RP - Sanjiv Goenka Group

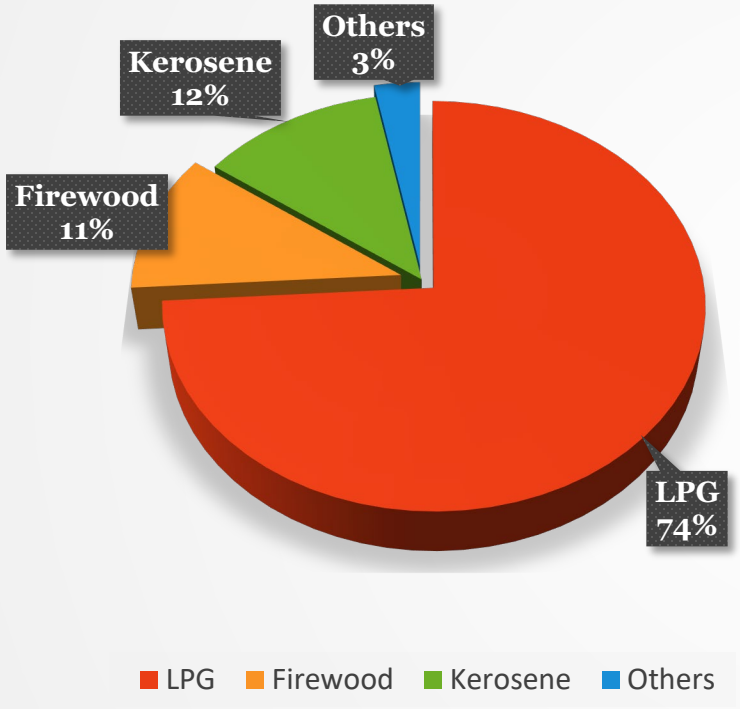
CESC LIMITED

CLEAN, SAFE, AFFORDABLE AND SUSTAINABLE COOKING OPTIONS

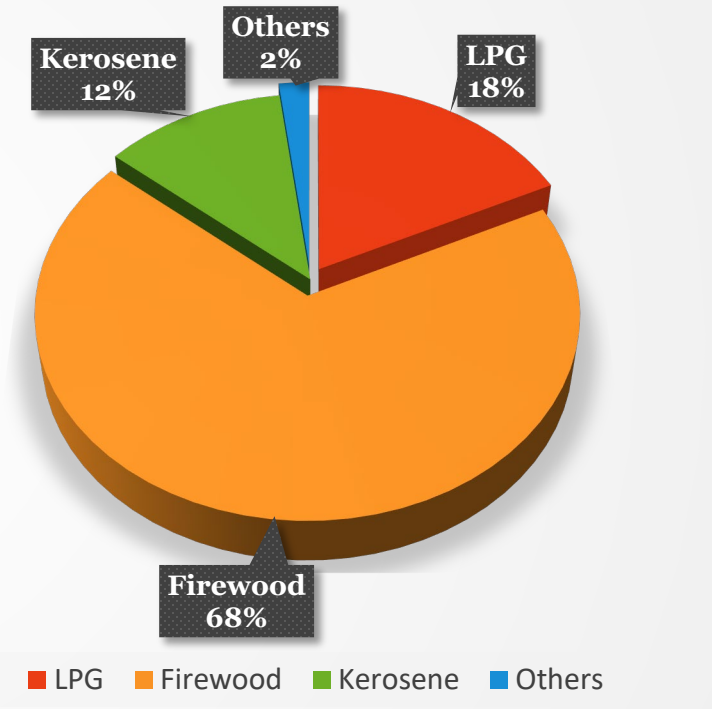
POSSIBILITIES AND REALITIES BEYOND LPG....

Cooking & India

Cooking energy use in 'Urban' India *



Cooking energy use in 'Rural' India *



* Source : 2011 Census of India

Three-fourth of urban India uses LPG for cooking.

