

2011 eAsia Award Recommendation Form

(to be filled by the HoD of the country/economy)

Recommended Project: Iran Fuel Card Project (IFCP)

Category: Trade Facilitation

Electronic Business in Public Sector

Electronic Business in Private Sector

Bridging Digital Divide

(Select only one category for a project)

Recommended by: (in print by the HoD) : Mahmood Zargar

Rational:

IFCP is a nation-wide, critical project to control the fueling of vehicles all over the country. More than 17,000,000 cards were distributed and 27,000 POSs were installed.

The main purpose of project is controlling fuelling amount, behavior of system user and therefore decrease risk of misuse at fuelling petrol station. Further system displays an automation of fuel distribution to customers and eliminate the usage of cash in petrol stations by the use of an electronic purse..

Key benefits of project are:

In This project, fueling is realized by smart card, concerning the sale of all types of fuels, and will include the vehicle identification, assess quotas and the price of the product, e-purse payment and limit fueling consumption, self-fueling, oil purchase, sales and storage management to avoid loss of petrol resource, reduce economic damage, and provide decision-making support for different levels' operators of NIORDC (NIORDC is a governmental organization and is the owner of the project)

The completed version of IFCP including ePayment was running from October 2010 and at the same time was the biggest project at the region with the 17,000,000 cards and 27,000 POSs around the country from the so far east point of country to the far west of the country.

Signature of the HoD:


Date: 20 Aug. 2011



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Application Form

(to be submitted by the project lead)

Country/Economy: Islamic Republic of Iran		Date: 13 Aug 2011
Project Title: Iran Fuel Card Project (IFCP)		
Organization: National Iranian Oil Refining and Distribution Company (NIORDC)		
Category: <input type="checkbox"/> Trade Facilitation <input checked="" type="checkbox"/> Electronic Business in Public Sector <input type="checkbox"/> Electronic Business in Private Sector <input type="checkbox"/> Bridging Digital Divide (Select only one category for a project)		
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Islamic Republic of IRAN

**Iran Fuel Card Project (IFCP)
Overall View**



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1. Definitions, Acronyms and Abbreviations

NIOC: National Iranian Oil Company

NIORDC: National Iranian Oil Refining and Distribution Company

IFCP: Iran Fuel Card Project,

CNG: Compressed Natural Gas

M.C.: Main Center

CSC: Card Support Center

G.S.: gas station

TMS: Technical Management System

Black List: list of invalid card information

White List: list of card that shall be deleted from the black list

TTC: terminal transaction code

PT: petrol terminal

IPC: industrial PC without peripherals

Puller System: data transfer system

PSTN: Public Switch Telephone Network

CRM: Customer Relationship Management

SAM: Secure Access Module.

2. Executive summary

The main purpose of project is controlling fuelling amount, behavior of system user and therefore decrease risk of misuse at fuelling petrol station. Further system displays an automation of fuel distribution to customers and eliminate the usage of cash in petrol stations by the use of an electronic purse..

Key benefits of project are:

1. Central controlling of fuel amount at petrol station.
2. Central and decentralist control of fuel behavior of Petrol-Card user, due of statistics
3. Decreasing misusage of fuel at petrol stations
4. Cashless payment.

In This project, fueling is realized by smart card, concerning the sale of all types of fuels, and will include the vehicle identification, assess quotas and the price of the product, e-purse payment and limit fueling consumption, self-fueling, oil purchase, sales and storage management to avoid loss of petrol resource, reduce economic damage, and provide decision-making support for different levels' operators of NIORDC (NIORDC is a governmental organization and is the owner of the project)

3. Project Scope

IFCP is a nation-wide, critical project to control the fueling of vehicles all over the country. More than 17,000,000 cards were distributed and 27,000 POSs were installed.

