



# Alternative Fuels Vehicle and Energy Technology

***Lourdes Maria A. Capricho***  
***Chief Science Research Specialist***

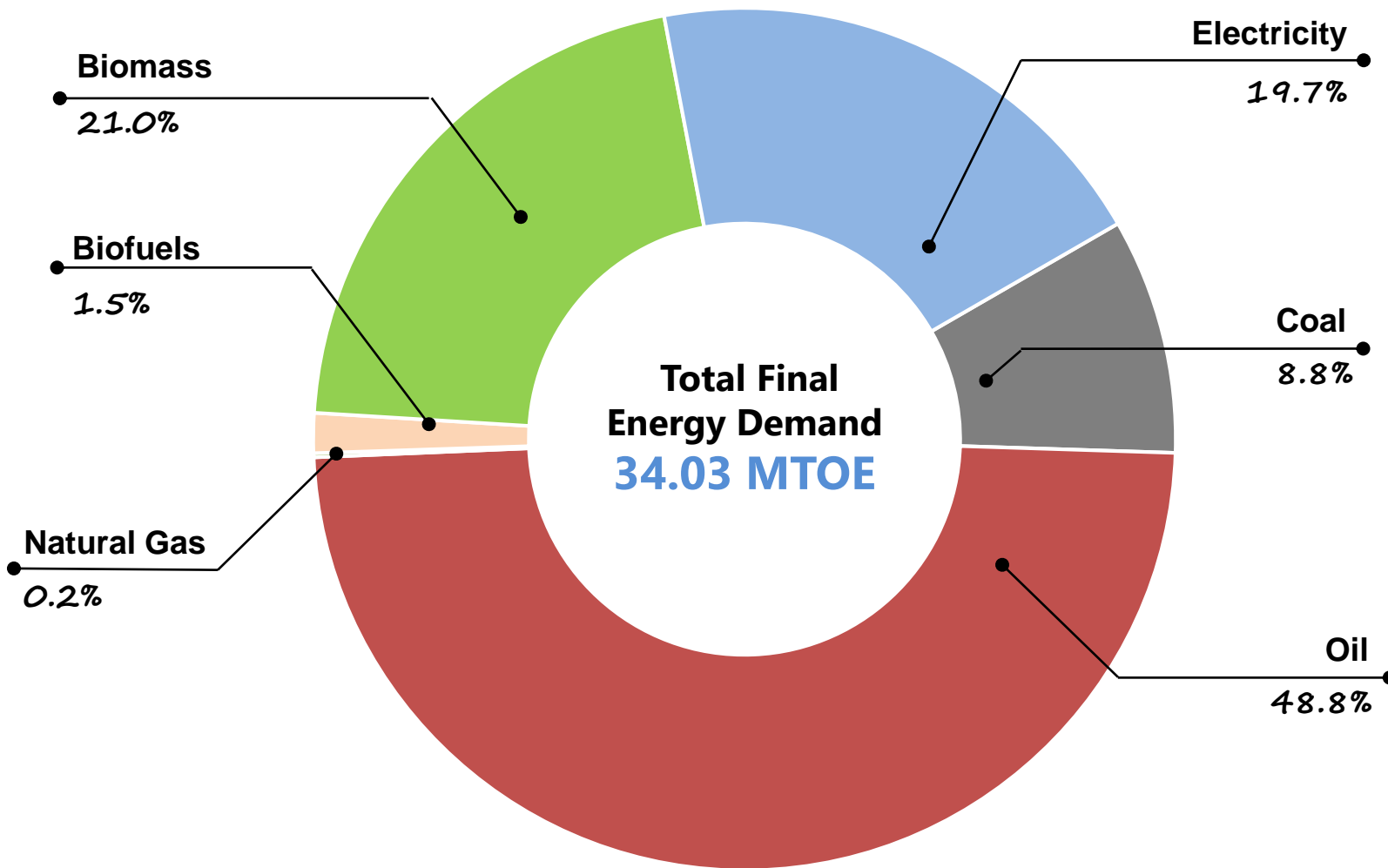
E-Power Mo! Energy Consumers and Stakeholders Conference

