COMPANY’S POLICY

IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING

№ П2-04.02 П-01

VERSION 1.00

MOSCOW
2014
CONTENT

INTRODUCTORY PROVISIONS ........................................................................................................... 3

INTRODUCTION ............................................................................................................................... 3

OBJECTIVES .................................................................................................................................... 3

TASKS ............................................................................................................................................... 3

AREA OF APPLICATION ..................................................................................................................... 3

EFFECTIVE PERIOD AND AMENDMENT PROCEDURE .............................................................................. 4

1. TERMS AND DEFINITIONS ........................................................................................................... 5

2. SYMBOLS AND ABBREVIATIONS ............................................................................................... 8

3. GENERAL PROVISIONS ................................................................................................................ 9

   3.1. COMPANY’S OBJECTIVES IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING ................................................................. 9

   3.2. COMPANY’S TASKS IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING ................................................................................. 9

   3.3. PRINCIPLES IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING .... 10

   3.4. MANAGEMENT OBJECTS ....................................................................................................... 11

   3.5. BUSINESS PROCESSES TO MANAGE ENERGY EFFICIENCY AND ENERGY SAVING ....................... 12

   3.6. PERFORMANCE INDICES OF MANAGING ENERGY EFFICIENCY AND ENERGY SAVING .............. 13

   3.7. MANAGEMENT LEVELS, DISTRIBUTION OF RESPONSIBILITY AND POWERS ...................... 13

   3.8. BASIC RISKS AND RISK MANAGEMENT TECHNIQUES ...................................................................... 14

   3.9. STRUCTURE AND HIERARCHY OF LRD GOVERNING ACTIVITIES ON ENERGY EFFICIENCY AND ENERGY SAVING ........................................................................... 15

4. DISSEMINATION OF POLICY .......................................................................................................... 16

5. REFERENCES .................................................................................................................................... 17
INTRODUCTORY PROVISIONS

INTRODUCTION

The Company’s Policy in the area of enhancement of energy efficiency and energy saving (hereinafter - the “Policy”) is a fundamental document for introduction and operation of the Energy Management System in the Company and determines general principles of activities, aimed at enhancement of energy efficiency and energy saving.

This Policy was elaborated in accordance with basic methodological approaches, principles, regulations and requirements of GOST R ISO 50001 “Energy Management Systems. Requirements with guidance for use” and ISO 50001 “Energy management systems - Requirements with guidance for use”.

OBJECTIVES

The Policy expresses the Company’s position in the area of enhancement of energy efficiency and energy saving and formalizes unified principles and approaches in this area.

TASKS

Primary tasks of the Policy are:

- Identification of the Company’s objectives and tasks as well as principles for activities in the area of energy efficiency and energy saving;
- Determination of the system for management of activities aimed at enhancement of energy efficiency and energy saving (including management objects, management levels, distribution of responsibility and powers);
- Determination of the structure and hierarchy of local regulatory documents governing activities in the area of energy efficiency and energy saving.

AREA OF APPLICATION

This Policy is binding for all employees of Rosneft and subsidiaries of Rosneft, operations of which are directly or indirectly connected with utilization of energy resources, enhancement of energy efficiency and energy saving.

This Policy bears recommendatory nature for employees of Rosneft’s affiliates.

Requirements of this Policy will be subject to compulsory implementation in subsidiaries and affiliates of Rosneft, as well as in any other Entity, in which Rosneft participates directly or indirectly, after they are validated in an Entity in accordance with its Charter and in the procedure established in it.

Order, local regulatory documents and other internal documents shall not conflict with this Policy.
EFFECTIVE PERIOD AND AMENDMENT PROCEDURE

This Policy is a permanent local regulatory document.

This Policy is approved in Rosneft by a decision of the Board of Directors of Rosneft and put into force in Rosneft by Rosneft’s order.

The Policy is recognized as ceased to be in force in Rosneft on the basis of a decision of the Board of Directors of Rosneft.

Amendments to this Policy are introduced on the basis of a decision of the Board of Directors of Rosneft and put into force by Rosneft’s order.

