The Menu

A list of actions that leaders
can take to make their
community a plug-in pioneer.

Rocky Mountain Institute®

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Table of Contents

Project Get Ready: Helping Communities Become Electrified Vehicle Pioneers	3
Summary of System Wide Costs, Benefits, and Jobs	6
Actor: Municipal Government	8
Municipal Government: Business Case	9
Actor: Utility (and their regulators/grid operators)	10
Utility: Business Case	11
Actor: Civic Groups	12
Civic Groups: Contributions	12
Actor: Local Businesses	13
Local Business: Business Case	13
Actor: Other (Developers, Schools, Philanthropists, Dealers, Banks, Mechanics)	14
Web Resources	15
Contact Information	15
Sponsors and Advisors	15

For background research, on-line database, and customizable calculators, visit www.projectgetready.com.

Project Get Ready is a Rocky Mountain Institute Initiative: www.move.rmi.org

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Project Get Ready: Helping Communities Become Electrified Vehicle Pioneers

Electrified vehicles are coming

Imagine your city free from the strain of volatile gas prices, where quiet vehicles drive the street emitting zero air pollution. This is the promise of electrified vehicles, or "plug-ins", one of the most important components of transitioning to a greener economy. These vehicles can be new or converted conventional vehicles, run wholly or partially on electricity and can reduce operating costs, air pollutant and greenhouse gas emissions, and dependence on oil.

Early models already have hit the road in Asia. In the U.S., conversion shops have been retrofitting existing vehicles to be plug-ins and building low-speed EVs for several years at small, but fast increasing, volumes. Tens of thousands of factory-made plug-ins are expected to be available in the U.S. in late 2010 and 2011.

Transitioning to electrified vehicles mean initial costs and change, creating barriers

There are two key barriers to plug-ins: first, the current battery technology is very expensive, adding adding thousands of dollars to the cost of a plug-in. Next, many well-established sectors must change to accommodate plug-ins. Automakers must manufacture a new drivetrains. Consumers must learn the pros and cons (mostly pros!) of a plug-in lifestyle, and a new way of valuing upfront costs against operational savings. Utilities must learn to manage a large and mobile load. Cities, retailers, and other businesses must incorporate a new infrastructure of charge spots. All these players must build a new system of connectivity in order to line up charging times, billing, consumer preferences, and more. Such changes create a multitude of barriers, not the least of which is "how can all these changes happen simultaneously and in a coordinated manner?"

Overcoming these barriers requires cross-community collaboration

We believe that the best way for the nation to get ready is for pioneering communities to get ready, developing new systems that suit local needs, while maintaining communication and coordination between communities. Project Get Ready was founded to:

1. Help community stakeholders work together to create a plan to become plug-in-ready, and
2. Provide a forum for pioneering communities to openly exchange lessons learned and best practices, and show their progress to automakers and other national/global businesses.

This menu prioritizes the "must have" actions for your community to get ready

Rocky Mountain Institute (RMI) has worked with industry leaders over the past year to document a plug-in vision and the key barriers to that vision, as well as strategies to overcome them. Our plug-in vision includes all forms of electrified vehicle, such as plug-in hybrid electrics (PHEVs), pure battery electrics (EVs) and conventional vehicles converted to plug-ins. We have prioritized the most important actions cities must take to become plug-in ready, and divided them into two tiers:

- "Must have" actions: For a community to be ready, it must meet most of these.
- "Nice to have" actions: A city meeting these actions will accelerate plug-in success.

We call it a menu because it isn't a black-and-white checklist: different communities need different approaches. This menu is a dynamic document; it will change as we learn from our partners what works and what doesn't. We will designate communities as "ready" based on meeting most (not all) of our suggested actions and, more importantly, having a coordinated and active plug-in community.

In the main body of this document, we have estimated the cost, revenues, and potential jobs created for each action (where possible) and organized the actions by primary stakeholder. This menu presents interim incentives targeted at the first five years, or two percent of registered vehicles. After attaining the 2% target, communities should re-evaluate their plans and activities.

15 "Must Have" Actions*

Barrier: Not enough cars in the pipeline, OEMs need proof of future consumer demand

1. Corporate/city/state fleets commit to buy a certain number of plug-ins (RFPs for major purchases).
Suggested target: 180 vehicles, or five fleets purchasing or converting 30 plug-ins each

2. Stakeholder group provides a place for interested consumers/fleets to register early, and put cash down to reserve plug-ins (cash used for readiness where possible).
Suggested target: 5,000 commitments in first 2 years

Barrier: How can we manage this as a multi-sector, city-wide project?

3. Create collaborative stakeholder group within the community to help regulatory, commercial, and community interests align. Sign on to a clear regional plan (based on this menu!). Plan should give consideration to BEVs, PHEVs, EREVs, LS-EVs, and conversions.

4. Have one "champion" whose job it is to keep this group moving forward, who has authority
Suggested target: part time job, 20 hours/week

Barrier: How can we bring down upfront costs for consumers?

5. Work with banks and dealers to offer low-interest loans for plug-ins, based on projected lower operating costs from gas savings.

6. Bundle all key incentives at vehicle point of purchase (home charger vouchers, rebates, etc.)

Barrier: Consumer hesitation at diving into a new paradigm for mobility

7. Perks: access to HOV lanes, free tolls/downtown parking, reserved airport parking.

8. Create consumer, city government, local business and utility education plans including test drives and "quick lease" options to individual and fleet consumers as well as high profile drivers.