26 June 2018

DOE, Taguig City



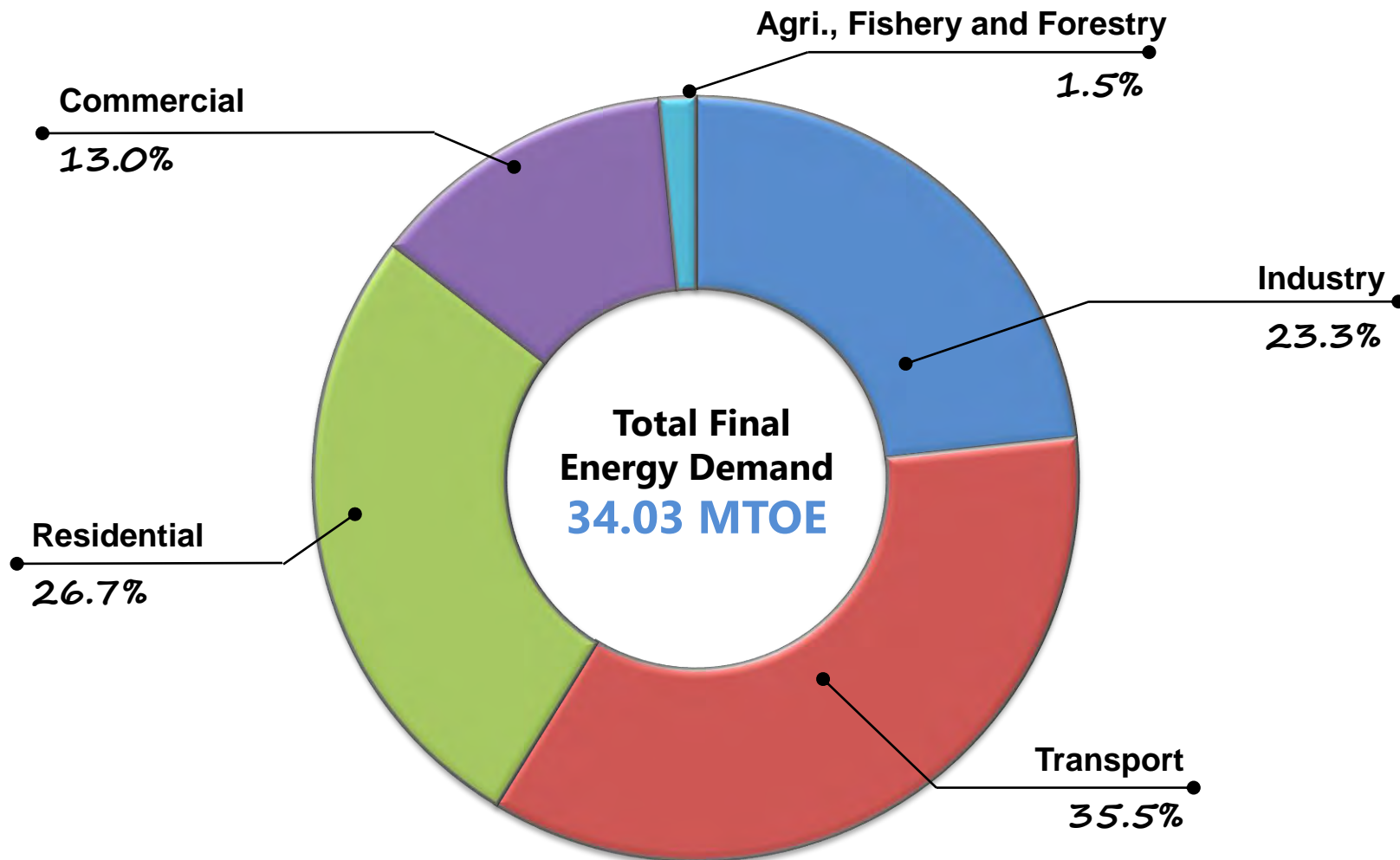
# 2017 Total Final Energy Consumption by Fuel



