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Induction Cooking for the Commercial & Residential Kitchens

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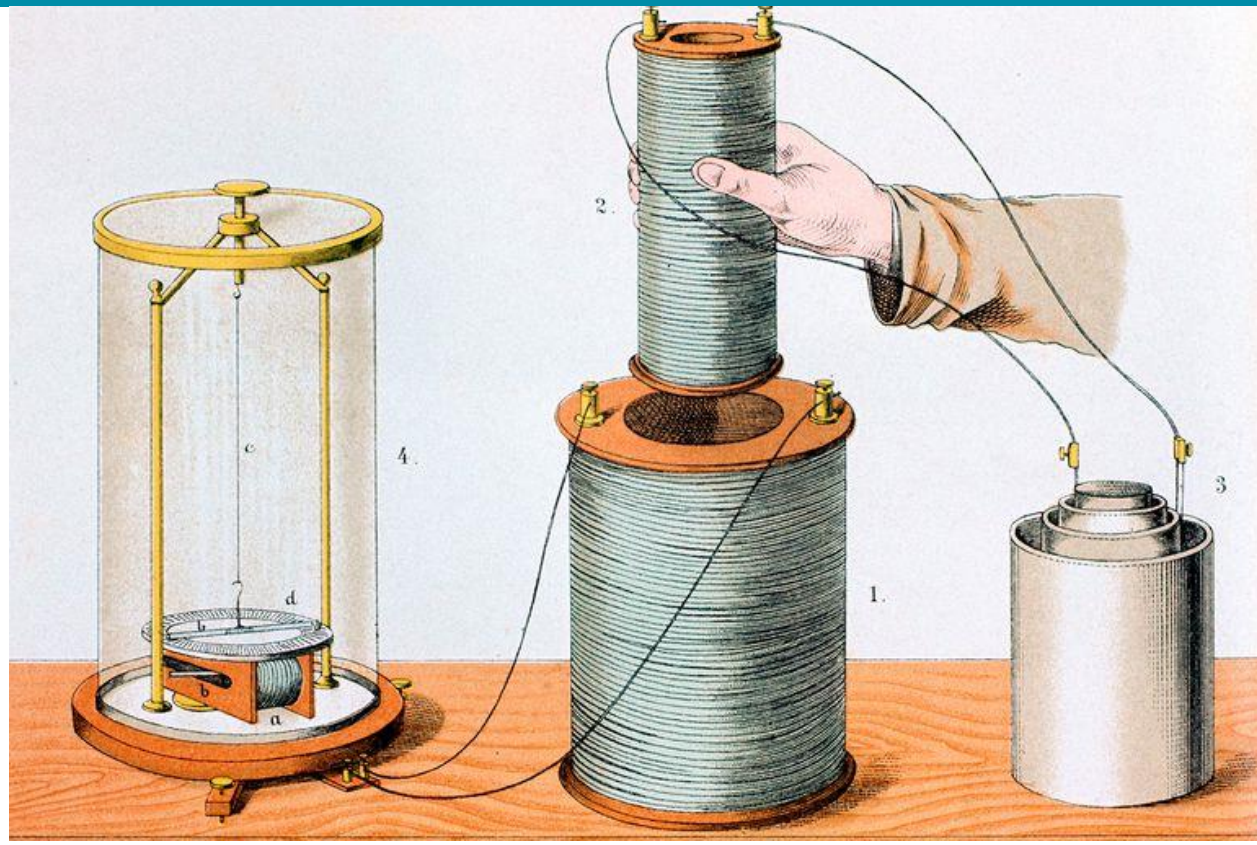
Todd Bell, Sr Energy Analyst

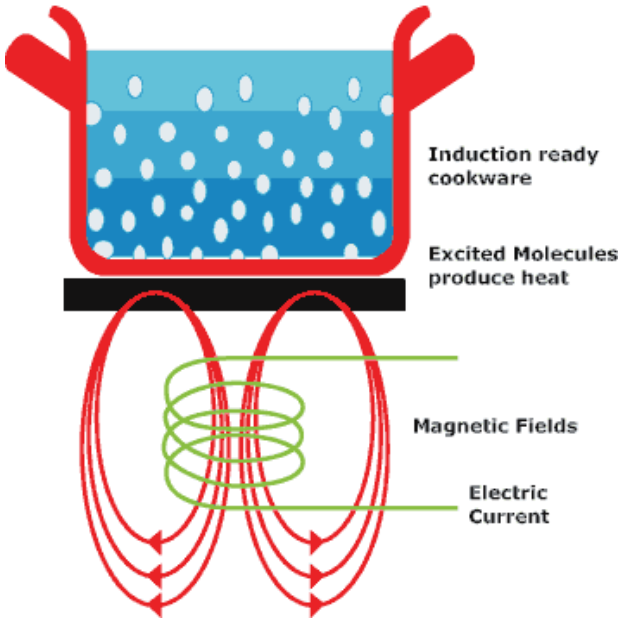
What is Electromagnetic Induction?

- Discovered by Michael Faraday in 1831
- It is the production of an electromotive force across an electrical conductor in a changing magnetic field.
- Many applications, including electrical components, motors, generators and ***cookware***.



How does Electric Induction Cooking Work?

- An electrically charged copper coil underneath the hot top surface creates an oscillating electromagnetic field.
- This field induces an electrical current in the cookware that excites its molecules = resistive heating
- The cookware becomes the heat generator, making the appliance very energy efficient!
- Without cookware in the electromagnetic field, no energy is consumed nor heat produced.

