

**PETROLEUM CONSERVATION RESEARCH ASSOCIATION  
NEW DELHI**

**TENDER DOCUMENT FOR**

**DESIGN, DEVELOPMENT, TESTING AND  
IMPLEMENTATION OF SAVING  
METHODOLOGY FOR PCRA ACTIVITIES**

**TENDER NO: PCRA/SAV/FA/07-08/01**

**OFFICE OF**

**ADDITIONAL DIRECTOR (FA)  
PETROLEUM CONSERVATION RESEARCH ASSOCIATION  
SANRAKSHAN BHAWAN, 10 BHIKAJI CAMA PLACE  
NEW DELHI - 110066**

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**NOTICE INVITING TENDER**

**TENDER NO: PCRA/SAV/FA/07-08/01**

1. Petroleum Conservation Research Association, New Delhi invites sealed tender under two-bid system in the prescribed tender form, from the prospective competent bidders for the job of Design, Development, Testing and implementation of saving methodology for PCRA activities.
2. Brief description of the tender is as below:

1	Brief description	Design, Development, Testing and Implementation of Saving Methodology for PCRA Activities.
2	Scope of Work	As defined in the tender
3	Completion Schedule	All activities covered in the scope of work should be covered in all respects in four months from date of Notification of award of work
4	Tender fee	1,00/-
5	Earnest Money Deposit	50,000/-
6	Sale of Tender Document	From 16.08.07 to 31.08.07
7	Last Date & time for submitting Tender	17.09.07 by 1500 hrs.
8	Date & Time of Tender opening	17.09.07 at 1600 hrs.
9	Validity of Bids	45 days
10	Tender issuing Authority	Addl. Director (FA)
11	Tender receiving Authority	Addl. Director (FA)
12	Correspondence address	Addl. Director (FA), PCRA, Sanrakshan Bhawan, 10 Bhikaji Cama Place, New Delhi - 110066

2. Tender documents containing detailed terms and conditions can be purchase on payment of requisite tender fees by way of Account Payee

Demand Draft (only) in favour of **Petroleum Conservation Research Association payable at New Delhi** during office working hours from 16.08.07 to 31.08.07. Tender documents can also be downloaded from PCRA website [www.pcra.org](http://www.pcra.org) and the required tender fees shall be submitted as above with the technical offer.

3. Pre-qualifying criteria:
  - a. The Bidder should have a team of suitable manpower with qualification in statistics and experience of development of scientific & statistical based model for assessment of result due to a range of varying activities. Supporting documents regarding the bidders having experience of successful execution of such jobs are to be enclosed with the tender documents
  - b. The Bidder should presently not be banned from dealing with the Government Ministries.
4. Earnest Money Deposit - The EMD of requisite amount shall be submitted along with the technical bid in the form of a crossed demand draft in favour of Petroleum Conservation Research Association payable at New Delhi along with Technical offer.
5. Tenders shall be dropped in the Tender Box in the office as mentioned at Sr. No. 2 (12) above on or before last date and time of submission of bid documents.

## Chapter - 1

### 1.0.0 Background

Petroleum Conservation Research Association (PCRA), on behalf of Govt. Of India, Ministry of Petroleum & Natural Gas, has been working for the development and deployment of strategies for energy conservation and environment protection in the major sectors of economy, i.e. Industry, agriculture, transport, domestic and commercial.

### 1.1.0 Emergence of PCRA

The oil crisis of 1970s brought into sharp focus the need for conservation of petroleum products due to the enormous hike in country's import bill. The Govt. in response set up the Petroleum Conservation Action Group (PCAG) in 1976, which was subsequently reconstituted as PCRA in 1978. Over the years, new developments have shaped and given thrust to PCRA's programs and activities.

The demand of petroleum products in the country is growing steadily and Govt. Policy as spelt out in India hydrocarbon vision 2025 considers issues such as energy security, use of alternate fuels and interchangeability of technology as vital to ensure that mix of energy sources used in economy is optimal and sustainable. The Energy Conservation Act 2001 provides the legal and institutional framework for energy conservation activities.

In its mission for improvement of quality of life, PCRA works with the support of Public Sector Oil Companies, Govt. & Non-Govt. Organizations, Research Institutes and Laboratories, Educational Institutes, Consumer Associations and other Organizations.

### 1.2.0 Organizational Setup of PCRA

PCRA has an All India presence through its setup of regional and sub-regional offices. The four regional offices are located in Delhi, Kolkata, Chennai and Mumbai respectively. The sub regional offices of PCRA are located in Jaipur, Chandigarh, Lucknow, Dehradun, Ranchi, Bhubneshwar, Guwahati, Vishakapatnam, Hyderabad, Coimbatore, Cochin, Bangalore, Pune, Bhopal, Raipur, Ahmedabad and Nagpur and the officials located in these offices maintain close liaison with the industries, industrial associations, State Govt. officials, Educational and Research Institutions etc. with a purpose of conducting the chartered activities of PCRA.

### **1.3.0 Scope of Job**

PCRA conducts several activities through its set up at HQs, regional and sub-regional offices that directly or indirectly lead to conservation of energy consumption. It is intended that the selected agency develop a methodology for calculations of savings resulting from PCRA activities and that the methodology should have a scientific approach and based on a statistical model. The development of such a methodology would involve interaction with PCRA team and the formulation of the savings resulting from the respective activity. The methodology so developed would require to be tested on the basis of the number of activities of PCRA in the preceding two years. A brief write up of the major activities of PCRA are detailed in the succeeding chapters. Tender may be filled by the parties after studying about activities of PCRA available on PCRA website [www.pcra.org](http://www.pcra.org) and also the annual report for 2005-06.

The developed methodology should be applicable for calculation of savings resulting from PCRA activities for at least the next 8 to 10 years. The developed methodology should clearly enumerate how and from which source the information is to be picked up for this calculation. In case, the desired data is to be derived on the basis of a survey, the required format for the respective sector and the period when the survey is to be conducted is to be clearly indicated.

