## リトアニア共和国

# 鉱工業プロジェクト形成基礎調査 (大型燃焼設備(LCP)からの大気汚染物質規制調査)

調查報告書

2002年2月 JICA LIBRARY 11171010[0]

国際協力事業団鉱工業開発調査部

鉱調資 JR 02-189

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エレクトレイナ (リトアニア) 火力発電所



発電所内制御室



発電所内蒸気タービン(建屋内に設置)



発電所内ボイラーの二段燃焼バーナー



発電所内排出ガス電磁集塵装置(外観)



発電所内排出ガス電磁集塵装置(内部)



発電所内排出ガス測定装置(煙道に設置)



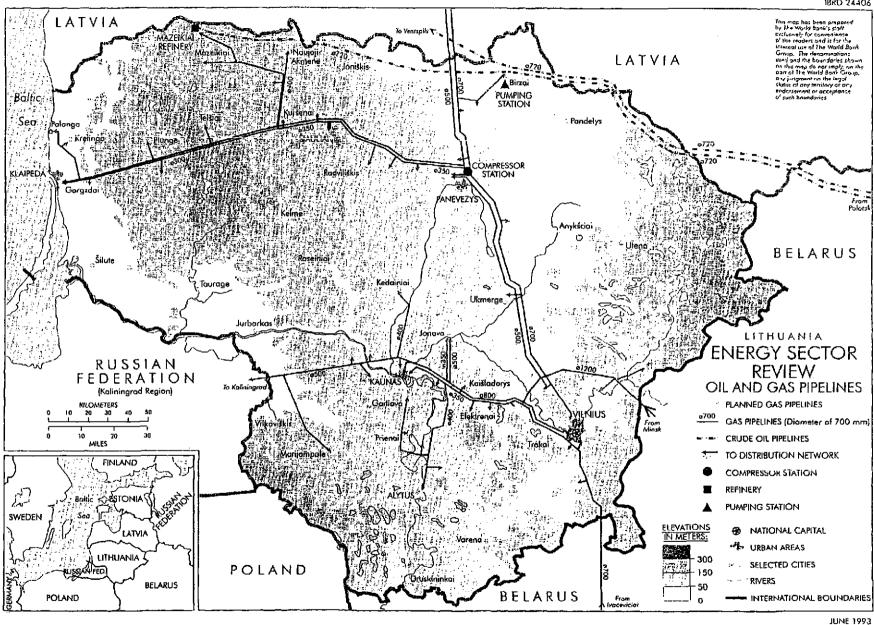
発電所内排出ガス測定モニタリング状況



ビリニュス市内の大気観測装置



議事録 (M/M) 署名式



出典: World Bank Report No. 11867-LT "Lithuania Energy Sector Review" May 23, 1994

# 第1章 調査の概要

## 第1章 調査の概要

#### 1.1 要請の背景及び経緯

リトアニア国では1999年11月に第二次国家エネルギー戦略が採択され、イグナリナ原子力発電所を閉鎖することをその主要目標としている。2005年及び2010年に予定されている原子力発電所の閉鎖により、既存の火力発電所及びコ・ジェネレーション(熱電併給)設備の稼働率が高まり現状に比べ大きな負荷がかかるため、適切な環境対策が必要である。また、リトアニア国ではEU加盟を目指しており、当該国のエネルギーシステムをEU統合基準に適合させることが急務となっている。

しかし、現在リトアニア国には欧州評議会指針 88/609/EEC の対象となる 48 の大型燃焼設備(Large Combustion Plants、以下 LCP)があるが、そのいずれもが当該指針に規定された排出ガス基準を満たしていないとされている。リトアニア政府は欧州評議会指針 88/609/EEC の遵守実行プログラム(Acquis Implementation Action Plan、以下 AIAP)を 2002 年に準備する予定であり、この AIAP では、既存 LCP から排出される二酸化硫黄及び窒素酸化物の漸次的削減及び規制に関する計画を準備し、排出限度値を設定する必要がある。

かかる背景の下リトアニア政府は日本政府に対し、エネルギー部門における環境配慮に対する問題点の把握、大気汚染対策における現実の問題点の把握、各 LCP における大気汚染物質削減計画の策定を目的とする開発調査を要請した。