9. Reduced (or free) electricity rates for charging.

Barrier: Red tape around infrastructure installation

10. Fast-track permitting for charging stations.

11. Ensure new and reconstruction/renovation building codes support the operation of plug-ins.

Barrier: What if these cars exacerbate my peak load?

12. Tie provisions of free home and public charge spots, as well as free or cheaper electricity, to either utility override power or "no charge" times.

Barrier: Who will pay for infrastructure?

13. Local employers/retailers provide some charge stations at parking decks.
Suggested target: 4,000 workplace stations (because 60% of car-owners are assumed to have home stations)

14. Install public charge spots in high-traffic zones and parking areas, either with public money (via utility or gov't for the first 2% of vehicles) or private money that uses the stations to market.
Suggested target: 1 charging station for every 100 vehicles not including workplace charging stations

15. Provide affordable and available—or free—Level 2 home-charger/driveway circuit installation.
Suggested target: 6,000. We assume 60% of our 10,000 car-owners have driveways/garages.

Visit www.projectgetready.com for examples of actions taken across the globe, to use our jobs and business case calculators, to get details on our top barriers, to see what other cities are doing, and to get your community signed on.

10 "Nice to Have" Actions

Barrier: Not enough vehicles in the pipe-line

1. Support non-traditional OEMs, conversion shops, and other plug-in manufacture businesses with tax incentives, contracts.

Barrier: Who will service my plug-in?

2. All xEV owners get access to a "plug-in concierge" call service for info on trained mechanics/ electricians, where to charge, how to deal with technological issues, for the first five years of vehicle ownership. Plug-in service is better than traditional service.

3. Invest in technical education and worker transition assistance needed to rapidly train plug-in service technicians, encourage plug-in curricula in trade/technical colleges and community colleges, as and create/fund modules in plug-in crash safety training for fire/police

Barrier: How can we bring down upfront costs for consumers?

4. Provide direct cash incentives to consumers for vehicle (including tax rebate, waiving of registration fee/sales tax, etc.) so that plug-in-premium is eliminated or so that plug-in are markedly cheaper than comparable ICEs

Suggested target: $3000/vehicle on top of federal rebate, and $8,000/vehicle once federal rebate has expired

5. Introduce a government/3rd party sponsored battery warranty program to share the risk and to reduce the near-term cost of advanced batteries

Barrier: Consumers have limited understanding of plug-ins

6. Launch large scale marketing plan to highlight the "empowerment, fun and energy independence" associated with plug-in, including viral, hands-on, TV, and radio advertising as well as a website.

7. Bundle plug-in purchase with a "green power only" utility contract and discounts on home solar, AMI installation, a smart grid upgrade, bike, bus pass, and/ or light rail pass to high-light plug-in role in the green lifestyle

8. Foster early roll-out in taxi fleets and rental cars

9. Develop materials to educate the drivers of tomorrow by reaching students of all levels (elementary- college) with related curricula

Barrier: What if this exacerbates my peak load?

10. Install sub-meters (or Smart Grid) for plug-ins

Got different or better ideas? Think your community can be ready with a different set of options? Please let us know at www.projectgetready.com, or email smartgarage@rmi.org.

Summary of System Wide Costs, Benefits, and Jobs

These and all cost/benefit numbers in this report use a hypothetical "ready" city with plug-ins accounting for 2% of its total registered vehicles by December, 2014. For the purposes of the calculations in this document, we say that 2% means 10,000 plug in cars after 5 years.[1] In addition to financial costs, these actions will incur costs in the form of time and energy. In some cases, we qualitatively describe the time/hours we estimate necessary to complete an action, and leave it to individual cities to assess that cost (and if our estimate is correct).

Figure 1: Costs and benefits of "must-have" Project Get Ready actions[2]