Many stakeholders are involved in this project as follows:



Name	Represents	Role
NIORDC	Bring forward requirements and take charge of requirement review, design review, system acceptance and sales management.	Project sponsor and User
Gas station	Take charge of fueling and selling.	User
Vehicle owner	Use fuel card to fuel	User
Police station	Provide basic information of vehicle owner and vehicle.	Associated stakeholder
Bank	Provide load, unload and the other transactions and settle an account with NIORDC.	Associated stakeholder

IFCP includes four sub systems, namely, Main Center System, Card Support Center System, Puller System and Gas Station System.

The IFCP system will provide three interfaces to other systems, that is, the system for police, the system for bank, the management system that already existed in NIORDC.

Main Center system is for NIORDC to supervise underling units on business operation and to manage the whole IFCP. Its main contents include Oil Information management, Data Transfer management, settlement Management, terminal management, inquiry, statistics and System Maintenance.

CSC system runs in M. C. (Main center) and user can access it from web. CSC (Card Support Center) system is responsible for card supporting in the whole fuel system. CSC system is composed of CCC (Customer Care Center) and CCO (customer Care Office). the CCC is the main Customer support center which manage and organize all functionalities of all CCO branches.

Daily business data of gas station must be uploaded to Main center to be convenient for each management center to make statistics, analyze and management. After going off shift, operator launches data transmission program, connects to upload server and carries out the data uploading. After data uploading is finished, related data is automatically downloaded from the Main Center.

Data set by management center such as price policy, blacklist must be sent to gas stations in time to ensure that the basic information of all gas stations is consistent all over the country.



Gas Station System is in charge of the operation management and system management to gas station, the smallest unit and the basic data sources of the whole fuel card system. It receives and processes real-time transaction data from dispenser, and uploads various data to Puller system. This system also communicates with Puller System periodically, downloads various data and uploads report data. In addition, G.S. (Gas Station) system provides system initialization, information maintenance, employee management, shift management, oil storage management, Terminal Monitor Management, Transmission Management, Transaction Record Management and etc.

The user summaries are as follows:

Name	Description	Stakeholder
NIORDC administrators in different levels (including M.C. Administrator, CSC administrator, Zone administrator, Area administrator)	Take charge of organization maintenance, user management, privilege management and so on.	NIORDC
NIORDC Publishers	Take charge of releasing information related to oil, such as oil product price and quota table.	NIORDC
NIORDC Operators in different levels	Take charge of oil purchase, sales and storage management	NIORDC
NIORDC Accountants	Take charge of settling account with bank and gas station	NIORDC
NIORDC Maintenance Men	Install and maintain equipments and system in gas station.	NIORDC
CSC Operator	Take charge of card lifecycle management.	NIORDC
G.S. Administrator	Take charge of all businesses in gas station and system management.	Gas station
G.S. Operator	Take charge of fueling, shift maintenance, purchasing oil and storage management.	Gas station



G.S. Accountant	Take charge of cashing and printing ticket	Gas station
Bank Accountant	Take charge of settling an account with NIORDC	Bank
Bank Operator	Take charge of charging the fuel card and other businesses.	Bank
Data Provider in police station	Provide basic information of vehicle owner and vehicle	Police station

IFCP General Characteristics summarized as follows:

- One smart card for each vehicle (car, motorbike, truck etc.).
- Dynamic monitoring and control of the fuel consumption.
- Multi layer quota and pricing model.
- Centralized management and enforcement of the quota and pricing model.
- Tightly coupled POS and fuel pump.
- State of the art data center as the heart of the system.
- Full back up and mirroring for the data center .
- Offline link between gas station and data center.
- Payment through PSP (Payment Service Provider).
- Online network of Customer Support Centers (>900 centers)
- Centralized card issuing and management.
- Management of cards through black & white list etc.