#### 1.2 調査目的

本プロジェクト形成基礎調査では、リトアニア国の環境政策を踏まえ、LCP から排出される大気汚染物質に関する現況調査を行い、本格調査に向けての要請内容及び調査事項の確認を行うことを目的とする。

なお、リトアニア国は京都議定書付属書 B (CO2 の排出抑制または削減の約束国) に該当すること、及び LCP の改修 (燃料転換等の場合) は CO2 の排出削減にも資することから、本件要請内容に併せて「共同実施 (JI) もしくは排出権取引」の実施状況についても確認する。

## 1.3 団員構成

千原 大海 (団長/総括) : JICA 国際協力総合研修所国際協力専門員

後藤 光 (調査企画) : JICA 鉱工業開発調査部資源開発調査課

川田 晋也(環境法制度(大気)): 国際航業株式会社

浦野 勝雄(大気汚染防止技術) : KET

## 1.4 調査日程

日順	月日		行 程		宿泊地
1	1月20日(日	)	出国(成田 NH201/11	:20→ロンドン 14:45	
			ロント ン TE453,	/16:15→リトア=ア 21:05)	ビリニュス
2	1月21日(月	)午前	日本大使館表敬、外利		
			環境省協議 (C/P)		ビリニュス
3	1月22日(火	)午前	経済省協議		
		午後	リトアニアエネルギ-	一公社等訪問	ビリニュス
			サイト踏査(リトアコ		ビリニュス
			環境モニタリング機関		ビリニュス
	1月25日(金	) 全日	環境省協議(M/M 案作	≦成)	ビリニュス
L	1月26日(土	) 全日	団内打合せ		ビリニュス
	1月27日(日				ビリニュス
9	1月28日(月		環境省協議(M/M 署名	1)	
			日本大使館報告		ビリニュス
10	1月29日(火	)	(千原、後藤)	(川田、浦野)	(千原、後藤)
			資料整理	補足調査等	ロンドン
		午後	移動(リトアニア TE452/		(川田、浦野)
		<u> </u>	14:15→『ント ン 15:15)		ビリニュス
11	1月30日(水	ł .	JICA 英国事務所報告	補足調査等	(千原、後藤)
			帰国 (ロンドン NH202/		機中
			17:00→)		(川田、浦野)
		<del> </del>			ビリニュス
			帰着(→成田 13:30)	補足調査等	ビリニュス
13	2月1日(金)	午前		資料整理	
		午後		帰国(リトアニア TE452/	
				14:15→ □ントン 15:15、	
	a H a / / 1			□ント ン NH202/17:00→)	機中泊
14	2月2日(土)			帰着(→成田 13:30)	

NH:全日空 TE:リトアニア航空

## 1.5 対処方針

主として以下の事項に配慮したうえで、開発調査の必要性及び実施可能性を確認し、先方機関との協議内容をM/Mに取りまとめることとする。

#### 1.5.1 先方の本プロジェクト実施にかかる取組状況について

#### (1) 本格調査実施に向けた意識

本件にかかる日本への協力要請については、エネルギー部門および大気汚染に関する問題点を明確化し、LCPにおける大気汚染物質削減プログラムを策定することとされているが、先方政府内の具体的な実施体制、計画及び高いプライオリティを有しているかを確認する。

#### (2) 上位計画との整合性

第二次国家エネルギー戦略及び AIAP の策定内容と実行状況、実現時期を確認する。

#### (3) EU 加盟に係る条件

リトアニア国の EU 加盟に関連する政策及び条件を確認する。特にイグナリナ原子力発電所の廃止計画と LCP (うち発電所) の改修、新設計画との関係を確認する。

#### (4) 共同実施(JI)等の実施状況

リトアニア国における、京都議定書による共同実施(JI)や排出権取引、キャパシティビルディングの実施状況について確認する。(本案件に限定せず情報収集を行う)

