GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

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PART I: PROJECT INFORMATION

Project Title:	Integrated adoption of New Energy Vehicles in China		
Country(ies):	China	GEF Project ID:[1]	9226
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	150157
Other Executing Partner(s):	Ministry of Industries and Information Technology (MIIT)	Submission Date: Resubmission Date: Resubmission Date :	30 July 2015 14 August 2015 28 August 2015
GEF Focal Area(s):	Climate Change	Project Duration (Months)	36
Integrated Approach Pilot	IAP-Cities ☐ IAP-Commodities ☐ IAP-Food Security ☐	Corporate Program: SGP ☐	
Name of parent program:	n.a	Agency Fee ($)	848,350

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES[2]

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	**Trust Fund**	**(in $)**	
		GEF Project Financing	**Co-financing**
CCM-2 Program 3	GEFTF	8,930,000	117,000,000
Total Project Cost		8,930,000	117,000,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: Facilitate and scale up the integrated development of New Energy Vehicles (NEVs) and Renewable Energy (RE) in China.

Project Components	**Financing Type[3]**	**Project Outcomes**	**Project Outputs**	**Trust Fund**	**(in $)**	
					GEF Project Financing	**Co-financing**
1. Policies and Programmes	TA	Technical standards and guidelines are drafted to provide regulatory elements, leading to higher adoption of NEV schemes by city Governments, vehicle manufacturers and consumers	1.1. National Guidelines for the integration of Electric Vehicles (EVs) in the electricity grid are made available to Government agencies for adoption 1.2. Technical standards issued for the integration of EVs in the electricity grid, including those for smart charging systems, vehicles to grid (V2G) connections, mobile charging systems, and secondary uses of EV batteries	GEFTF	1,000,000	4,000,000

[1] Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.
[2] When completing Table A, refer to the excerpts on *GEF 6 Results Frameworks for GETF, LDCF and SCCF*.
[3] Financing type can be either investment or technical assistance.

			1.3. Analysis of domestic and international carbon policies to promote a higher adoption of renewable energy (RE) in the grids supplying electricity to power NEVs; to be proposed to Government agencies for adoption 1.4. Monitoring and evaluation of policy performance, through life cycle assessments of the city level pilots; evaluating the technological options social, economic and environmental dimensions 1.5 Replication plan for the adoption of the proposed policies, allowing other pilot cities to rapidly adopt them			
2. Institutional Capacity Building	TA	The institutional capacities and public awareness of policymakers at national stakeholder on the use of integrated EV-SG(Smart Grid)-RE systems	2.1. A training programme for 100 policy makers on low carbon technology integration and promotion policies in other countries 2.2. Four workshops conducted to validate the regulatory framework 2.3.International forums organized to promote best practices learned in Yancheng and Shanghai with participants from Central Government agencies and EV demonstration cities	GEFTF	880,000	2,800,000
3. Piloting of Technical Measures and Commercialization Approaches	Inv	Two city scale projects are piloted to demonstrate the technology integration (Yancheng) and	3.1. Yancheng pilot infrastructure developed: 520 smart charging devices for EVs; 1 static energy	GEFTF	2,650,000	91,000,000

		innovative business models for the promotion of EV fleets (Shanghai)	storage systems to utilize secondary uses of EV batteries; 10 mobile charging sites; and a dedicated mini grid of 450 KW of wind generation; and vehicle to grid (V2G) system 3.2. Yancheng fleet of 1,000 EVs used to test mobile and smart charging systems, consisting of 700 trucks, 50 taxis, 10 buses, 100 fleet passenger vehicles and 140 private passenger vehicles (including car rental and car sharing) 3.3. Scale up of Shanghai infrastructure from current pilot to 2,500 charging piles and 1,500 dedicated EV parking spaces 3.4. Shanghai business models for car sharing system expanded from the current pilot of 800 vehicles in 72 sites in Jiading district to scale up its operations to 2,000 vehicles in 500 sites (EV card fleet) in all Shanghai; and to develop the 200 pure electric buses service (e-drive fleet)			
	TA		3.5. Yancheng control infrastructure developed, consisting of ICT energy management center to collect data on storage systems 3.6. Shanghai technology validation: a demonstration network system based on the EV battery storage (secondary	GEFTF	2,000,000	13,000,000

			use) and a charging infrastructure information platform, which monitors infrastructure use and booking service			
4. Awareness Raising and Dissemination amongst Manufacturers, Suppliers and Consumers	TA	Increased capacities of stakeholders, including awareness, research and development, manufacture, operation, and maintenance	4.1. Dissemination of technical standards amongst 15 vehicle manufacturers and charging equipment producers 4.2. Awareness raising of the car sharing scheme amongst other pilot cities promoting NEVs 4.3. Promotion of social platforms such as Shanghai user and enterprise owner clubs in Yancheng and other pilot cities promoting NEVs 4.4. A RE-EV demonstration center in Yancheng created to raise awareness amongst 2,000 prospective users of NEV	GEFTF	1,500,000	3,000,000
5. Monitoring and Evaluation (M&E)	TA	A robust mechanism for the M&E is put in place to ensure the attainment of project outcomes	5.1. Project monitoring plan designed and executed 5.2. Mid-term review and terminal project evaluations conducted 5.3. Recommendations determined for long term project sustainability, as part of the terminal evaluation follow-up actions	GEFTF	475,000	650,000
			Subtotal		8,505,000	114,450,000
			Project Management Cost (PMC)[4]	GEFTF	425,000	2,550,000
			Total Project Cost		8,930,000	117,000,00

[4] For GEF Project Financing up to $2 million, PMC could be up to10% of the subtotal; above $2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

			0

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: ( )

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount ($)
Recipient Government	Ministry of Industries and Information Technology (MIIT)	In-kind	650,000
Recipient Government	Yancheng City Government	Grants	5,600,000
Recipient Government	Yancheng City Government	In-kind	8,000,000
Recipient Government	Shanghai Jiading District Government	Grants	1,500,000
Private Sector	Yancheng smart grid & smart charging operator	Grants	12,400,000
Private Sector	Yancheng RE developer (solar power, wind power)	Grants	16,800,000
Private Sector	Yancheng (NEV fleet operator)	Grants	17,500,000
Private Sector	Shanghai International Automobile City Company	Grants	30,500,000
Private Sector	Shanghai International Automobile City Company	In-kind	22,350,000
Private Sector	SAE - China	In-kind	1,200,000
GEF Agency	UNIDO	Grants	100,000
GEF Agency	UNIDO	In-kind	400,000
Total Co-financing			117,000,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS [a)]

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in $)		
					GEF Project Financing (a)	Agency Fee (b)[b)]	Total (c)=a+b
UNIDO	GEFTF	China	Climate Change	(select as applicable)	8,930,000	848,350	9,778,350
Total GEF Resources					8,930,000	848,350	9,778,350

a) Refer to the Fee Policy for GEF Partner Agencies.

E. PROJECT PREPARATION GRANT (PPG)[5]

Is Project Preparation Grant requested? Yes ☒ No ☐ If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: $200,000				PPG Agency Fee: $19,000			
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in $)		
					PPG (a)	Agency Fee[6] (b)	Total c = a + b
UNIDO	GEF TF	China	Climate Change	(select as applicable)	200,000	19,000	219,000
Total PPG Amount					**200,000**	**19,000**	**219,000**

[5] PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to $50k for PF up to$2m (for MSP); up to $100k for PF up to $3m; $150k for PF up to $6m; $200k for PF up to $10m; and $300k for PF above $10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

[6] PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS[7]

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	*Hectares*
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	*Hectares*
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	*Number of freshwater basins*
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	*Percent of fisheries, by volume*
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO_{2e} mitigated (include both direct and indirect)	*864,458 tCO2e per year* (See Part II 1.4)
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	*metric tons*
	Reduction of 1000 tons of Mercury	*metric tons*
	Phase-out of 303.44 tons of ODP (HCFC)	*ODP tons*
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	*Number of Countries:*
	Functional environmental information systems are established to support decision-making in at least 10 countries	*Number of Countries:*

PART II: PROJECT JUSTIFICATION

1. *Project Description.* Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area[8] strategies, with a brief description of expected outcomes and components of the project, 4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 5) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 6) innovation, sustainability and potential for scaling up.

1.1. The global environmental and/or adaptation problems, root causes and barriers to be addressed

The energy and transport sectors are two major contributors to greenhouse gas (GHG) emissions. According to IPCC Fifth Assessment Report, GHG emissions grew 130% and 220% respectively from 1970 to 2000 and 2000 to 2010, of which 47% and 11% of that respectively came from the energy sector and transport sector. Amongst the key measures identified to mitigate emission, the use of renewable energy (RE) sources and EV has been identified.