4. Goals and objectives

a) Creation of fuel consumption data bank. These information aims at :

- Gathering the average of fuel consumption of different cars which is based on the type of engine, date of manufacturing, etc.
- Access to the fuel consumption information on the basis of its different usages such as personal, public, governmental, etc.
- Using statistical, comparison and management reports of fuel consumption to frame our governmental strategies.

b) Creation of new distribution and consumption management system to :

- Applying necessary controls on fuel distribution and its consumption mechanisms.
- Increasing regulative measures to prevent fuel smuggling.
- Creating necessary facilities to achieve targeted fuel subsidies.



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- The ability to offer different amount of fuel based on different applications.
 - Improving the quality services at the gas station (from manual to automatic).
- c) Creating necessary facilities to make an e-payment for the fuel fee at the gas stations by the smart card. This aims at :
- Promoting e-payment culture among the people.
 - Reducing cash flows and adding security quotient at the gas stations.
 - Preventing the erosion of banknote and ultimately reducing the new print.
 - Improving public health and avoiding plague through the banknotes.

5. Challenges

The fuel is provided and distributed by the government. The price was subsidized and it was very low and it caused uncontrolled fueling, which will result in the loss of petrol resource also large quantity of oil wasted and cause dramatic economic damage to the country and uncontrolled storage. The other reasons for very huge consumption are as follows:

- Lack of correct consumption model (consumption culture)
- Lack of efficient public transportation system
- Increasing the number of cars
- Very low price
- Using very old cars
- Uncontrollable consumption
- Uncontrollable distribution
- Smuggling

A successful solution would limit consumption for each car, support card payment, Provide self-fueling and make statistic of the petrol consumption. This solution is also caused the following challenges:

- Scope definition
- Various stakeholders
- Minimum social and economical impacts
- Acceptability
- Change management
- Lack of infrastructure and databases
- Security and privacy
- Prediction of the out of critical issue
- Flexibility
- Expandability

6. Strategies

There were few solutions in order to overcome this problem:

- Cutting the government support (Realizing the fuel price)
- Replacing gasoline with CNG
- Using a technology that can control the consumption and gasoline distribution

The main constraint was time. With consideration of social impact and price/performance, the best solution was combination of the above strategies with following priorities:

- Using ICT technology for control of consumption and distribution.
- Increasing gas stations and force car manufactures to produce cars with capabilities of using CNG fuel.
- Realizing the fuel price step by step.

A smart card based system was an ICT technology which provides functionality to allow the Iranian authorities to:

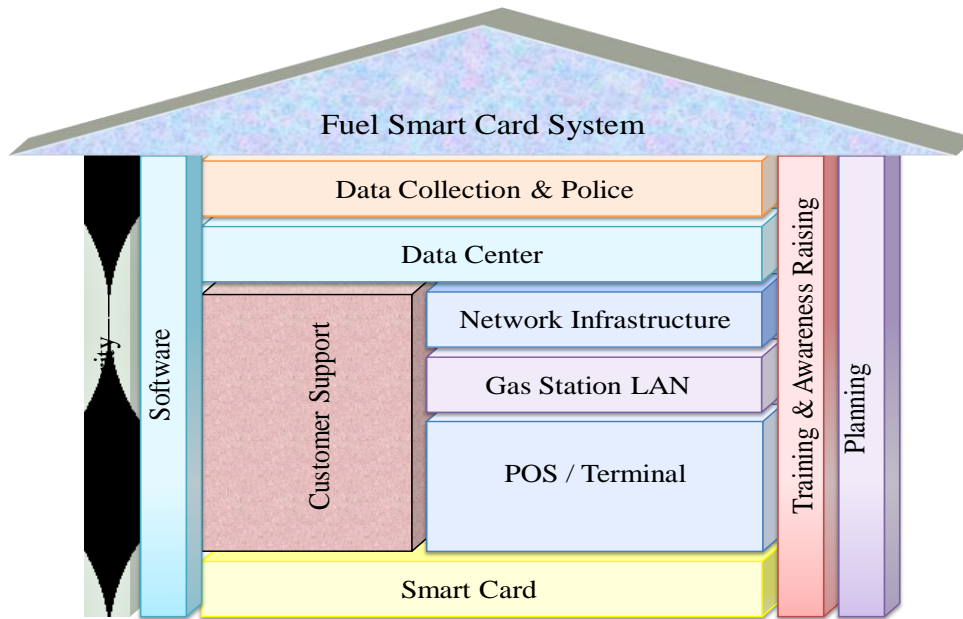
- Supply all car holders with Smart cards
- Install smart card systems in all petrol stations
- Provide facilities for transaction statistics
- Control the amount of subsidized fuel
- Provide Prepaid Payment functionality for subsidized fuel