#### 1.5.2 リトアニア国における他の国際援助機関の動向の把握

リトアニア国のエネルギー・環境セクターにおいて、他の援助機関による関連プロジェクトについて調査し、その動向を把握した上で本格調査の必要性を確認する。

#### 1.5.3 開発調査サイクルの説明

本調査はプロジェクト形成基礎調査であり、本格調査をコミットするものではない点を先方に対し明らかにした上で、本格調査の流れを S/W の実例を提示しつつ説明し、先方の理解を得ることとする。なお S/W の事項についての議論は案件採択決定後に派遣される事前(予備)調査団に委ねることとする。

1.5.4 リトアニア国における関連機関の役割の明確化とカウンターパート機関の確認

本プロジェクト形成基礎調査について関連するリトアニア国内の機関は以下のとおりである。

- (1) リトアニア国外務省 (Ministry of Foreign Affairs)
- (2) リトアニア国環境省 (Ministry of Envionment):環境基準策定機関
- (3) リトアニア国経済省 (Ministry of Economy): エネルギーセクターの監督 機関
- (4) リトアニアエネルギー公社 (Lithuanian Energy Corporation): 発電所の 運営組織
- (5) カウナス汚染防止センター (Kaunas Pollution Prevention Centre)
- (6) 排出ガスモニタリング施設及び大気分析機関
- (7) 火力発電所、熱併給発電所(数カ所)
- (8) 中東欧地域環境センターリトアニア事務所 (Regional Environmental Center)
- (9) EU 代表部リトアニア事務所 (European Commission Delegation to Lithuania)

本件要請書によると、環境省大気課がカウンターパート機関とされているが、LCP等を監督する経済省の意見を踏まえずして調査を進めることは困難となる可能性がある。本格調査時に円滑な調査を進めるためにも、各機関の役割、影響力等を本プロジェクト形成基礎調査で確認し、本格調査の実施に当たっては関連機関でステアリングコミッティの構成を提案する等適宜密接に連携していくこととする。

なお、発電所を運営するリトアニアエネルギー公社の民営化計画(政府保有株式の放出等)の有無についても確認する。

#### 1.5.5 リトアニア国の大気汚染状況について

リトアニア国の大気汚染状況について、以下の項目についての情報収集を通 じ、データの整備状況、入手難易度を確認するとともに本格調査実施の検討材 料とする。

- (1) 既存の環境基準、排出ガス規制
- (2) 大気汚染削減計画
- (3) 大気モニタリング状況、環境アセスメント状況
- (4) 大型燃焼設備の運用状況 等

#### 1.5.6 調査対象施設について

本案件の対象施設はリトアニア国内のLCPとし、複数の特徴的なLCPを協議 選定のうえサイト踏査を行うとともに、火力発電所以外のLCPについて監督官 庁、規制等を確認する。また本格調査時においては、これらの選定されたLCP を対象に改修計画等のケーススタディを行うことを想定している。

#### 1.5.7 安全管理情報の収集

本件調査対象地域はリトアニア国内であり、現時点では特筆すべき危険情報 は得られていない。しかしながら本格調査移行時には調査団の長期滞在が予想 されること、また JICA 事務所が現地にないことから、現地大使館、先方関連 機関等に対し、連絡体制等の安全管理に関する情報について確認する。

#### 1.5.8 調査実施可能時期の確認

リトアニア国気候において調査を円滑に実施できる期間を確認する。本格調査の調査期間は2年程度を想定している。

#### 1.6 要請内容(ToR)

## APPLICATION FOR

# TECHNICAL CO-OPERATION BY THE GOVERNMENT OF JAPAN

By the Government of Lithuania to the Government of Japan for a Development Study on "The possibilities of the implementation of Council Directive 88/609/EEC on the limitation of certain pollutants into the air from large combustion plants requirements in Lithuania"

Vilnius September 2000

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#### Application

for

#### the Development Study by the Government of Japan

### 1. Project digest

#### 1.1. Project Title

Study of the possibilities of the implementation of Council Directive 88/609/EEC on the limitation of certain pollutants into the air from large combustion plants requirements in Lithuania