The developed methodology should be of a highest quality and a proper justification of each factor considered should be clearly enumerated. For factors considered in the saving methodology which would depend on parameters external to PCRA activities e.g. reach of electronic media etc. necessary correction factors which would be required to be applied based on some statistical data are to be also detailed.

### **1.4.0 Time period for completion**

The job of preparation of Saving Methodology based on scientific and statistical techniques taking into account (but not limited to) the details of PCRA activities as detailed in this tender document and other activities shall be completed within six months from the date of Notification of Award which would include the validation of methodology. The successful tenderer shall be required to submit an interim report and to make a presentation to PCRA management at the

end of 2 months and 4 months respectively to apprise PCRA management of the progress achieved so far. The comments/feedback of PCRA team shall be suitably incorporated.

### **1.5.0 Payment terms**

The selected agency would be entitled for payment as per the terms and conditions enumerated below:

- 40% on submission of draft report on the saving methodology at the end of the time period for completion of work of development of methodology for calculation of savings arising out of PCRA activities.
- 40% on submission of final report incorporating the comments of the owner on the draft report and accepted by the owner.
- 10% on verification of the accepted methodology after application of the same on data available about PCRA activities for the last two years i.e. 2005-06 & 2006-07.
- 10% on calculation of the savings resulting from PCRA activities at the end of the current financial year i.e. 2007-08.

### **1.6.0 Technical Bid**

The Technical Bid should contain the details of relevant persons in the organisational set up with details of qualification and experience who would be associated in the execution of the job. The team leader's name should also be identified. The details of similar works executed earlier with documentary proof are to be also attached along with report of satisfactory completion from the client. The details of statistical packages, softwares, survey tools etc available with the Tenderer and proposed to be used for this job is also to be enclosed. Tenderers are advised to enclose a copy of the Balance Sheet for the last two years

### **1.7.0 Financial Bid**

The financial bid with the total quoted cost in the proforma as per Annexure-I is to be submitted in a separate sealed envelope. Both the technical and financial bids shall be sealed in separate envelopes, which shall be together enclosed in a sealed envelope with the name of the work and Tender No. clearly marked.

## Chapter 2

### 2.0.0 ENERGY EFFICIENCY AND ENERGY CONSERVATION THROUGH PCRA'S ACTIVITIES

Field Activities are one of the core areas of PCRA operations. It is only through sectoral field activities that PCRA engineers and its external experts are able to reach the masses in person with its innovative energy conservation programmes. These activities are designed for specific target groups in the different sectors:

- Industrial
- Transport
- Domestic
- Agriculture &
- Commercial.

Its four regional heads at Chennai, Delhi, Kolkata and Mumbai coordinate PCRA activities in the field with support from PCRA head office at Delhi. Activities, however, are carried out by PCRA engineers based at its four regional offices and sub-regional officers located mostly at the state capitals. Besides its workforce of 78 officers, PCRA is also supported by over 158 external faculties/NGOs and 83 energy agencies.

### 2.1.0 INDUSTRIAL SECTOR

PCRA activities in this sector include Energy Audits and the Follow-ups thereof, Fuel oil diagnostic studies, walk through audits of the small-scale sector industries, seminars, consumer meets, workshops, and institutional Training Programmes. This sector accounts for nearly 25% of the country's total consumption of petroleum products with around similar level of the conservation potential.

#### 2.1.1 Energy Use Studies

Every year around 850 energy use studies are carried out by PCRA identifying the saving potential of approximately 7500 metric tones of oil while the saving realized as a result of the follow-ups is to the tune of 32000 metric tones of oil. PCRA's activities in this sector included Energy Audits and the Follow-ups thereof, Fuel oil diagnostic studies, walk through audits of the small-scale industries, Seminars, consumer meets, workshops, and Institutional training

programs. This sector accounts for nearly 25% of country's total consumption of petroleum products with conservation potential to the tune of 20-25% (Identified Savings potential), which can be achieved in the Industries, are segregated in our energy audit reports as:

No cost improvements:

Low cost improvements:

System improvements:

As a policy, any saving requiring investment with a pay-back period of more than three years is generally not included as it is considered that within a period of 3 years the technology involved gets upgraded.

The findings of the audit are circulated amongst the industries in the same cluster and also given wide publicity for the general benefit of other industries.

### **2.1.2 Cluster Approach**

PCRA has adopted "Cluster Approach" to rapidly spread the message on the need and the benefits of energy conservation among the industrial clusters. Here, representatives from many small-scale industries which are operating inefficiently due to obsolete technology, lack of skilled manpower or due to lack of information about Energy Conservation opportunities are brought to a common platform through PCRA activities such as consumer meets, Seminar/Technical meets etc. and are given information on latest technology and how to implement it in their units. In order to encase the experience, gained over the years, following activities have been listed for reaping the benefits. Firstly, the findings under each sector are required to be tabulated under different heads which will inter-alia include major findings of broad nature, findings of recurring nature with savings realized and revenue generated. After the above tabulation, a detailed Action Plan as detailed below is followed:

- Identification/compilation of Industries in each sector.
- Write to all identified industries and industry associations in each sector about the common finding of energy saving potential areas in respective sectors.
- Get feedback from the Industry on implementation.
- Preparing case studies.
- Share broad findings and case studies with all PCRA field Engineers and regions.

- Preparing leaflet for inciting industries to use PCRA's Expertise.
- Contact Industries for getting every audit.
- Showcasing thro: Seminar, Industrial Training Programmes, Workshops etc.
- Conduct Seminars for information dissemination and sharing of the best practices in the industry.
- Establish need for R&D in any section of the process.
- Identifying/ developing ESCO companies.
- Concepts as a Think Thank to concerned Ministries such as Ministry of Power, Ministry of Steel, Ministry of Heavy Industries etc. through MOP&NG.
- Networking with other Energy Auditors and share information and findings.
- Use this information to work in a cluster approach fashion.
- Establish Benchmarking and compare with international Standards.
- Networking with international Energy Auditors.
- Papers can be put-up for National/International seminars.
- SRO Training.
- Complete Compilation.
- Relevant films for ITP.