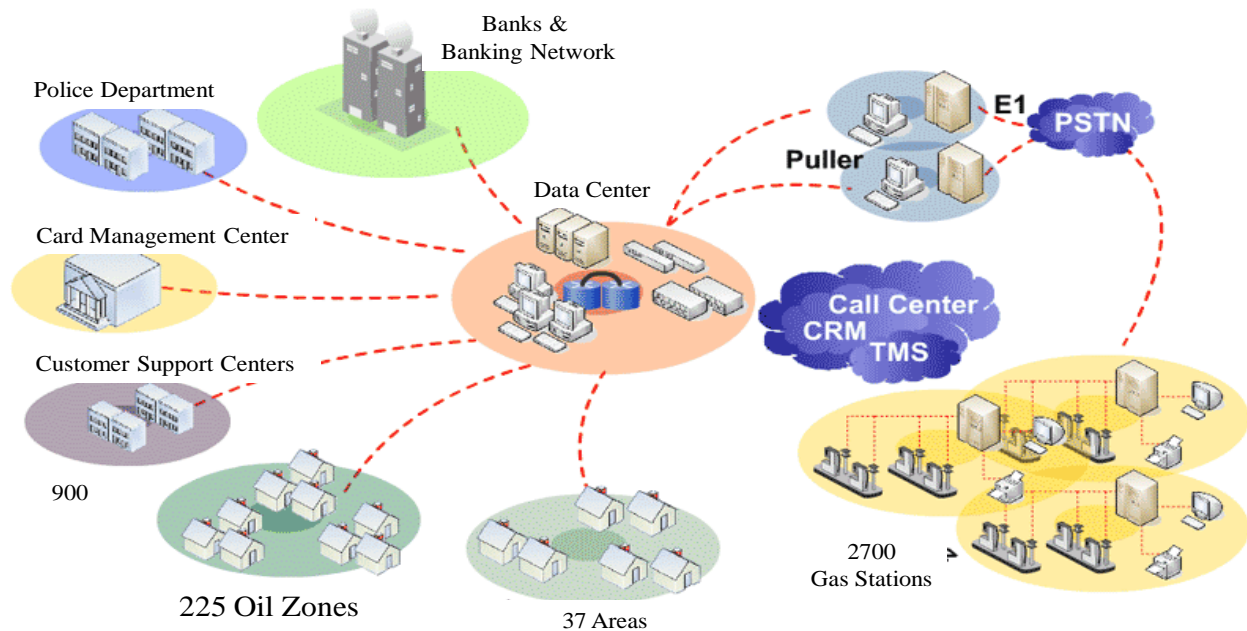
The smart fuel card solution was designed to meet the following architectural requirements:

- Offline operation of POS-Terminal
- Throughput and Scalability
- Security
- Availability
- Robustness
- Maintainability
- Adherence to standards
- Usage of well-proven products and components

7. Methodology and Architecture

IFCP Components





- 1) Using **Divide and Conquer** methodology.
- 2) Using **UML and the Rational Unified Process (RUP)** method to design the architecture of the system. Start with a Vision document. Then proceed with a Use Case document, to lay the foundation for the other architecture documents
- 3) Using **Power Designer** which is a Database E/R model design tool, used to design the configuration and relationship of table.
- 4) Using **Clear Case** which is a program version control system, used to assist the edition control in developing process, support team software developing
- 5) M.C. System and CSC System adopt **JAVA** language, complying with **J2EE** development specification.
- 6) **Jbuilder9** was used to develop M.C. System and CSC System.
- 7) **Test Director, Win Runner, and Load Runner** were used in system test process.
- 8) **C/C++** which used to develop the program of Communication module in G.S. System and Puller System.
- 9) **Clear Case:** a program version control system, used to assist the edition control in developing process, support team software developing.
- 10) In gas station offline transaction is adopted, and at the other levels online transaction.

