


Urgent Call for Food Waste Recycling in Hong Kong



Hong Kong, long known as a food paradise, never fails to satisfy diners' palates with an exciting range of choices from street snacks to haute cuisine prepared by star chefs. Whilst people are enjoying their food, they may be unaware that what is left on their plates might have some influence on our environment. This month's *Industrialist* discusses the business opportunities and challenges of food waste recycling in Hong Kong.

Food waste includes leftovers from meals, kitchen scraps, peels, used tea leaves, coffee grounds and food past its use by date. On a daily basis, 3,200 tons of food waste, representing 37 per cent of Hong Kong's total solid waste is produced, with 900 tons from businesses. Most of this food waste is sent to local landfills, with very little being recycled.

Prof Jonathan Wong, Department of Biology at Hong Kong Baptist University points out that dumping food waste into landfills is not sustainable. Being organic waste, it rots easily and releases greenhouse gas (such as methane) and waste water which can seriously pollute the environment. Furthermore, as the remaining space in Hong Kong landfills will be exhausted by 2018, it is a terrible misuse of these increasingly scarce resources to include food waste in them.

"If food waste is recycled, it can be turned into compost, animal feed and even biogas, so by using landfills for food waste we are being doubly wasteful."



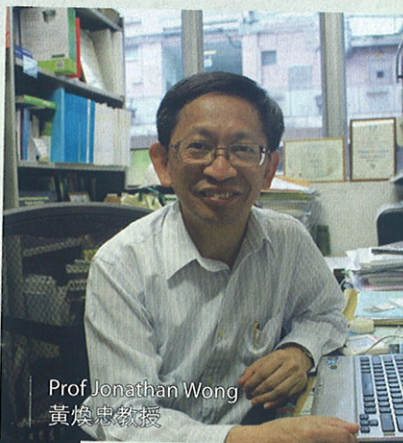
While people are enjoying various cuisines offered in Hong Kong, they are hardly aware of the importance of food waste recycling. 香港有着各類美食，但人們在享用美食的時候卻並未意識到廚餘回收的重要性。

Having realised the importance of food waste recycling, the Environmental Protection Department developed a Pilot Composting Plant at the Kowloon Bay Waste Recycling Centre in 2008 to acquire experience in collecting and treating food waste. A Food Waste Recycling Partnership Scheme with trades and institutions was also established in 2009 to promote food waste reduction and source separation for subsequent collection and treatment. Currently, the Government plans to build two recycling centres in Siu Ho Wan and Shaling.

However, food waste recycling has not yet officially commenced in Hong Kong. According to Prof Wong, "It is already highly developed in Taiwan, South Korea, Japan and Europe. In Hong Kong, only a few hotels and restaurants have just started it, while household food waste recycling is almost a blank due to the lack of relevant separation and collection systems. People have no clue how to start even though they are aware of its importance and want to do it. In terms of the food waste recycling industry, only a few local organisations are in operation."

Right Way for Hong Kong Food Waste Recycling

Food waste can be either converted to energy, such as biogas after anaerobic treatment or compost through other treatments. Prof Wong suggests, "As there is no large scale agriculture and livestock breeding in Hong Kong, the huge amount of compost and animal feed created by a newly developed recycling industry could not be utilised. Probably, excess compost and animal feed would still end up in landfills. Actually we can convert food waste into biogas to generate power, and use residues from biogas conversion as fertilisers. Achieving two things at one stroke, it would be a most suitable method for food waste recycling in Hong Kong."



Prof Jonathan Wong
黃煥忠教授

Prof Wong says that relevant technologies are very advanced overseas, and Hong Kong could just bring them in and adopt them according to our local situations. "In the US and Europe, waste mainly consists of western food of course, whereas Hong Kong's waste is Chinese food. Therefore adopting treatment technologies without any modification might affect the effectiveness of treatment process and the gas generation efficiency." Thus, it is essential for Hong Kong to conduct a feasibility study on anaerobic treatment technology. "We have actually carried out related research and are able to offer data support in the future."