### 2.1.3 Replication Effect

One of the essences of a good energy study is its " Replication" Efforts are made to communicate good energy practices identified at one industry to other similar type of industries. Efforts made during the last few years for replicating energy savings in industrial clusters by circulating the saving potential and saving methodology in earlier energy audits of PCRA are as below:

Industry Cluster	No of Industries with whom the audit findings of PCRA were shared
Cement	130
Textile	140
Pulp & Paper	120
Refinery	14
Milk & Food	245
Steel Re-rolling	570

#### **2.1.4 Technical Meets / Seminars / Consumer Meets**

One day interactive meets are aimed at providing a common platform for the benefit of industrial consumers through experiences sharing. Here, participants include manufacturers of energy efficient equipment, consultants, industrialists and experts in field of energy conservation. Industrialists present their success stories in the areas of energy conservation for the benefit of other similar industries.

#### **2.1.5 Institutional Training Programmes**

PCRA's institutional training programmes (ITP) are an activity primarily meant to share the experience gained by PCRA during industry audits. Institutional training programmes are conducted in large/ medium industry for groups of 20-30 managers/supervisors/ technicians. Experience is shared through discussion on case studies of specific energy audits that have resulted in sizeable energy saving potential/realization in various types of industries. Every year around 300 ITPs are conducted in various industries.

#### **2.1.6 Exhibition**

It is an ideal platform where PCRA creates awareness about the conservation of petroleum products/energy among the general public in all over the country. Under this activity, PCRA participate/put up stalls and exhibits to the general public the methods/ways/tips for energy conservation through its personal interaction, distribution of conservation related literatures/display posters/audio/video cassettes and screen conservation films etc. Every year PCRA organizes/participates in around 100 nos. exhibitions in various parts of the country

#### **2.2.0 TRANSPORT SECTOR**

The transport sector accounts for almost 50% of country's total petroleum products consumption with conservation potential of around 20% PCRA activities in this sector include Driver Training Programmes, Model Depot Studies, Emission Awareness Programmes & Transport Workshops.

### **2.2.1 Driver Training Programme**

This is PCRA's unique 3-day programme designed to train the drivers and the driver trainers to enable them to acquire and apply improved driving skills and fuel conservation techniques. Every year, PCRA trains around 15000 drivers under this programme. Drivers trained, belong to State Transport Undertakings, Army establishments, Border Security force, Oil companies and the various private establishments. The extent of savings realized in KMPL through these programmes is to the tune of 12% on an average.

### **2.2.2 Model Depot Studies**

These activities involve the study of the existing system and maintenance practices of depts./workshops of STUs. The estimated saving of account of such studies carried out ever years is around 2000 tonnes of diesel.

### **2.2.3 Follow up programmes with Trained Drivers**

PCRA organizes a get-together of the drivers already trained through PCRA's Driver Training programmes. It is aimed at receiving feedback on how PCRA's tips on good driving habits are helping them to achieve improvement in KMPL, their constraints in this direction and their suggestions. Each of the programmes received an overwhelming response.

### **2.2.4 One -Day Transport Workshop**

This workshop is to bridge the considerable information gap amongst drivers and mechanics regarding proper operational and maintenance practices for achieving optimum fuel consumption, PCRA has been organizing transport workshops every year. During 2004-05, 668 such workshops were organized in all the four regions through empanelled external faculties and PCRA's field engineers. Audio visual aids and PCRA's printed material is used to train the drivers and mechanics properly and upgrade their awareness level about good driving practices.

## **2.3.0 AGRICULTURE SECTOR**

Agriculture sector accounts for nearly 2% of the total consumption of petroleum products in the country. PCRA efforts in this sector focus on setting up of the demonstration centers, rectification of diesel-powered fuel inefficient irrigation pump sets and the replacement of fuel inefficient foot valves. Besides these PCRA imparts education to the farmers on oil conservation through van publicity campaigns, exhibitions, Kisan melas, etc. PCRA saving tips are also equally beneficial for electric driven pump sets in the agriculture sector, where electricity accounts for 31% of the energy consumption

### **2.3.1 Demonstration Centers**

The activity involves installation and operation of efficient and the inefficient pumping systems together. Through this arrangement farmers in the area are demonstrated and explained about the possible saving in diesel achievable through the use of standard ISI-marked foot valves and accessories such as white rigid PVC pipes etc.

These demonstration centers (DS) are normally installed at:

Village having a sizeable number of pump sets.

Sites of the organizations imparting education to farmers (farmer training centers)

Agriculture institutes, Agriculture Extension Centers, Krishi Mandis, co-operative Societies, Krishi Vikas Kendras, Panchayat Bhawans etc.

Any other location frequently visited by farmers

These workshops are specifically designed and conducted to impress upon the farmer community the ways and means to conserve diesel in their day-to-day activities. Through these demonstration centers PCRA has been able to demonstrate savings in the range of 10-15%

### **2.3.2 Kisan Melas & Agricultural Workshops/Clinics**

Through participation in various Kisan Melas, the scope of energy optimization through adoption of the appropriate techniques pertaining to the agro climatic zone is conveyed. The stalls are put

up at Kisan Melas and printed leaflets and PCRA's developed films for agriculture sector are utilized by PCRA representatives for spreading the message of energy conservation.