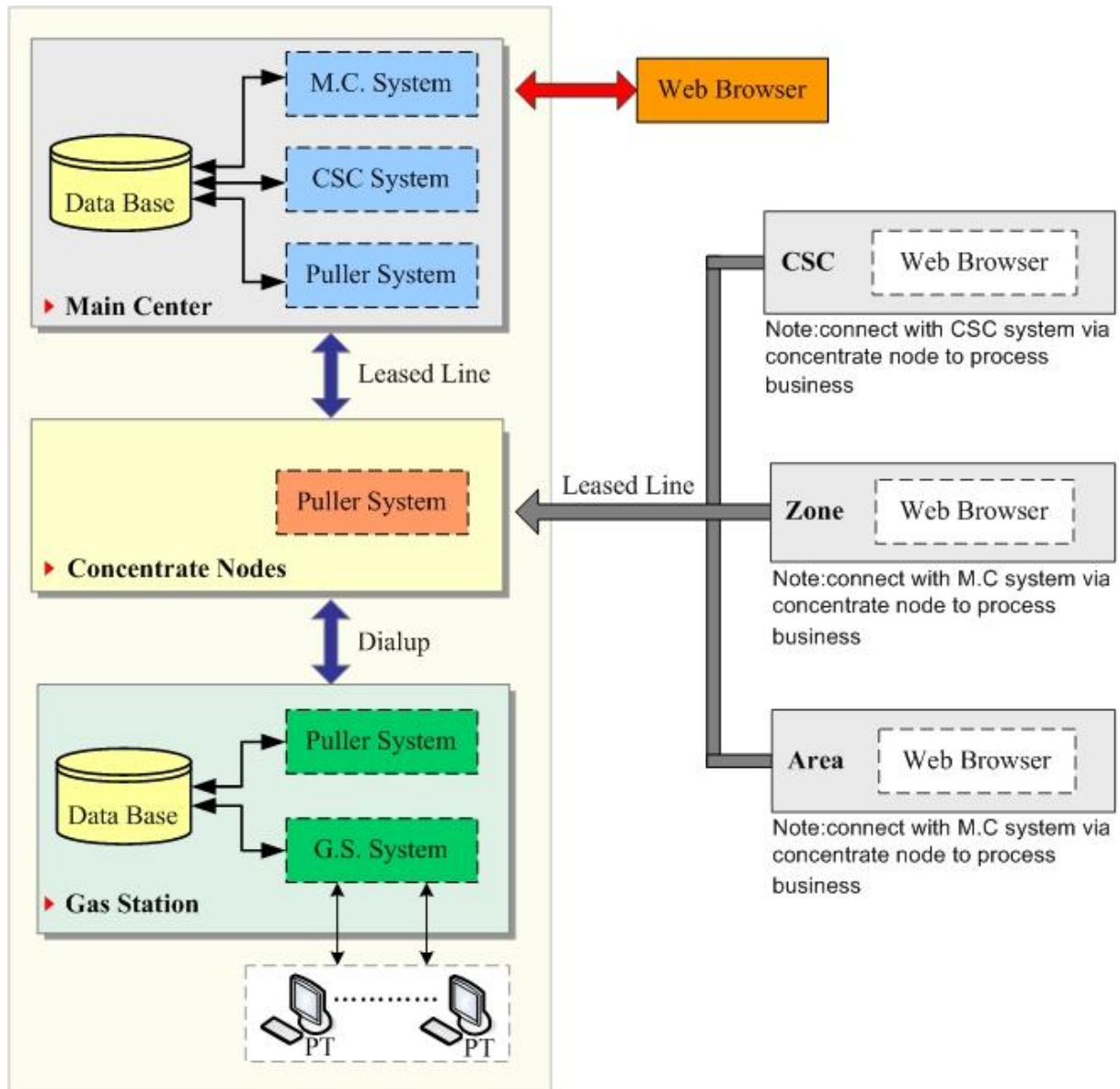


- 11) **Project 2002, Word 2002, and Visio 2002** were used project management, document and chart.
- 12) Data are transmitted in cipher text during transmission process and security of personalization data during card issuing process is ensured.
- 13) Dial-up way is auto dial-up from Concentrated Node to Gas Station.
