need to be fed and how much to feed them.

How it is low carbon: Fish feeding is a laborious and arbitrary task, and excess feed often ends up polluting surrounding waters and the natural environment. Feedstock is expensive for farmers and a waste of resources if used indiscriminately. Remote sensing means that farmers don't have to be on site all the time, which could make fish farming a more attractive career to younger Indonesians and boost food security.

DIGITALISATION | PERSONALISATION

Company: Zozo (Japan)

What it does: Offering customised clothing at mass market prices, online retailer Zozotown's new brand Zozo requires customers to download its app and order a black-and-white Zozosuit. The customer puts on the Zozosuit and uses the app to automatically record 150 measurements. Clothing can be tailored to one's preferred fit or length.

How it is low carbon: Customised clothing could mean fewer returns and therefore less emissions from transport, as well as a small amount of leftover stock to dispose of at the end of the day—two major concerns for online fashion retailers.

DIGITALISATION | PERSONALISATION

Company: Iflix (Malaysia)

What it does: The Malaysian video-streaming service takes advantage of growing internet access to provide video content to audiences in the emerging economies of Africa and Asia.

How it is low carbon: It takes on the estimated US\$6 billion market for counterfeit DVDs, reducing the amount of resources needed for production.

DIGITALISATION

Company: Energo Labs (China)

What it does: The Shanghai-based company has created a digital platform through which households that generate extra solar energy can sell it off in the form of cryptocurrency. Excess energy is “uploaded” and automatically matched with energy orders placed by other users.

How it is low carbon: Provides an incentive for consumers with renewable energy assets to minimise their own energy consumption and maximise production to sell on Energo Labs' platform.

5. Product life extension

This business model is for companies that use renewable, bio-based or fully recyclable raw materials in their production processes.

PRODUCT LIFE EXTENSION | PRODUCT AS A SERVICE | DIGITALISATION

Company: HandyHome (India)

What it does: A mobile platform that connects consumers with service centres of the brands that made the appliances they own.

How it is low carbon: Makes repairing more convenient for consumers, encouraging them to prolong the use of existing items instead of buying new ones.

PRODUCT LIFE EXTENSION | RESOURCE RECOVERY

Company: Momoko (Thailand)

What it does: A repair service for bags, shoes, leather and fabric goods.

How it is low carbon: By sending their items and apparel for restoration, consumers can extend the use of goods instead of throwing them away.

PRODUCT LIFE EXTENSION | RESOURCE RECOVERY | DIGITALISATION

Company: Faida (India)

What it does: An online redistribution market for unwanted items such as electronics, sports gear, bikes, and even baby clothing. Users can post items they no longer want and sell if to others who may have a need for it. It includes a leader board to gamify the experience and make it more attractive to users.

How it is low carbon: Unwanted goods that can still be used find a new lease of life, while and sellers stand to earn some cash in the process.

CONCLUSION

The business models outlined above represent a sample of some of the most exciting ways production, consumption and business is being conducted.

But that is not to suggest that these systems have perfected the low carbon business model. In disrupting the status quo some innovative companies have inadvertently resulted in higher rather than lower carbon emissions.

For example, sharing economy businesses were once the darlings of sustainability for making use of idle resources and giving asset owners an extra form of income. But this did not play out as theorised: heavily discounted Grab fares resulted in extra traffic for the company as intended, but caused an increase in the amount of fuel consumed in Singapore. Vacation rental Airbnb saw enterprising individuals purchase extra flats to rent out. Blockchain, the technology underlying Energo Labs' energy cryptocurrency, consume monstrous amounts of energy.

That does not mean these business models are ineffective. Instead, this points to the fact that low-carbon business models alone will not translate into a low-carbon economy. It must be supported by government, community and individual efforts to bring sustainability efforts into alignment.