### **2.3.3 Rectification of Lift irrigation pumps (LIPS) and the replacement of foot valves**

These activities also involve the demonstration of savings in diesel achievable through the use of fuel-efficient ISI marked equipment in Pump sets. To demonstrate this effect PCRA gets the pipes, fittings and foot valves etc. replaced in the pump sets installed at the farmers' premises. To motivate farmers, PCRA provides a subsidy equivalent to 50% of the actual cost subject to the maximum of Rs.60 per LIP rectification, whereas in the case of foot valve replacement, a new ISI marked CI foot valve is given to the farmer with his contribution of Rs.50/- only. These activities have a replication effect of 1:3.

A number of studies and surveys of irrigation pump sets and systems have indicated and that around 80% of the pumping systems installed are energy inefficient and that simple rectification measures could result in a reduction of 10-30% in the energy consumption.

Activities such as Kisan melas, exhibitions and the promotion through field publicity vans have provided PCRA an effective platform to propagate the message of conservation to the rural masses in the country. Every year PCRA participate in approx around 100 Kisan melas & exhibitions.

### **2.3.4 Agricultural Survey by Rural School Children**

Innovative scheme aptly named "Learn while you enjoy" continues to motivate rural school children to participate in the every efficiency movement through a survey in agriculture sector in the vicinity of their area. The scheme aims to the school children by:

- Developing their knowledge of various aspects of energy being used in agriculture sector.
- Developing their communication skills, analyzing skills and their self-confidence, while surveying the farmers.
- Developing them as young ambassadors.

In addition the survey format and methodology adopted gives knowledge on saving opportunities and fuel saving tips to students conducting survey as well as the farmers who respond to the questionnaires.

Post survey deliberations in the school premises are held with the help of audio visual aids to discuss benefits available through proper selection of pump sets and good driving habits.

For carrying out these surveys, PCRA invites participation from schools across the country through media. The school principals nominate a group of 15-20 children for carrying out the survey under the guidance of a teacher. PCRA prefers such schools, which are recognized by CBSE/ State Board/ICSE etc. and have a teacher on its rolls who has been honored by the National/State Government Award.

The response to the scheme has been very enthusiastic. 11 Schools involving 180 students completed survey of over 1048 farmers in a format specially designed for the survey. Some of the useful questions in the Survey-format where as below:

- Pumps being used are of submersible or non-submersible type and whether they are of ISI mark.
- Foot valve installed in the pump suction line is ISI mark or not.
- Average consumption of electricity or diesel for operating the pump sets.
- Extent of use of tractor in preparation of farmland.
- Average consumption of diesel in operating the tractor.
- Awareness level about the extent of savings possible through the use of ISI mark equipment in pump sets and tips for minimizing the consumption of diesel in tractors.
- Awareness level about PCRA tips for minimizing diesel consumption in tractors and pumps.

### **2.3.5 Van Publicity Program**

This activity is taken up to spread the message of petroleum conservation to remote, rural and semi-urban areas of various States and to create awareness amongst people in various sectors on

petroleum conservation. A van fitted with audio-visual aids, poster and banners on theme of petroleum conservation visits in villages. Farmers and other people in the rural area are given education on conservation through talks, pamphlets distribution and by use of audio-visual aids. The services of State Field Publicity Departments and the Station Directors of All India Radio of the region are utilized extensively for distributing PCRA literature and showing video films through their field publicity vans. The Station Directors of All India Radio are having van equipped for carrying publicity material in the form of literature and screening of films for the theme to be publicized. Our SROs maintain regular contact with the Station Directors and during 2004-05, 514 Van Publicity Cycles were conducted in rural & semi-urban India.

### **2.3.6 IMPCC Meetings**

A monthly meeting organized under the Chairmanship of the Station Director of all India Radio is convened wherein thrust areas, issues and governmental guidelines which require to be disseminated amongst the rural and semi-urban areas. Various representatives of Government Departments along with PCRA representative deliberate on ways & means for publicizing the critical issues decided during the meeting. The meeting takes stock of the results achieved in publicizing the efforts through the State Publicity Departments and also designs the future course of action.

### **2.3.7 Promotion of Bio-Diesel**

Details of major activities carried out for promotion of bio-diesel are included in the R&D section. Promotion and dissemination of information about 'Jatropha' cultivation and use of bio-diesel was taken up extensively at Kisan Melas & Agricultural Workshops. Efforts of PCRA in this area were:

- Opening of a National Information Centre on Bio-fuels.
- Production of 5 films on Jatropha plantation and bio-diesel production.
- Developed 2 brochures on bio-diesel.

- Presentations in different forums on bio-diesel i.e. at CII Seminars etc.
- Training to Orissa Self Help Group Women on bio-diesel production.
- R&D project sponsored on production of biogas from Jatropha oil cakes.
- Institutional linkages with Delhi College of Engineering to help Self Help Groups and small farmers for bio-diesel production.
- Promotion and dissemination of information through mass awareness campaign.

#### **2.4.0 DOMESTIC SECTOR**

The domestic sector share in consumption of commercial energy is around 20% with almost similar potential of energy conservation. The focus of PCRA activities in this sector is on educating women on better cooking habits aimed at conservation of LPG and kerosene, use of fuel-efficient stoves and lighting appliances, use of alternative source of energy such as solar, bio-gas etc.

##### **2.4.1 Youth Programmes**

PCRA organizes a variety of programmes for the youth. These constitute quiz, essay, debate and the painting competitions on topics related to energy conservation. The whole idea behind these programmes is to make young minds understand the issue of energy conservation and motivate them to apply and promote the cause of oil conservation into their widening spheres of domestic and the professional lives.

Every year PCRA organizes around 1500 youth programmes in various schools, colleges and institutions within the country.

##### **2.4.2 Five Day Intensive Programmes on Oil Conservation in Residential Colonies**

These programmes aim at focusing the issue of oil conservation within a large industrial-cum-residential complex and sensitize the residents on the need, importance and benefits of oil conservation.

This has a lasting impact and also helps in bringing about the necessary attitudinal changes in a big way.