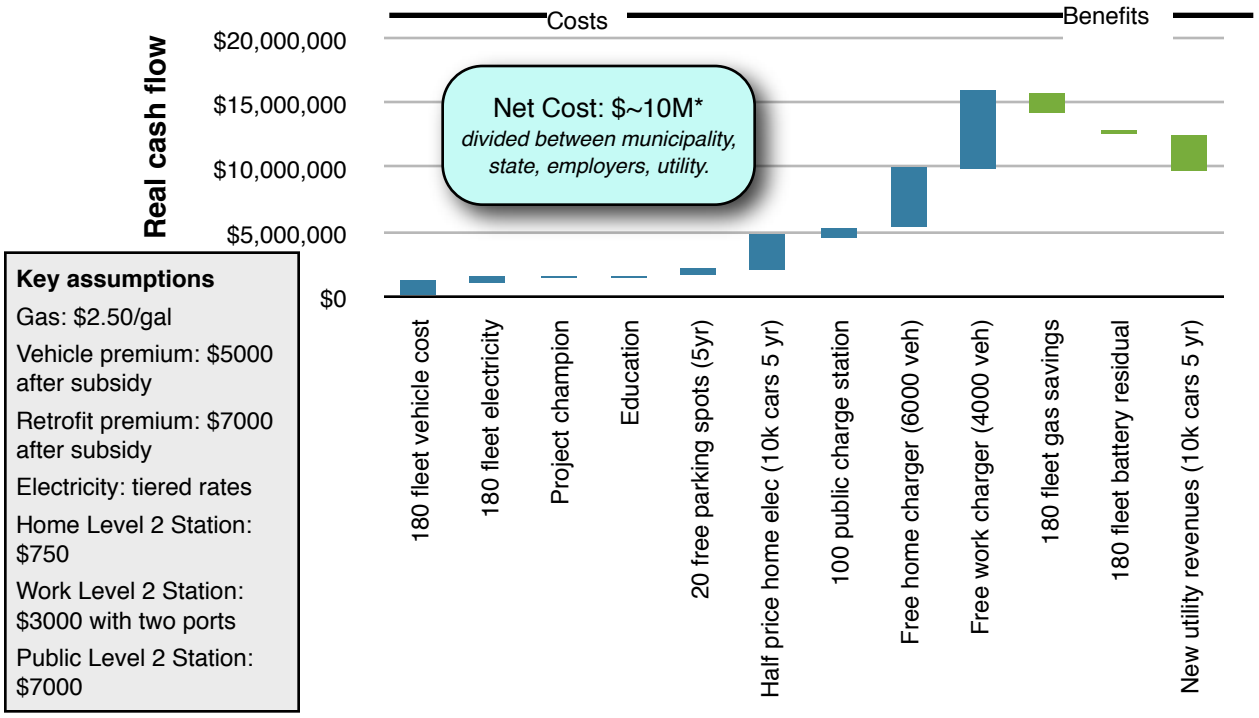


Figure 2: Jobs created by "must have" actions *and* 10,000 new plug in vehicles in 2014 based on Bureau of Labor Statistics multipliers

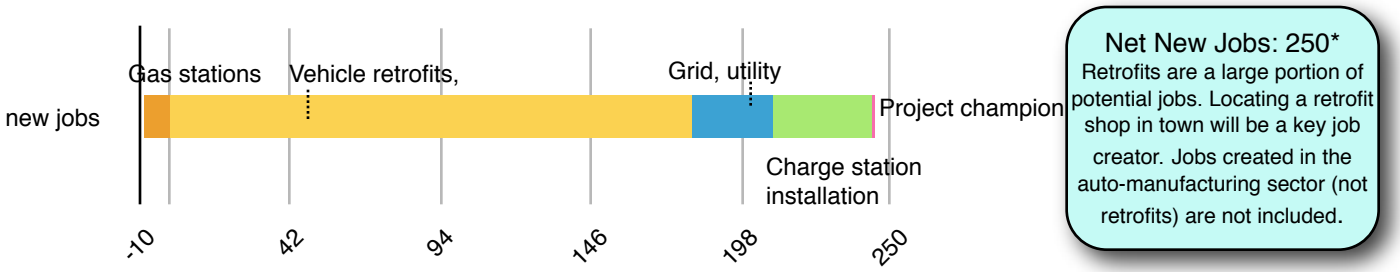


Figure 3: Reduction figures for meeting "ready" goal of 10,000 vehicles in five years

	# plug-ins	GHG savings in 2014 (tonnes CO_2-e/year)	Gallons of oil avoided in 2014 (gal/year)
Over 5 Years	10,000 (half retrofits)	9,750 in 2014, worth $400,000 at $40/tonne	2 million gallons avoided in 2014, or $5 million at $2.50/gal.

[1] Our hypothetical city is modeled on Denver, Colorado. In the first year, only conversions and low-speed EVs will be available.

[2] For the purposes of this figure fleets of 30 cars are assumed to be 50% new vehicles and 50% retrofits

Figure 4: Incremental Costs and Benefits of One Factory Model Car (3)

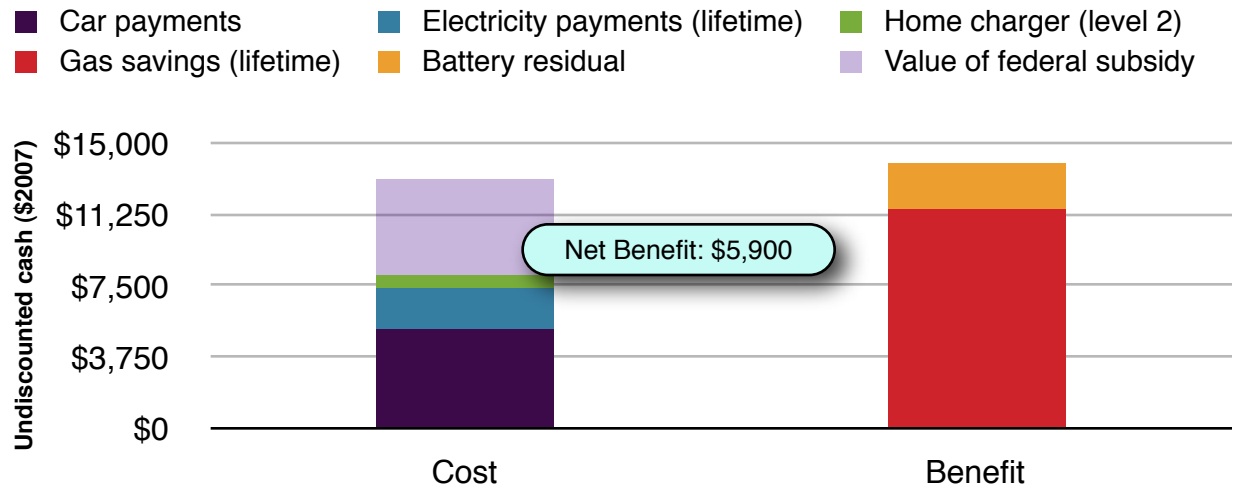


Figure 5: Incremental Costs and Benefits of One Retrofit Car (4)