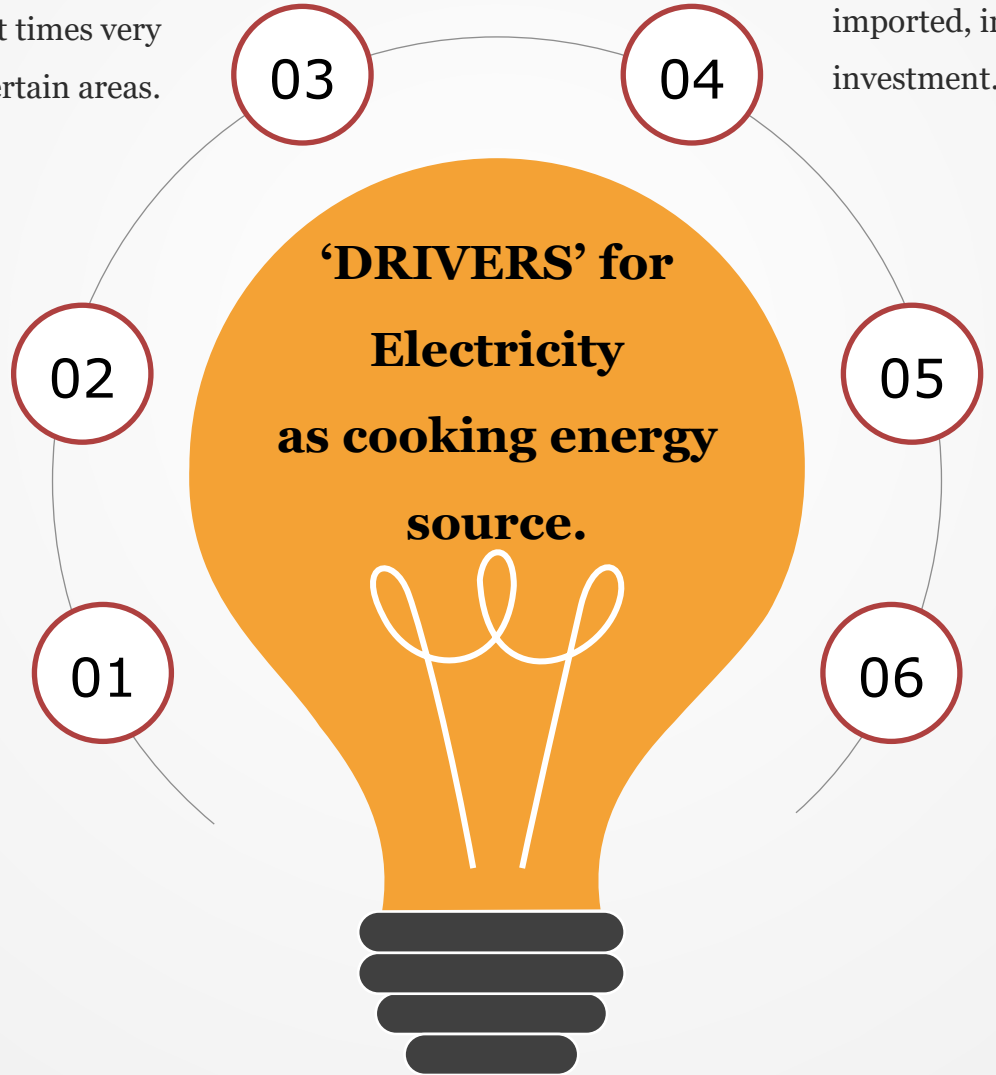
Electricity…A game-changer, generating opportunities beyond connections

Costly LPG / Natural Gas distribution.

Network to create LPG distribution and gas pipeline involves huge CAPEX. Long replacement times very common in certain areas.

Dependence on others.

50% of domestic LPG requirement imported, involving huge government investment.



Minimization of *GHG emission.

Electricity, clean & efficient way of consuming energy. India will have to dramatically slow down its emissions to achieve the 2° goal of Paris agreement’16.

Volatility impact.

International price of oil & gas fluctuates due to geopolitical risk, which in turn leads to variation in LPG price.

Electricity for all.

Government aims to achieve by 2022.

Capping on Subsidized LPG.

Only 6 cylinders / Family / year. Government encourages the rich to give up subsidy for poor.

* GHG : Green House Gas

Hazards of LPG

- **Highly Flammable** LPG forms a flammable mixture with air in concentrations of between 2% and 10%.
- **Leakage of LPG** Fire from accidental leakage from the gas tubes or explosion due to accumulated gas from the leakage is one of the leading causes of fire accidents.
- **Blast of LPG cylinder** Impact from the blast of a gas cylinder explosion or rapid release of compressed gas.
- **Suffocation due to Inhalation** At very high concentrations when mixed with air, vapour produced from LPG is an anaesthetic and subsequently an asphyxiant by diluting the available oxygen.Though this is not a fire hazard, suffocation due to inhalation of LPG could be fatal.
- **Poor Indoor Air Quality** Gas stoves emit harmful gases like nitrogen dioxide (NO_2), carbon monoxide (CO), and formaldehyde (HCHO) which aggravates health problems for persons with asthma, emphysema or other health issues.

Pros MEDIUM FOR SUSTAINABLE COOKING : INDUCTION COOKTOP Pros

Speed
Heats up faster. Cooking takes up to 50% lesser time.