### **2.4.3 School Level Science Exhibitions**

School level science exhibition offers an opportunity to the students to express and exchange their creative ideas. PCRA instituted the school level science exhibition awards with the objective to develop awareness about the importance of science and technology in the national development vis-à-vis the global changes and motivate the children to develop science projects related to energy conservation and environmental protection.

## **2.5.0 COMMERCIAL SECTOR**

### **2.5.1 Urban Energy Management**

Urban areas by their very nature are energy intensive because they are hubs of governmental, industrial and economic activities. According to the 'Economic Survey 2003-04', the town and cities of India are estimated to contribute roughly 50% of the country's GDP. India's urban population increased from 17% in 1995 to 30% in 2002 and likely to go up to 50% in 2025. To maintain such a huge infrastructure and run civic services to support such a large population needs a lot of energy input.

Increasing energy consumption naturally raises the question of future sustainability of supplies besides problems like environmental pollution, groundwater pollution and greenhouse gas emissions leading to climate change, destruction of bio diversity, deforestation and public health hazards. These issues need to be addressed through a sustainable energy management approach, which will involve taking a serious look at planning and management of energy systems that will facilitate efficient use of energy.

PCRA identified the following core issues connected with Urban Energy Management in the metropolis and has made a modest beginning:

- Traffic management
- Solid waste management

- Energy audits of commercial buildings (hotels, hospitals etc.)
- Rainwater harvesting
- Ambient air quality monitoring
- Energy efficient buildings
- Pumping water supply and sewage system
- Road and infrastructure management
- Air conditioning and lighting
- Energy audit of governmental buildings
- Speed breakers
- Community washing
- Grease traps
- Street Light management
- Use of CFLs

### **2.5.2 Urban Transport Management**

A Web page in PCRA's site has been opened for people's participation on traffic issues of other cities. Readers are posting the traffic issues on this Web page and these are being taken up with appropriate city authorities. The action taken by PCRA is being put up on the website for the information of the persons who are highlighting the traffic related issues which have a potential of resulting oil savings if attended properly by the authorities.

PCRA in association with Delhi Police has sponsored the installation of Reverse Timers at several important Traffic Intersections in Delhi. The reverse timers are installed so that the vehicles owners have an idea about the time gap after which their traffic lane would be permitted to move. By switching off the engine the excess fuel, which is consumed during idling, can be avoided and which can result in enormous savings of petroleum products. The message of switching off at traffic signals is being addressed in PCRA programmes being aired on the electronic media and through posters being utilized in the Education Campaigns.

### **2.5.3 Solid Waste Management**

PCRA's efforts in promoting Solid Waste Management are bearing fruits. We provided training to Resident Welfare Associations, MCD Officers, Schools, Colleges & other stakeholders in Bhagidari schemes in 12 programs on payment basis. Similar training was

provided to railway officer & employees in Hyderabad Division at the request of Divisional Railway Manager, Hyderabad. It has been implemented in 2 Railway-Colonies in Hyderabad. Spurred by the success of this program at Hyderabad, Indian Railways at Chennai has also shown keen interest & PCRA is going to conduct similar workshops there also. Film on the success story of railways Hyderabad in SWM in association with PCRA, has also been developed. Token money @ Rs. 20,000 per workshop was charged from all these and revenue earning was RS. 2.55 lacs.

### **2.6.0 ACTION GROUP MEETINGS**

These meetings are organized in different states with the State level coordinator of the oil industry as the convener. These are aimed at facilitating interaction between oil users and the State Government on the issues related to oil conservation in industrial, transport and the agriculture sectors within the State. The forum is effectively used to draw out action plans and monitor progress on different conservation activities. Over the last five years PCRA has carried out around 141 such action group meetings.

### **2.7.0 DEVELOPMENT OF EXTERNAL FACULTIES**

PCRA believes not only in carrying out the energy efficiency improvement activities themselves but also in developing individuals and the institutions as external faculties to expeditiously promote the cause of energy conservation among masses. For this purpose, PCRA has specially designed the external faculty schemes detailing procedural requirements and the activities that can be performed through external faculties. Interested faculties are initially trained and groomed to carryout effectively the energy efficiency programmes of PCRA. These programmes include workshops in different sectors, youth programmes, institutional training programmes in industry, depot development studies in transport sector, driver training programmes and the kisan melas.

Today, PCRA has more than 200 trained external faculties in different states across the country. Every year in association with these faculties around 3500 energy conservation programmes in different sectors are conducted.

## 2.8.0 SOFT LOAN SCHEMES

To facilitate energy efficiency improvement and sustain energy conservation efforts, PCRA has different soft loan schemes. These are;

- 1) Soft loan for purchase of instruments and equipment to upgrade the maintenance facilities of a garage in the State Transport Undertakings.
- 2) Soft loan to implement energy audit recommendations in an industry for the purchase of energy efficient equipment/instruments

The salient features of the above schemes are as below:

Loan amount	Rs. 15 lacs or 75% of the cost of equipment, whichever is less
Rate of interest	7% per annum on reducing principal
No. of installments	Six equal annual installments

Soft loan for upgrading the testing facilities for manufacturing BIS mark foot valves. The scheme involves a loan amount of Rs. 65,000 with rate of interest at 7% per annum payable in two equal installments.

## 2.9.0 EMPANELMENT OF ENERGY AUDITORS

PCRA is the nodal agency for empanelment of energy auditors in the country at the national level. Over the years, PCRA has been playing an important role of providing quality energy auditors to industries and commercial establishments in the country. For the purpose, it acts as a facilitator and a coordinator for the empanelment committee comprising of other members from BEE, NPC and TERI. Today a strong force of 83 PCRA empanelled energy auditors is providing service to the Indian industry to help them maximize their profits through energy efficiency improvement.