#### 1.2, Location

Lithuania

#### 1.3. Implementation Agency

Air Division, Ministry of Environment, Lithuania

#### 1.3.1. Name of responsible agency:

Ministry of Environment of Lithuania

#### 1.3.2. Number of Staff in Agency (on category basis)

Air Division of the Ministry of Environment; 5 persons

#### 1.3.3. Budget allocated to the Agency

Budget of the Air Division of the Ministry of Environment - 105.5 thousand litas (USD 26.375 thousand) (only national budget)

#### 1.3.4. Intending number of counterparts for the study

- 1) Co-ordinator: (Programme officer Dept. of Environment) 1
- 2) Specialist of air pollution management\_
- 3) Specialist of environmental issues in energy sector
- 4) Specialist on Economy.
- 5) Specialist on air emissions 1
  - Total 5

#### 1.3.5. Budget of allocated to the Agency

- 1) The expenses for this study will be shouldered by JICA
- 2) The capital for industrialisation is to be shouldered by private organisations
- 3) The cost of the national administration to be shouldered by the Government of Lithuania.

#### 1.3.6. Organisation of the working team

The Japanese study team will be supplied the available data on the environmental law and air quality in Lithuania by the Ministry of Environment.

#### 1.3.7. Co-operation Agency

Department of Environmental Quality and Joint Research Centre of Ministry of Environment and its affiliated organisation(s) as well as of the Ministry of Economy of Lithuania.

#### 1.4. Justification of the Project

#### 1.4.1.Present condition of the sector

The Second National Energy Strategy of Lithuania was adopted in November 1999 in which the main goal is the closure of Ignalina Nuclear Power Plant (the first Ignalina NPP unit is to be decommissioned by 2004). That means that the main burden in the energy sector will be laid on the existing co-generation (CHPs) and thermal power plants with view of the reduction of negative impact upon the environment and integration of the Lithuanian energy systems of the EU. At present, there are 48 facilities in Lithuania that meet thermal input requirements according to the Council Directive 88/609/EEC but none of them comply with the rest requirements of the above Directive.

Under such circumstance, the Government of Lithuania has developed the Acquis Implementation Action Plan (AIAP) under which the Implementation Programme of the requirements of the Council I directive 88/609/EEC in Lithuania should be prepared by 2002. To meet this goal it is necessary to prepare a plan for a progressive reduction and control of total annual emissions of sulphur dioxide SO<sub>2</sub> and nitrogen oxides NO<sub>x</sub> from the existing power plants and develop fixed emission limit values for the above pollutants from large combustion plants (LCPs) of Lithuania to which the Council Directive 88/609/EEC will apply.

### 1.4.2. Sectoral development policy of the national government

The Acquis Implementation Action Plan (AIAP), developed by the Government of Lithuania sets the requirement to prepare the Implementation Programme of the requirements of the Council directive 88/609/EEC in Lithuania by 2002.

### 1.4.3. Problems to be solved in the sector

- Reduction of air emissions from existing large combustion plants;
- Drawing of national targets for the reduction of SO<sub>2</sub>, NO<sub>x</sub> and other pollutants (CO<sub>2</sub>) according to the EU requirements and international commitments;
- Implementation of methodologies for SO<sub>2</sub> and NO<sub>x</sub> emissions monitoring in accordance with the EU requirements;
- Increase of energy efficiency and introduction of new energy technologies and BAT,

#### 1.4.4. Outline of the project

The results of the Study should address the following issues:

- Assessment of the existing situation in the Lithuanian energy sector and other fuel combustion sectors and the review of the compliance of technological status of large combustion plants with the environmental requirements;
- Preparation of Progressive Emission Reduction Plan from large combustion plants sector of Lithuania with view of the EU environmental requirements for LCPs;
- Establishment of emissions monitoring in accordance with the EU requirements and methodologies;
- Make proposals for investment projects for the implementation of the requirements in separate LCPs.
- Stabilisation, reduction and control of total annual emissions (SO<sub>2</sub> and NO<sub>x</sub>) from the existing power plants.