- 14) Bandwidth of network between Gas Station to Concentrated Node is 56K, from CSC, Zone and Area to Concentrated Node suggested 256k and at least 64K, from Concentrated Node to Main Center 1M.

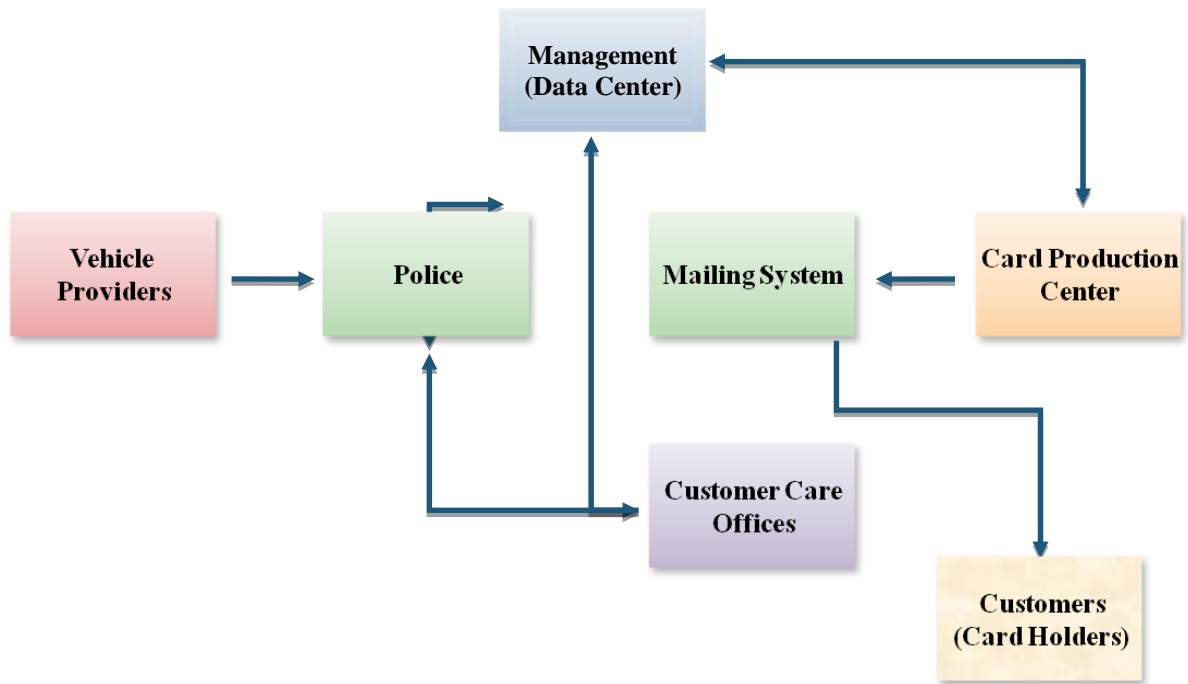
Bandwidth	Transfer Response time	Notes
64K	10 Second	Size of homepage is about 100K, other pages about 40K. Supposed that there are two users online, the size of transmitted data is 80K.
128K	5 Second	
256	2.5 Second	