He continues to suggest that facilities such as special food waste collection equipment in which residents could dispose of their food waste, could be placed in each housing estate. This waste would be treated preliminarily inside the equipment before being sent to the recycling centres on a daily basis. With special technologies, food waste in the equipment would neither cause any nuisance such as unpleasant smells or mosquitoes nor pollute the surroundings. "To implement this, we need enough space for waste equipment, and a hygiene management system to make sure the collection equipment would not affect the surroundings."

"In addition to the planned ones in Siu Ho Wan and Shaling, more food waste treatment facilities are expected to be built. This will effectively extend our landfill lifespan, and reduce



Henry Ngai
倪漢順

environmental pollution and carbon footprint at the same time."

Business Opportunities and Challenges of Food Waste Recycling

"In this industry, the supply of materials for recycling is guaranteed. Hong Kong produces over 3,000 tons of food waste every day, and even if only 10 per cent is recycled, that would be 300 tons not dumped in landfills," says **Henry Ngai, CEO of Hong Kong Organic Waste Recycling Centre (HKOWRC)**.

Mr Ngai established HKOWRC earlier this year, recycling food waste from over 60 hotels, food factories and school lunch catering companies.

The food waste is first sorted, shredded and dehydrated in the clients' kitchens to reduce the volume by 40 per cent, and then biological enzyme is added to destroy its unpleasant odour. On delivery of the waste to its factory, HKOWRC will sort it into two categories – low nutritional value waste (such as rice and vegetables) and high nutritional value one (such as meat). The former is converted to biogas and fertilisers through ozonolysis reaction, and the latter to animal feed.

HKOWRC also produces environmentally-friendly deodorant from food waste, as well as plant gift boxes from coffee grounds collected from hotels, which are sold at cafés.

According to Mr Ngai, there are only three food waste recycling companies in Hong Kong, and their treatment methods are quite different. Thus there is not much competition in this industry so far. However, the company is faced with other challenges.

"Our costs consist of transportation fees and factory operation fees. Every day, our trucks travel across Hong Kong Island, Kowloon and

Food waste treatment technologies are very advanced overseas, and Hong Kong could just bring them in and adopt them according to our local situations.



New Territories to collect food waste, so the costs of fuel and tunnels tolls are quite high. At the moment, the recycling fees paid by clients only cover transportation costs, while the factory operation is maintained by profits from our end products. So far, our company has not yet made any profit."

Businesses' tight budgets also hold up the development of food waste recycling. Mr Ngai says, "We charge our clients a monthly recycling fee of HK\$8,000 which is not very much, but many Chinese restaurants do not have a budget for waste disposal. Also as the economy is lacklustre, many do not want to spend any extra money."

He continues, "Even if restaurant owners are willing to, the staff may not want to get involved. Hotels usually have many employees with specific work duties, so it is comparatively easier for them to collect food waste during food preparation, and half of the local hotels have already started food waste recycling. Chinese restaurants, however, do not have as many employees, and it is more difficult for workers to change their work procedures to actively collect the food waste. This requires us to find out a method to apply in their work, and let them become involved in food waste recycling without doing extra work. This is indeed a great challenge for us."

Mr Ngai also feels his company is not "properly justified" due to the lack of a clear official registration scheme for food waste recycling. "At first, we assumed that we could start recycling food waste after we applied for a Business Registration. Then the Food and Environmental Hygiene Department required us to apply for an Offensive Trade Licence. As there is no specific registration and regulation system for food waste recycling, we are completely bewildered when looking for references and complying with regulations. Thus I hope the Government sets up a relevant system with guidelines, by which companies, large or small, permanent or temporary can apply for related licenses. This scheme can help the industry grow appropriately."

Urgent Call for Governmental Support

FHKI Deputy Chairman Ir Daniel Cheng points out, "All the problems of food waste recycling here can be ascribed to the Government's lack of a road map and a schedule regarding environmental protection."

He says, "What the SAR Government needs to do at the moment is to initiate an environmental protection plan which is similar to the National 12th Five-year Plan. It should list the goals for the next five years, and the Government needs to assess and adjust them accordingly every five years. Only by doing this can the environmental protection industry in Hong Kong make progress."