#### 1.4.5. Purpose (Short-term objective) of the Project

The study of the possibilities of the implementation of Council Directive 88/609/EEC on the limitation of certain pollutants into the ambient air from large combustion plants requirements in Lithuania is to:

- prepare a Programme for the development of large combustion plants sector in Lithuania with view of the EU environmental requirements for LCPs;

- assess the requirements for renovation costs of all LCPs, having in mind the requirements for the implementation of the Directive;
- envisage the time schedule for the implementation of the Programme for the development of large combustion plants sector in Lithuania;
- propose the most cost-effective measures for the implementation of the Council Directive 88/609/EEC for separate LCPs;
- consider alternative possibilities for the installation of pollution abatement equipment (e.g., flue-gas desulphurisation or catalytic reduction of nitrogen oxides, etc.).

#### 1.4.6. Goal (Long-term objective) of the Project

- Full implementation of the requirements of Council Directive 88/609/EEC as well as the Convention of Long-range Transboundary Air Pollution (CLRTAP) and its Protocols in Lithuania.
- Proposals and time schedule for reconstruction of the total energy and other fuel combustion sectors.
- Cost assessment for the improvement of the existing pollution control system, including acquisition of efficient control and monitoring equipment for SO<sub>2</sub>, NO<sub>x</sub> and dust emissions.
- Assessment of economic consequences of full transposition and implementation of the requirements of the Directive.
- Establishing of a reporting system and the database, enabling the reporting to the EC and the Secretariat of CLRTAP.

#### 1.4.7. Prospective beneficiaries

The population and the environment of Lithuania because of the improved ambient air quality and the reduced air pollution

- 1.4.8. The project's priority in the National Development Plan / Public investment Plan
- 1.5. Desirable of schedule time of the commencement of the Project Beginning of 2001
- 1.6. Expecting funding source and / or assistance (including external origin)

  International technical assistance by the Government of Japan (JICA base)

#### 1.7. Other relevant project, if any

WB Project of the Environmental Policy Development and Regulatory Capacity Building in Air Sector

#### 2. Terms of Reference of the proposed Study

#### 2.1. Necessity of the Study

Large combustion plants (LCPs) will be highly activated in the energy sector after the closure of Ignalina Nuclear Power Plant. Therefore it is necessary to introduce changes in this sector of Lithuania with view of EU requirements.

#### 2.2. Necessity of the Japanese Technical Co-operation

Japanese know-how on large combustion plants is crucial for the project.

#### 2,3.Objective of the Study

Preparation of large combustion plants for the forthcoming changes and the implementation of Directive 88/609/EEC in Lithuania.

#### 2.4. Area to be covered by the Study

Environmental aspects in energy sector.

Impacts of energy sector on the ambient air quality.

#### 2.5. Scope of the study

#### 2.5.1. The Study will include these segment:

- (1) To find out obstacles in energy sector;
- (2) To reveal actual problems in air protection sector;
- (3) To establish a progressive pollution reduction plan and programme in a separate LCP.

#### 2.5.2. Scope of the study

The study has three stages, which are the basic study, the master plan and feasibility study for practical implementation.

### (1) Basic Study:

To analyse present condition of the entire energy sector and the existing large combustion

plants;

To collect, analyse and review of existing data on the natural conditions, social structure, economic conditions, legislation, budget, land usage condition and any relevant information regarding LCPs in Lithuania;

To analyse environmental conditions such as ambient air quality and human health requirements and any relevant information regarding the environment condition for LCPs.

#### (2) Master Plan

To review legislation, management organisation, management system, public awareness of air pollution and emission reduction;

To clarify the problems of air pollution and emission stabilisation, reduction and control;

To set targets for the emission stabilisation and reduction plan;

To design the total plan;

To compare the system component, cost, and financial plan;

To establish a plan for implementation;

To make a priority list for further improvements;

To conduct field surveys if it is necessary.

#### (3) Feasibility study

To confirm the framework of plan (target, area, environmental consideration) of priority for the project;

To implement the model project in a selected LCP;

To make a plan for improving facilities for emission control and monitoring in selected LCPs

To establish a plan of public education for environmentalist and specialists of LCPs;

To conduct socio-economic analysis and assess the environmental situation;

To evaluate total impact of the study;

To conduct a field survey if it is necessary.