Energy efficiency
Manifestation in form of savings in energy consumption and reduction energy usage cost.

Easy & Precise Control
Achieve desired temperature.

Safety
No flame, no gas leakage and no grease deposition on cooktop.

Low maintenance
Periodic change of Burners, pipe, and regulators on periodic basis not required.

Compact
Can be easily transferred from one place to another.

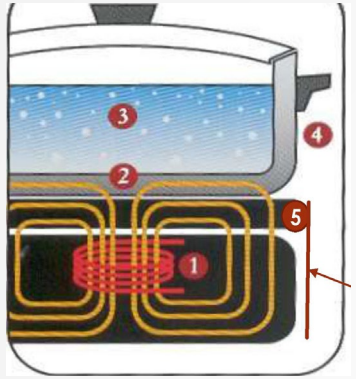
Improved health
Prolonged exposure to smoke arising from conventional indoor cooking methods detoriate health.

Comfort
Cooking in kitchen with fan or AC environment. No perspiration in summer.

Backup to regular LPG stove
Delay in delivery of LPG cylinder due to transport strike can be mitigated.

Ease of cooking
Built in cooking option makes the job easier for novice.

Induction Cooking – The most efficient E-cooking



Process

- Induction coil in the cooktop
- Induction Cookware base(Ferrous Material)
- Heat is transferred to the content
- Nothing outside the vessel is affected by the field
- Induction Cooktop plate is not heated

Principle

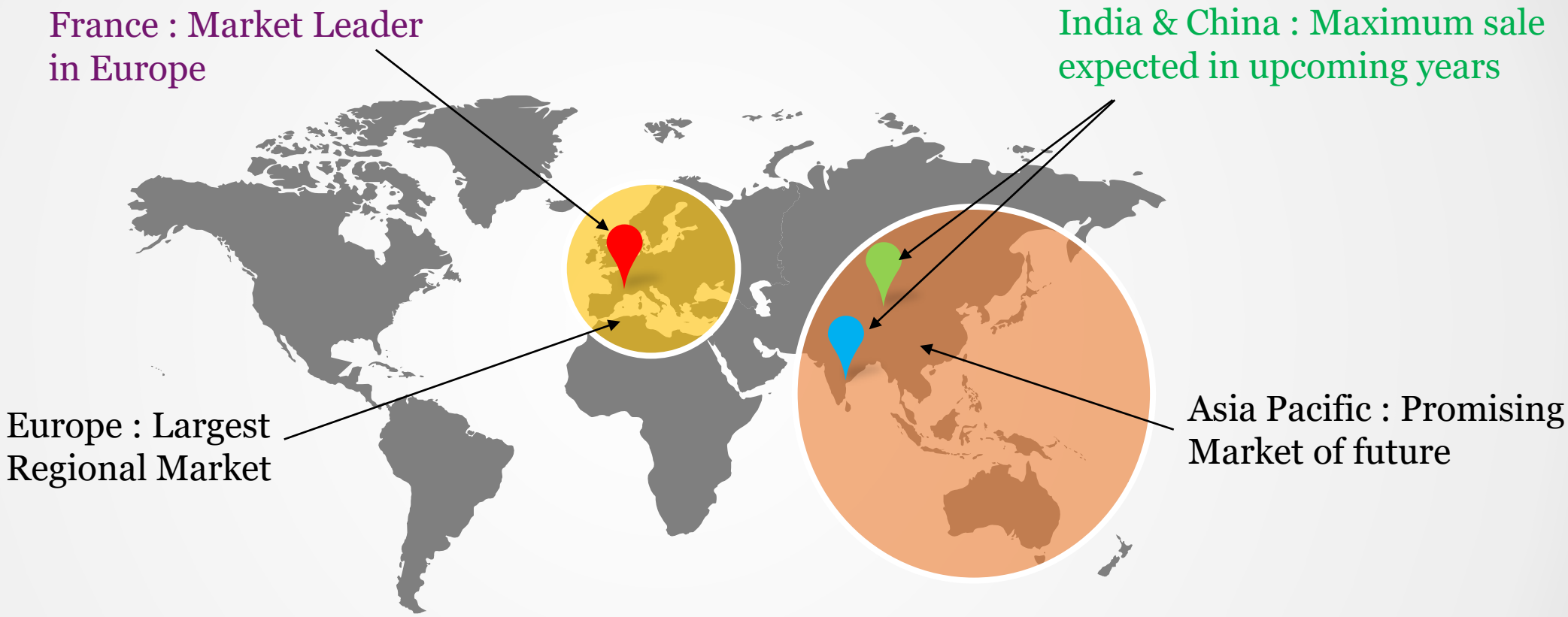
- Works on principle of Electromagnetic Induction.
- Induction process makes the cooking vessel itself the original generator of the cooking heat.

