“Induction & Low Carbon Cooking”

Clara Pi, MSc. RD. FCSI

Applications of induction cooking equipment in Asia, latest development /trends in low carbon foods & cooking
Global Temperature & Atmospheric CO₂ 1880-2010

![Graph showing global temperature and atmospheric CO₂ levels from 1880 to 2010. The graph illustrates a significant increase in both temperature and CO₂ levels over time, with a notable rise in CO₂ levels during the 20th century. The data is sourced from NASA GISS, NOAA ESRL, and Worldwatch.](Image)

Source: NASA GISS; NOAA ESRL; Worldwatch

A CARBON NEUTRAL EVENT 零碳排会议
Climate Change & Crop Loss

A CARBON NEUTRAL EVENT
Pollution, overgrazing, loss of farmland

Global topsoil lost per year:
- enough to grow:
- enough to make up the diets of:
- Economic losses:
- 75 billion tonnes
- 27 million tonnes of grain
- 700 million hungry people
- $400 billion p.a.
Energy Crisis and shortage of fossil fuel
turn food into bio-diesel

Increase in world hunger (1969-2009)
2011 Major Global Food Crisis
Food Shortages & Rising Food Prices

A CARBON NEUTRAL EVENT
2008 Prediction: Global Crisis on food shortages 20 years from now... Resulting in one meal less per person per day...

This day may come sooner than it was predicted in 2008.
What can we do to help?

Foods on our menu?

How we cook our foods?
Topic for Discussion

1) Induction Cooking and Applications in Asia

2) Developments/trends in Low Carbon foods & Cooking
Induction – Way of the Future!

A CARBON NEUTRAL EVENT 零碳排会议
Induction Heating

- **Induction heating** is the process of heating an electrically conducting object (usually a metal) by electromagnetic induction, where eddy currents (also called Foucault currents) are generated within the metal and resistance leads to Joule heating of the metal.

- An induction heater (for any process) consists of an electromagnet, through which a high-frequency alternating (AC) is passed.
Induction Cooking

• In induction cooking, an induction coil in the cook-top heats the iron base of cookware. Copper bottomed pans, aluminum pans and other non-ferrous pans are generally unsuitable.

• The heat induced in the base is transferred to the food via conduction.

• Benefits of induction cookers include efficiency, safety (the induction cook-top is not heated itself) and speed.

• Drawbacks include the fact that non-metallic cookware such as glass and ceramic cannot be used on an induction cook-top.
<table>
<thead>
<tr>
<th></th>
<th><strong>Induction</strong></th>
<th><strong>Open Gas</strong></th>
<th><strong>Electric</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Hob</strong></td>
<td><strong>Burner</strong></td>
<td><strong>Hob</strong></td>
</tr>
<tr>
<td><strong>Input power</strong></td>
<td>2 kw</td>
<td>2.5 kw</td>
<td>3.5 kw</td>
</tr>
<tr>
<td><strong>Energy retained</strong></td>
<td>1.7 kw</td>
<td>2.1 kw</td>
<td>2.96 kw</td>
</tr>
<tr>
<td><strong>by pot &amp; food</strong></td>
<td><strong>85%</strong></td>
<td><strong>84%</strong></td>
<td><strong>85%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>43%</strong></td>
<td><strong>44%</strong></td>
<td><strong>43%</strong></td>
</tr>
</tbody>
</table>
Energy Savings
= Lower CO$_2$e

Average energy savings of 60 to 80% are common.

- The **Primary** savings in the cooking energy, that is the energy used by the cooking unit itself, which is only “on” when actually needed and always adjusted to the correct temperature. The efficiency of the heat transfer is better than any other conventional cooking method, less energy loss to the outside environment.

- Then there is the **Secondary** savings in the reduction of the ventilation expenses and where applicable in the costs for air-conditioning.
## Less Cooking Time

<table>
<thead>
<tr>
<th></th>
<th>Gas range</th>
<th>Induction range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong></td>
<td>24.4 Kwh</td>
<td>11 Kwh</td>
</tr>
<tr>
<td><strong>Water Boiling time</strong></td>
<td>55 Min/ 100L</td>
<td>45 Min/ 100L</td>
</tr>
</tbody>
</table>
Staff (OSH) & Food Safety (HACCP)

No fire hazard, reduce room temperature by ~ 10 °C
Other Benefits

Quality of cooked foods

- Top quality cooking is obtained, through optimum temperature control. Cooking is fast and efficient, retaining maximum nutrients.

- Overcooking is prevented by fast reacting and very sensitive controls which allow reduction of the heating power instantly.