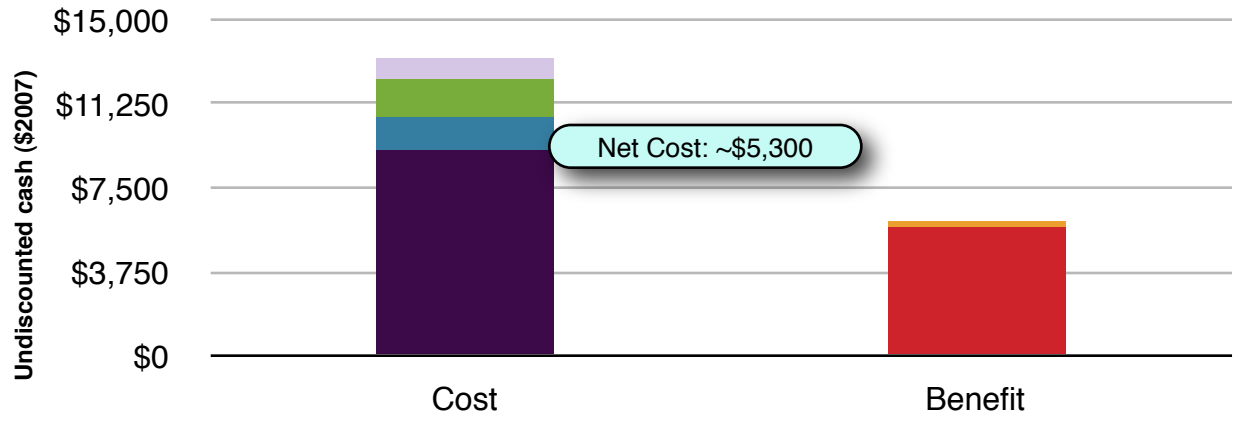
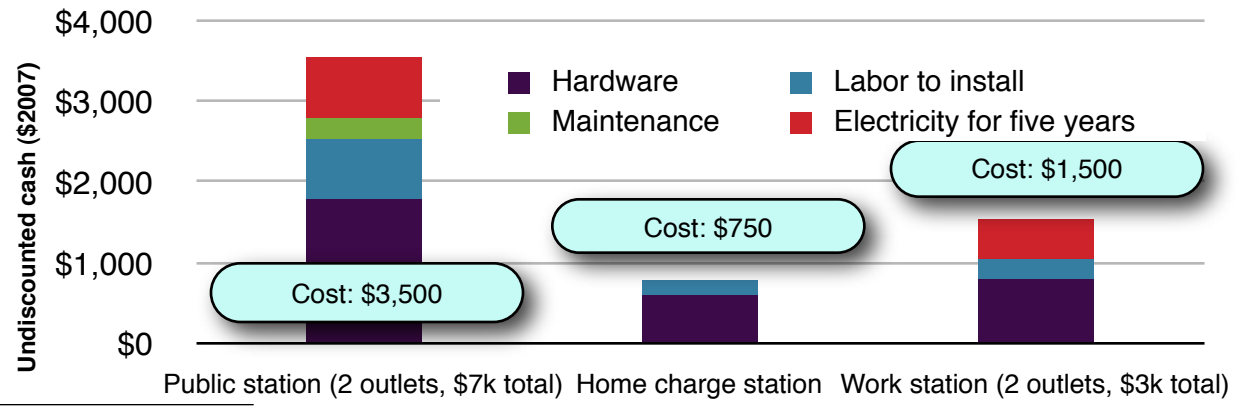


Figure 6: Costs Associated with One Level 2 (240V) Charge Station Per Outlet (5)



[3] Includes $5,000 assumed federal subsidy off $11,000 incremental cost over a $30,000 vehicle.
[4] Only includes cost of retrofit (not cost of vehicle that gets retrofitted). Includes $3,000 assumed federal subsidy off a $10,000 total cost. Retrofit has a smaller battery than factory model, hence smaller gas savings.
[5] Cost for charging stations vary greatly depending on where they are installed. Numbers shown here are based on industry interviews, and represent estimates for an average, existing building. Some public charge stations can cost half as much, or three times as much. Installing charge spots in new construction costs a small fraction of the price of installing in an existing building . We assume the public and work station will provide five years of free electricity.

Actor: Municipal Government

Here, we list the actions in which the municipal government could be primary actor, with an estimate of net cost. Note: many of these actions could be taken by state governments as well. Visit www.projectgetready.com for examples of implementation.

