

Post-Hearing Interrogatory CSC-1

The United Illuminating Company
Docket F-2008

Witness: Roddy Diotalevi
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Q-CSC-1: On July 28, 2008, Governor Rell asked the Chairman of the Department of Public Utility Control to work closely with automakers and the state's electric utilities to ensure that Connecticut maintains its leadership role in encouraging and accommodating "plug-in" electric vehicles. How does The United Illuminating Company (UI) expect that the electric system and the load patterns would be affected by such vehicles being recharged by end users? Explain

A-CSC-1: Assuming an accelerated market penetration rate beginning in 2010 and the anticipated U.S. auto market availability of PHEV's, UI does not forecast significant load increases from vehicle battery charging. Table 1 models the growth of PHEV vehicle registrations in UI's service area from 2010 through 2017 along with kWh consumption and demand associated with re-charging of energy storage devices.

	2010	2011	2012	2013	2014	2015	2016	2017
U.S. New Vehicle Sales (millions)	17	17.2	17.3	17.5	17.7	17.9	18.0	18.2
PHEV Market Penetration	0.5%	1.5%	3%	5%	7%	10%	15%	20%
U.S. New PHEV Sales	85,000	257,550	520,251	875,756	1,238,319	1,786,717	2,706,876	3,645,260
UI % National Vehicle Registrations	0.218%	0.218%	0.218%	0.218%	0.218%	0.218%	0.218%	0.218%
UI Service Area PHEV Sales	185	561	1,134	1,909	2,700	3,895	5,901	7,947
Cumulative PHEV Total	185	747	1,881	3,790	6,490	10,385	16,286	24,232
PHEV Annual kWh Consumption	2,100	2,400	2,700	3,000	3,300	3,900	4,200	4,500
UI Off-Peak Load Growth (KW)	259	1,045	2,633	5,306	9,085	14,538	22,800	33,925

Table 1: Impacts of PHEV Charging Load in UI's Service Area

This model suggests that given aggressive market penetration, current limitations and future advances in energy storage devices, the likelihood of significant demand increases in UI's service area is very low.

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It is assumed that recharging will largely occur during off-peak hours. This assumption is based on the facts that (1) initial PHEV all electric ranges will be limited to 40 miles or less, and (2) according to the U.S. Department of Transportation (2003), 78% of commuters drive 40 miles or less to and from work. This assumption is further supported by data from the U.S. Census Bureau's 2005 American Housing Survey (August 2006) that suggests 75% of commuters travel less than 20 miles in one direction. The majority of PHEV consumers should, depending upon driving habits, be able to travel to and from work without the need to re-charge. PHEV on-board internal combustion engines also serve to re-charge batteries in a low energy state. PHEV batteries will require less than 8 hours to fully re-charge when plugged in. Currently available off-peak electricity rates would make it possible for future PHEV's owners to operate their vehicles more cost-effectively.

Notes to Table 1:

- Assumes U.S. new car sales increase by 1% annually.
- Assumes PHEV penetration starts slowly and quickly increases to 20% by 2017 (current HybridVehicle market penetration rose to only 3% in ten years). Increases in fuel costs can be directly attributed to consumer acceptance of technology and incremental acquisition costs.
- UI's percentage of national vehicle registrations (.218%) is based upon data from the U.S. Bureau of Transportation Statistics and the State of Connecticut Department of Motor Vehicles.
- PHEV average annual kWh consumption is based on data from the Electric Power Research Institute (EPRI) and assumes nightly charging and that kWh consumption will increase based on increases in battery capacity and all electric range.
- Load growth is based on PHEV recharging by a 120 VAC / 15 Amp circuit at 1.4 kW.