Amendments to this Policy are introduced in the following cases:

- changes in the legislation of the Russian Federation in the area of energy efficiency and energy saving and / or the Company’s Development Strategy;
- making of a decision by the senior managers of Rosneft according to findings of the analysis of operation of the Energy Management System;
- changes in the organizational structure and powers of managers, etc.

Introduction of amendments to this Policy is initiated by: senior managers of Rosneft, organization departments of Rosneft and an Entity of Rosneft Group by agreement with a senior manager of Rosneft, who is responsible for the energy sector.

Responsibility for updating of this Policy in Rosneft is imposed on the senior manager of Rosneft, who is responsible for the energy sector.

Control over fulfillment of requirements set forth in this Policy is imposed on the senior manager of Rosneft, who is responsible for the energy sector.
1. TERMS AND DEFINITIONS

TERMS AND DEFINITIONS OF CORPORATE GLOSSARY

**BUSINESS BLOCK** – a set of organization departments of Rosneft, immediately subordinated to the senior manager of Rosneft, responsible for a business area; Entities of Rosneft Group and / or organization departments of Entities of Rosneft Group, carrying out their activities in a business area.

**BUSINESS AREA OF ACTIVITIES** – a set of interrelated and interacting business processes and their results, which are combined by particular signs (achievement of particular results of business activity, utilization of resources, geographic sign, etc.) for the purpose to enhance effectiveness of activities in accordance with decisions on the Company’s development.

**BUSINESS / FUNCTIONAL SEGMENT** – a set of areas of the Company’s activities, which are homogeneously grouped.

**AUDIT OF ENERGY EFFICIENCY** – a systematic, independent and documented process for obtaining of evidences and their objective assessment for determination of a degree of fulfillment of established requirements.

**SENIOR MANAGEMENT** – a person or a group of employees carrying out management at the top level [GOST ISO 9000].

**COMMISSION FOR ENERGY EFFICIENCY** – a continuing collegiate consultative body, acting under the direction of the Chairman of the Commission, coordinating implementation of general principles in the area of energy management and enhancement of energy efficiency within the Company.

**INDEX (INDICATOR) OF ENERGY EFFICIENCY (INDICATOR OF ENERGY RESULTS)** – a quantitative value or a measure of energy efficiency, determined by Rosneft / Entity of Rosneft Group.

*Note:* Indicators of energy results may be expressed in simple metric units, proportions or more complicated models (p.3.13 of GOST R ISO 50001).

**REPRESENTATIVE OF SENIOR MANAGEMENT IN ENERGY MANAGEMENT SYSTEM** - an office holder, appointed by the Senior Management (President of Rosneft, Director of an Entity of Rosneft Group), vested with required powers and responsible for provision of operation of the Energy Management System in accordance with requirements of GOST R ISO 50001 and ISO 50001.

*Note:* A representative of the senior management in the Energy Management System of an Entity of Rosneft Group, is also a manager of the Working Group for energy efficiency of an Entity of Rosneft Group.

**ENERGY SAVING PROGRAM** – a program for energy saving and enhancement of energy efficiency or any other energy management program, which establishes indices (indicators) of energy efficiency and measures for their fulfillment [GOST R ISO 50001].
Note: the Energy Saving Program includes technical and organization measures, implementation of which reduces consumption of energy resources, combined in the program with a certain time period, established format, requirements to filling – in the format and subsequent reports.

PRODUCTION ASSETS – a set of production units, ensuring a complex nature of management of production, transportation, processing and sale of hydrocarbon material.

PRODUCTION UNITS - technological complexes, individual objects, ensuring production, transportation, processing and sale of hydrocarbon material.

DIVISION FOR ENERGY EFFICIENCY AND ENERGY SAVING – an organization department of Rosneft / an organization department (an employee – an energy manager) of an Entity of Rosneft Group, responsible for organization and maintenance of activities in the area of energy saving and enhancement of energy efficiency, including introduction of the Energy Management System.

Note:

- In Rosneft a Division for Energy Efficiency and Energy Saving is the Division for Energy Efficiency and Energy Saving of the Energy Department of Rosneft.

- In various Entities of Rosneft Group may be identified as, for example, Energy Saving Department, Chief Power Engineer Office.