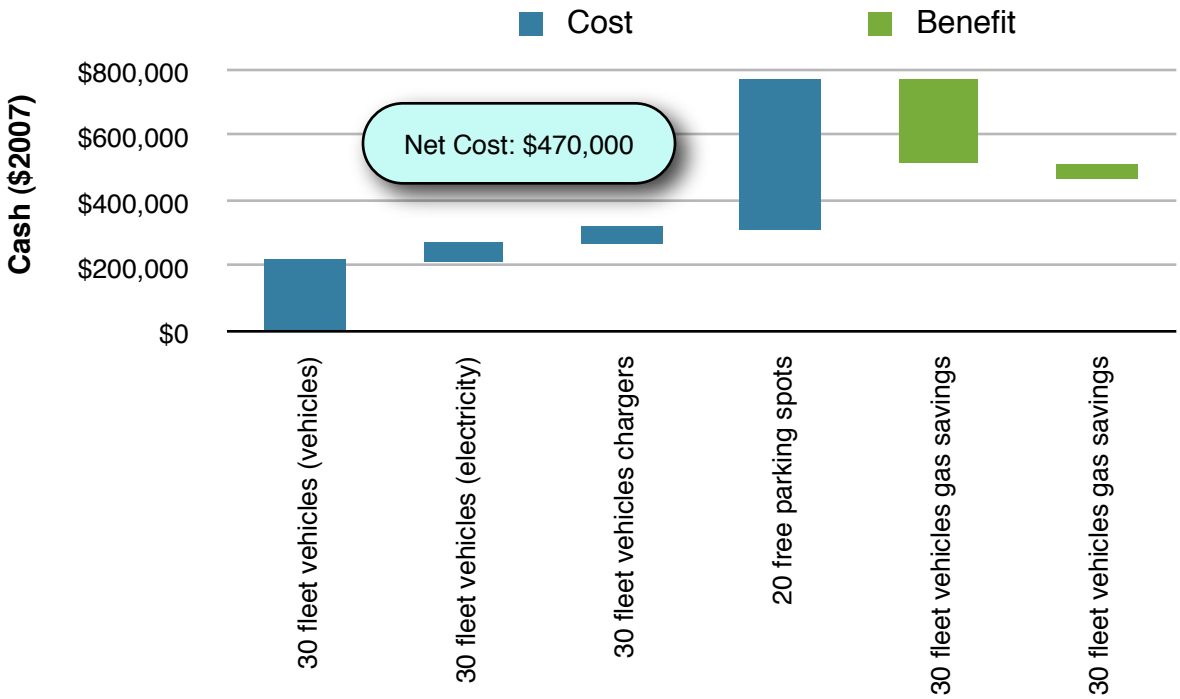
Action (with potential enablers)	Net Cost (+ means savings)
"Must Have" actions that ONLY municipal government can lead	
Participate in local/regional stakeholder council that meets regularly to create the plug-in readiness plan, and check-in on implementation.	n/a
Buy 30 plug-ins for municipal fleet over five years.	$13,000
Give free parking spots in desirable locations (for five years)	-$22,000 ea.
Fast track permitting for charging stations	n/a
Revise code for new buildings and renovations to be plug-in ready	n/a
Update municipal buying guidelines to include 'total environmental cost' of fleet ownership	n/a
"Must Have" actions that municipal governments OR another stakeholder can lead	
Assign one staff member to be the "champion" of the regional stakeholder council.	-$40,000
Bundle all incentives at point of purchase	n/a
Install 100 public charge spots in high-traffic zones/parking areas	-$700,000
Provide up to $3,000 coupon for free installation of 220V home charging (for 60% of vehicles assumed to want Level 2 home charging)	-$4,500,000
Create and implement basic consumer education plan, including basic educational materials and test drives/leases	-$100,000
"Nice to Have" actions for municipal governments	
Incentivize and subsidize local OEMs, suppliers, conversion shops for plug-ins.	n/a
Invest in technical education and worker transition assistance needed to train plug-in service technicians, encourage plug-in curricula in technical and community colleges, and create/fund modules in plug-in crash safety training for fire/police.	n/a
Sponsor battery warranty program to share the risk and to reduce the near-term cost of advanced batteries	To come*
Expand rebate, educational offerings	n/a
Enable plug-in roll-out in taxi fleets	n/a
Provide $3,000/vehicle incentive, direct to first 10,000 consumers	-$30,000,000
Enablers: direct rebate at the dealer, tax rebates, waiving of registration and other fees.	

*RMI will estimate these values in the coming months with data from our partners.

