

Fiscal Policy options for Electric Vehicle Uptake in Ghana

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1. Introduction

- Transportation is very important for economic activity. It was responsible for more than 64% of the global oil use in 2014, and nearly for 23% of energy related GHG emissions.
- Road transportation is responsible for 71% of emissions since 1990 and also accounted for three quarters of transportation emissions in 2014 (ICCT, 2014).
- To cope with these challenges, alternative vehicle technologies including Electric vehicles (EVs) are receiving increasing attentions.
- Governments employ financial incentives to promote the adoption of EVs in response to barriers such as the high purchase price and access to charging stations.
 - financial incentives (price subsidies, and tax credits),
 - technology support and charging stations.
- Recent studies have investigated the efficiency of fiscal policy instruments on EV uptake.
- These analyses are unable to suggest a consistent choice among fiscal policies
 - mainly due to conflicts of interests between consumers, the government, oil companies, automakers and environmentalists.

2. Justification for EVs

- The past decade has seen the emergence of electric vehicles with large automakers such as Nissan venturing into the EV arena, while newer companies such as Tesla have made large strides in EV technology.
- With the emergence of these cars, the future of ICE fleets is thrown into question.
- Proponents of EVs claim that their use brings about environmental, financial and operational benefits.

3. Costs and Benefits Perspectives (1/3)

3.1 Regional Perspective

Benefits: considers all directly monetized benefits flowing in and out of a region due to EV adoption. On the benefits side, this perspective includes government incentives for EVs, operation and maintenance (O&M) savings, and avoided gasoline purchases, cost for carbon emissions to represent a potential tax or emission allowance cost.

Costs: include those incurred by the utility to serve the added load, the incremental cost of the EVs over conventional vehicles, and home, workplace and public charging infrastructure, loss on tax revenue to the state.

Subtracting these costs from the benefits results in the Regional Net Benefit (or net cost) from consumer adoption of EVs as a substitute for conventional internal combustion engine (ICE) vehicles.

3. Costs and Benefits Perspectives (2/3)

3.2 Ratepayer Perspective

- considers the impact of EV adoption on all electric utility customers. It compares the utility's cost of serving EV charging load with revenue realized from EV charging. The difference between these costs and benefits is the Ratepayer net benefit (or cost).
- If the utility incurs less cost to serve EV charging load than the revenue it collects via EV drivers' electric bills, then ratepayers as a whole benefit: utilities can use the savings to invest in programs that promote EV adoption, reduce electricity rates, or make other grid investments. The net benefit represents the amount that a utility can spend on EV adoption programs or other investments without increasing electric rates.

3. Costs and Benefits Perspectives (3/3)

	Regional Perspective	Ratepayer perspective
Electricity supply cost		
Electricity energy cost	Cost	Cost
Generation capacity cost	Cost	Cost
T&D Cost	Cost	Cost
Ancillary Services cost	Cost	Cost
Electricity energy CO ₂ cost	Cost	Cost
EV Cost and Benefit		
Incremental EV Cost	Cost	
Tax Credit	Benefit	
Avoided Gasoline CO ₂ Cost	Benefit	
Avoided Gasoline Cost	Benefit	
Vehicle O&M savings	Benefit	
Charging Costs		
Charging infrastructure cost	Cost	
Vehicle charging utility bills		Benefit

A Case of PEV uptake in Ohio - Benefits

- PEV adoption is likely to bring significant net economic benefit.

Regional Perspective:

- In the Base scenario, Regional net benefits from PEV adoption over the next 20 years range from **\$380 Million** in the High PEV Adoption case to **\$256 Million** in the Low PEV adoption case.

Ratepayer Perspective:

- In the Base scenario, Ratepayer Perspective total net benefits from PEV adoption over the next 20 years range from **\$278 Million** to **\$351 Million** in the Low and High PEV Adoption cases, respectively.

4. Fiscal Policy Incentives (1/2)

Main fiscal incentives for EV uptake

- Tax Credits
- Tax Expenditures/exemption
- Public investment in charging infrastructure

4. Fiscal Policy Incentives (2/2)

Lessons from countries experiences

Portugal:

- Cost of Incentives (€25M) and Public charging networks (€75M) considering 5000 Evs will receive €5000 gov't incentive → €100M in total public investment.

Loss in Tax Revenue due to exemption on Evs → €579M - € 627M

- Savings on fuel imports - €307M - €523M and €6M in carbon credit

Reduction of emissions of PM in urban areas are considered, the indirect economic benefits on urban air quality and subsequent impacts on human health will be substantial.

5. Policy Recommendations

- Increasing Real GDP
- Improved Macroeconomic Environment
- Improve Credit to Private Sector
- Increasing domestic revenue to create fiscal space
- Passing the PPP Bill into Law
- Expenditure rationalisation
- Intense education of the public

Thank
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