Few Drawbacks

- Expensive : Costlier than regular gas based cooktop.
- Cookware specific : Special form of cookware i.e. flat-bottomed ferrous (magnetic) vessel required

With advent of new technology, the price difference between gas and induction cooking accessories will reduce drastically.

GLOBAL INDUCTION COOKTOP MARKET – AT A GLANCE



The global induction cooktops market size was valued at USD 18,667.8 million in 2020 and is expected to grow at a CAGR of **8.5%** from ***2021 to 2028***.

With the largest share of population in the world that relies on LPG and zero reliance on electricity for cooking, ***India*** is an ***outlier***.

Electric Cooking Range

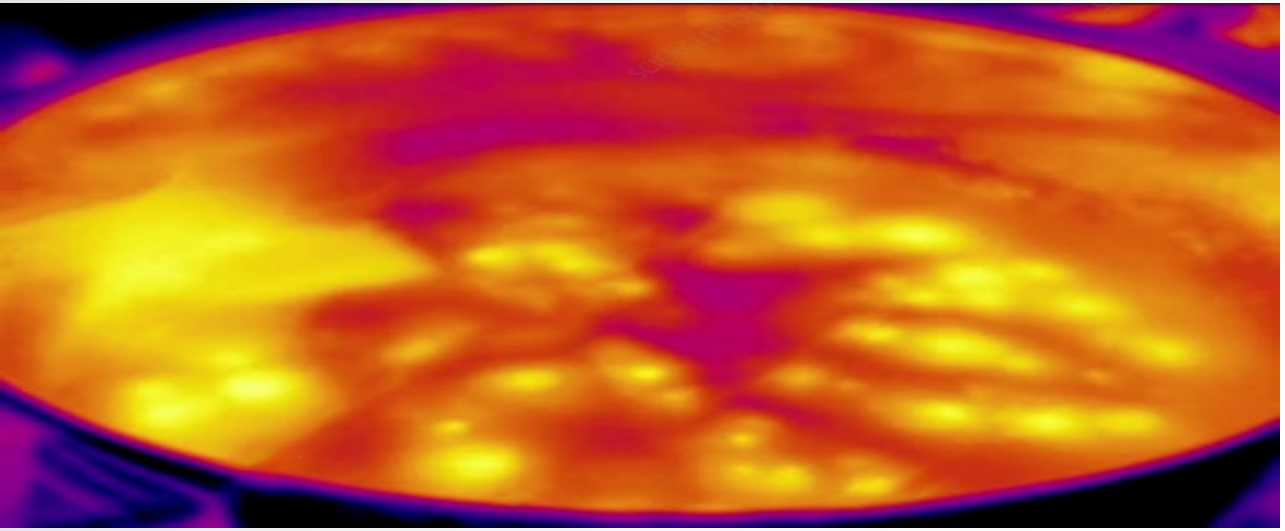
Electric Hot plate

Rice Cookers & Electric Pressure Cookers

Microwave Oven

Induction Cook top

Induction Cooking : Fast & Effective

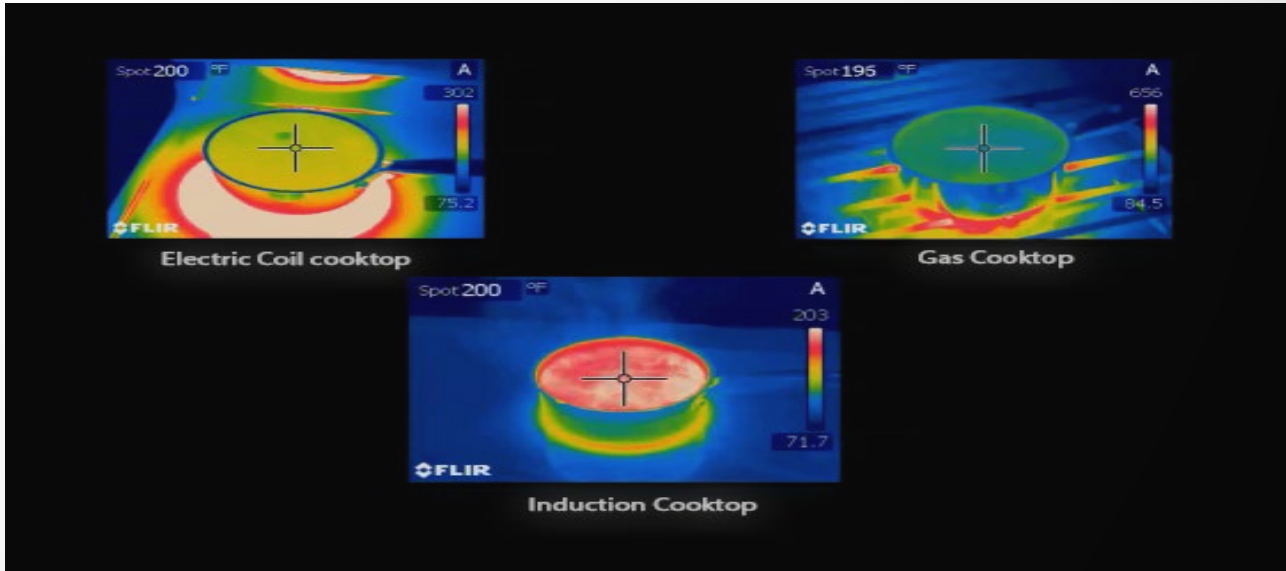


Gas cooking creates hot spots

Gas Cooking creates hot spots on utensils due to non-uniform heating and also requires stirring for dispersal of heat.

Uniform heating through Induction

- Mitigates hot spot creation
- Faster cooking mode

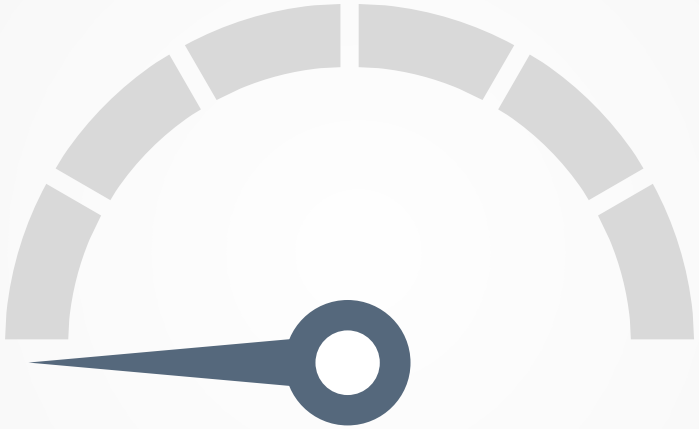