- If it is not expedient to establish in an Entity of Rosneft Group a separate organization department, then its functions are imposed on an individual employee – an energy manager.

- A status and a numerical strength of a Division for Energy Efficiency and Energy Saving of an Entity of Rosneft Group are agreed with the Personnel Department and the Energy Department of Rosneft.

WORKING GROUP FOR ENERGY EFFICIENCY OF ENTITY OF ROSNEFT GROUP - a continuing collegiate consultative body coordinating implementation of general principles in the area of energy management and enhancement of energy efficiency within an Entity of Rosneft Group.

ENERGY MANAGEMENT SYSTEM – a set of interrelated or interacting elements used for elaboration and introduction of the Policy in the area of enhancement of energy efficiency and energy saving and energy objectives, as well as processes and procedures for achievement of these objectives.

ENERGY PERFORMANCE - measurable results, related to energy efficiency, energy use and consumption [GOST R ISO 50001].

ENERGY EFFICIENCY – characteristics reflecting a ratio of a useful effect from consumption of energy resources to expenditure of energy resources, made for the purpose of obtainment of such effect, applicable to products, a technological process, a legal entity [Federal Law № 261-FZ dated 23.11.2009 “On energy saving and enhancement of energy efficiency and on introduction of amendments to individual legislative acts of the Russian Federation”].
**ENERGY SURVEY** – collection and processing of information about utilization of energy resources for the purpose of obtainment of reliable information about volumes of utilized energy resources, indicators of energy efficiency, identification of capabilities of energy saving and enhancement of energy efficiency specifying findings in the energy passport [article 2 of Federal Law № 261-FZ dated 23.11.2009 “On energy saving and enhancement of energy efficiency and on introduction of amendments to individual legislative acts of the Russian Federation”].

**ENERGY RESOURCE** – a carrier of energy, that is utilized or may be utilized in the course of business and any other activities, as well as a kind of energy (atomic, thermal, electrical, electromagnetic or any other kind of energy) [Federal Law № 261-FZ dated 23.11.2009 “On energy saving and enhancement of energy efficiency and on introduction of amendments to individual legislative acts of the Russian Federation”].

**ENERGY** – electricity, fuel, steam, heat, compressed air and other similar environments [GOST R ISO 50001].

**ENERGY SAVING** - implementation of organization, legal, technical, technological, economic and other measures, aimed at reduction of a volume of utilized energy resources subject to preservation of a useful effect from their utilization (including a volume of manufactured products, performed works, rendered services) [Federal Law № 261-FZ dated 23.11.2009 “On energy saving and enhancement of energy efficiency and on introduction of amendments to individual legislative acts of the Russian Federation”].
2. SYMBOLS AND ABBREVIATIONS

**SENIOR MANAGEMENT OF ROSNEFT (SENIOR MANAGERS OF ROSNEFT)** – President of Rosneft, First Vice – Presidents of Rosneft, Vice – Presidents of Rosneft, Chief Accountant of Rosneft, Financial Director of Rosneft, advisors and managers of organization departments of Rosneft and services of Rosneft in the rank of Vice - Presidents.

**SENIOR MANAGEMENT OF ENTITY OF ROSNEFT GROUP (MANAGERS OF ERG)** – managers of Entities of Rosneft Group and their deputies by areas of activities of an Entity of Rosneft Group.

**COMPANY** – a group of legal entities of various corporate forms, including Rosneft, with regard to which the latter acts as a parent or a predominant (participating) entity.

**RFY** – a refining Entity of Rosneft Group.

**ENTITY OF ROSNEFT GROUP** — a subsidiary / affiliate of Rosneft, as well as any other entity, in which Rosneft participates directly or indirectly.

**ISLP&E** – industrial safety, labour protection and environment.

**ORGANIZATION DEPARTMENT (OD)** – an organization department with individual functions, tasks and responsibility within its competence, determined under the Regulations on Organization Department.

**EMS** – the Energy Management System.
3. GENERAL PROVISIONS

Rosneft Oil Company, a leader of Russia’s oil industry and one of the world’s largest public oil&gas companies is successfully implementing a strategy of a steady growth of hydrocarbon production, expansion and modernization of RFY and increase in volumes of sale of own products directly to final consumers.