System Perspective



IFCP Process flow





System Capabilities

Customer benefit	Supporting Features
Usability	<p>Individuation, usability and maintainability are fully taken into consideration when interfaces are designed.</p> <p>Auto script configuration is adopted.</p> <p>System provides two kinds of operation way, namely, keyboard and mouse.</p>
High Reliability	<p>System must support 7*24 hours work. M.C.</p> <p>System adopts cluster function to ensure reliability.</p> <p>In G.S. System, when there is fault in IPC, PT can fuel standalone.</p>
High security	<p>Data are transmitted in cipher text during the whole transmission process.</p> <p>Personalization data for issuing card are encrypted from end to end.</p>
High extensibility	<p>Development mode based on components is adopted and has good extensibility.</p>
Complete data backup and recover function	<p>System provides auto backup mechanism and disaster recover function.</p> <p>Data can be recovered through data file, backup file and log file.</p>
Abundant role and privilege management system	<p>Three-level system management is adopted.</p> <p>Each level system administrator can assign role and privilege to underling system administrator and operator.</p>
Strong inquiry and statistics function	<p>Customized inquiry and statistics function. Plug-in technology is adopted to print various reports.</p>



8. Re-engineering

Project led to changes in business processes in some areas :

- Settlement process in gas stations
- Accounting process of sell fuels
- Process of identifying and replacing old cars
- Reorganizing agencies car and private cars which uses as taxi
- Preparation of using other e initiatives in country

9. Standards

HTTP – Hypertext Transfer Protocol

HTML – Hypertext Markup Language

XML – extensive Markup Language

TCP/IP - Transport Communication Protocol/ Internet Protocol

PS/SC- Personal Computer/Smart Card

J2EE- Java 2 Platform, Enterprise Edition

ISO 27000 family

EMV 4.1-1	Integrated Circuit Card Specifications for Payment Systems - Book 1, Application Independent ICC to Terminal Interface Requirements
EMV 4.1-2	Integrated Circuit Card Specifications for Payment Systems - Book 2, Security and Key Management
EMV 4.1-3	Integrated Circuit Card Specifications for Payment Systems - Book 3, Application Specification
EMV 4.1-4	Integrated Circuit Card Specifications for Payment Systems - Book 4, Cardholder, Attendant, and Acquirer Interface Requirements
FIPS 180-2	Secure Hash Standard
ISO 639-1	Codes for the representation of names of languages – Part 1: Alpha-2 Code
ISO 3166	Codes for the representation of names of countries and their subdivisions
ISO 4217	Codes for the representation of currencies and funds
ISO/IEC 7811-1	Identification cards – Recording technique – Part 1: Embossing
ISO/IEC 7811-3	Identification cards – Recording technique – Part 3: Location of embossed characters on ID-1 cards



ISO/IEC 7813	Identification cards – Financial transaction cards
ISO/IEC 7816-1	Identification cards – Integrated circuit(s) cards with contacts – Part 1: Physical characteristics
ISO/IEC 7816-2	Information technology – Identification cards – Integrated circuit(s) cards with contacts – Part 2: Dimensions and location of contacts
ISO/IEC 7816-3	Information technology – Identification Cards – Integrated circuit(s) cards with contacts – Part 3: Electronic signals and transmission protocols
ISO/IEC 7816-4	Information technology - Identification cards – Integrated circuit(s) cards with contacts – Part 4: Inter-industry commands for interchange
ISO/IEC 7816-5	Identification cards – Integrated circuit(s) cards with contacts – Part 5: Numbering system and registration procedure for application identifiers
ISO/IEC 7816-6	Identification cards – Integrated circuit(s) cards with contacts – Part 6: Interindustry data elements
ISO 8583:1987	Bank card originated messages – Interchange message specifications – Content for financial transactions
ISO 8583:1993	Financial transaction card originated messages – Interchange message specifications
ISO 8731—1: 1987	Message authentication algorithm approved by banking – Part 1: DEA
ISO/IEC 8825-1	Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)
ISO/IEC 8859	Information processing – 8-bit single-byte coded graphic character sets
ISO 9362	Banking – Banking telecommunication messages – Bank identifier codes
ISO 9564-1	Banking – PIN management and security – Part 1: Basic principles and requirements for online PIN handling in ATM and POS systems
ISO 9564-3	Banking – PIN management and security – Part 3: Requirements for offline PIN handling in ATM and POS systems
ISO/IEC 9796-2:2002	Information technology – Security techniques – Digital signature schemes giving message recovery – Part 2: Integer factorization based mechanisms
ISO/IEC 9797-1	Information technology – Security techniques – Message Authentication Codes - Part 1: Mechanisms using a block cipher