China is the largest vehicle sales market in the world, with more than 23 million sales volume and 150 million car ownership in 2014. From 2005 to 2015, the growth rate of car ownership reached 19.1%, compared with 11.1% from

[7] Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the *GEF-6 Programming Directions*, will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

[8] For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which Aichi Target(s) the project will directly contribute to achieving.

1995 to 2005. And considering the large gap from the developed countries, the car ownership level will continue to grow rapidly.

The rapid growth on car ownership is the significant factor on the increase of energy consumption, urban air pollution and GHG emissions. China is the world's largest energy consumer and producer, and consumed 4.26 billion tons of standard coal equivalent; with coal representing two thirds of its supply. There is a strong reliance on imported oil accounting for 58.1% of oil supply in 2014. Road transport consumed about 50% and 90% of the national total diesel and gasoline respectively each year.

China is one of the largest global GHG emitters, with 8,250 $MtCO_2$ emitted in 2012; of which 50% were released by heat and power generation, followed by the industrial sector contributing to 31%. The transport sector accounted for 9% of emissions, of which 80% are from road transport (IEA, 2014).

NEV is one of the most important developing directions of national strategy. In 2010, NEV was listed as one of China's seven major strategic emerging industry of the State Council, regarding it as the national priority supporting area. In May 2014, Xi Jinping, President of China, pointed that: development of NEVs is the only way for building a powerful nation. In May 2015, the State Council promulgated "Made in China 2025", regarding NEVs as one of the top ten key development fields.

The main technical pathway to realize large-scale energy-savings and emission reductions in the automotive industry is through the development of 'New Energy Vehicle' (NEV) technologies. These advanced-powertrain vehicle technologies, which include electric battery and plug-in hybrid technologies have the advantages of high energy efficiency (EE) and zero tail pipe emissions. While the use of EVs reduces the demand on imported liquid fuels, improving energy security; it does not reduce environmental impacts if electricity is mainly sourced from coal fired power generation.

China has a dominant global manufacturing position, which ensures availability of all the required technologies for the proposed project can be procured domestically. In addition to the over 23 million manufactured conventional vehicles, the production of NEVs in China in June 2015 reached 19,153 units (12,864 Battery Electric Vehicles and 6,289 units Plug-in Hybrid Electric Vehicles) and their sales was of 21,055 units (China Association of Automobile Manufacturers, 2015). Finally, China manufacturing of solar PV modules represents 64% of the global share (REN 21, 2015).

Yancheng city

Yancheng City in the province of Jiangsu has been identified amongst the 88 NEV demonstration cities in the phase 2. The key criteria for its selection by the Government have been:

- Defining a Clear policy target to have 3,200 EVs in its fleet by 2015 and 20,000 EVs by 2020.
- Having a cluster of automotive sector enterprises operating since 2010, Yancheng new energy automobile industrial park, including automobile manufacturers, component suppliers, ICT and infrastructure developers and research institutes. Yancheng is also home to solar panel modules manufacturer Trina.
- Unique to other NEV demonstration cities, Yancheng has high availability of RE resources, totaling up to 14.7GW, representing two thirds of total wind power resources in Jiangsu Province. In 2013, wind and solar produced 11% of total electricity supply in Yancheng. Finally, the city has expansion plans to develop 3 GW wind and 1 GW solar power capacity by 2015.

In Yancheng, installed wind and solar power capacity was about 23.36% of the total capacity, however, renewable electricity provided only 11% of total electricity supply. At the same time, many wind power plants were built and solar power panels were placed, however the connection to the grids is a concern due to the typical intermittency of RE sources, which results in electricity produced in off-peak hours being discarded. In the case of Yancheng, an average of 10% of the RE produced is discarded.

Jiading district, Shanghai

The Jiading district of Shanghai has been a quick adopter of policies and technologies to promote the use of EVs since 2013. By February if 2015, the NEV population in Shanghai represented 16 % of the domestic fleet in China

The district has been identified amongst the 88 NEV demonstration cities in the phase 2. The key criterion for its selection by the national government has been:

- Clear policy target to have 13,000 EVs by 2015.
- The establishment of the China (Shanghai) International EV Demonstration Zone, combining urbanization and development model, with a strong industrial base focuses on the automotive subsector.
- A cluster of vehicle manufacturers, like SAIC Motor and auto part companies.

The power load in Shanghai shows the characteristic of high power consumption as well as a big peak and off-peak difference. The Shanghai Power Company estimated that the peak and off-peak power difference reached 40-45%. Moreover, Shanghai has abundant solar energy resources and a distributed PV solar system. Therefore EV will take full advantage of the off-peak power and solar power to balance the demand.

The policy package introduced by the regional Government includes promotion policies, advises in the energy saving and environmental benefits of NEVs, provides subsidies to both fleet and domestic consumers of NEVs. These policies have shown positive results for the district, such as the EV sales booming in 2014, with 581 NEVs sold in 2013 and 10,886 in 2014.

Shanghai has also been successful in integration of R&D systems to support their EV deployment, by creating three technological platforms and four purpose built research centers, namely:

Shanghai has promoted knowledge exchange through the establishment of three global forum dissemination events including:

- International EV Pilot Cities and Industrial Development Forum: a biannual international forum to disseminate the latest trends in EV policies and technologies.
- The Electric Vehicles and Key Components Exhibition: which promotes commercialization of new technologies and is organized on the sidelines of the world renowned Shanghai Auto Show,
- The Electric Vehicle Challenge Competition: which attracts the Chinese and foreign OEMs to participate

Finally, Shanghai has also been an innovator in addressing societal needs, by focusing on the latest trends in consumer behavior. This is reflected in the creation of:

- a company to develop a local car sharing scheme;
- an Owner Club, for NEV owner to share their experience and interest for NEVs; and
- an Enterprise Club, a business to business (B2B) promotion model. It was created as a partnership between SAE, Tongji University and the operator of the EV area (EVZONE), with the goal of developing relationships between enterprises in the NEV value chain. This club promotes information sharing between the members.

Renewable Energy generation and power storage

The national Government has set an ambitious promotion policy to develop RE technologies, including a concrete target set in the 12th Five-Year Plan (FYP) 2011-2015 which targets to increase non-fossil energy to 11.4 percent of total energy use (including hydro, nuclear and RE). This target, fueled by significant private investment has translated into a surge of RE capacity, which since 2010 Since 2010, RE generating capacity in China has increased with the yearly growth rate of 15%. Renewables currently provide 32% of China's electricity generating capacity. The capacity of non-hydro renewable sources accounts for 134GW in 2014of which wind power represents 96GW, solar 28GW and biomass approximately 9GW.

The growth in RE is significant however its contribution to the energy consumption is still limited. In 2014, wind and solar capacity in China were about 9.2% of total installed capacity, while they contributed only with 3.2% of total electricity generation. In a baseline scenario, EV and RE will grow in a standalone way and shall grow to meet the national targets of 11.4% RE sources and 500,000 NEVs by 2015. These actions will be supported by the existing and planned national projects including the 88 NEV city pilots.

Finally, it is important to note the fact that EVs are not combined with RE and smart grid which limits its potential of energy savings and emissions reduction. While EV continues to be seen as a normal electric device, its energy storage feature is not fully leveraged. Without any control of charging time periods, charging EVs may create a new peak load when vehicles are charged during peak hours. If charging periods could be controlled, then there would be a source to utilize the off-peak RE generated by recharging vehicle batteries and the grid load would be more balanced.

The integration of dedicated RE grid and NEV technologies and their V2G control systems is illustrated in the diagram below.