Work Safety

- No open flame, less accidents through burning.
Applications of Induction cooking in Asia
Back of the House

Induction Cooking System

A CARBON NEUTRAL EVENT 零碳排会议
Noodle Range

Noodle range

Temperature recovery is fast, noodle stays al dante state
Induction noodle boiler

Low range for noodle soup
Heavy duty Induction for main kitchen e.g. soup pots
Griddle

- Temperature control: 60°C (122°F) ~ 200°C (392°F)
- Precise thermo control.
- Recovery speed:
  - Induction griddle > Gas griddle > Electric griddle
- Change griddle to induction, can achieve energy savings
Countertop induction and Induction low range
Induction Griddle

Low range
Special Applications

Fryer
- Deep fryer + Flange + Outer thermo sensor
- Thermo control from 35°C to 200°C (95°F to 392°F)
- 11kw output, set to 180 ℃, when throwing a chicken, falls 10℃ (50°F) and recovery in 2 Min.

Sous-vide cooking
- Sous-vide cooking is possible by thermo sensor and timer
- Sous-vide cooking : Take foods in plastic pouch, cooking in long time with precise temperature
- Group feeding and retort cooking is possible

Chocolate making
- Chocolate melting and sugar craft is possible by low temperature setting to 35 ℃ and stable output.
- No Skimming in chocolate surface caused by temperature change.
Front & back type induction for cooking individual foods

for open kitchen and medium volume cooking
Built-in type induction for grill meats, Bulgogi and Shabu Shabu
Customized induction for noodle, soup, steamed dish

Induction Griddle for open kitchen
Induction Griddle, Soup Boiler, Warmer, Built-in induction for pasta cooking
Built-in induction for pasta cooking combined with refrigerator
A CARBON NEUTRAL EVENT 零碳排会议
Making of Chocolates & Candies

A CARBON NEUTRAL EVENT 零碳排会议
Steam kettle has replaced to Induction low range

Countertop Induction for main kitchen. Can be removed during banquets
Induction for personal Shabu-Shabu
Grand Lisboa (Hong Kong)
A CARBON NEUTRAL EVENT

零碳排会议
A CARBON NEUTRAL EVENT

零碳排会议
Marina Square, Singapore
Shangri-la Ningbo
Shangri-la Shenzen

A CARBON NEUTRAL EVENT 零碳排会议
Induction 18-24 inch Wok Range

New Generation
With modern induction technology a new way of cooking is created which benefits all kitchen operation.

Features
- Lever type power control
- Large induction coil
- Vitro ceramic wok bowl for Ø24" wok
- Overheat protection
- Small object protection

Benefits
- Clean, Fast cooking, No noise, No heat waste
- Induction - Creates a much cooler cooking environment

Safety
- No combustion, No harmful gas
From noisy & hot kitchen to quiet & comfortable workplace
Park Hyatt Shanghai

Induction Woks

A CARBON NEUTRAL EVENT
Hong Kong JC

Induction woks
Beijing Hyatt

A CARBON NEUTRAL EVENT 零碳排会议
Can the foods we eat have impact on Climate Change?
Global Warning

The Impact of Meat Production and Consumption on Climate Change

R K Pachauri
Chairman, IPCC
Director-General, TERI

London
8th September 2008
Did you know?

• all of our food sources are the cause of one third of the world’s greenhouse gas emissions.

• changing your diet is more eco-friendly for the planet than driving a hybrid, or switching from incandescent light bulb to a fluorescent
IPCC Chair Dr. Pauchuri recommended “eat less meat”. He suggested to go without meat one day per week, then gradually reduce meat intake. He said: “in terms of immediacy of action and the feasibility of bringing about reductions in a short period of time, it clearly is the most attractive opportunity.”
Chili or Lentil/Bean Soups

86 grams CO2e
Vegetable Omelet

783 grams CO$_{2}$e
Garden Salad & Beef Tenderloin

8,042 grams CO₂e
We need to know how to manage our own carbon footprints:

Reduce the usage frequency of high carbon emission foods in menu planning

Reduce carbon emission and save energy in our daily operations
What matters before...

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
<th>营养分析</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size: One Cheeseburger (130g)</td>
<td></td>
</tr>
<tr>
<td>Serving Per Container: Contains 1/2 a burger (255g)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>710</td>
</tr>
<tr>
<td>% Daily Value</td>
<td></td>
</tr>
<tr>
<td>Total Fat</td>
<td>42 g</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>21 g</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>150 g</td>
</tr>
<tr>
<td>Sodium</td>
<td>1330 mg</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>57 g</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>5 g</td>
</tr>
<tr>
<td>Sugars</td>
<td>11 g</td>
</tr>
<tr>
<td>Protein</td>
<td>55 g</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>7%</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>5%</td>
</tr>
<tr>
<td>Calcium</td>
<td>25%</td>
</tr>
<tr>
<td>Iron</td>
<td>8%</td>
</tr>
</tbody>
</table>

* Percent Daily Value (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.
What matters now...