\* Preliminary as of 24 April 2018

\*\* Excludes non-energy used

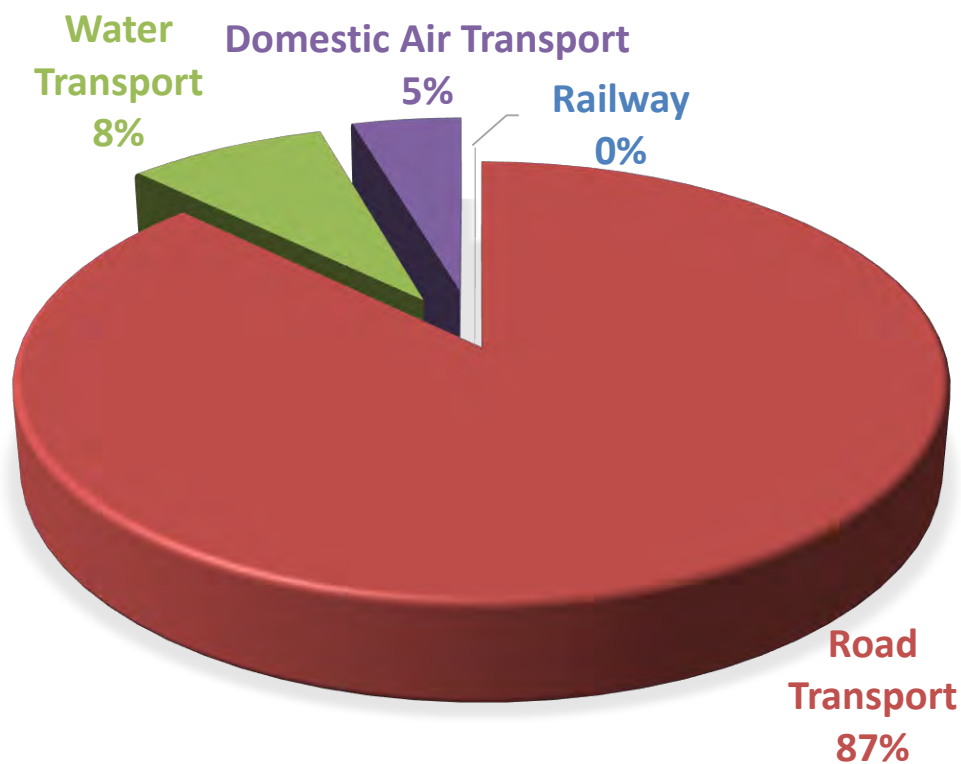
# 2017 Total Final Energy Consumption by Sector



\* Preliminary as of 24 April 2018

\*\* Excludes non-energy used

# 2017 Transport Fuel Consumption

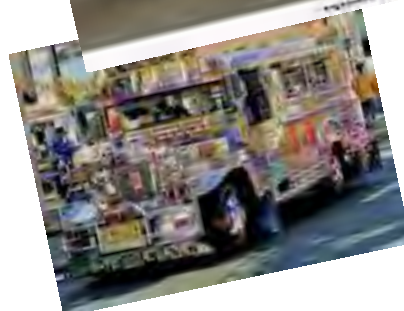


TRANSPORT FUEL OIL CONSUMPTION, BY SECTOR

- Total Transport Petroleum Consumption = 11336.01 kTOE
- Total Road Transport Gasoline Consumption = 9894.09 kTOE

\* Preliminary as of 24 April 2018

\*\* Excludes non-energy used



VEHICLE TYPE	NUMBER OF VEHICLES
MC/TC Motorcycle/Tricycle	5,329,770
Bus	29,794
Car	971,750
UV	1,969,351
SUV	493,223
Truck	407,357
Trailer	50,315
<b>TOTAL</b>	<b>9,251,560</b>

Source: Land Transportation Office (LTO) - 2016

# Promotion of Alternative Fuels and Energy Technology

Initiative	On-Going Programs
<b>Alternative Fuels and Energy Technology Program for the Transport Sector</b>	<ul style="list-style-type: none"><li>• Auto-LPG for Public Utility Vehicles (PUV)</li><li>• Tricycle Modernization Program (TMP)</li><li>• Introduction of Next Generation Vehicles</li></ul>
<b>Promotion of Emerging Energy Technologies</b>	<ul style="list-style-type: none"><li>• Promotion of Emerging Energy Technologies for Agricultural, Household, Industrial &amp; Commercial Applications</li><li>• Partnership with State Universities, DOST &amp; other Research Institution</li></ul>





# Promotion of Auto LPG Program

## Use of AutoLPG in Public Utility Vehicles

### GOAL:

Enhance energy supply security in the transport sector through fuel diversification using LPG as a clean alternative fuel for transport



### Objectives:

1. Promote the use of LPG as a clean alternative fuel for public transport
2. Harmonize and streamline government procedures in the utilization of LPG as fuel for public transport

### Deliverables:

1. Monitoring of converted / retrofitted LPG vehicles in major cities
2. Harmonization of government procedures for the utilization of LPG as transport fuel
3. Conduct of tests on the use of LPG for public utility jeepneys
4. Develop and enhance inspection protocol for LPG in transport