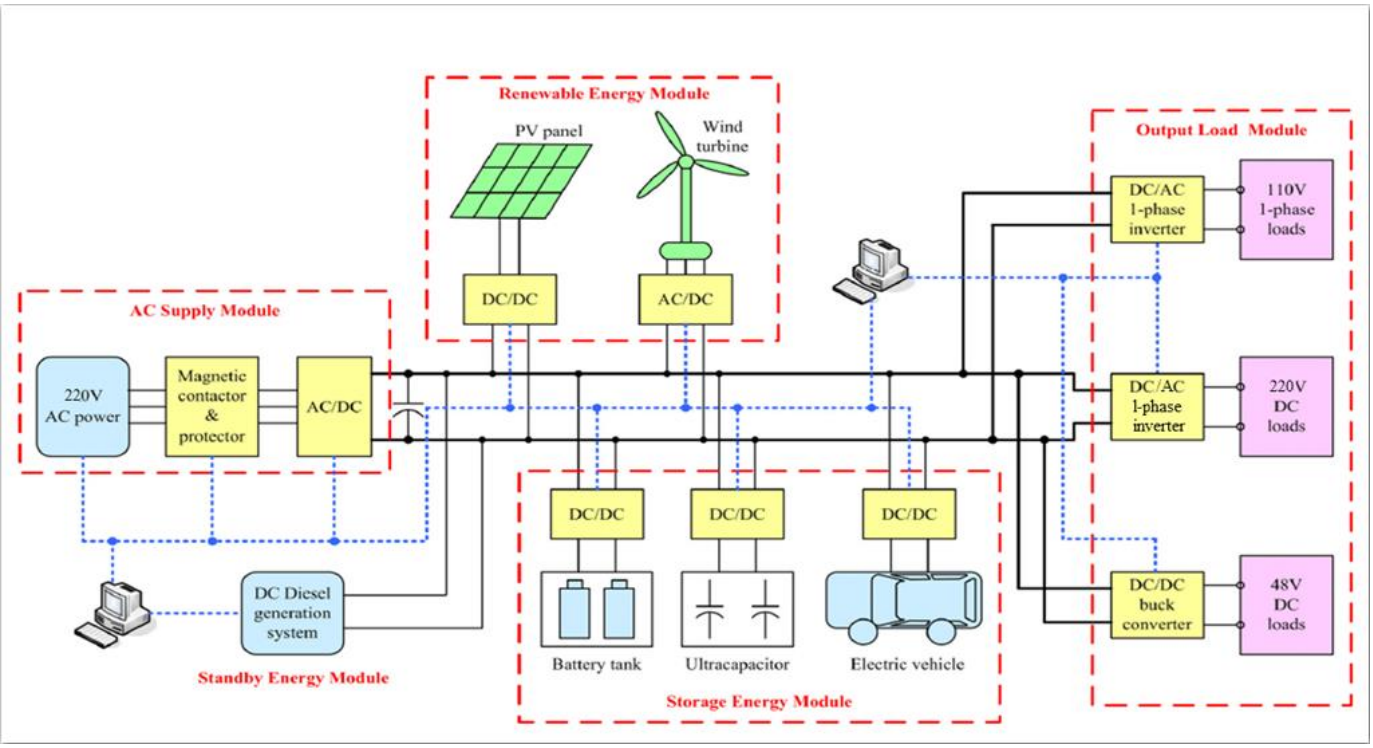


Figure 1 – NEV supply and energy storage cycle (Shanghai Electric Vehicles International Pilot City, 2015)

Carbon crediting schemes and pilot carbon markets

Automotive industry firms have identified mechanisms to mitigate the future emission of the vehicles they place in the market. Vehicles for ownership and rent are being marketed as carbon neutral. OEMs and large rental companies are buying domestic and international offsets to mitigate the combustion of fossil fuel in vehicles. Examples are found in both developed and developing countries, and involve offsets from both the power generation and the forestry sector.

China has launched a pilot programme to develop 7 regional carbon markets in 2013, and in February 2015 the NDRC has announced the scale up and launch of a national carbon market for 2016. The pilot carbon markets in Beijing and Shanghai, which have been operational since 2013, cover the emission from the public transport sector, namely the operations of metro, rail and airports.

EV could be marketed under a carbon neutral scheme, and rather than purchasing offsets, manufacturers or distributors could stimulate the investment in RE power generation.

1.2. The baseline scenario or any associated baseline projects

In 2012, to respond to the energy and environmental challenges, the Chinese Government released the "Energy Saving and New Energy Vehicles Industry Development Plan (2012-2020)" and put forward the development goals on national NEVs. This policy set clear policy targets for the sector, of having 500,000 and 5,000,000 NEVs in operation by 2015 and 2020 respectively. To achieve this, China has conducted a NEV demonstration at city level in two phases: phase 1 demonstrations (2009 to 2012) were conducted in 25 cities and phase 2 demonstrations (2013-2015) are underway for 88 cities. In both demonstration phases at city level, it was the central government who choose the cities based on their geographic, social and economic diversity and representativeness, existing foundation and/or preparation work in NEVs and demonstrated interest by the local regions to be a pilot location. Additional details on the city pilots are presented in Annex A.

In addition, the Plan explicitly puts forward an overall target of reducing the average fuel consumption of passenger vehicles down to 6.9 L / 100 km and 5.0 L / 100 km by 2015 and 2020 respectively, which consequently encouraged vehicle companies to develop NEVs.

Furthermore, the Central Government and City Governments have provided subsidies for NEV purchase in the demonstration cities to stimulate the development and deployment of NEVs. The Government has also announced that the subsidies will continue until 2020 as a support measure to meet the targets set.

China is not only actively promoting NEVs domestically, but also in the international dimension. China has been leading, jointly with the United States, the Electric Vehicles Initiative (EVI) of the Clean Energy Ministerial (CEM) process, since 2010. The initiative seeks to facilitate the global deployment of 20 million EVs, including plug-in hybrid electric vehicles and fuel cell vehicles, by 2020. This will be achieved by encouraging the development of national NEV deployment goals; leading a global network of cities to share experiences from early EV deployment in urban areas and regions; sharing information on public investment in research, development, and demonstration; developing programmes to ensure that the gaps in vehicle technology development are being addressed; and engaging private-sector stakeholders to discuss the respective roles of industry and government in the EV market.

While the Government has set ambitious targets for the development of NEV at national level, its development lags behind. According to the data by the Ministry of Industry and Information Technology (MIIT), by the end of 2014, 119,000 NEVs were produced in China. In 2014, 85,000 NEVs were sold, which is still short from the planned target of 500,000 units on the road in 2015. The main barriers for EV development and deployment in China include:

- High ownership cost, a typical gasoline small segment car is 10,000 to 16,000 USD (60,000 to 100,000 RMB) while a battery electric car is in the range of 30,000 USD to 40,000 USD (180,000 to 240,000 RMB). Even when Central Government funded or locally funded subsidies of 10,000 USD (60,000 RMB) are considered, a small electric car is still 60% more expensive than a gasoline car.

- Limited access to charging infrastructure. Very few public charging devices have been set up. The challenges of installing such devices include land availability in urban areas, grid capacity limits and safety concerns. For example, by end of 2013 in Yancheng, there were only 100 charging poles and one charging station in place.

- Concerns on EV's fuel lifecycle emissions if electricity to charge the EVs is sourced 75.3%, from coal fired power generation. Emissions of new energy life cycle have been controversial all the time. A "Well to Wheels" study by Tsinghua University in 2013 indicates that the fuel cycle emissions of a battery car powered by the grid are 250g CO2/km, only a little lower than that of a gasoline car, of 269g CO2/km.

Moreover, promoting RE for power generation, including the supply of electricity to NEV, has been identified as one of the countermeasures in the national strategy to address energy and environmental problems in both sectors.

Demonstration of the integration of such measures is already in place in several European countries, Japan and the United States.

In a baseline scenario, actions are taken to achieve the national targets of 500,000 NEVs and 11.4% share of RE in the electricity mix by 2015. Such actions include the achievement of the policies and programmes which are underway in the 88 NEV city pilots. While EVs continue to be seen as a normal electric device, its energy storage feature is not fully leveraged. Charging infrastructure will be developed by City Governments but their rate of development is hard to predict.

Among the baseline projects, it is worth mentioning an additional initiative by SAE-China and UNIDO: the "Vehicle Technologies in China", which is a policy research project funded by the China International Centre for Economic and Technical Exchanges (CICETE) which will focus on the commercialization pathways for NEVs by developing a detailed analysis of various NEV technologies and their markets. A technology roadmap for the commercialization of the integrated application of NEVs and RE will be established under this component. In this regard a research on the technical and policy status of NEVs and RE as well as the resource availability of RE will be carried out. Furthermore, the main development obstacles will be analyzed and evaluated. Technology roadmaps will be defined by conducting detailed assessments. Recommendations on how to scale up NEV commercialization in China will be provided to both policy makers (MOF, MIIT, NDRC, MOST, etc.) and industry players. Moreover, a policy framework to support the commercialization will be developed.

In the National Energy Plan 2011-2015 released by the State Council in January 2013, energy supply will be reformed, by developing "distributed energy, smart grid, charging infrastructure for electric vehicles", "smart grid to integrate renewable electricity, distributed energy, electric vehicles and realize the interaction between power users and power systems" and "charging infrastructure for electric vehicles to promote low carbon fuels for transport". Hence the integration of EV with RE has been identified as one of the central measures to promote both EV and RE.

Therefore the project encourages EV-RE integration; however, detailed policy and standards regulation to facilitate the adoption of these technologies have not yet been developed.