A CARBON NEUTRAL EVENT

Carbon Facts

<table>
<thead>
<tr>
<th>Non-Energy Source</th>
<th>kgCO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Collection</td>
<td>5</td>
</tr>
<tr>
<td>Efficiency Rating</td>
<td>A+</td>
</tr>
<tr>
<td>Production Method</td>
<td>5</td>
</tr>
<tr>
<td>Total: Energy Source</td>
<td>0.07</td>
</tr>
<tr>
<td>Total: CO2 Equivalent</td>
<td>0.07</td>
</tr>
<tr>
<td>Total: CH4 Equivalent</td>
<td>0</td>
</tr>
<tr>
<td>Total: N2O Equivalent</td>
<td>0</td>
</tr>
</tbody>
</table>

What matters now...

A CARBON NEUTRAL EVENT
Carbon Footprint Labeling

Carbon Facts

<table>
<thead>
<tr>
<th>Product Size: 1 Cheeseburger (130 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount per Serving</td>
</tr>
<tr>
<td>Kilograms CO2 Equivalent: 6.12</td>
</tr>
<tr>
<td>Kilograms CO2: 243</td>
</tr>
<tr>
<td>Kilograms CH4: 123</td>
</tr>
</tbody>
</table>

Total C: Energy Sources: 243g

- **Transportation**
  - Fossil Fuel (diesel): 120g
  - Fossil Fuel (Gasoline): 48g
  - Electricity Production: 24g
  - Fossil Fuel (Natural Gas): 75g
  - Fossil Fuel (Coal): 0g
  - Other: 2g

Total C: Non-Energy Source: 2840gCO2E

- Entoro Fermentation: 81.0g (1864g CO2E)
- Manure: 25.8g (856g CO2E)
- Other: 5.2g (120g CO2E)

Carbon/Product Ratio: 23.7

Localism rating: C+
Sustainable Production Rating: D+
Overall Carbon Code: Orange

A CARBON NEUTRAL EVENT 零碳排会议
Climate Change Diet

- Buy fresh, locally-produced foods...
- Eat fewer processed foods...
- Reduce the amount of meat and animal and diary products we eat...
- Eat foods lower down the food chain – grains, fruits and vegetables that are cheaper to grow, use less energy and less land space...
- Buy foods in season...

"Health Professionals Taking Action on Climate Change", BMJ 2008;336:733-734 (5 April), oi:10.1136/bmj.39538.509456.80 (published 2 April 2008)
Low Carbon Menu & Food Production

- Reduce amount of meat on menus at the same time maintain protein adequacy
- Reduce amount of processed & canned ingredients, use fresh where possible
- Instigate Meatless Monday program at work
- Use of induction cooking where possible and reduce cooking time
- Use local, organic foods where possible
Low Carbon Cooking Tips

Simplify cooking method and reduce cooking time thus save energy utilization and reduce carbon emission

- Apply healthy cooking principle of “3 less”: less oil, less salt and less sugar.

- Avoid deep frying where ever possible.
Low Carbon Menu & Food Production

Langham Hong Kong banquet and wedding menus now feature food sustainably sourced from local organic farms.
Local Organic Salads
Meatless Monday Program in HK Hospitals

Hospital serves up meatless Mondays for environmental health

Maggie Tam

Forget smoke-belching power stations and idling diesel engines for a moment and think about what you eat. Diet is the latest target of health and environment experts striving to cut harmful emissions.

Yet they are not talking about bodily emissions that might result from too much of the wrong kind of food, such as beans or onions.

They want people to consider the environmental impact of producing paper tray liner citing facts about environmental problems arising from food sources.

Through the programme, the hospital expects to reduce carbon dioxide equivalent unit emissions by 40,000 kilograms a year — equal to the average annual emissions of the food produced by six Hong Kong people.

It will also save 120 grams of meat per meal and the hospital plans to use that cost saving to add organic bak choy to the meal set in August.
Low Carbon Buffet at HK Renaissance Harbour View Hotel
With every meal you cook and eat, you have the power to reduce climate change and help food shortage problems...
The challenges are great, but if we accept individual responsibility and make sustainable choices, we will rise to the challenges, and we will become part of the solution.
The Future is in our own hands!
Thank you!