In the course of its production activities the Company is one of the largest consumers of energy resources of the Russian Federation. It realizes that rational utilization of energy resources is an important value alongside with improvement of results of the Company’s primary production activities, industrial safety and environment.

The Company guarantees, that the nature and scale of energy utilization and consumption is under its control. When planning its activities the Company puts more emphasis on enhancement of energy efficiency and rational utilization of energy resources.

3.1. COMPANY’S OBJECTIVES IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING

Primary objectives of the Company in the area of energy efficiency and energy saving are:

- continuous enhancement of energy efficiency, rational utilization of energy resources and improvement of the management energy saving process in the course of all types of production activities;
- reduction of expenditure level through rational utilization of energy resources and introduction of latest innovative energy-efficient technologies;
- ensuring functioning and continuous improvement of the Energy Management System, meeting requirements of GOST R ISO 50001 and ISO 50001.

3.2. COMPANY’S TASKS IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING

For achievement of established objectives the Company undertakes to focus its efforts on solution of the following tasks:

- planning and implementation of production activities subject to legislative and other Company’s requirements in the area of energy efficiency and energy saving;
- maintenance of accounting and control of consumption efficiency, as well as losses of energy resources, development and fulfillment of measures for their reduction;
- provision of accessibility of information and availability of resources in a required volume for achievement of established energy objectives and tasks;
- carrying out energy survey of objects of Entities of Rosneft Group, elaboration of economically feasible energy - saving measures (application of new and innovative energy-efficient technologies) and inclusion of them in the Energy Saving Program of the Company and Entities of Rosneft Group;
determination of responsibility for energy saving and enhancement of energy efficiency at all management levels;

- raising the level of knowledge of the Company’s employees in the area of energy efficiency and energy saving;

- involvement and stimulation of the Company’s employees, influencing on consumption of energy resources, in activities for energy saving and their motivation;

- ensuring observance of requirements of the federal, regional and territorial legislation in the area of energy efficiency and energy saving, requirements of regulatory - legal and local regulatory documents governing the Company’s activities;

- development of automated systems for accounting of energy resources and control of energy efficiency of technological objects and plants of a relevant level and depth of coverage, in accordance with local regulatory documents in the area of automation of technological processes and productions, as well as in the area of uniformity of measurement and control of quality of products, including development and introduction of the energy loss management system;

- staffing of the Energy Management System;

- fulfillment of measures, provided for under the Energy Saving Program of the Company and Entities of Rosneft Group;

- involvement of all Company’s employees in activities for enhancement of energy efficiency and energy saving. Carrying out of appropriate stimulation measures, systematic training and professional improvement of the Company’s employees in the area of energy efficiency and energy saving;

- interaction with concerned parties (contracting organizations, general public, etc.), including their informing on matters of enhancement of energy efficiency in the Company and implementation of joint initiatives in the area of energy efficiency and energy saving;

- bringing this Policy of the Company, relevant local regulatory documents and standards in the area of energy efficiency and energy saving, adopted in the Company to notice of the Company’s employees, contracting organizations and suppliers, carrying out works on production objects of the Company and demanding their observance.

Being conscious of the need to enhance energy efficiency and to utilize energy resources in a rational manner, the senior management of Rosneft and Entities of Rosneft Group undertakes an obligation to implement the Policy in the area of energy efficiency and energy saving.

### 3.3. PRINCIPLES IN THE AREA OF ENHANCEMENT OF ENERGY EFFICIENCY AND ENERGY SAVING

The Policy is implemented subject to the following basic principles:

- observance of requirements of the legislation of the Russian Federation, applicable provisions of the international law, requirements of the Russian and applicable international standards, industrial standards and corporate requirements;

- provision of accounting and control of efficiency of consumption as well as losses of energy resources;
• inclusion of economically feasible new and innovative energy – efficient technologies in the Energy Saving Program;
• assessment of the risk of negative influence of the Energy Saving Program on basic production and financial indicators of the Company;
• monitoring of fulfillment of measures provided under the Energy Saving Program through energy efficiency audits;
• involvement of all Company’s employees in activities for enhancement of energy efficiency and energy saving;
• implementation of the whole economically accessible and practically realizable package of measures for reduction of specific consumption of energy resources for a given volume of production under comparable operating conditions.