The main barriers to the integration of EV-RE are as follows:

- Weak regulatory and policy framework, since it is an emerging cross-sector area, there is no policy explicitly promoting integration of EV and RE. For example there is no favorable policy for ICT management center building and operation, or smart charging infrastructure construction.
- Lack of implementation guidelines for EV and RE, such as city planning for distributed energy, smart charging infrastructure building, pricing for electricity from storage systems and V2G.
- Limited capacity for implementing the strategy, developing policies and management structures at provincial and city levels. Lack of knowledge from policymakers on EV-RE.
- Absence of standards, such as smart charging, mobile charging, ICT management, V2G, secondary use of EV battery.
- Some EV-RE integration technologies are not proved in field test, such as smart charging and V2G.

The proposed project aims to adopt the following measures to address those barriers:

- Conduct a regulatory study to asses a national policy framework which removes policies and institutional barriers.
- Develop technical standards to remove technical and market barriers.
- Increase capability amongst policymakers at the national level to develop an adequate framework to promote RE-EV integration.
- Investigate the use of carbon crediting or pricing schemes to promote the synergetic mitigation goals of integrating NEV and RE technologies.
- Set up smart charging devices and mobile charging systems to enable charging optimization. Test a RE smart grid (ICT energy management center), V2G and energy storage system to manage EV charging and grid interaction.

- Demonstrate the EV-RE integration in a pilot scale in Yancheng City and also scaling up a pilot for market promotion in Jiading District.
- Raise awareness and acceptance amongst consumers of NEVs.

1.3. The proposed alternative scenario, with a brief description of expected outcomes and components of the project

In the next 6 years, the Chinese Government will adopt measures to deploy both RE and EVs independently. Under that scheme, significant efforts will be made at a national and city level to deploy NEVs which will consume power from electricity provided by coal fired grids.

In this context benefits will be obtained by reducing the consumption of liquid fuels, while translating the need for energy resources to increased electricity demand from the coal fired grid.

Unless additionally efforts are made to ensure a wider integration of renewables for transport, it is unlikely that achieving a lower emission transport system will be attained at national scale. This project is designed to promote EVs running on RE by deploying smart grid and smart charging infrastructure.

The project aims to support the Ministry of Industry and Information Technology (MIIT) in the development of policies, technologies and standard system to promote development of NEV and RE, and carry out integrated demonstration of the policies and technology standards in areas which have extensive experience in this sector.

This project will realize the distributed utilization of RE in the NEV field, improve EE from the perspective of vehicle life cycle, and explore the business model to promote integrated development of NEVs, clean electricity and smart grid to maximize their potential in energy conservation and emission reduction.

This project focuses on the comprehensive utilization of NEVs and RE. It aims to remove the main policy obstacles in the development, establish a technical roadmap and a standard system, propose and validate relevant technical solutions, carry out capacity building among stakeholders and improve public awareness, and ultimately realize the commercialization of the integrated promotion of NEV and RE.

The proposed project is in line with the Objective 2 of GEF 6 Climate Change Focal Area which aims to demonstrate systemic impacts of mitigation options, which in this case involve both the reduction of liquid fossil fuels as well as electricity generated form fossil sources. In particular, the project contributes to the objectives of Program 3, to promote integrated low emission urban system, by helping Chinses cities shift towards low emission urban development.

Component 1: Policies and Programmes

This component aims to establish a favorable policy environment to support integrating promotion of NEV and RE.

National guidelines for the integrative development of NEVs and RE will be established by MIIT, Ministry of Finance, Ministry of Science and Technology and National Development and Reform Commission.

This component is expected to establish a standard and regulation system adapted to the commercialization of the integrative application of NEV and RE. To accomplish this output, a joint standard research committee will be set up with the direction of MIIT in which the enterprises and institutions in vehicle and energy fields participate. Additionally, the following activities will be conducted: (a) research and constitute the framework for the standards and regulations adapted to the integrated development of NEVs and RE; (b) establish the development plan for standards; (c) Develop and publish technical standards, including standards for RE integration, standards for integration of vehicles and the grid and vehicle standards adapted to the RE application.

Specifically, there will be a set of standards developed under this component, in order to improve the technical standard system, provide the relevant enterprises to design and manufacture products which are compatible across the value chain and increase investment in this field. These standards include:

- RE integration standards: technical specification of NEV distributed utilization of the wind and solar power.
- Integration of vehicles and the grid standards: technical specification and safety requirement involving V2G technology.
  Vehicle standards adapted to the RE application: technical specification, safety requirement and authorization standards of mobile charging vehicle; standards concerning battery cascade utilization including battery state estimation methods and regulations concerning battery recovery and utilization.

The proposed project will actively engage experts from the National Technical Committee of Auto Standardization (NTCAS), as well as other relevant Government Bodies who participate in the standardization process, such the Standardization Administration of the People's Republic of China. The private sector will be encouraged to participate in technical committees

The scope of this component includes a study for evaluating the use of carbon trading / carbon crediting as policy tool to reduce GHG emission, from NEVs-RE development. In other words, the study seeks to incentivize GHG mitigation though clean energy technology integration. Business models will be investigated as they operate on the ground such as the car sharing initiative in Shanghai. The existing 7 pilot carbon trading schemes in Chinese cities will be considered.

The component will design a methodology to assess the performance of policies used in the pilot cuties. This M&E action targeted at the policy level aims to help policymakers in the proposed plot cities as well as in other Chinese in better selecting future policies.

Finally, this project will elaborate a short replication guide aimed at national policymakers, highlighting the lessons learned in technological adoption for NEV-V2G-RE integration.

C*omponent 2: Institutional Capacity Building*

As a new and cross-sectoral approach, it's critical to raise the awareness of policymakers in holistic issues which are needed to implement RE-SG-EV programs. Most of these stakeholders are responsible for a single sector and not familiar with regulations and technologies of other sectors. The proposed project shall raise awareness on global trends in RE-EV integration technology; enabling policy tools and benefits and the impact to power generation and vehicle industry will be shared with policymakers. A training programme for 100 policy makers, four policy and technical workshops and 2 forums will be held with participation from the Government, industry and research sector. Both National Government policymakers from relevant ministries, including MIIT, Ministry of Science and Technology (MOST), National Development and Reform Commission (NDRC) and City and Provincial level Governments will be invited to participate in the training programmes. To limit the number of participants, the following selection criteria is considered: cities who have significant RE resources to consider integration and those who have manifested or are testing car sharing schemes,

The experience learned in Yancheng and Shanghai will be shared with the pilot cities in China and other international cities through the international forum under the framework of EVI held by the China (Shanghai) International EV Demonstration Zone and SAE-China and other international forums held by SAE-China. Also other international platforms such as Urban Electric Mobility Initiative (UEMI) and the EU Mobility Week will be considered as mechanisms for showcasing the project.

It is anticipated that the MIIT will retain the ownership of the training programs and will be able to disseminate this information to policymakers in the 88 pilot cities and other cities which plan to adopt EV policies. The intention is to guarantee knowledge transfer and replication beyond the project direct activities.

Component 3: Piloting Technical Measures and Commercialization Approaches

(a) Demo cities

This component is meant to establish replicable technical solutions and commercialization models for the integrated application of NEVs and RE. To address the barriers identified in the development of NEV and RE two cities have been selected by the Government to demonstrate different aspects of the deployment of NEVs at city scale:

- Yancheng, as an automotive sector hub in China will aim at deploying a fleet of NEV and integrating them with RE systems.
- Shanghai, is a world class example[9] of NEV pilot deployment and will adopt measures to scale up the use of NEVs and of innovative commercialization pathways.

The measures to be adopted include:

- Piloting of charging technologies will include the setting-up of smart charging infrastructure to enable the adoption of RE, consisting of:
- Smart charging system - It will be deployed in large scale to optimize grid load through charging time management;
- Mobile charging system - A mobile energy storage system will be built with fast charging functions. It will be charged with off-grid RE or off-peak electricity, and then transported to EV for fast charging service or roadside service.
- V2G technology - It will enable bi-directional energy and data to flow between vehicles and grid.
- Secondary use of EV batteries - Battery recycling and reuse will be tested and also the RE off-grid storage will be developed.

Thousands of NEVs will be put in service in the integrated systems, including logistics vehicles, sanitation trucks, taxis, buses, fleet passenger vehicles and private passenger vehicles. The user friendliness dimension of the technology and its application will be considered for vehicles, batteries and charging devices alike.

(b) Technologies and business models validation

The data collected from the vehicles, smart charging system, mobile charging system, V2G technology and secondary use of EV batteries will be validated with the perspective of reliability, economy and feasibility.

Various business models for vehicle/charging option combination will be investigated and an operation report will be completed. These business models will involve a bundling operation of mobile charging vehicle with buses, passenger vehicles using distributed energy with smart charging system, fleet passenger vehicles with V2G technology and passenger vehicle sharing.