Municipal Government: Business Case

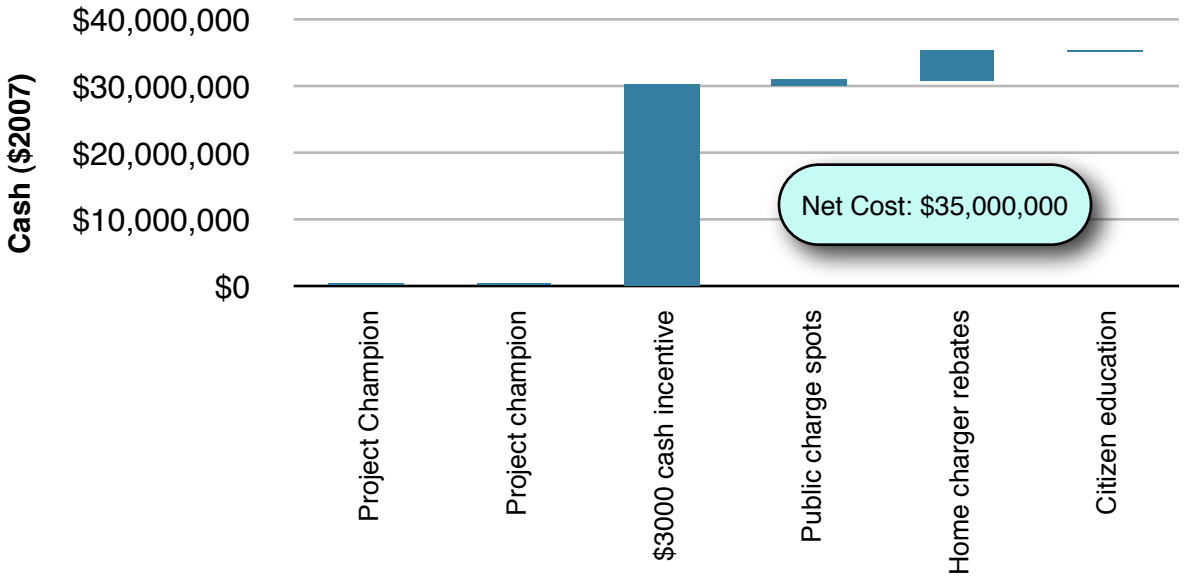
The following two waterfall chart present the costs and benefits of the actions described above for the municipal government over five years. For key assumptions, please see the last page of this menu. For more information about the case for individual actions, see Appendix A and to input your own assumptions into our calculator, please visit www.projectgetready.com.

Cost/Benefit for Municipal Government Actions Over Five Years: "Must Have" Gov't ONLY



Cost/Benefit for Municipal Government Actions Over Five Years: "Must Have" Gov't OR other

Local governments may not be able to take on all the costs below. In addition to sharing these costs, they can play a vital role in encouraging other stakeholders to take on these costs. In the coming months, RMI will be exploring the "indirect" benefits such as green branding, attracting green consumers/citizens, etc. to help encourage community stakeholders.



Non monetized benefits:
Recognition as city leader in green technology, green collar jobs, reduced air pollution and GHG emissions

Actor: Utility (and their regulators/grid operators)

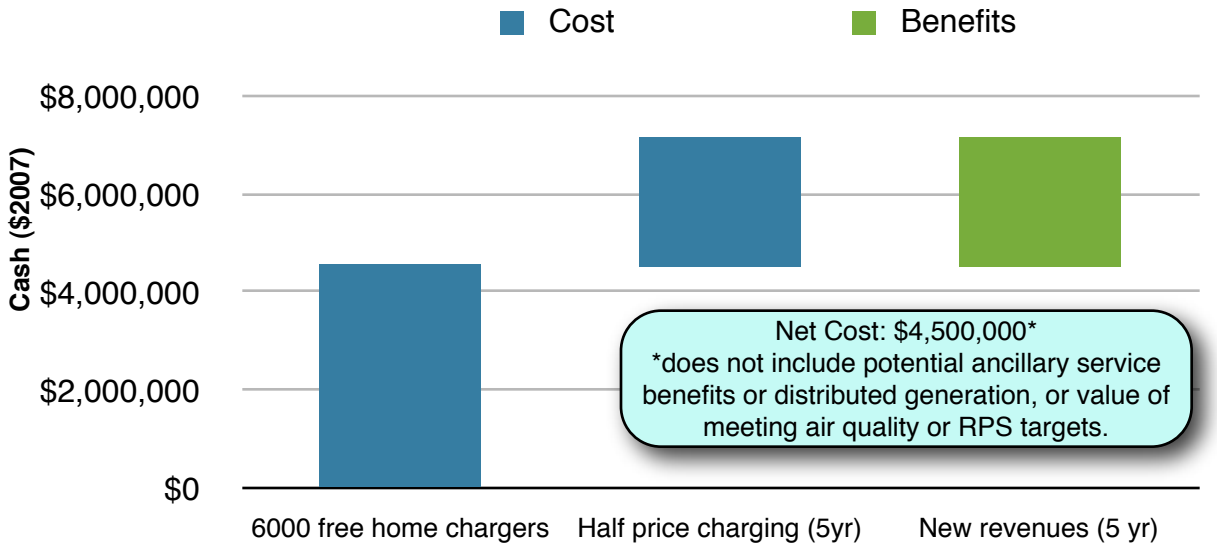
The utility has perhaps the most to gain financially in this new system (besides new businesses that emerge to serve plug-ins), and can provide funds, incentivized prices for electricity, and expertise in electrical connectivity to a plug-in ready community.