3.4. MANAGEMENT OBJECTS

Basic management objects in the area of enhancement of energy efficiency and energy saving are processes, implemented in all productive assets and at all production units of the Company, connected with consumption of energy resources.

Managed processes are sub-divided into:
• production processes (primary production in productive assets);
• supporting processes (supporting of primary production – for example, material-technical supply, personnel management).

Management objects also include the following business-management processes and their outcomes (the Energy Saving Program, reports):
• Energy planning;
• Implementation of the Energy Saving Program;
• Audit of energy efficiency;
• Energy analysis.
### 3.5. BUSINESS PROCESSES TO MANAGE ENERGY EFFICIENCY AND ENERGY SAVING

#### Table 1

<table>
<thead>
<tr>
<th>№</th>
<th>BUSINESS-PROCESS</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Energy planning</td>
<td>The Energy Saving Program of the Company / Entities of Rosneft Group including organization and technical measures aimed to reduce consumption of energy resources in the course of production processes, approved by the Commission for Energy Efficiency of the Company.</td>
</tr>
</tbody>
</table>
| 2 | Implementation of the Energy Saving Program          | Report on implementation of the Energy Saving Program of the Company / Entities of Rosneft Group approved by the Commission for Energy Efficiency of the Company. Results of implementing measures under the Energy Saving Program:  
  - Introduction of new energy-efficient technologies;  
  - Optimization of production processes; introduction of control procedures;  
  - Attainment of energy efficiency. |
| 3 | Audit of energy efficiency                           | Report on performance of Entities of Rosneft group including:  
  - assessment of the current level of organization of the process to enhance energy efficiency;  
  - a list of recommendations on improvement of the organization process;  
  - a list of recommendations on elaboration of technical measures for energy saving on processes and individual objects with a high potential of energy saving. |
| 4 | Energy analysis                                      | The outcome of the energy analysis constitutes decisions and actions made by the Commission for Energy Efficiency of the Company on the basis of the Report on Implementation of the Energy Saving Program and results of audit of energy efficiency regarding:  
  - changing of planned energy performance;  
  - changing of the Policy;  
  - changing of indicators of energy efficiency;  
  - changing of objectives, tasks and other EMS elements, based on obligations on its continuous improvement;  
  - allocation of resources for support and improvement of EMS. |
3.6. PERFORMANCE INDICES OF MANAGING ENERGY EFFICIENCY AND ENERGY SAVING

Table 2
Performance indices of managing energy efficiency and energy saving

<table>
<thead>
<tr>
<th>№</th>
<th>NAME OF INDEC</th>
<th>DESCRIPTION OF INDEX</th>
<th>INDEX APPLICATION PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enhancement of energy efficiency of operations.</td>
<td>Fulfilment of planned specific rates of energy consumption for production of one production unit considering measures of the Energy Saving Program.</td>
<td>The index is used for assessment of real effect of the Energy Saving Program.</td>
</tr>
</tbody>
</table>

3.7. MANAGEMENT LEVELS, DISTRIBUTION OF RESPONSIBILITY AND POWERS

For achievement of objectives and tasks established under this Policy the Company has two-level management structure including:

- **1st level in Rosneft:**
  - Coordination Body of Rosneft - Commission for Energy Efficiency of the Company. The Chairman of the Commission is one of senior managers of Rosneft by a decision of the President of Rosneft, responsible for management of activities in the area of energy efficiency and energy saving throughout the whole perimeter of the Company;
  - OD of Rosneft – a division for energy efficiency and energy saving of the Energy Department of Rosneft, responsible for organization and maintenance of activities in the area of energy efficiency and energy saving throughout the whole perimeter of the Company;
  - OD managers at the level of business - blocks and business - segments of Rosneft (members of the Commission for Energy Efficiency of the Company), supervising activities in the area of energy efficiency and energy saving at the level of individual business-block or business-segment;