THERMAL EFFICIENCY: DECISIVE FACTOR

Fraction of heat that becomes useful work

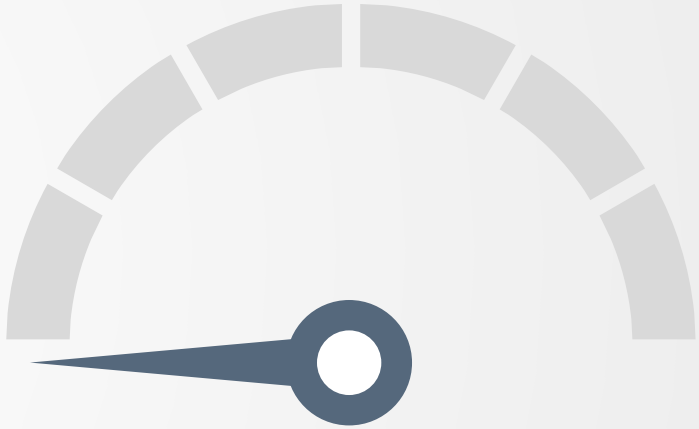
84 %

INDUCTION COOKTOP



74 %

ELECTRIC COIL COOKTOP



40 %

LPG STOVE

- 44% less energy wasted in Induction cooktop compared to conventional LPG stove as the heat produced through induction, gets easily into the food .

COST OF COOKING COMPARISON FOR VARIOUS COOKTOPS : 10 ltrs of water

PARTICULARS	LPG STOVE	ELECTRIC COIL COOKTOP	INDUCTION COOKTOP
Unit Definition	1 Cylinder (46.1 MJ/kg) (14.2 kgs LPG/19 kgs LPG)	1 kWH	1 kWH
Energy (in Mega-Joules)	654.6/875.9	3.6	3.6
Energy Efficiency	40%	74%	84%
Energy (in Mega-Joules) output	261.84/350.36	2.664	3.024
Energy required to boil 10 ltrs of water (in Mega-Joules)	3.15	3.15	3.15
Units Required to heat 10 ltrs of water.	0.012/0.009	1.18	1.042
Cost per Unit (in Rs) * LPG rate as on 15-10-2021 (Kolkata) Subsidy considered Rs 20/-	*Subsidized: 906 *Un-subsidized : 926 *Commercial : 1803	Domestic:7.31 Commercial:8.5	Domestic:7.31 Commercial:8.5
Cost of heating (in Rs)	**Subsidized : 10.90** **Unsubsidized: 11.14** **Commercial : 16.21**	**Domestic:8.64** **Commercial:10.05**	**Domestic: 7.61** **Commercial: 8.85**