(c) Evaluation and validation

Demonstration data will be monitored and collected to analyze the real effect of the integrated application of NEV and RE as well as the impact of the tested technologies, such as smart charging system, mobile charging system, V2G technology, to the grid. Furthermore the effectiveness of the policies and technical standards will also be evaluated.

Component 4: Awareness Raising and Dissemination amongst Manufacturers, Suppliers and Consumers

This component is meant to promote the integrated development of NEVs and RE into local development plans and increased capacities of stakeholders.

To achieve those outcomes, a knowledge and information dissemination programme on the standards, regulations, policies and business models will be conducted to raise the awareness and acceptability, and also facilitate their implementation. The selection of manufacturers will be based on their market share of NEVs and prospective

[9] Shanghai is depicted in the Clean Energy Ministerial EVI City Case Book (CEM, 2012) as the single leading Asian city to adopt comprehensive measures to promote EVs

growth. SAE China will hold the ownership of the awareness raising program, training materials or guidebooks, and disseminate amongst their members. Based on this and on the local development status, a sustainable follow-up plan for the replication of the NEV-RE systems in other cities will be formulated.

Under this component, there will be a series of academic exchange and training programs to raise the capacities among policymakers, personnel from enterprises and research institutions in the vehicle and energy field, including awareness, research and development, manufacture, operation, and maintenance; as well as social aspects of energy and transport, such as those related to gender dimensions.

Furthermore a NEV-RE demonstration center will be established in Yancheng to raise awareness amongst NEV consumers and public about NEV-RE integrated application. The existing demonstration center in Shanghai shall serve as a model from which lessons can be drawn and success stories transferred (EVI City Casebook, 2014).

Component 5: Monitoring and Evaluation (M&E)

A robust mechanism for the monitoring and evaluation (M&E) is put in place to ensure the attainment of project outcomes.

1.4. Incremental/ additional cost reasoning and expected contributions from the baseline, the GEFTF, LDC/SCCF and co-financing

Under the current energy structure of which coal is the most important part, the large-scale promotion of NEV will not bring enough environmental benefit. Therefore it is urgent to expand the RE application in the NEVs to maximize their potential in energy saving and emission reduction.

Despite the progress made in recent years, there are still several barriers to the application of the NEV and RE integrated system. Currently NEV and RE are growing in a standalone way and have set their own national targets. Relevant policy environment are inadequate, the technical standards are insufficient and severely lag behind the developed countries, and the awareness amongst stakeholders and public is poor. Furthermore, according to the current vehicle and energy industry development plan in China, clear and operational policy and technical roadmap for the integrated development of NEV and RE are off the schedule before 2020. With the existence of the current barriers of the integrated application of NEV and RE in China, the commercialization of the integrated system will not be realized or will be delayed. Therefore, through the implementation of this project, the NEV and RE integrated development will be accelerated to boost the commercialization and improve the technical level of integrated development of NEV and RE, and realize the life cycle energy saving and emission reduction goal in transport sector.

This project will carry out the research under the lead of MIIT on NEV and RE integrated application based on the existing NEV and RE development plan. The specific plan includes: research on policies and regulations, draft policy framework, removal of policy barriers in the process, development of technical standards and technical problems solution; carrying out the commercialization model demonstration and validation which involves thousands of EVs using distributed RE; improving their awareness among the main stakeholders and public to provide capacity guarantee for the policy-making and implementation.

The overall benefit from the project is to accelerate both EVs and RE deployment to meet national targets and reduce GHG emissions, fossil fuel consumption and pollution emissions. EVs can run on RE from wind/solar power, thus realizing low emissions in their lifecycle because emissions from both vehicle tailpipe and electricity production from wind and solar are zero. While many other cities will be testing EVs, the proposed project aims at highlighting specific technological and commercialization pathways. The uniqueness of the proposed pilot for Yancheng city is to demonstrate the integration of RE-SG-EVs, and in Jiading district, to scale up the existing pilot car sharing scheme to a region wide (Shanghai) programme.

It is anticipated that the GEF grant will be utilized to finance capital investment in necessary charging infrastructure, the common goods, while government and private investment will be allocated for power generation and distribution, as well as for the vehicles.

1.5. Global environmental benefits (GEFTF, NPIF) and /or adaptation benefits (LDC/SCCF)

Through realizing integrated application of EV and RE in China, the project will reduce the GHG and pollutants emission and achieve global environmental benefits.

This proposed GEF project will facilitate and scale up the coordinated development of New Energy Vehicles (NEVs) and Renewable Energy (RE) in China. The major direct CO2 emission reductions that are attributable to the project will come from the validation and demonstration of NEVs and RE integrated application in Yancheng and Shanghai Jiading district.

The proposed project will generate the Global Environmental Benefits (GEBs) presented in the table below:

Savings for All Project Components	***Direct (2016-2019)***	***2020-2025 (direct post project – 6 years)***	***2019-2028 (indirect top down)***
GHG Emission Savings (tCO_2)	180,832	271,278	8,150,000

The full calculation is presented in Annex B.

The post project and indirect benefits shall be estimated in full detail in the GEF CEO Endorsement Form including the Climate Change tracking tool.

With regards to social benefits the project has a strong capacity building aspect which shall improve national skills on industrial manufacturing as well as improving the design of local equipment. Furthermore, efforts will be made to mainstream gender issues by sensitizing relevant stakeholders on the importance of gender matters and their relationship with capacity building projects in a technical field.

1.6. Innovation, sustainability and potential for scaling up

Innovation
The main innovation promoted by this project is testing individual technologies, as well as their integration and validation. The specific new technologies to be tested include:

- Mobile charging system - The system will be charged by renewable electricity or off-peak electricity and provide mobile charging service and roadside assistance service to EV. An economic analysis will be done.
- Smart charging infrastructure - This will optimize the charging time for EV to maximize the RE use and off-peak electricity use.
- Vehicle to Grid (V2G) - A few charging devices will be installed and V2G enabled vehicles will be used and feedback power to grid as the power storage system.
- Energy storage using secondary battery from EV - The battery will be used in off-grid RE storage and implement secondary recycling.
- Power grid / Communication technologies facilitating the control of stored power being stored in NEV batteries
- Social media, ensuring that new user share their experience and disseminate it

Sustainability
After the project's completion, in terms of the city level pilot, enforced policy and regulation will continue to promote EV-RE integration.

The Yancheng City Government and Shanghai Jiading district will continue operating the adopted infrastructure, including the smart and mobile charging infrastructure. The system will be self-sustaining as its operation cost could be balanced by electricity rate difference. The charging service will be provided to any e-vehicle in the city as the charging interface shall be standardized. Furthermore, new smart and mobile charging infrastructure may be added once the piloting operation proves to be technically and economically feasible. At the same time, the project will conduct a validation of multiple technical solutions and various typical business models for the distributed use of RE in EV, that will attract investments in the field of integrated application of NEV and RE.

At national level, as a result of creating a more competitive and reliable system for NEV charging, it is anticipated that this project will help to solve the charging issue in the NEV development and support the central Government's NEV target in 2020.

Scale up potential
Currently there are 88 NEV demonstration cities in China, focusing on battery electric vehicles and plug-in hybrid electric vehicles which is also the trend in global auto industry. It is clearly stated that favorable policy will continue till 2020, when the policy target of 5 million NEVs on road should be reached. The lessons learnt from EV-RE integration in this project, piloting technology and policy framework can be shared with other cities from phase II demonstration which choose to establish an EV programme to realize the low carbon emissions in NEV's lifecycle.

For those cities with RE resources (solar, wind), all piloting technology (smart grid, mobile charging, smart charging, energy storage on secondary use of EV battery, V2G) can be leveraged to increase using RE for EV charging. For cities without RE resources, these technologies can be used to balance grid load and avoid NEV's negative impact to grid. For tier 1 and tier 2 cities where land resource is limited, mobile charging systems piloted in this project will help them to set up charging infrastructure.

A main project output is the development of national policy and technical regulations, which removes policy and institutional barriers for EV-RE integration in China. The propose project will not only facilitate the achievement of the national target in 2 specific cities, but will aim to create technical standard, guidelines and tools that will service the entire population of demonstration cities.

2. Stakeholders. Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes ☒ /no☐) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

Please note that the participation of indigenous people is not foreseen.

Stakeholders	Roles and responsibility
Implementing agency (UNIDO)	To implement the Programme: including monitoring and evaluation, administration, management and reporting.
Ministry of Industry and Information Technologies (MIIT)	Executing agency; for project commissioning and management on the ground including procurement, recruitment, administration and reporting. As the national competent authority for industrial development it will be involved in the coordination of Government agencies at central and local level on policy development, including the formulation of national EV development policies, and promotion of national technical standards for vehicles.
Ministry of Finance	Focal point for the GEF with responsibility to monitor and evaluate the national execution of the project. In addition, as the national competent authority it shall review the policy and technology assessment on EV-RE integration.
National Development and Reform Commission	National competent authority; it shall review the policy and technology assessment on EV-RE integration.