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ISO/IEC 10116	Information technology – Security techniques – Modes of operation for an n-bit block cipher
ISO/IEC 10118-3	Information technology – Security techniques – Hash-functions – Part 3: Dedicated hash-functions ISO/IEC 10373 Identification cards – Test methods
ISO 11568-2:1994	Banking – Key management (retail) – Part 2: Key management techniques for symmetric ciphers
ISO 13491-1	Banking – Secure cryptographic devices (retail) – Part 1: Concepts, requirements and evaluation methods
ISO 13616	Banking and related financial services – International bank account number (IBAN)
ISO 16609	Banking – Requirements for message authentication using symmetric techniques
PrEN 1546–1: 1994	Identity Card System E-purse – Part 1: Definition, Conception and Struction
PrEN 1564–2: 1996	Identity Card System E-purse – Part 2: Secure Mechanism
PrEN 1564–3: 1996	Identity Card System E-purse – Part 3: Data Element and Exchange
PrEN 1564–4: 1996	Identity Card System E-purse – Part 4: Equipments

10. Economic benefits, achievements and impact

- Manageability of fuel distribution and consumption
- 25% fuel consumption decrease in nation wide
- Direct ROI: 10 days
- Changing the public consumption model
- Expansion of e culture in whole country
- Negative smuggling
- Overall traffic reduction
- Air pollution reduction
- Improving public transportation
- Experiencing a very huge and complex smart card project
- Top managers rely on ICT for big project



11. Next Steps onwards

- The whole online banking cards beside the e-purse can be used for payment in gas stations
- Energy card is now in the process in order to bring capabilities for consumer to control and use different fuels based on amount of thermal energy only by this card
- The new applications in current card will be activated very soon.
- Different quota tables in different regions will be activated for same group of usage

12. Resources

- **More than 17,000,000 cards were distributed!**
- **27,000 POSs were installed**
- **A very high performance data center was established**
- **A robust communication link between all Gas Stations and Data Center is established**
- **The project takes about 2 years**
- **The whole project budget was about 100 million dollars :**
 - **Hardware 65 million dollars**
 - **Software 10 million dollars**
 - **Man power 25 million dollars**

13. IFCP Statistics

- **More than 17,000,000 cards were distributed!**
- **27,000 POSs were installed**
- **A very high performance data center was established**
- **A robust communication link between all Gas Stations and Data Center is established**
- **The project takes about 2 years**
- **The whole project budget was about 100 million dollars**

14. Lesson learned and Experience

- **Managing large scale smart card projects**
- **Using Spiral Model**
- **Paying high attention for training**
- **Do not forget the technology culture**
- **Plan for change management**
- **Keep the users much informed**
- **Technology Independent Design**
- **Divide and conquer is the best methodology for solving big problem**



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SUM UP

- **There is a big trend to the Smart Card Technology in IRAN**
- **Smart Card Projects can solve many economic problems**
- **IRAN Fuel Card Project can be a good example for similar projects**

We are open to share our experience for all companies, which are willing to run such projects