#Source:
https://www.bijlibachao.com/appliances/cooktop-comparison-gas-electric-and-induction.html
https://en.wikipedia.org/wiki/Liquefied_petroleum_gas
https://www.iocl.com/indane-cooking-gas-overview

COST OF COOKING COMPARISON FOR VARIOUS COOKTOPS : 1 kg of rice

PARTICULARS	LPG STOVE	ELECTRIC COIL COOKTOP	INDUCTION COOKTOP
Unit Definition	1 Cylinder (46.1 MJ/kg) (14.2 kgs LPG/19 kgs LPG)	1 kWH	1 kWH
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Energy Efficiency	40%	74%	84%
Energy (in Joules) output	261.84/350.36	2.664	3.024
Energy required to cook 1 kg of rice (in Mega-Joules)	1.5	1.5	1.5
Units Required to heat 1 kg of rice	0.006/0.004	0.56	0.50
Cost per Unit (in Rs) * LPG rate as on 15-10-2021 (Kolkata) Subsidy considered Rs 20/-	*Subsidized: 906 *Un-subsidized : 926 *Commercial : 1803	Domestic:7.31 Commercial:8.5	Domestic:7.31 Commercial:8.5
Cost of heating (in Rs)	**Subsidized : 5.19** **Unsubsidized: 5.30** **Commercial : 7.72**	**Domestic:4.12** **Commercial:4.79**	**Domestic: 3.63** **Commercial: 4.22**

#Source:
https://www.bijlibachao.com/appliances/cooktop-comparison-gas-electric-and-induction.html
https://en.wikipedia.org/wiki/Liquefied_petroleum_gas
https://www.sciencedirect.com/science/article/pii/S2212667814001038
https://aip.scitation.org/doi/10.1063/1.4865794
https://www.iocl.com/indane-cooking-gas-overview

COST OF COOKING COMPARISON FOR VARIOUS COOKTOPS : 1 kg of meat

PARTICULARS	LPG STOVE	ELECTRIC COIL COOKTOP	INDUCTION COOKTOP
Unit Definition	1 Cylinder (46.1 MJ/kg) (14.2 kgs LPG/19 kgs LPG)	1 kWH	1 kWH
Energy (in Mega-Joules)	654.6/875.9	3.6	3.6
Energy Efficiency	40%	74%	84%
Energy (in Joules) output	261.84/350.36	2.664	3.024
Energy required to cook 1 kg of meat (in Mega-Joules)	1.93	1.93	1.93
Units Required to heat 1 kg of meat	0.007/0.006	0.72	0.64
Cost per Unit (in Rs) * LPG rate as on 15-10-2021 (Kolkata) Subsidy considered Rs 20/-	*Subsidized: 906 *Un-subsidized : 926 *Commercial : 1803	Domestic:7.31 Commercial:8.5	Domestic:7.31 Commercial:8.5
Cost of heating (in Rs)	**Subsidized : 6.68** **Unsubsidized: 6.83** **Commercial : 9.93**	**Domestic:5.30** **Commercial:6.16**	**Domestic: 4.67** **Commercial: 5.42**