On a daily basis, 900 out of 3,200 tons of food waste is produced from businesses.

香港每日產生 3,200 噸廚餘，其中有 900 噸來自工商業。

Food waste from businesses has seen a continual increase in the past few years, rising from 400 tons in 2002 to 840 tons in 2010. According to Mr Cheng, the commercial sector industry, especially the food sector should take up their responsibilities and pay relevant fees. "The Government and the industrial and commercial sector should jointly map out a plan and implement it at the earliest moment."

In addition, he also adds that the planned recycling centres in Siu Ho Wan and Shaling are only able to treat a total of 400 - 500 tons of food waste every day, so the rest has to go to private companies. Thus, the Government needs to foster the food waste recycling industry.

One of the ways to do so is financial support. He says, "To encourage more companies to enter the food waste recycling industry, the Government should advise them of the opportunities and achievable profits, especially amid today's harsh environment. Therefore, I hope the Government will help the industry grow by providing subsidies to those companies."

Mr Ngai adds, "After the registration system is implemented, officially-registered food waste recycling companies can issue certificates, with which the clients can apply for tax refunds such as pollutant discharge fees from the Government. Such incentives can greatly encourage businesses to recycle their food waste without costing them extra money."

It has been suggested that transfer centres be built around the town, according to Mr Cheng. "In Hong Kong, transportation is expensive. Transferring food waste collected around the city to recycling centres will not only add an extra expense to the recycling industry, but will generate many carbon footprints as well. Thus it

is advised that the Government allocate money and land to build transfer centres in different areas around Hong Kong to collect food waste in each locality. Inside these centres, some biochemical and filtration technologies can be adopted to keep them and the neighbourhood clean so that residents there will not experience any negative effect."

He continues, "There are various kinds of food waste treatments, and I am sure companies themselves can find the most suitable ways by introducing advanced technologies from overseas with the support from local research institutes. However, the land for transfer centres and their operation should be provided by the Government."

"Environmental protection policies are supposed to be long-term and continuous. I call on the new Administration to seriously consider industrial and business policies, especially those for environmental protection. It also needs to initiate a food waste recycling scheme for Hong Kong's sustainable development."



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廚餘回收 刻不容緩



在香港這個美食天堂，無論是街邊小吃，還是星級名廚主理的高級料理，都能滿足人們不同的美食需求。然而食客們大快朵頤之時，是否意識到他們享用的美食對環境可能造成的影響。今期《香港工業家》探討廚餘回收在香港的商機和挑戰。

廚餘包括剩菜、剩飯、菜頭菜尾、果皮、茶葉渣、咖啡渣和過期食品。據統計，香港每日產生3,200噸廚餘，佔棄置廢物的37%；其中900噸來自工商業。目前，這些廚餘大部分都被送至堆填區填埋，只有極少部分得以回收。

香港浸會大學生物系教授黃煥忠指出，靠堆填區棄置廚餘並不符合可持續性發展的理念。廚餘是有機廢物，容易腐爛，棄置在堆填區會產生大量溫室氣體（如甲烷）以及污水，嚴重影響環境衛生。同時，香港現有的堆填區預計將於2018年飽和，形勢十分嚴峻，將廚餘棄置於堆填區，無疑浪費了日漸稀少的地球資源。

「此外，廚餘經過回收和再處理之後，能夠製成肥料、飼料，或產生沼氣等。所以棄置廚餘也浪費了其本身這一有用的資源。」

鑒於廚餘回收的重要性，環境保護署於2008年在九龍灣綜合回收中心設置了一座廚餘試驗處理設施以吸取相關經驗，亦於2009年與業界和機構合作，推行「廚餘循環再造合作計劃」。目前，政府正計劃在小蠔灣及沙嶺興建兩間廚餘處理中心，處理工商業廚餘。