# Promotion of Auto LPG Program

## Use of AutoLPG in Public Utility Vehicles



### Status:

1. Total of 8,415 auto-LPG taxis and 192 dispensing stations nationwide
2. Institutionalization of AutoLPG Technical Working Group for the harmonization of AutoLPG related government policies and guidelines through a Joint Administrative Order
3. Integration of AutoLPG Technician Vocational Course in State Universities offering automotive course
4. Entered into cooperation with DILG-BFP for the formulation of emergency response protocol for alternative fuel vehicles
5. Completed the conduct of Phase 2 of on-road and laboratory performance testing for AutoLPG Jeepneys
6. Partnership with Isabela State University on the use of LPG in farm implements
7. Review and update of applicable AutoLPG standards for transport







# Electric Vehicles Program



# Promotion of Electric Vehicles

## Market Transformation through Introduction of Energy Efficient Electric Vehicles (E-Trike) Project



### Objectives:

- 1.Reduce dependence on transport sectors annual petroleum consumption;
- 2.Aims to deploy locally made E-Trikes powered by Lithium-ion batteries to key cities and municipalities nationwide;
- 3.CO2 avoidance by shifting to tricycle running on pure electricity;
- 4.Establishment of associated EV support industries such as Charging stations, Motor and parts supply chain, Maintenance and repair services;
- 5.Alleviate the standard of living of tricycle drivers



# POTENTIAL DAILY FUEL SAVINGS:

	Conventional Tricycle (Two-stroke Gasoline-fed)	E-Trikes
Range per day (kilometers)	80	80
Fuel Consumption per day	5 liters	7 kwh
Fuel Price/ Electricity Charging	Php55/liter	Php11.50/kwh
Fuel Cost per day	Php275	Php80
Peso per kilometer	Php3.4375	Php1.00
Savings on Fuel		Php2.275 per kilometer
<b>DAILY FUEL SAVINGS</b>		<b>Php 195.00</b>



# Environmental Impact

2.32 kg CO<sub>2</sub> / Liter  
Gasoline

For 2-Stroke Tricycle  
with 5 Liters of  
Gasoline

**10.64 kg CO<sub>2</sub>**



0.5 kg CO<sub>2</sub> / kWh

For E- Trike with 7 kWh

**3.5 kg CO<sub>2</sub>**



VS



**ENVIRONMENT-FRIENDLY!**





# Deployment of E-Trike Units



**Turnover of E-trike units at Marawi City**



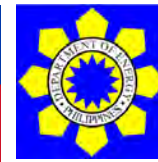
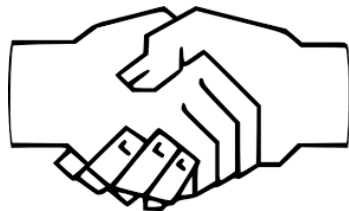
**MOA signing with LGUs in NCR**





# Promotion of Electric Vehicles

## Japan Non Project Grant Aid (NPGA)












### Non-Project Grant Aid (NPGA) for the Introduction of Japanese Advanced Products and Its System (Next-Generation Vehicles Package)

- ❑ JPY 500 million (PhP225 million) grant for the promotion of next-generation vehicles and infrastructure
- ❑ Provided as part of Typhoon Yolanda assistance as well as for the promotion of environment-friendly and fuel efficient vehicles



# NPGA Vehicles

Type	Description	Efficiency	CO <sub>2</sub> Emission
Hybrid Vehicles 	<ul style="list-style-type: none"> <li>Combination of two (2) or more distinct power sources i.e., gasoline engine and electric motor</li> </ul>	Gasoline: 19.58 km/L  Hybrid:  31 km/L	Gasoline: 152 g CO <sub>2</sub> /km  Hybrid:  86 g CO <sub>2</sub> /km
Plug-in Hybrid 	<ul style="list-style-type: none"> <li>Power input can either be gasoline or electric</li> <li>Intelligent system maximize efficiency of gasoline and electric power drive</li> </ul>	Gasoline: 17.58 km/L  PHEV:  45 km/L	Gasoline: 120 g CO <sub>2</sub> /km  PHEV:  41 g CO <sub>2</sub> /km
Electric Vehicle 	<ul style="list-style-type: none"> <li>Powered by electricity through battery packs</li> </ul>	Gasoline: 29.23 km/L  EV:  51 km/L <sub>equiv</sub>	Gasoline: 101 g CO <sub>2</sub> /km  EV:  No tailpipe emission



# NPGA Activities



Briefing/Orientation of Drivers



Establishment of EV Chargers



Turnover of vehicles to Beneficiaries





# Promotion of Emerging Energy Technologies



Electricity from human kinetics



Grass-based biomass fuel (Bugang/Napier) for domestic cooking to address deforestation and reduce indoor pollution