Action (with potential enablers)	Cost Benefit
"Must have" actions that ONLY utilities can lead	
Participate in local/regional stakeholder council that meets regularly to create the plug-in readiness plan, and check-in on implementation.	n/a
Provide free home charger/circuit installation for first 10,000 customers	-$4,500,000
Provide reduced-rate or free charging for 10,000 vehicles for 5 years	0
(we calculate revenues from 10,000 vehicles for an average utility to be ~$9M over five years)	
Tie free/reduced charging to "no charge" times or utility override power (though tiered rates should incentivize consumers to charge off-peak).	n/a
"Must have" actions that utilities OR another stakeholder could lead	
Sponsor 100 public charge spots in high-traffic zones and parking areas.	-$700,000
Commit to buy or convert 30 plug-ins over five years for corporate fleet.	$13,000
Contribute to education plan via cash, or using existing connection to customers.	-$100,000
Provide $3,000 plug-in purchase incentive to 10,000 customers.	-$30,000,000
Assign one staff member to be the "champion" of the regional stakeholder council.	-$40,000
"Nice to have" actions for utilities	
Install sub-meters (or Smart Grid) for plug-ins	n/a
Bundle plug-in purchase with a "green power only" utility contract and discounts on home solar, AMI installation, a smart grid upgrade, bike, bus pass, and/ or light rail pass to high-light plug-in role in the green lifestyle	n/a
Sponsor battery warranty program to share the risk and to reduce the near-term cost of advanced batteries	To come

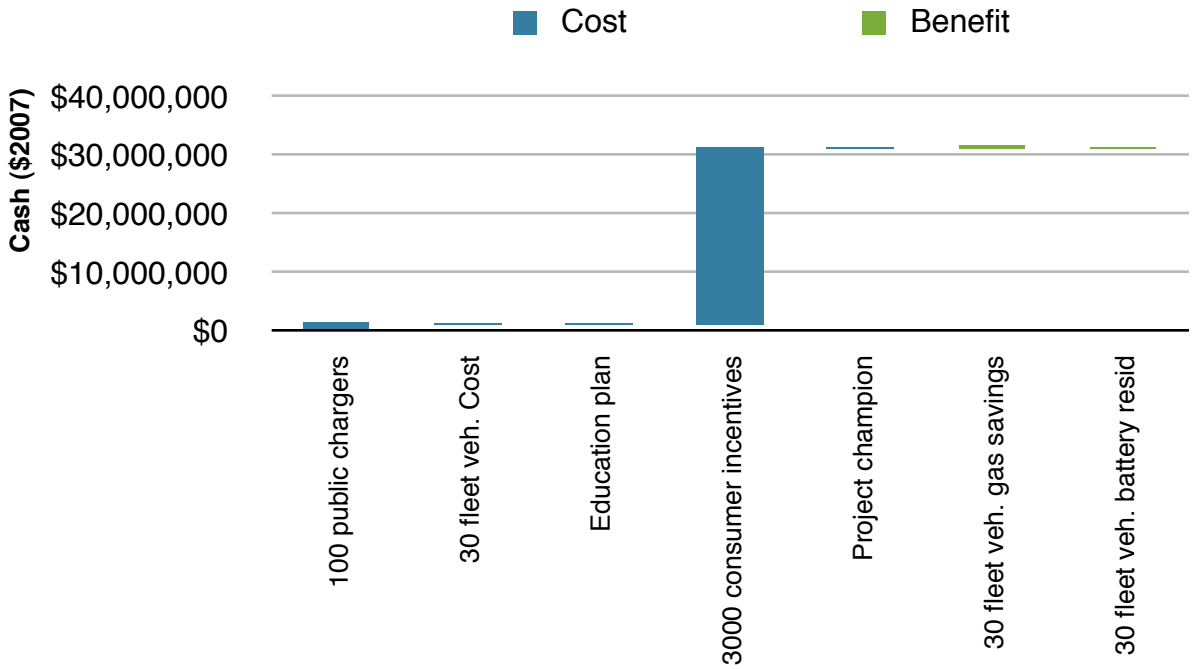
Utility: Business Case

Cost/Benefit for Utility Actions Over Five Years: "Must Have" Utility ONLY

Note: this does not reflect the fact that plug-ins offer new sales. IE: offering reduced rates "costs" the utility $14M, but the utility earns $14M in new revenue from plug-ins. This also does not reflect the potential ancillary service or load management benefits of plug-ins combined with Smart Grid.



Cost/Benefit for Utility Actions Over Five Years: "Must Have" Utility OR Other



Non monetized benefits:
Recognition as city leader in green technology, potential credit for CO_2-eq and criteria air pollutants saved from transport sector, leverage smart grid investments

Actor: Civic Groups

Project Get Ready, and the plug-in revolution, only succeed if consumers adopt plug-ins quickly. Civic groups, which connect citizens and act in the public interest, are a critical component of education, organization, and support.

Action (with potential enablers)	Cost Benefit
"Must Have" actions that ONLY civic groups can lead	
Participate in local/regional stakeholder council that meets regularly to create the plug-in readiness plan, and check-in on implementation.	n/a
Contribute to education plan	n/a
Provide a venue for interested citizens to register their intent to purchase an plug-in	To come
"Must Have" actions that civic groups OR another stakeholder could lead	
Sponsor public charge spots in high-traffic zones and parking areas.	~$7,000 per spot
Assign one staff member to be the "champion" of the regional stakeholder council.	-$40,000
"Nice to Have" actions for civic groups	
Provide plug-in "concierge" hotline to connect owners to trained mechanics, electricians, etc.	To come
Launch large scale marketing plan to highlight the "empowerment and fun" associated with plug-in while also highlighting energy use and security benefits, including heavy TV and radio advertising as well as website.	At least $2M
Develop materials to educate the drivers of tomorrow by reaching students of all levels (elementary- college) with related curricula	n/a

Civic Groups: Contributions

List of Potential In-Kind Donations: "Must Have" Civic Group ONLY

Please refer to page 5 for monetary costs associated with the following donations.