但目前香港的廚餘回收網絡尚未正式開始發展。黃煥忠介紹：「在台灣、韓國、日本和歐洲，廚餘回收都已十分成熟。而香港只有部分酒店和餐廳開始自行回收廚餘；而由於欠缺相關的回收系統，家居廚餘的回收仍是空白，即使市民想回收廚餘，卻無從下手。至於廚餘回收行業，目前也只有寥寥數家機構在運營。」

適合香港的廚餘回收方式

廚餘可以通過厭氧處理轉化為能源，如沼氣；或經過其他生化方法轉化為肥料。黃煥忠建議：「香港並無大規模的農業和養殖業，當廚餘回收行業成熟後，產生的大量飼料和肥料可能並無足夠的市場來消化，而多餘的肥料最終還是會棄置於堆填區。若將廚餘轉化為沼氣，則可用於發電；轉化沼氣時產生的廢渣則可用作肥料，一舉兩得，不失為適合香港的回收方式。」

至於廚餘回收的技術，黃煥忠介紹，國際上的相關技術已經十分成熟，香港可以引進這些技術，並根據本地情況改進。「這是由於歐美的廚餘以西餐為主，香港則以中餐為主，照搬處理方法可能會影響處理過程和產生的氣體含量。」

可見，香港需要在廚餘處理方法進行可行性研究。「事實上，我們學界已經開展了相關研究，並得出了一些數據，若這一方案在香港實行，將能提供支援。」

針對尚未展開的家庭廚餘回收，黃煥忠建議，可於每座屋苑內設立設施，如特製的廚餘回收桶，居民可將分類後的廚餘棄置於桶內。廚餘在桶內經初步處理後，每日送至回收點。這些設施經過特殊處理，不會對居住環境造成包括臭味和蚊蟲等的滋擾，也不會污染環境。「這一方式的實施需要足夠地方來放置回收設施，以及衛生管理系統以確保回收桶不會給環境造成影響。」



「除了計劃中的在小蠔灣和沙嶺的回收中心外，政府還應該修建更多的回收設施，這能在有效地延長堆填區的壽命的同時，減少污染和碳足跡。」

廚餘回收的商機與挑戰

「香港每日產生逾3,000噸廚餘，即使只能處理10%，也有300噸的廚餘能夠利用。可見，這一行有着強大的原料保障。」香港有機資源回收中心行政總裁倪漢順說。

倪漢順於今年初成立了香港有機資源回收中心，與本地60多家酒店、食品工廠和為學校提供午膳的公司合作，進行廚餘回收。

這些機構首先將廚餘在源頭分類、破碎、脫水，令體積減少四成，並加入生物酵素減少其臭味。之後，回收中心的車隊將廚餘運至其工場。工場工人會將其分類為營養價值低（如飯菜）和營養價值高（如肉類）的廚餘。前者進行臭氣分解後作為沼氣及肥料；後者經過生物發酵技術後轉化為動物飼料。

回收中心還將廚餘製造成環保除味劑；亦將從酒店回收的咖啡渣處理後製成盆栽禮品盒，並放在咖啡店內出售。

據倪漢順介紹，香港目前從事廚餘回收的公司只有三家，且他們的處理方法不同，所以行業競爭並不激烈。然而公司卻面臨着不同方面的困難。

「我們的運營成本分為運輸費用和工場運營兩部分。每日，我們的車隊穿梭於港島、九龍和新界運輸廚餘，所以油費和隧道費是一筆很大的開銷。客戶支付的回收費只能負擔運輸成本；而工場的運營則用廚餘回收後的產品利潤來維持。目前公司尚未取得盈利。」

香港只有部分酒店和餐廳開始自行回收廚餘；而由於欠缺相關的回收系統，家居廚餘的回收仍是空白。



Currently, the Government plans to build two recycling centres in Siu Ho Wan and Shaling.