Ministry of Science and Technology	National competent authority; it shall review the policy and technology assessment on EV-RE integration.
National Energy Administration	National competent authority; it shall review the policy and technology assessment on EV-RE integration
Yancheng Government Development and Reform Commission of Yancheng, Automobile Industry Management Office of Yancheng Government, Government of Yancheng Economic-Technical Development Zone	Local Government; for local demonstration, commissioning and supervision, provision of local policy.
Shanghai Jiading Government	Local government; for local demonstration, commissioning and supervision; provision of local policy
Society of Automotive Engineers of China(SAE-China)	Technical executing agency that will support the MIIT in overall design and management of proposed project.
Local electric company (State Grid Yancheng Power Supply Company)	Commissioning and operation of ICT management center and smart charging infrastructure development.
Vehicle manufacturers and component suppliers (batteries, chargers) Aoxin Auto	Support research in V2G and provide demonstration fleet operation.
Energy project developers Jiangsu Tianhe Solar Power company, Jiangsu Goldwind Science & Technology company, Shenhua-Guohua Wind Power company,CECEP Solar Energy Technology company	Construction and operation of smart grid, ICT energy management system, smart charging infrastructure, mobile charging system, energy storage
Fleet operators and vehicles owners Shanghai International Automobile City Company, Shanghai E-Drive service co., LTD., Potevio New Energy Yancheng Company	Will provide their EVs for the pilot testing
Universities, research institutes and consulting companies Tongji University, Shanghai Jiaotong University, Yancheng Teachers University	Participation of policy research and provision of technical support
Local and international associations, CSOs, NGOs, and agencies promoting gender equality and women's empowerment	Will provide input for assuring gender mainstreaming of the project, e.g. equal opportunities for women and men to participate in and benefit from project activities.

3. Gender Considerations. Are gender considerations taken into account? (yes ☒ /no☐). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

The project will also support women in the capacity building activities and public awareness activities. Furthermore, disaggregated indicators will be introduced during the PPG phase to assess the impact of the project by gender. For example, efforts will be made to mainstream gender issues by sensitizing relevant stakeholders on the importance of gender equality and their relationship with both technology and policy research, awareness raising and in particular, when promoting the deployment of NEVs. Special consideration shall be given to raising awareness to female drivers of the economic and environmental benefits of NEVs. Detailed gender assessments for NEVs application shall be considered in the development of the demonstration project in a large urban context (Outcome 3).

The UNIDO Policy on Gender Equality and the Empowerment of Women outlines UNIDO's commitment to and recognition of the positive impact of women's empowerment on inclusive and sustainable industrial development. In the PPG stage a number of women researchers and experts will be involved in the project design. Women will benefit from the low-carbon urban public transport realized through the implementation of this project which integrating RE and NEVs.

Due to the gender dimensions of energy and transport, the project aims to demonstrate good practices in mainstreaming gender aspects into the deployment of NEVs in China, wherever possible and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. Consequently, it will be considered to include the gender dimension during the whole project cycle.

In practice, to mainstream gender into the project a gender analysis will be conducted during PPG phase to identify entry points for defining gender aware project outputs and activities; in particular a detailed gender assessments for NEVs application shall be considered in the development of the demonstration project in a large urban context (Outcome 3). Furthermore, sex-disaggregated indicators will be introduced during the PPG phase to assess the impact of the project by gender..

Guiding principle of the project will be to ensure that both women and men are provided equal opportunities to access participate in and benefit from the project, without compromising the technical quality of the project results. The aim is that women will benefit from the low-carbon urban public transport realized through the implementation of this project which integrating RE and NEVs.

4 Risks. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

The main risks to the effective implementation of the proposed GEF project are described in the following table:

Risk	Rating*	Mitigation
Project progress is slower than the schedule due to poor coordination between various stakeholders	M	Led by MIIT and SAE China, a joint workgroup will be set up to clearly define the scope, plan and responsibility and follow-up the progress. They will set up and fully leverage steering committee and technical expert committee to provide clear guide on industrial trend and attract the participation of industries in accordance with the approved project document.
Policy making process is slow due to lack of agreement among stakeholders	L	The project will ensure the policy target consistent and contributable to national strategy on climate change, energy and environment, as well as vehicle and power industry plan. Project proponent will engage relevant ministries at the planning stage and set up a steering committee.
Few companies interested in participation, which may delay the pilot project	L	The proponent will engage industry and gather/integrate their inputs at the planning phase to make the plan in line with technology development, market needs and national strategy. They will clearly define the responsibility of participating organizations.
Deployment of smart grid (ICT centre, smart charging) is slower	M	The executing agencies will ensure the participation of utility and other relevant stakeholders. A steering committee will facilitate the vehicle and power industry cooperation. A workgroup will be set up with clear responsibility and working plan. A technical committee consisting of vehicle and power industry experts will be formed to provide technical guidance on EV-RE integration. Other countries' best practices will be learnt for smart grid development.

Incentive and financial support systems are insufficient to attract EV consumers to meet the national vehicle targets	L	The government provides a substantial financial incentive for the purchase of EVs and the subsidy will last until 2020. By increasing the deployment of charging infrastructure, and increasing the awareness of consumers towards the reliability and autonomy of EVs, the project aims to bring down the barriers regarding vehicle purchases. In addition, the project aims to inform policymakers on the most adequate commercialization pathways and their life cycle impacts so that they can adjust the incentive schemes to further promote ownership. Finally, the innovative schemes of car sharing and also car rental systems would be prominent consumers, by being able to centralize charging systems.
Social and Gender Risk Risk of resistance against, or lack of interest in, the project activities from stakeholders, especially with regard to the active promotion of gender equality. Low participation rates of suitable female candidates due to lack of interest, inadequate project activity or missing qualified female population within engineering sector.	L	China, while having a number of significant gender issues, is a pro-gender equality society. This project will pursue an in-depth gender analysis thorough and gender responsive communication and ensure stakeholder involvement at all levels, with special regard to involving women and men. This shall mitigate social and gender related risks, promote gender equality, create a culture of mutual acceptance, and maximize the potential contribution of the project to improving gender equality in the transport and energy fields.
Vulnerability to climate events	L	It is not foreseen that any of the project outputs could be vulnerable to climatic events.

* L = low risk; M = medium risk; H = high risk

5. Coordination. Outline the coordination with other relevant GEF-financed and other initiatives.

It is important to note that this project is the first project to integrate vehicle industry with renewable power industry.

There have been several projects in China funded by GEF to promote both transport and NEV. These projects have to date focused on:

- The promotion of electric buses for urban transportation as a measure to mitigate local air emissions such as Promoting Clean Electric Buses for the Beijing Olympics " (GEF ID 3534) or "PRC Clean Bus Leasing (GEF ID 5627)
- Other transport related projects (Sino-Singapore Tianjin Eco City project, Eco-Transport in City Clusters, Large-City Congestion and Carbon Reduction, Jiangxi Fuzhou Urban Integrated Infrastructure Improvement Project) which focused more on the improvements in the transport system to reduce congestion and/or to promote green transport (walking, cycling, public transport).
- Sustainable Cities IAP – China child project, which is currently under development by the World Bank, and aims to promote sustainable urbanization in selected 7 Chinese Cities.

In addition, UNIDO is currently developing GEF funded projects which focus on the promotion of the wide-spread adoption of EV and non-motorized transportation, which are foreseen to begin implementation in late-2015, namely:

- "Energy Efficient Low-Carbon Transport in Malaysia" (GEF ID 5741) – aims to catalyze and accelerate the widespread adoption of electric vehicles (EVs), through policy development, demonstration activities and

capacity building that focus on both the demand and supply sides of the market. The project is part of the Sustainable Cities IAP

- "Energy Efficient Low-Carbon Transport in South Africa" (GEF ID 5737) – focused on the widespread use of EVs and non-motorized transport to facilitate development of local manufacturing capacity of EV and bicycle components, and the necessary support infrastructure.

The project is closely linked with the UNIDO objective to promote inclusive and sustainable industrial development (ISID) that supports economic growth, employment and broader societal objectives, such as climate change mitigation, sustainable development and creation of decent jobs for women and men in the context of inclusive economic growth. The project will support R&D and commercialization activities that, if successfully implemented, will lead to the development of green industry and the green manufacturing in the automotive sector, which has strong backward linkages with the supplier industries.