## Chapter 3

### 3.0.0 OIL & GAS CONSERVATION FORTNIGHT

Oil and Gas Conservation Fortnight (OGCF) is organized every year during the period from January (15<sup>th</sup> to 31<sup>st</sup>), jointly by PCRA and the public sector Oil and Gas companies. Started, as Oil Conservation Week (OCW) in 1991, this nation-wide campaign about the importance of effective tool in creating mass awareness about the importance of energy conservation in the country. Encouraged by the tremendous success of the campaign, the duration of OCW was extended to a fortnight form 1997.

With increasing use of cleaner and eco-friendly gaseous fuels, the conservation of these fuels is equally important. Therefore, with effect from 2004 the event has been renamed as "Oil & Gas Conservation Fortnight (OGFC)" in line with the decision taken at the 63<sup>rd</sup> Executive Committee meeting of PCRA.

All over the country, over 5.0 lac activities relating to mass awareness were undertaken by the oil and gas industry in the Transport, Industrial, Agricultural and Domestic sectors.

### 3.1.0 AWARDS

Besides token awards given by PCRA in various field activities, PCRA has also constituted several National level awards in different sectors. The idea is to motivate and give recognition to those who have made special efforts and have excelled in the field of energy conservation in their respective spheres of activity. The Honorable Minister MOP&NG gives these awards during the Oil Conservation Fortnight Valedictory function in January each year at New Delhi. Each of the awards carries a trophy and a citation.

- Best Energy Auditor & Best Energy Service Company (ESCO) Awards
- Award for Exemplary Work in Energy Conservation
- Award for Best KMPL to STUs
- State/National Level Essay Competition Awards for Students & Teachers
- Best External Faculties Award
- Performance Award for PCRA Field Officer

### 3.2.0 TWO WHEELER WOMEN'S RALLY

Adding a new dimension to the OGCF campaign, a "Save Oil Two Wheeler Women's Rally" was organized for the first time in 2003 at six selected cities across the country.

The initiative was prompted by the twin objectives of sensitizing women about issues of energy and environment as well to help them in self-empowerment through participation in a group outdoor activity. As women from nearly half of the country's population and represent the household sector, which consumes 20% of petroleum products in the country, conservation efforts cannot succeed without their involvement and participation. Encouraged by the immense success of the initiative, this event was again organized during OGCF-2004 at seven cities of the country. In 2005, the event was organized at New Delhi, Ranchi, Raipur, Jaipur, Bhubneshwar and Chennai.

Hon'ble Minister for Petroleum & Natural Gas and Panchayati Raj Shri Mani Shankar Aiyar was the chief guest at the rally at New Delhi and flagged off the rally. Shri M S Srinivasan, Addl. Secy. MOP&NG, Dr. Girija Vyas, Chairperson, NCW, Ms Shovana Narayan, famous danseuse, Ms Lalita Balakrishnan, Vice President All Indian Women Conference and many other celebrities graced the occasion. The rally was a huge success with around 600 women taking part in the rally. The rally was organized by the Oil Industry and had the support of two major Sponsors viz. Oil India and Asian Electronics.

## CHAPTER - 4

### Education Campaign

#### 4.0.0 PRINT MEDIA

##### 4.1.0 Press Campaign:

Print media plays a powerful role to educate the end users on importance of conservation of petroleum products in various sectors. PCRA released sector specific ads in newspaper during 2006-07 (as on 25.01.07). "Cutting Pollution with Energy Audit", the ad on dual affect of energy audit in enhancing industrial profit as well in reduction of environmental pollution was released on the occasion of World Environment Day, 2006. PCRA promotes research & development projects on energy efficient technologies and in order to attract such projects, it released an ad "Got some green ideas?" inviting R&D Project proposals on energy efficient technologies. Advertisements, at times, are required to be supplemented with editorial inputs in the Print media. Keeping this in view, full page write up on efforts and Endeavour's of PCRA towards energy efficient practices in industrial, transport and R&D sector were released in Financial Express along with an ad on fuel conservation in transport & industrial sector. "Fuel Saving through Driver Training Program, Save up to 20%" - an ad highlighting success story of PCRA's Driver Training Program was released in various newspapers of the country inviting attention of other state road transport corporations to replicate the same.

PCRA's R&D Projects on fuel saving in transport sector revealed many interesting results that were released in newspapers and magazines through ads with subjects "Drive your vehicle at the most fuel efficient speed of 45 KMPH" and "Stop your Engine at Traffic Red Lights beyond 15 seconds to avoid wastage". India Today & Outlook are the two leading newsmagazines in the country today that enjoy huge readership. Keeping this in view, two Page articles highlighting PCRA's efforts in oil/gas conservation were released in both the magazines to mark the celebration of Oil & Gas Conservation Fortnight, 2007. PCRA's energy audit in Shastri Bhawan, North Block & South Block resulted in a scope of huge saving potential in its energy bill by implementation of PCRA recommendation. This information was highlighted in the form of press release in

newspapers order to motivate other Govt. Buildings to take up energy audit and cut down on their energy bill.

#### **4.1.1 Printed Literature:**

Leaflets, Brochures, Pamphlets on various topics of oil & gas conservation developed by PCRA have been used extensively to spread the fuel saving tips to the end users in various sectors of the economy. Four numbers of new booklets/leaflets (list shown below) were compiled, designed and printed during the year 2006-07(as on 25.01.07).

- Booklet on PCRA's Unique Driver Training Program
- Leaflet on "Energy Efficiency in Pulp & paper Industry"
- Leaflet on "Sona ESV", energy efficient cooking equipment
- Leaflet on LPG saving

During the year 2006-07 (as on 25.01.07), PCRA printed eleven lacs copies of various free literatures on oil & gas conservation in 12 languages and distributed to 158 distribution centers all over the country spread across 106 locations. These free literatures are distributed throughout the year to different end users of petroleum products all over the country in order to educate them on energy efficient practices.

Active Conservation Technique (ACT), the quarterly technical bulletin of PCRA that focuses on articles pertaining to energy conservation techniques & case studies on successful energy audits, were published and distributed amongst industries.