政府正計劃在小蠔灣及沙嶺興建廚餘處理中心。

而工商業資源緊絀，也影響著廚餘回收業的發展。

倪漢順說：「我們的收費為每月8,000港元。這筆錢不算太多，但是很多中餐廳卻並沒有這筆預算。再加上現在營商環境嚴峻，許多商家並不願多付這筆錢。」

他補充：「而且，即使餐廳老闆願意，員工卻未必情願。酒店人手充裕，分工仔細，能夠在廚餘產生的時候就將其分類，所以現在香港酒店至少有一半已經開始回收廚餘；而中式酒樓的人手較少，在流程和工作習慣的改變上會有些困難，員工未必願意多做一些程序將廚餘分類。這就需要我們研究出簡單易行的流程，配合他們的操作工序，在不加重員工工作量的情況下讓他們參與廚餘回收。這對我們來說是一個不小的挑戰。」

政府並未針對廚餘回收行業設立清晰的發牌制度，也令倪漢順有「名不正、言不順」的感覺。「最初，我們以為在稅務局進行了商業登記（Business Register）後便能進行廚餘回收；但後來，食環署還要求我們申請『厭惡性行業牌照』（Offensive Trade Licence）。由於並無專門的發牌制度和規管系統，我們在參考指引、執行規定時感到無所適從。由此，希望政府在發牌方面建立清晰的機制和指引，比如針對大型、小型或臨時、永久的廚餘處理商發出相關牌照，從而促進廚餘回收業健康發展。」

環保政策應該是長遠、持續的。希望即將上任的新政府能正視工商政策，特別是環保工業的政策，迅速開展廚餘回收，讓香港得以可持續發展。

政府支援 事不宜遲

針對本地廚餘回收的處境，香港工業總會副主席鄭文聰指出：「香港廚餘回收面臨的問題，歸根究底，源於政府欠缺清晰的環保路線圖和時間表。」

他說：「特區政府在環保方面需要儘快制定一個類似國家『十二五』規劃的五年環保計劃，列明目標，並每五年根據實際情況進行評估和調整。只有這樣，香港的環保事業才能進步。」

鑒於近年工商業廚餘的棄置量有持續上升的趨勢，由2002年的400噸增至2010年的840噸，他認為工商業特別是飲食業必須承擔責任，積極回收廚餘，並主動承擔相關費用。「希望政府和工商界能夠針對廚餘回收儘快開展合作，共同制定解決方案，並加以實施。」

此外，鄭文聰還指出，小蠔灣及沙嶺的回收中心建成後，每日只能合共處理400-500噸廚餘，其餘的必須交由私營的廚餘處理商處理。所以政府在扶持本地廚餘回收行業方面也應該承擔更多責任。



The commercial sector should take up their responsibilities for food waste recycling and pay relevant fees.
工商業必須承擔責任，積極回收廚餘，並承擔相關費用。



方式之一是經費上的資助。他說：「現時營商環境並不樂觀，要鼓勵更多的公司進入廚餘回收這一行，必須讓他們看到行業的商機和利潤。所以希望政府能夠給予相關公司經濟補貼，扶持行業的發展。」

倪漢順補充說：「當政府建立了正式的發牌制度後，政府承認的廚餘回收商可以幫助與其合作的酒店、食肆等出具廚餘回收方面的證書，他們憑證書可向政府申請退稅，如排污費等稅項。這個經濟誘因可以鼓勵工商業回收廚餘，並且不會加重他們的營商負擔。」

鄭文聰還建議，政府應該帶頭設立廚餘中轉中心。「香港的運輸成本昂貴，加重了業界負擔；而且每日從全港各地收集的廚餘運至處理中心，會產生不少碳足跡。所以我建議政府提供資金和土地，在香港不同的地區建立廚餘中轉站，集中附近的廚餘。中轉站內可以採用生化和過濾等技術和系統，保持內部和周圍的環境衛生，不影響周圍市民的生活。」

他說：「處理廚餘的方法多種多樣，相信通過引進國外先進技術，再加上本地科研機構的支持，公司都能夠找到適合自己的方法；但土地的供應和中轉站的運作，必須依靠政府的支持。」

「環保政策應該是長遠、持續的。希望即將上任的新政府能正視工商政策，特別是環保工業的政策，迅速開展廚餘回收，讓香港得以可持續發展。」