This project considers that NEV technologies are proven and aims to maximize the energy saving and GHG emission reduction potential in EV sector by deploying the integration with existing technologies for a new application: the use of RE to supply power to vehicles.

***6. Consistency with National Priorities*.** Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes ☒ /no☐). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

This project is in line with both NEV and RE strategies and plans in China. In its Intended Nationally Determined Contribution (INDC) to the climate change policy process from June 2015, China recognizes that controlling emissions from the building and transport sectors, by integrating low-carbon development concepts, are important measures to be taken to enhance action on climate change. The INDC identifies NEVs as a technology to be used to develop a green and low-carbon transportation system, optimizing means of transportation, properly allocating public transport resources in cities, giving priority to the development of public transportation and encouraging the development and use of low-carbon and environment-friendly means of transport. Finally, the development of low-carbon energy systems is also featured as a prominent measure to curve its GHG emissions.

China takes NEVs a promising technology to address energy (oil dependency) and environment (city pollution and GHG emissions) issues, and a shortcut to progress with global auto industry. In the national industrial plan for New Energy Vehicles (2012-2020) released by the State Council in June 2012, ambitious targets: 500,000 EV or Plug-in Hybrid Vehicles (EV/PHEV) on road in 2015 and 5 million EV/PHEV in 2020.

In the national strategy on climate change in the 12th Five Year Plan (2011-2015) released by the State Council in December 2011, key countermeasures to control GHG emissions include: promoting low carbon energy; demonstration and building a low carbon community to realize low carbon transport and electricity.

In the document released by NDRC, the department responsible for climate change stated that "promoting low carbon development demonstration is one of the focuses in the national 12th Five Year Plan (2011-2015), and exploring the low carbon development based on China's situation and reshaping the economic growth pattern are key countermeasures to address climate change".

In the National Energy Plan 2011-2015 released by the State Council in January 2013, China plans to increase the share of non-fossil energy from 8.6% in 2010 to 11.4% in 2015, and increase the share of non-fossil power generation capacity to 30% in 2015, among which wind power will increase 26.4% annually and solar power will increase 89.5% annually, much higher than the average industry annual growth of 9%. The NEVs and RE joint development is explicitly presented in the energy supply reform which states: "developing distributed energy, smart grid, charging infrastructure for electric vehicles", "developing smart grid to integrate renewable electricity, distributed energy, electric vehicles and realize the interaction between power users and power systems" and "developing charging infrastructure for electric vehicles to promote low carbon fuels for transport". This strategy encourages EV-RE integration.

Finally, in the announcement made regarding the objectives of the 13th Five Year Plan (2016-2020) promoting environmental protection will become a central objective of the National Government. The impact of the new national strategy will be fully considered during the detailed design phase when the new policies will already been disclosed. In May 2015, the State Council promulgated "Made in China 2025", regarding NEVs as one of the top ten key development fields.

7. Knowledge Management. Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

This project will share the experiences, expertise and research results with the relevant stakeholders through the trainings, forums and technical communication designed in capacity building and expands a replication plan for the NEVs and RE integration system.

NEV operation data and charging data will be collected by the data centers. The collected data will be analyzed to assess consumer behavior, including typical daily mileage and charging levels. This analysis may provide the basis for decision-making on vehicle design, vehicle promotion policy and charging infrastructure network plans.
A detailed knowledge management plan will be devised in the PPG stage.

The activities under output 2.3 should also serve as a channel for knowledge transfer between the 2 cities in the proposed project and the 88 national city pilots.

UNIDO, as a member of the Partnership on Sustainable, Low Carbon Transport (SLoCaT), will aim to transfer the lessons learned on policies and technologies to other stakeholder.

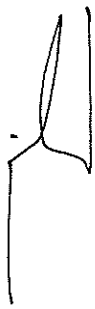
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT[10] OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Mr. GUO Wensong	Operational Focal Point Director, IFI Division III, International Department	Ministry of Finance	08/01/2015

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies[11] and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency Name	Signature	Date *(MM/dd/yyyy)*	Project Contact Person	Telephone	Email
Mr. Philippe R. Scholtès UNIDO Managing Director Programme Development and Technical Cooperation UNIDO GEF Focal Point		08/28/2015	Ms. Bettina Schreck Industrial Energy Efficiency Unit	+43 1 26026-3032	B.Schreck@unido.org

C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF PROJECT AGENCIES)

For newly accredited GEF Project Agencies, please download and fill up the required **GEF Project Agency Certification of Ceiling Information Template** to be attached as an annex to the PIF.

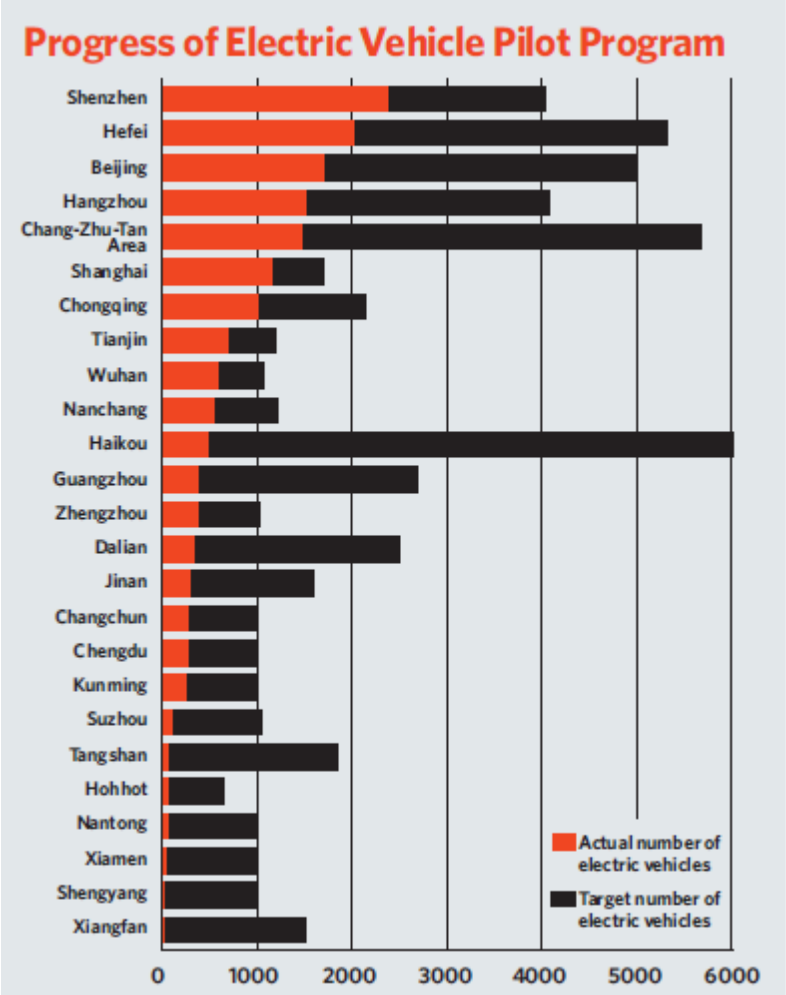
[10] For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

[11] GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF

ANNEX A – ADDITIONAL POLICY DETAILS

Demonstration projects

In 2009, China's government launched "Ten Cities with Thousands Vehicles" program, which aimed at developing 10 cities each year and pushing 1000 NEVs in each city over the next three years via financial subsidies. Initially, many cities were inspired and ambitiously established a four-year plan to grow ten to thirty thousand NEVs. However, the sum of NEVs in 25 pilot cities was around 10,000 (see figure below) annually, there is still a large gap between the reality and the expected goal.



Source: China Quests to adopt electric vehicles, Marquise et al, Stanford Social innovation review, spring 2013.

In this context of the "New Energy Vehicles Industrial Development Plan" (2012-2020) release in July of 2012, the Ministry of Finance (MOF), the Ministry of Industry and Information Technology (MIIT), the Ministry of Science & Technology (MOST) and the National Development and Reform Commission (NDRC) have jointly released an incentive scheme for the promotion of new energy vehicles in September of 2013.