#### **4.2.0 OUTDOOR PUBLICITY**

##### **4.2.1 Conservation Hoardings at Public Utilities**

Hoardings on energy efficient practices in transport sector and energy audit in commercial buildings were displayed in public utilities in different cities.

#### **4.2.2 Conservation Hoardings at Petrol Retail Outlets**

Petrol Retail Outlets are the most strategic locations to disseminate message on petrol/diesel saving tips as all vehicles on an average spends 5-7 minutes while refilling their fuel tanks. Keeping this in mind, PCRA displayed conservation hoardings at 10 numbers of petrol retail outlets of IOCL, HPCL, BPCL & IBP in the city of Delhi during 2006-07 (as on 25.01.07).

#### **4.3.0 ELECTRONIC MEDIA**

##### **4.3.1 Films, TV Spots:**

During the year 2006-07 (as on 25.01.07), PCRA contemplates to multiply the effect of its research findings in the form of films and motivate similar industries to replicate various energy efficient practices. 4 numbers of technical films were produced during the year 2006-07 (as on 25.01.07) as shown below:

- Shining Rays of Biodiesel - Film on Biodiesel, the emerging alternate source of fuel targeted at entrepreneurs
- Ek Nai Pahal - Film on PCRA's success story on driver training program in Rajasthan State Road Transport Corporation targeted at various State Transport Corporations.
- Energy efficient Tunnel Kiln - Film on measures to increase energy efficiency in Pottery Industry targeted at Pottery Industries all over the country
- Jatropha Agro Practices - Film on Agro practices of Jatropha targeted at village Panchayats of the country

##### **4.3.2 Internet Campaign**

Internet is considered to be one of the most emerging and effective media of communication in the industry today in view of its accessibility on fingertips and its wide spread popularity in amongst the masses. "indiatimes.com", the internet portal of India Today Group provides wide scope of catching attention of users and PCRA is running 5 Banner advertisements on conservation techniques on industrial and transport sector on this portal that has received very encouraging results in terms of response to the quiz on conservation.

## CHAPTER -5

### 5.0.0 Research & Development

PCRA continued its efforts towards new R&D projects aimed at accelerating conservation of petroleum products leading to environment protection, energy security and sustainable development. Thrust has been to look into the aspect of dissemination of project outcome at the time of sponsoring the project itself. For this purpose project proposers were requested to contact & wherever feasible associate the prospective users of technology right from the beginning. This is an effective methodology as the project results are quickly implemented.

Two of the technologies have been licensed & PCRA received 50% of licensing fee. Patents have been filed for 4 technologies.

#### R&D Projects

S.No.	Particulars	No. Of Projects	Value of Projects (in Lac)
1	New Projects awarded during 2005-06	15	129.6
2	On-going projects	27	354.4
3	Projects completed in 2005-06	9	143.0
4	Commercialized (SITRA-2, CFTRI-1, Khurja Project -1)	4	
5	Patent filed (SITRA-3, IITD-1, CFTRI-1)	5	

### **5.1.0 Brief of a few R&D projects:**

#### **5.1.1 Energy Efficient Kiln designing by RDCIS**

PCRA had sponsored a project on RDCIS, SAIL Ranchi to redesign & modify existing kiln to energy efficient tunnel kiln used in white ware industries.

Project has now been completed. Information is disseminated among other industrialists in the cluster. Seminar were held on 08.06.05 & 28.12.05 . About 120 industrialists attended & learnt about the ways by which actual saving have been achieved. They also were taken for site visit of kilns where the efficiency has been achieved. The fuel consumption per ton came down from 211 liters to 172 liters in 1<sup>st</sup> and from 172 liters to 152 liters in 2<sup>nd</sup> industry. The demonstration has established the technical & economic feasibility & social acceptability. Further project is being planned in this field.

#### **5.1.2 Application of LPG & Natural Gas in food industry by CFTRI**

Another project for energy efficient baking & roasting was sponsored on CFTRI, Mysore for application of LPG & Natural Gas in food industry. CFTRI carried out design, development, fabrication & trial run of the continuous roasting machine.

Project has been completed & technology has been licensed. PCRA received Rs. 15000/- as 50% as of licensing fee. CFTRI have also applied for patenting along with PCRA. Prospective beneficiary industries had been associated with the project.

#### **5.1.3 Energy efficient control system for humidification plant in textile mills by SITRA**

A project was sponsored on SITRA, Coimbatore for design & development of energy efficient control system for humidification plants in textile mills. The project is completed now. This system also has been designed, developed, fabricated & is put in use in two industries. 20% actual energy saving has been achieved.

Technology has been licensed. PCRA received Rs. 25,000/- as 50% of licensing fee. Patent has also been applied jointly by SITRA & PCRA.

#### **5.1.4 Optimized energy saving control system for overhead cleaners in textile industry by SITRA**

Under another project sponsored on SITRA, optimized energy saving control system for overhead cleaners, which are used in textile industry, has been developed & put in use in two industries.

15 to 20% energy saving has been observed. Patents have been applied. Because of association of industry with these projects right since beginning, implementation in the industries has been quick & effective

#### **5.1.5 Estimation of fuel loss due to congestion at Paharganj side of New Delhi railway station by CRRI & remedial measures.**

CRRI has completed PCRA sponsored study of fuel loss at Paharganj side of New Delhi Railway Station. Fuel loss alone works out to be Rs. 3.1 crores annually besides cost of time loss of about Rs. 2.4 crores. Short terms & long terms remedial measures have also been recommended in the study. Presentation was made before Commissioner MCD, Railway officials & Delhi traffic police for implementation. They appreciated the project results. Commissioner MCD agreed to implement some of the recommendations. He also agreed to take up other recommendation in association with Railways.