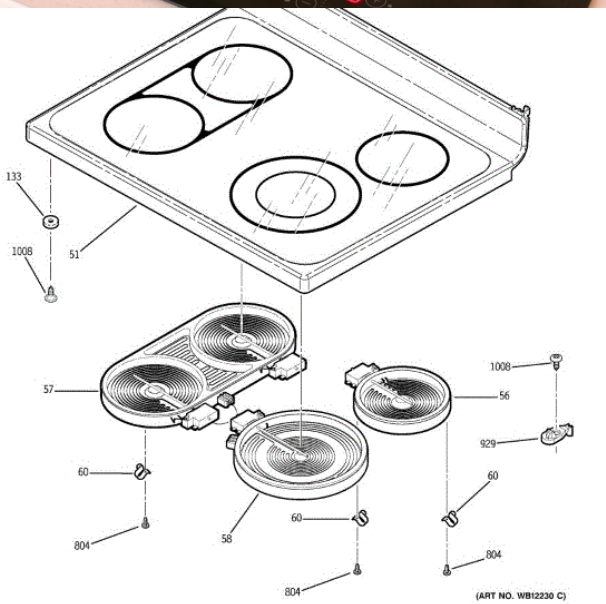


How Does It Differ From Conventional Coil Electric Range Tops?

- Traditional range tops use “resistive” heating elements which heat as electrical current passes through them.
- Heat is transferred to the cookware through *conduction* - the contact of the cookware with the heating element.
- Heating element is slow to heat up and remains on when cookware is removed.

What about Electric Ceramic/Glass Range Tops?

- A Glass or Ceramic surface protects the resistive coil beneath making it easier to clean.
- Heat is this transferred to the cookware through *radiation* – electromagnetic energy transfers heat form the element to the cookware.
- Just like a conventional electric range top, the heating element is slow to heat up and remains on when cookware is removed.



What about Gas?

- Characterized by an open flame underneath a metal grate
- Heat is transferred to the cookware through conduction as well as *convection and radiation*
- *Very poor efficiency - most heat is lost between the burner and cookware*

Gas Cooking: Indoor Air Quality Concerns




Most residential hoods do a poor job of removing gas byproducts from the kitchen.

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. . . and what is *Energy* Efficiency exactly?

Energy into Water (Btu)

Efficiency (%) =

Energy into Cooktop (Btu)

A Measure of Useful Work!

Residential Hot Tops
How do they Compare? *Performance*

	½ gallon Water Boil Efficiency (%)	Boil Time (min)	Temperature Response (°F over set pt)	Saute Time (min)	Saute Efficiency (%)
Induction	86	10	1.0	7	50
Resistance & Radiant	70	16	5.0	7	38
Gas	31	19	1.7	7	23

How do they Compare? *Purchase* Cost

Electric Coil

$300 - $400

Electric Ceramic

Basic: $600
Premium: $3,000

Induction

Basic: $1,200
Premium: $5,000

Gas

Basic: $400
Premium: $6,000

How do they Compare? *Operating* Cost

Electric Coil

$45/year

Electric Ceramic

$45/year

Induction

$40/year

Gas

$30/year

Try before you buy!

Residential Countertop Induction Cooktop (115V)

- 1300, 900, 600 watt settings
- Programmable
- Timer
- $65!
- Provided via muni & CCA loaner programs

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Commercial Kitchen Induction Appliances

Multiple Applications

Hot Tops/Ranges

Woks

Rethermalizers & Holding

Griddles

Shanghai Restaurant Show: Full Induction Suite!

Commercial Induction Rangetop Field Study

	Baseline Electric	Baseline Gas	Induction
Average Daily Energy Use	18.2 kWh	1.5 therms	7.4 kWh
Annual Energy Cost	$1,460	$600	$595

@ $0.22/kwh & $1.10/therm

Real World - Real Chefs:
Salt Craft, Pleasanton

Pros, Cons & Misconceptions of Induction

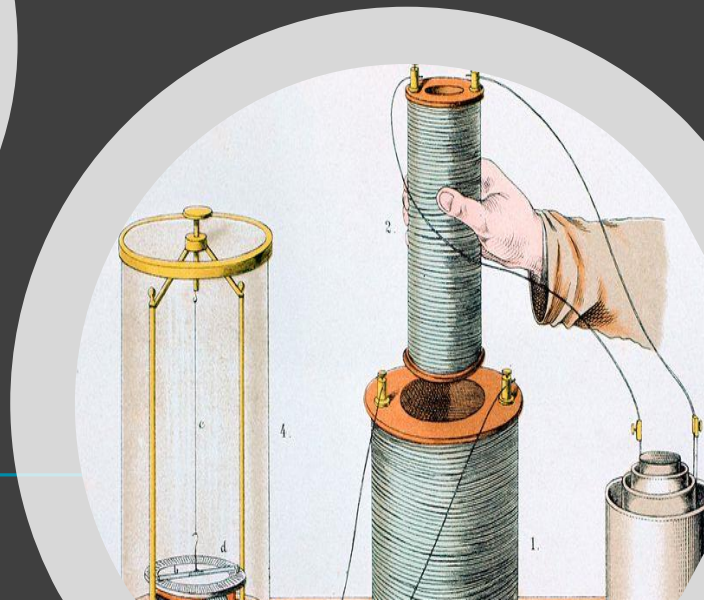
Pros

- Energy Efficient
- High productivity
- No standby energy use
- Low radiant heat
- *Safe*
- *Easy to Clean*
- *Highly responsive temperature control*
- *Programmable*

Cons & Misconceptions

- Higher purchase price - True
- Requires proper cookware - True
- No flame for a visual cue – True, *but* some incorporate LED lighting feedback
- *Not as fast as gas* – A misconception
- *Durability – Like all appliances - it depends on how well it is treated*
- *Utility requirements for high voltage models – True*

Thanks!



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