ANNEX B: ESTIMATED GHG EMISSION SAVED

Case 1) Yancheng City

The project baseline emissions are those from the utilization of conventional fossil fuel vehicles:

Baseline emissions – using fossil fueled cars							
Vehicle categories	Number of vehicles in fleet*	Type of fuel	Typical fuel consumption	Usage per day per vehicle	Total fuel use per year	Emission Factor for fuel	Emissions per year
			L/100 km	km/day	L	kg CO2/L	tCO2/y
Yancheng City Pilot							
Delivery vans / small buses	700	Gasoline	9	100	2,268,000	2.3	5,216
Buses	10	Diesel	30	200	216,000	2.63	568
Taxis	50	Gasoline	10	300	540,000	2.3	1,242
Fleet cars	100	Gasoline	10	100	360,000	2.3	828
Private cars	140	Gasoline	10	50	252,000	2.3	580

The baseline project scenario emissions would be the use of NEVs powered from electricity of the East China Grid:

Baseline project emissions – using EV but power generation from coal								
Vehicle categories	Number of vehicles in fleet	Energy use of vehicles*	VMT per day per vehicle	Typical electricity use per vehicle	Typical distribution losses for uncoordinated charging	Total electricity use per year	Emission Factor of East China grid ** (NDRC, 2013)	Emissions per year
		kWh/100km	km/day	MWh/y	%	MWh/y	tCO2/MWh	tCO2 /y
Delivery vans / small buses	700	18.0	100	4,536	2.4	4,645	0.791	3,672
Buses	10	120.0	200	864	2.4	885	0.791	699
Taxis	50	22.4	300	1,208	2.4	1,237	0.791	978
Fleet cars	100	22.4	100	805	2.4	825	0.791	652
Private cars	140	22.4	50	564	2.4	577	0.791	456

* Data from fuel consumption test program by SAE China in 2013-14 for buses. Typical consumption for cars is obtained for the EV (Nissan Leaf) and PHEV (GM Chevrolet Volt) as reported by US DOE[12] of 0.*36 kWh/mile (22.4kWh/100km)*

**The emission factors of the East China grid are combined as 75% of the Operating Margin + 25% Built Margin as indicated by the UNFCCC guidelines for grid emissions

[12]http://www.afdc.energy.gov/vehicles/electric_emissions_sources.html

For the proposed projects, the emissions are those derived from the use of EVs which are powered 50% of the time from renewable energy sources. Assume 50% of electricity for EV charging is from RE.

Alternative project emissions – using EV powered 50% time with RE and 50% from coal									
Vehicle categories	Number of vehicles in fleet	Energy use of vehicles	Vehicle use	Typical electricity use per vehicle	Typical distribution losses	Total electricity use per year	Share of RE in the mix	Emission Factor of East China grid (NDRC, 2013)	Emissions per year
		kWh/ 100km	km/day	MWh/y	%	MWh/y	%	tCO2/ MWh	tCO2 /y
Delivery vans / small buses	700	18.0	100	4,536	2.4	4,645	50	0.791	1,836
Buses	10	120.0	200	864	2.4	885	50	0.791	350
Taxis	50	22.4	300	1,208	2.4	1,237	50	0.791	489
Fleet cars	100	22.4	100	805	2.4	825	50	0.791	326
Private cars	140	22.4	50	564	2.4	577	50	0.791	228

The emission reductions per year result in discounting the proposed projects from the baseline project

Emission in tCO2 per year					
Vehicle categories	Baseline	Baseline project	Baseline savings	Alterative scenario	Proposed project savings
Delivery vans / small buses	5,216	3,672	1,545	1,836	1,836
Buses	568	699	-131	350	350
Taxis	1,242	978	264	489	489
Fleet cars	828	652	176	326	326
Private cars	580	456	123	228	228
Total			1,976		3,229

Case 2) Jiading district, Shanghai

The project baseline emissions are those from the utilization of conventional fossil fuel vehicles:

Baseline emissions – using fossil fueled cars							
Shanghai City Pilot							
Vehicle categories	Number of vehicles in fleet*	Type of fuel	Typical fuel consumption	Usage per day per vehicle	Total fuel use per year	Emission Factor for fuel	Emissions per year
			L/100 km	km/day	L	kg CO2/L	tCO2/y
Buses	200	Diesel	25	200	3,600,000	2.63	9,468
Private cars	10,000	Gasoline	10	100	36,000,00	2.3	82,800

The baseline project scenario emissions would be the use of NEVs powered from electricity of the East China Grid. Since these vehicles are car sharing fleet cars, it can be considered that they are replacing a larger number of privately owned vehicles.

According to the existing literature on car-sharing vehicles, in Europe each car-sharing replaces 4 to 10 forgone purchases of private cars (European Automobile Manufacturers' Association- ACEA), while in the figure of North America is 9 to 13 forgone purchases. As an estimate it is considered, that due to lower vehicle penetration in China, each car sharing vehicles may represent a forgone 5 privately owned vehicles.

Hence, the 800 existing fleet cars, are equivalent to 4,000 forgone privately owned fossil fueled cars. Hence in the baseline project scenario, there would be 800 EVs and 6000 conventional cars:

Baseline project emissions – using EV but power generation from coal								
Vehicle categories	Number of vehicles in fleet	Energy use of vehicles*	VMT per day per vehicle	Typical electricity use per vehicle	Typical distribution losses for uncoordinated charging	Total electricity use per year	Emission Factor of East China grid ** (NDRC, 2013)	Emissions per year
		kWh/100km	km/day	MWh/y	%	MWh/y	tCO2/MWh	tCO2 /y
Car-sharing cars	800	22.4	100	805	2.4	825	0.791	652

* Data from fuel consumption test program by SAE China in 2013-14 for buses and typical consumption for cars is obtained for the EV (Nissan Leaf) and PHEV (GM Chevrolet Volt) as reported by US DOE[13] of 0.*36 kWh/mile (22.4kWh/100km)*

**The emission factors of the East china grid are combined as 75% of the Operating Margin + 25% Built Margin as indicated by the UNFCCC guidelines for grid emissions

[13]http://www.afdc.energy.gov/vehicles/electric_emissions_sources.html

Baseline emissions – foregone 4000 fossil fuel cars and buses							
Vehicle categories	Number of vehicles in fleet*	Type of fuel	Typical fuel consumption	Usage per day per vehicle	Total fuel use per year	Emission Factor for fuel	Emissions per year
			L/100 km	km/day	L	kg CO2/L	tCO2/y
Buses	200	Diesel	25	200	3,600,000	2.63	9,468
Passenger cars	6,000	Gasoline	10	100	21,600,000	2.3	49,680

The alternative project scenario would be the use of 200 E-buses to replace the diesel ones and 2000 car-sharing fleet cars to replace the 10,000 private cars.

Alternative project emissions -200 electric e-buses and 2000 car-sharing cars								
Vehicle categories	Number of vehicles in fleet	Energy use of vehicles*	VMT per day per vehicle	Typical electricity use per vehicle	Typical distribution losses for uncoordinated charging	Total electricity use per year	Emission Factor of East China grid ** (NDRC, 2013)	Emissions per year
		kWh/100km	km/day	MWh/y	%	MWh/y	tCO2/MWh	tCO2 /y
E-Buses	200	80	200	11,520	2.4	11,796	0.791	9,331
Car Sharing cars	2,000	22.4	100	16,128	2.4	16,515	0.791	13,063

The emission reductions per year result in discounting the proposed projects from the baseline project

Emission in tCO_2 per year					
Vehicle categories	Baseline	Baseline project	Baseline savings	Alterative scenario	Proposed project savings
Buses	9,468	9,468	0	9,331	137
Private cars	82,800	49,680	33,120	0	49,680
Car-Sharing NEVs	0	5,225	-5,225	13,063	-7,838
Total			27,895		41,979

This proposed GEF project will facilitate and scale up the coordinated development of New Energy Vehicles (NEV) and Renewable Energy (RE) in China. The major direct CO2 emission reductions that are attributable to the project will come from the validation and demonstration of EV-RE integrated application in Yancheng City and Shanghai Jiading district. According to the estimate, the vehicles of validation and demonstration will achieve 3,200 vehicles in two cities. The direct emission reduction is 180,832 tCO_2 over the project period of four years.

Post project direct emission reductions

The lifetime direct CO_2 emission reductions that will be derived from the operation of vehicles and charging infrastructure invested in this project are related to the lifespan of the equipment. They will continue operation after the proposed project concludes. Vehicle's life span is 10 years so post project direct CO_2emission reduction by NEVs is 271,278 tCO_2.

Indirect top down emission reductions

This proposed GEF project will promote commercialization of Integrated Application of NEV-RE in China.The CO_2 emission reductions of project expected will be derived from scale up integrated Application. According to China's national NEV target implies that there will be 5 million NEV. Assuming 10% will be charged with RE, the total CO_2 emission reduction could be 815,000 tons per year, since the emission reduction is about 1.63 tons per year for each passenger car.

The proposed project will generate the Global Environmental Benefits (GEBs) presented in the table below:

Savings for All Project Components	***Direct (2016-2019)***	***2020-2025 (direct post project – 6 years)***	***2019-2028 (indirect top down)***
GHG Emission Savings (tCO_2)	180,832	271,278	8,150,000

A detailed analysis of the direct and indirect (bottom up and top down) GEBs will be conducted during the project design phase.