- **2nd level in Entities of Rosneft Group:**
  - Coordinating bodies at the level of Entities of Rosneft Group – Working Groups for energy efficiency and energy saving of Entities of Rosneft Group under the direction of a representative of the senior management on EMS of Entity of Rosneft Group, responsible for management of activities in the area of energy efficiency and energy saving in an Entity of Rosneft Group;
  - OD at the level of Entities of Rosneft Group – a division for energy efficiency and energy saving of an Entity of Rosneft Group, responsible for organization and maintenance of activities in the area of energy efficiency and energy saving in an Entity of Rosneft Group;
  - Managers of OD by areas of activities in Entities of Rosneft Group (members of the Working Group for energy efficiency and energy saving of an Entity of Rosneft Group), supervising activities in the area of energy efficiency and energy saving by areas of activities.
### 3.8. BASIC RISKS AND RISK MANAGEMENT TECHNIQUES

#### Table 3
Risk management

<table>
<thead>
<tr>
<th>№</th>
<th>RISK</th>
<th>RISK MEASUREMENT INDICATOR</th>
<th>RISK MANAGEMENT MEASURES</th>
</tr>
</thead>
</table>
| 1 | Non-observance of applicable legislative requirements in the area of energy efficiency and energy saving | Penal sanctions. | 1. Monitoring of legislative requirements in the area of energy efficiency and energy saving and ISLP&E.  
2. Control over fulfilment of legislative requirements in the area of energy efficiency and energy saving and ISLP&E. |
| 2 | Adverse effect of the Energy Saving Program on achieving of targets of the production program and fulfillment of basic production and financial indicators of the Company’s business plan. | ▪ Reduction of production volumes by areas of the Company’s production activity.  
▪ Reduction of sales volumes of the Company’s products. | 1. Control over correctness of planning measures for enhancement of energy efficiency.  
2. Regular control over fulfilment of measures and their effect on the Company’s primary production activities and sales volumes of the Company’s products.  
3. Creation of the knowledge base including lessons drawn. |
| 3 | Non-attainment of the planned effect from the Energy Saving Program (non-fulfilment of the Energy Saving Program). | Level of adequacy of actual indicators of the Energy Saving Program with those planned:  
▪ saving of electrical power;  
▪ saving of heating energy;  
▪ saving of fuel;  
▪ reduction of losses of energy resources.  
Level of adequacy of actual indicators of fulfilment of a business with those planned:  
▪ for Entities of Rosneft Group involved in oil&gas production – specific consumption of electric energy for liquid production, kW*th,  
▪ for Entities of Rosneft Group involved in oil&gas processing – specific consumption of energy resources for a volume of processed raw material, GJ/t. | 1. Control over correctness of planning measures for enhancement of energy efficiency.  
2. Control over financing of planning measures for enhancement of energy efficiency.  
3. Planning and analysis of technical and external factors having effect on absolute and specific indices of consumption of energy resources.  
4. Regular control over fulfilment of measures and verification of actual indicators of energy resources saving.  
5. Holding action owners liable for failure to implement energy efficiency actions. |

For the purpose of effective risk control this Policy establishes the necessity of a systematic approach to management of risks connected with energy saving and energy efficiency.
The system approach will be secured by identification and management of key risks at all stages of the business – process for management of the energy saving and energy efficiency.

Detailed description of preventative actions (control procedures) is represented in local regulatory documents of the Company.

3.9. STRUCTURE AND HIERARCHY OF LRD GOVERNING ACTIVITIES ON ENERGY EFFICIENCY AND ENERGY SAVING

Fig. 1 – Structure and hierarchy of LRD in the area of energy efficiency and energy saving
4. DISSEMINATION OF POLICY

This Policy is of a public nature.

This Policy shall be translated into English.

Dissemination of and provision of access to this Policy is carried out in accordance with the established procedure by means of informing of employees of Rosneft and Entities of Rosneft Group, publication on internal and external information resources of the Company.

Introduction of this Policy and compliance monitoring of the Company’s activities is carried out by the Commission for Energy Efficiency of the Company.

Audits to check the Company’s factual activities compliance with this Policy and energy efficiency and energy saving legislation shall be conducted on an annual basis as well as control of the Policy’s achieved objectives established in a relevant section hereof. Based on findings of monitoring the Policy may be duly adjusted for the purpose of update.
5. REFERENCES