#Source:
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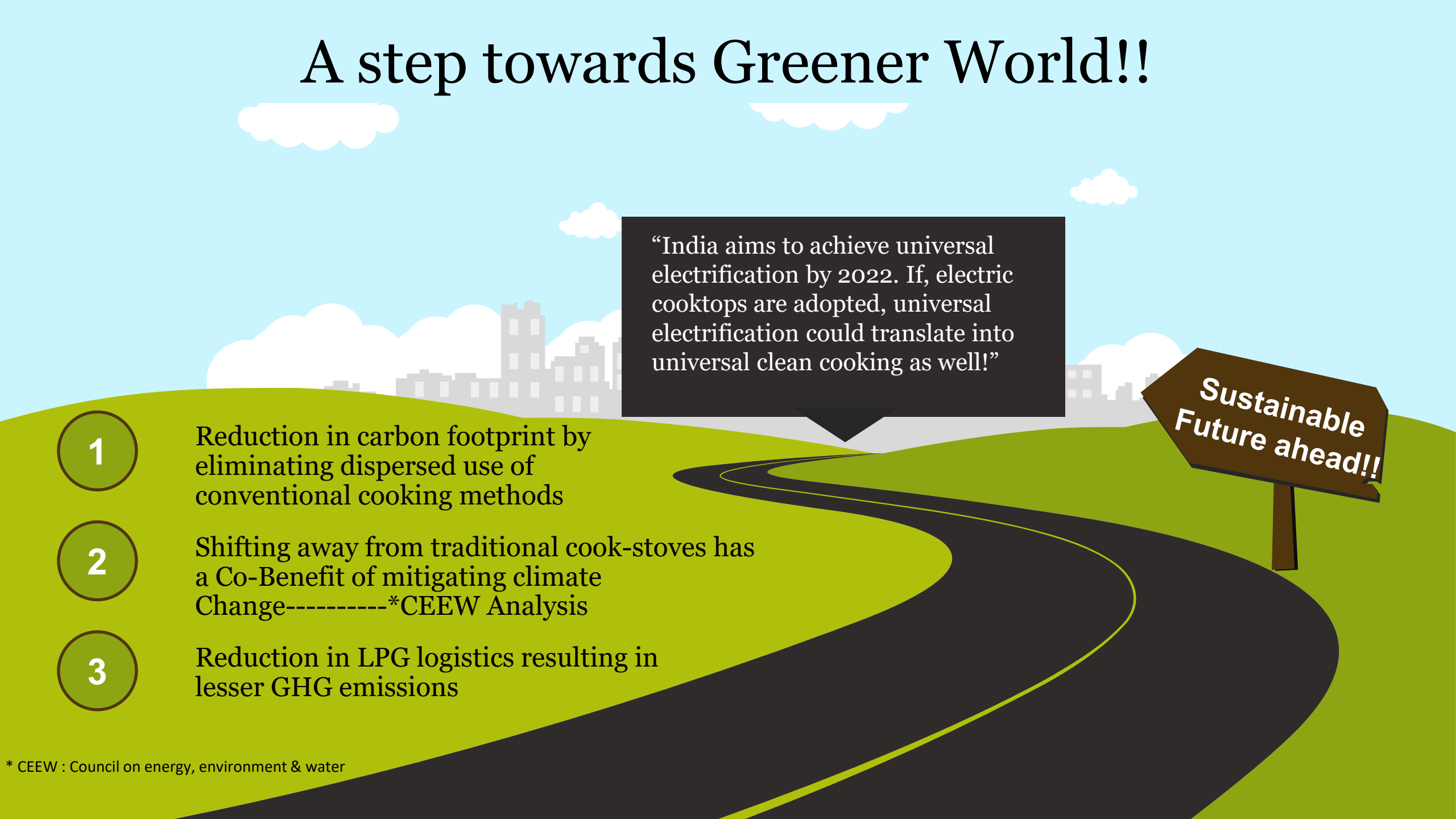
A step towards Greener World!!

"India aims to achieve universal electrification by 2022. If, electric cooktops are adopted, universal electrification could translate into universal clean cooking as well!"