LPG-powered farm equipment to avoid fuel spillage and reduce emission



Battery Energy Storage System for Reliable Power Distribution System



Use of Smart controls and sensors at home for energy savings



Waste tire/plastic recycle to oil

Alternative Fuel derived from waste rubber and plastics



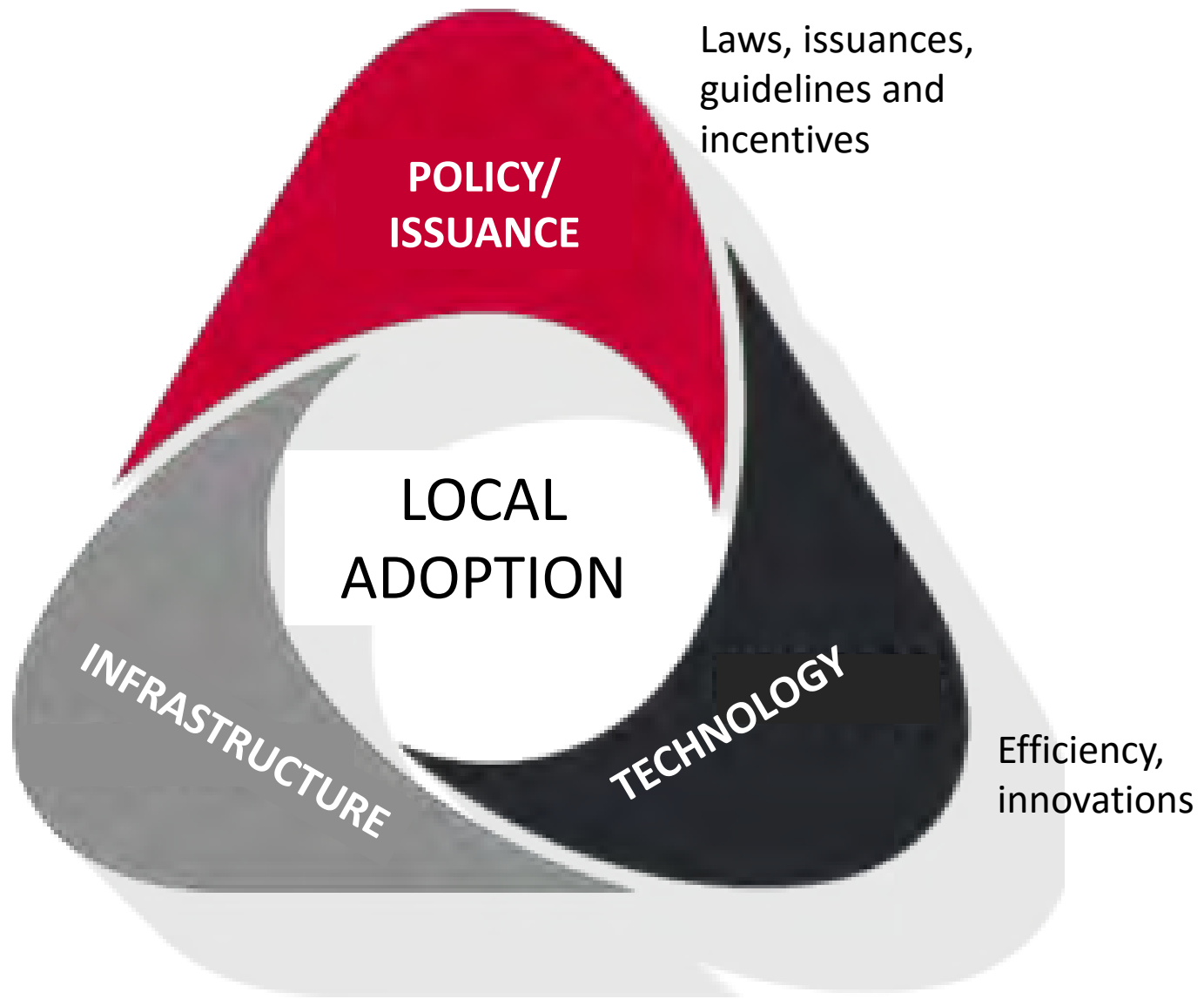
Ethanol Production from Pineapple leaves for Automobile Fuel



Use of FAST Electric Vehicle Charger will encourage use of EV for cleaner alternative



# Mainstreaming of Alternative Fuels and Energy Technologies





# Thank You!



(+632) 479-2900



name@doe.gov.ph



www.doe.gov.ph



//doe.gov.ph



@doe\_ph