- Participate in local/regional stakeholder group: volunteer time, expertise, venues, convening power
- Contribute to education plan: volunteer time, expertise, money, citizen outreach tools/lists/other channels
- Venue to register plug-in vehicle ready citizens: volunteer time, website

List of In Kind Donations: "Must Have" Civic Group OR Other

- Sponsor public charge spots: money
- Project champion: 20 hours a week from one staffer

Actor: Local Businesses

Local businesses can provide three important functions in an plug-in-ready city: first, they can use their set of employees as an organizational unit; second, they can lend business planning expertise to the stakeholder council; and third, they can incorporate plug-ins into their own businesses, providing early demand. Since businesses range so dramatically in size and budget, we put forth these numbers as baselines, and recognize that different businesses should contribute in proportion to their size.

Action (with potential enablers)	Cost Benefit
"Must Have" Actions that ONLY local businesses can lead	
Participate in local/regional stakeholder council that meets regularly to create the plug-in readiness plan, and check-in on implementation.	n/a
Provide charging spots in parking deck, as an employee perk. *Larger business should aim for 30, Smaller businesses can provide one or two, as appropriate*	-$3,000 per spot with two outlets
"Must Have" Actions that local businesses OR another stakeholder could lead	
Sponsor public charge spots in high-traffic zones and parking areas (one for small businesses, five for large businesses).	-$7,000/ -$35,000
Commit to buy or convert 30 plug-ins over five years for your corporate fleet.	$13,000
Contribute to education plan.	-$100,000
Assign one staff member to be the "champion" of the regional stakeholder council.	-$40,000
Create "plug-in only" parking spots for customers (two for small businesses, five for large businesses).	-$6,000/ -$35,000
Large businesses give first 100 employees $3,000 incentive to purchase plug-in, small businesses give first five employees $500.	-$300,000/ -$2,500
"Nice to Have" actions for local businesses	
Provide greater incentives to employees, contribute to larger educational plan.	n/a
Technical education and worker transition assistance needed to rapidly train plug-in service technicians, encourage plug-in curricula in trade/technical and community colleges, as and create/fund modules in plug-in crash safety training for fire/police.	n/a

Local Business: Business Case

In the coming months, we will be developing a few business-specific cases, for example, the value to a retailer of having a high-profile charging station in their parking lot. In addition, we expect that business who get involved in Project Get Ready will have the following benefits:

- "Green" branding identity,
- Attract with early adopter consumers,
- Greenhouse gas emission reductions for employee commute,
- Early insight into the IT, entertainment, and other service opportunities associated with electrified vehicles,
- Better employee satisfaction, and
- (With a smart grid) potential for more demand response or energy storage capability, using blocks of employee/customer vehicles.

Actor: Other (Developers, Schools, Philanthropists, Dealers, Banks, Mechanics)

Certain specific businesses can contribute specialized skills, functions, and insight to getting their community plug-in ready. Of course, all local businesses should consider joining the stakeholder council.

Action (with potential enablers)	NPV in 5 years
"Must Have" Actions	
Developers: welcome, support and implement codes to make all new parking spots/ garages/driveways plug-in ready.	
Universities: contribute to consumer education programs	
Universities: buy 30 plug-ins for fleets	
Universities: build charging spots on-campus	
Universities: assign one staff member to who's job it is to keep the stakeholder council moving forward.	
Philanthropists: sponsor the "champion's" salary for the time they spend on this project.	
Philanthropists: sponsor individual public charging station installation (like park benches)	
Automotive dealers with banks: provide a mechanism to bundle all incentives as a direct rebate/cost reduction at the point of purchase.	
Automotive dealers with banks: set up special, low-rate financing for plug-ins.	
Local celebrities: drive an plug-in.	
State gov't (DOT): free highway tolls and access to HOV lanes for plug-ins	
"Nice to Have" actions	
Auto repair shops/electricians: train staff to service plug-ins, member of concierge service	
Automotive dealers with banks: set up special, low-rate financing for plug-ins.	
Banks/3rd parties: develop warrantee program for batteries	

Our assumptions can be explored by contacting the authors at smartgarage@rmi.org and visiting www.projectgetready.com. Gas was assumed to be $2.50/gallon. All numbers are estimates, provided to help communities estimate costs for getting ready, and will vary based on location and technology. Full community charters should verify these estimates with stakeholders in their own locality. All job numbers were created using the Bureau of Labor Statistics' national average job multiplier tables.

Web Resources

The Project Get Ready website provides users with a **searchable database** containing pain points city leaders may face, solution strategies to overcome those barriers and specific implementation tools needed to take action.

Users will have the opportunity to browse plug-in initiatives taking place across the globe for specific examples (such as: what are mechanisms for local governments to give vehicle rebates to consumers?) while also contributing their own ideas and experiences. Calculators designed to estimate the costs, revenue and jobs created in relation to specific actions based on local inputs are available, along with media kits and other educational documents outlining core plug-in technology details and why cities should get ready.

Contact Information

Project Get Ready is coordinated by the Rocky Mountain Institute, a 501(c)(3) based in Colorado.

Please visit our webiste: www.move.rmi.org

To contact the authors for more information or to become a technical advisor, please use the links at www.projectgetready.com, or write to smartgarage@rmi.org.

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