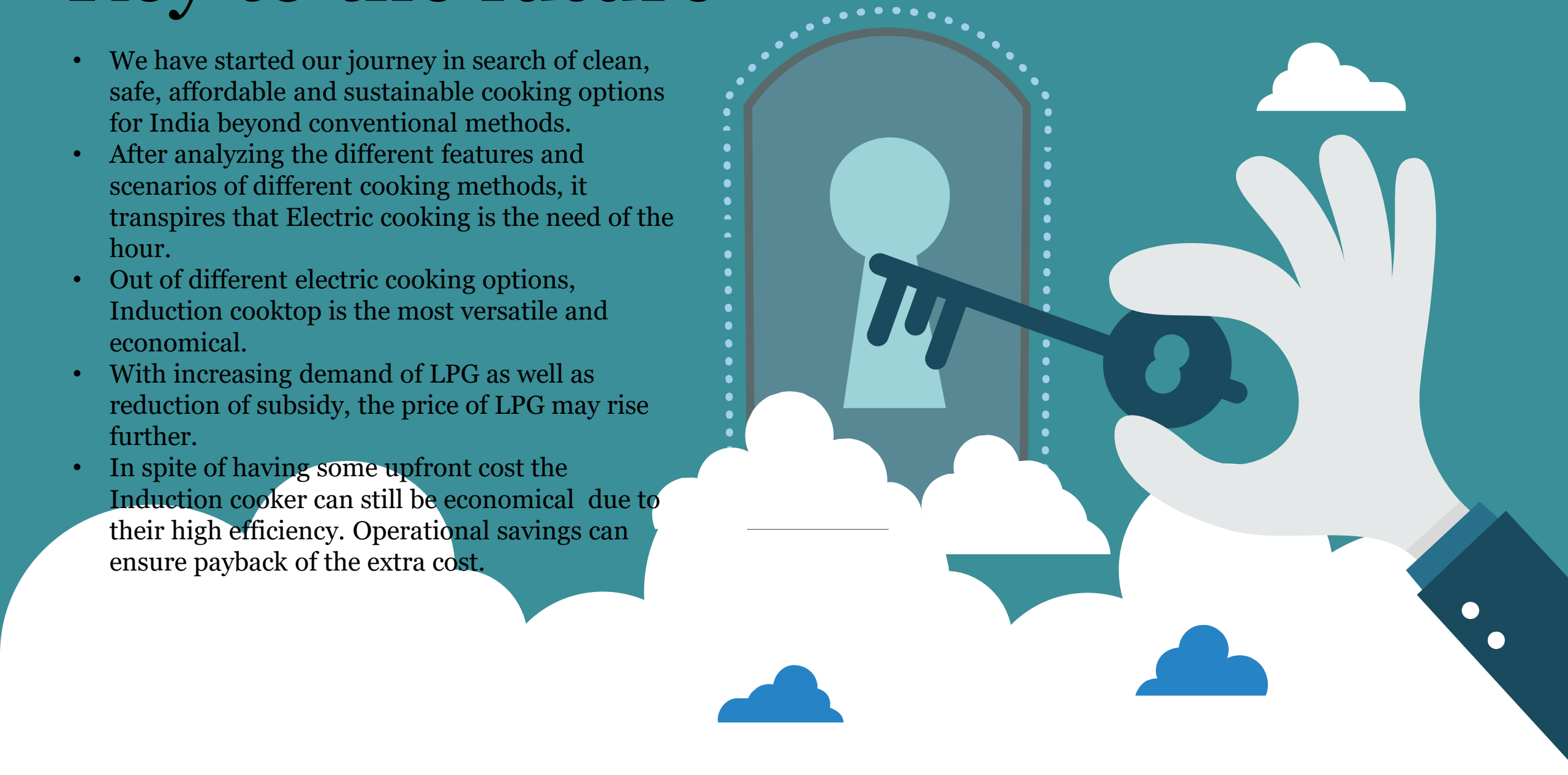


1. Reduction in carbon footprint by eliminating dispersed use of conventional cooking methods
2. Shifting away from traditional cook-stoves has a Co-Benefit of mitigating climate Change----------*CEEW Analysis
3. Reduction in LPG logistics resulting in lesser GHG emissions

* CEEW : Council on energy, environment & water

Key to the future

- We have started our journey in search of clean, safe, affordable and sustainable cooking options for India beyond conventional methods.
- After analyzing the different features and scenarios of different cooking methods, it transpires that Electric cooking is the need of the hour.
- Out of different electric cooking options, Induction cooktop is the most versatile and economical.
- With increasing demand of LPG as well as reduction of subsidy, the price of LPG may rise further.
- In spite of having some upfront cost the Induction cooker can still be economical due to their high efficiency. Operational savings can ensure payback of the extra cost.





It can change Indian hospitality and commercial food chain business.




Thank You

REFERENCES

- https://www.bijlibachao.com/appliances/cooktop-comparison-gas-electric-and-induction.html
- https://www.iocl.com/indane-cooking-gas-overview
- https://www.decisiondatabases.com/insights/analysis/global-induction-cooktop-market-to-show-6-cagr/303
- https://www.grandviewresearch.com/industry-analysis/induction-cooktops-market
- https://www.ceew.in/publications/clean-affordable-and-sustainable-cooking-energy-india
- https://www.sciencedirect.com/science/article/pii/S2212667814001038
- https://www.rediff.com/money/report/induction-cooker-makers-cashing-in-on-lpg-cap/20121004.htm
- https://aip.scitation.org/doi/10.1063/1.4865794
- https://en.wikipedia.org/wiki/Liquefied_petroleum_gas
- https://www.alliedmarketresearch.com/household-induction-cooktops-market
- https://eurokera.com/blog/gas-or-induction-cooktop-the-winner-is/
- https://niti.gov.in/writereaddata/files/document_publication/NITIBlog28_VC-AnilJain.pdf
- http://bestinductioncooktopreview.org/5-advantages-induction-cooktops/
- http://www.makeaheadmealsforbusymoms.com/the-advantages-and-disadvantages-of-induction-cooking/
- https://www.flogas.co.uk/lpg-properties-hazards
- http://blog.us.schott.com/boiling-point-putting-induction-electric-and-gas-to-the-test/
- https://www.sciencephoto.com/media/665656/view/cooking-soup-thermogram-footage
- https://www.leafscore.com/eco-friendly-kitchen-products/which-is-more-energy-efficient-gas-electric-or-induction/