#### **5.1.6 Studies on passenger cars for fuel efficiency at different speeds by IIP, Dehradun.**

This project was sponsored on IIP, Dehradun with the objective of finding the optimum speed for new cars for maximum fuel efficiency. This had become essential in view of new generation cars now having come to the market in a big way & necessity to give right information to users through our education campaign. Elaborate experiments were done by IIP on Maruti-800, Santro & Indica cars. All showed maximum fuel efficiency is achieved between 40 to 50 km/ hr speed.

#### **5.1.7 Estimation of fuel loss during idling of vehicles at selected intersections of Delhi by CRRI, New Delhi.**

A project was sponsored on CRRI, Delhi with the objective of estimation of loss of petroleum products due to idling of vehicles at signalized intersections under varying traffic conditions in Delhi. The study also identifies various remedial measures for minimizing the delays & fuel losses.

The fuel loss works out to be Rs. 994.5 crores per annum due to idling of vehicles at 600 intersections in Delhi. With the introduction of suitable traffic engineering measures these losses could be reduced by 40-45% of fuel loss. Remedial measures have also been recommended in the study.

#### **5.1.8 Energy saving through the use of roller head jigger in fabricating pottery wares by CGCRI, Khurja.**

A project was sponsored on CGCRI, Khurja. The project has been completed now. Energy saving at the rate of 803 lakh kcal/years for production of flat wares was obtained using rollers head jigger in comparison to conventional jigger jolly. Productivity increased by 5 times in comparison to conventional process of manufacturing. Savings per year work out to be Rs. 3.31 lakhs.

In addition defect rates are lower, rejections are less, i.e. down from 20% normally to 2.5%. Porosity, warpage, pinholes, breakage, thickness, shrinkage & weight are lower. Work environment remains clean & worker satisfaction is higher. It's easy to operate. Better quality product help in competition in India & abroad.

#### **5.1.9 Installation of Energy efficient durable improved cook stoves on cost sharing basis in the rural areas by Maharana Pratap University of Agriculture and Technology, Udaipur.**

PCRA had sponsored a project to MPUAT, Udaipur with the main objective of development of rural kitchen prototype energy efficient & environment friendly cook stoves & their deployment.

Project has been completed. Udairaj model of improved cook stoves was developed & 1752 cook stoves have been installed at various locations of tribal area. 170.27 tons of fuel wood has been saved till March'06 since installation. Thermal efficiency of improved cook stoves is 29.86% as against 10% of traditional stove.

Average quantity of biomass required for household reduced to 1 kg instead of 3 kg. Cooking time also reduced from 2.65 hours to 1 hour. Reduction in pollution levels has resulted in improved health standards. Traditional cook stoves result in 31.7 ppm of carbon monoxide presence in air.

**5.1.10 Education & reskilling of decentralized power loom Owners/ jobbers/ workers in better lubricant handling techniques system suitable for power loom in order to minimize the lubricant consumption in the decentralized sector of the textile industries, by Bombay Textile Research Association (BTRA), Mumbai.**

In India there are about 17 lakh decentralized loom. On an average each loom consumes about 15 to 20 litre of lubricating oil each year whereas it should consume about 8 litres per year as per norms. Main reasons for excess consumption are poor knowledge to workers about lubrication of machine. Improper grades of oil are used at times. Clogged holes do not even get properly lubricated. Excess oil also causes oil stains on cloth, which results in (a) Loss of good cloth (b) Loss of productivity (c) petroleum products are further required for cleaning stains to the extent feasible. Spilling also poorly affects house keeping.

M/S BTRA had undertaken a project to develop a Centralized lubrication system for looms so that excess consumption, over flow, staining can all be done away with. Project included deployment of such system at 16 factories, holding training programs for workers, developing audio video aids including a video film for such education, & holding seminars to focus attention of mill owners & senior personnel also on solving this problem & avoid wastage.

M/S BTRA completed PCRA sponsored project. They developed the centralized lubrication system. They fabricated, & installed such system in 16 factories, 4 each in Maharashtra, Karnataka, Tamil Nadu &

Gujarat. For training of workers, audio visual aids including a video film has been made 8 training programs & 4 seminars have been conducted with active association from industry in 4 different States. Saving upto 50% of oil has been reported. Actual saving of 17,700 litres of oil has been reported till March'06.

PCRA proactively sought & obtained energy efficiency related research projects from reputed research institutes. After careful scrutiny by Screening Committee certain projects have been sponsored on Research Institutes e.g. IIP- Dehradun, CGCRI-Kolkatta, CSIO-Chennai & IITs etc.

### **5.2.0 BIOFUELS**

PCRA has been making persistent efforts to promote biofuels particularly growing *Jatropha* and manufacturing of Biodiesel.

Presentations were made before oil companies, MoP&NG & Hon'ble Minister (MOP&NG) highlighting the need to develop 'Supply Chain Mechanism ' and declaring 'Minimum Support Price' for which purchase of bio-diesel is essential. Subsequently, PCRA also conducted several meetings with senior officials of oil companies to work out modalities of assured purchase. Meeting was again held with top oil company officials under the chairmanship of Secretary (P&NG) on 16.08.2005, to fix the minimum purchase price of bio-diesel.

These efforts culminated into declaration of Biodiesel Purchase Policy on 09.10.2005 by Hon'ble Minister (MoP&NG).

State Level Coordinators (SLCs) of Tamil Nadu and Maharashtra received responses from 29 & 22 willing suppliers respectively.

Price Schedule

Sl.	Job Description	Qty	Price (Rs.)
1.	Design, Development, Testing and implementation of saving methodology for PCRA activities	1	

( )  
Signature with Stamp of Authorized person

Note:

- (i) All applicable taxes, duties are to be included in the quoted price and the breakup of each price component is to be indicated separately
- (iii) All pages of the Tender Document are to be signed and submitted as a token of Acceptance of the Tender Document and specifications. Deviations (if any) are to be clearly indicated separately.