#### 2.6. Study Schedule

(1) Term: Two years from 2001

#### 2.7. Expected major output of the Study

- (1) The requirements of Council Directive 88/609/EEC on the limitation of certain pollutants into the air from large combustion plants will be fully implemented in Lithuania;
- (2) Assessment of total annual emissions until 2010 and determination of emission limit values

- of SO<sub>2</sub> and NO<sub>x</sub> from a separate LCP in accordance with the requirements of the National Energy and Environmental Strategies;
- (3) Guidance documents to environmental inspectors and specialists of LCPs is to be developed.
- 2.8.Request of the Study to other donor agencies

  None
- 2.9. Other relevant information

Emission projections if available.

- 3. Facilities and information for the Study
- 3.1. Assignment of Counterpart personnel of implementing agency for study
  - (1) Co-ordinators: One

Head of Programmes and Projects Management Unit of Ministry of Environment

- (2) Specialist of Air Pollution: Two
- (3) Specialist on combustion technologies: One

Personnel of the implementing agency for this study will work jointly with both Japanese and Lithuanian sides. Establishing a new project body for the implementation of the Study is to be considered.

Total number of counterparts: four - six

- 3.2. Available data, information, documents, maps, etc, related to the study Will be supplied when necessary.
- 3.3.Information on the security conditions in the Study Area

  Safety is guaranteed for study team members in the territory of Lithuania...
- 4. Global Issues
- 4.1. Environment components

(Such as pollution control, water supply, sewage, environmental management, forestry, biodiversity) of the project, if any

The Government of Lithuania has keen interest in pollution reduction measures. There are a number of relevant laws and decrees on the issue, executed by the Parliament after the

proclamation of Independence. The responsibility in this regard rests within the Ministry of Environment. The Government of Lithuania recognises that the management of ambient air quality and reduction of air pollution is very important in order to sustain good environmental living conditions.

#### 4.2. Anticipàted environmental impacts

(both natural and social) by the project, if any

The management of ambient air quality has inevitably important role for the ordinary life of citizens of Lithuania. The government of Lithuania sincerely hopes that the management of ambient air quality in each main industrial city in Lithuania for better life in Lithuanian citizen. In that sense, this study will improve the ambient air quality.

#### 4.3. Women as main beneficiaries or not

This study has no discrepancy in gender. The fruit of the study will benefit all concerned personnel regardless of gender.

#### 4.4. Project components, which requires special considerations for women

For this project, no consideration is necessary for women. We require to consider all concerned people regardless their gender or age.

## 4.5. Anticipated impacts on women caused by the Project

All concerned people regardless gender of age will have benefit from the project.

The study will not be carried for women but all concerned people.

## 5. Undertaking of the Government of Lithuania

In order to facilitate the smooth and efficient conduct of the Study, The Government of Lithuania shall take necessary measures.

- (1) To secure the safety of the study team.
- (3) To permit the members of the Study Team to enter, leave and sojourn in Lithuania in connection with their assignment therein, and exempt them from foreign registration requirements and consular fees,
- (3) To exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of Lithuania for the conduct of the Study,

- (4) To exempt the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study,
- (5) To provide necessary facilities to the Study Team for remittance as well as utilisation of the funds introduced in Lithuania from Japan in connection with the implementation of the Study,
- (6) To secure permission for entry into private properties or restricted area for the conduct of the Study,
- (7) To secure permission for the Study Team to take all data, documents and necessary materials related to the Study out of Lithuania to Japan, and
- (8) To provided medical services as needed. Its expenses will be chargeable to members of the Study Team.

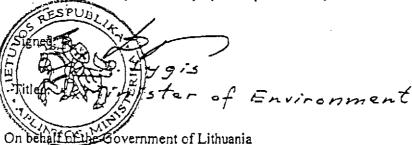
#### 6. The claims bearing by the government of Lithuania

The government of Lithuania shall bear claims, if any arise against member(s) against member(s) of the Japanese Study Team resulting from, occurring in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the member of the Study Team.

#### 7. Counterpart Agency

The Ministry of Environment of the Government of Lithuania shall act as counterpart agency to the Japanese Study Team and as co-ordinating body in relation with other governmental and non-governmental organisations concerned for the smooth implementation of the Study.

The Government of Lithuania assures that the matters referred to in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.



Date: