Proceedings of

Workshop on Asian Cities for Climate Protection Campaign

International Council for
Local Environmental Initiatives

Asia and Pacific Secretariat

Japan Office

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Prof. Onishi is giving a Keynote speech
at the "Forum on Global Warming"

Case presentation at the Workshop

Introduction

This report is a summary of the "Workshop on Asian Cities for Climate Protection (CCP) Campaign" held in November, 1996, by the International Council for Local Environmental Initiatives (ICLEI), together with the Saitama Prefectural Government and the Environment Agency of Japan.

The Workshop was held to further promote the "Asian Cities for Climate Protection (CCP) Campaign" launched at the "The 3rd Local Government Leaders' Summit On Climate Change (Saitama Summit) " held in October, 1995.

Attended by approximately 90 municipal staffs in charge of Global Warming Protection Action Plan from 40 municipal governments in Asia and the Pacific region (including 9 local governments from abroad), participants actively exchanged information and ideas regarding measures taken in each local governments. On the final day of the 3-day workshop (21st), it was agreed in the Chairpersons Summary that we would expand the "Asian CCP Campaign" into "Asia Pacific CCP Campaign" and work on increasing the participation in the CCP Campaign, that ICLEI Japan Office would finalize the "Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific" by March, 1997, and that we would hold workshops to build up capacity required for the development of local action plan in each municipal government.

Though the number of local governments participating in the CCP campaign is 164 worldwide, we have to admit that current participation of 7 in this Asia Pacific region is still small compared to that of the US and Europe. Given "Third Meeting of the Conference of Parties to the United Nations Framework Convention on Climate Change" being held in Kyoto this December, ICLEI would like to make every effort to expand participation of municipal governments in the CCP Campaign in the future, by distribution of the "Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific".

February,1997

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Table of Contents

An outline of the
"Workshop on Asian Cities for Climate Protection (CCP) Campaign"

The "Workshop on Asian Cities for Climate Protection (CCP) Campaign" organized by the Saitama Prefectural Government, Environment Agency and International Council for Local Environmental Initiatives (ICLEI) was held from November 19th (Tuesday), to 21st (Thursday), 1997, at Omiya Sonic City, Omiya City, with participation of approximately 90 local government officials in charge of developing an action plan against global warming from 40 municipal governments in Asia and the Pacific (including 9 foreign municipal governments).

This workshop was intended to further promote the "Asian Cities for Climate Protection (CCP) Campaign" which was launched at the "3rd Local Government Leaders' Summit on Climate Change" last October.

Participants actively exchanged opinions and information on measures taken in their local governments. The fruit of the meeting was stated in the Chairperson's Summary, put together on the final day (21st) of the three-day workshop. Among the topic included in the Summary were the expansion of the "Asian CCP Campaign" to "Asia Pacific CCP Campaign so as to encourage local governments to join in the Campaign in a larger area, the task of ICLEI Japan Office to finalize the "Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific" by March 1997 and suggestion of holding a series of workshops in the future, aiming to build capacity necessary to develop a local action plan.

1 Outline of The Workshop

(1) Forum on Global Warming - Challenge of Global Citizens to Stop Climate Change - (Session 1)

The opening lecture on the morning of the first day (19th), "Forum on Global Warming - Challenge of Global Citizens to Stop Climate Change", was held to provide residents of Saitama Prefecture with an opportunity to think about the present situation of global warming and measures that should be taken against it. More than five hundred attended the forum.

(2) Status quo of the CCP Campaign and Draft of Guidelines for Local Action Plans for Climate Protection in Asia Pacific (Session 2, 3)

Participants exchanged opinions, based on a general explanation on the status quo of

the CCP Campaign, the Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific and on related topics. It was confirmed that the CCP Campaign was essential in promoting measures against global warming in local level. Furthermore, it was stated that the CCP Toolkit and the Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific would be useful in developing local action plans of each municipal government, and development of a simpler tool kit would be expected in the future.

(3) Discussions on technical issues (Session 4)

Presentations and proposals on technical issues such as measurement of greenhouse gas emission, reusable energy, energy saving and adaptation strategies, were made by delegation from such local governments as Saitama Prefecture, Shenyang City, City of Kuala Lumpur, City of Kumamoto, City of Hamilton and Suva City. Among the cases introduced were development of local action plans, management of coal combustion facilities, improvement of transportation system, water and garbage power generation, and initiative implementation plan, green purchasing guideline, measures related to methane, environmental diagnosis of houses and environmental education. Active exchange of information succeeded the discussion.

(4) Future Actions (Session 5)

Various proposal were made regarding future action plans. Among those proposed were:

- to actively encourage local governments in Asia and the Pacific to join the Asian CCP Campaign,
- to recognize the great importnace of understanding and cooperation of national governments in order to achieve the above,
- to make the most of various support for municipalities provided by the US Environmental Protection Agency and Environment Agency of Japan,
- to recognize the importance of capacity building through training programs and workshops and of cooperation with the private sectors through technology transfer and activities implemented jointly (AIJ),
- to ask for further comments on the draft Guidelines for Local Action Plans for Climate Protection in the Asia and the Pacific and finalize it by March, 1997, after giving necessary revisions based on the opinions gathered,

  and
- to hold workshops to build up capacity to develop local action plans and expand the Asian CCP Campaign into the Asia Pacific CCP Campaign.

Workshop on Asian Cities for Climate Protection Campaign
19-21 November 1996, Omiya, Japan
Chairperson's Summary

1. The workshop on Asian Cities for Climate Protection Campaign was held on 19-21 November 1996 in Omiya Sonic City, Omiya City, Saitama, Japan organized by Saitama Prefecture, the International Council for Local Environmental Initiatives (ICLEI) and the Environment Agency of Japan (EAJ) with the support of the Ministry of Foreign Affairs of Japan and the "Sai-no-kuni" Saitama Environmental Development Council.

Attendance

2. The workshop was attended by experts from thirty nine cities mainly in Asia and the Pacific. From Japan, experts of thirty prefectural and municipal governments attended the workshop. From abroad, experts of Ansan in Korea, Bangkok in Thailand, Berlin in Germany, Hamilton in New Zealand, Hanoi in Vietnam, Kuala Lumpur in Malaysia, Mumbai in India, Shenyang in China and Suva in Fiji attended. Representatives of the Korea Local Authorities Foundation for International Relations (KLAFIR), Credit Guarantee Corporation of Saitama, the National Environmental Training Institute, Earth Day Japan and People's Forum 2001, Japan also attended the workshop. As the secretariat, experts of Saitama Prefecture, ICLEI World Secretariat and Asia Pacific Secretariat, and EAJ attended the workshop.

Major objectives

3. The major objectives of the workshop were to follow up the Saitama Summit and to further develop the Asian "Cities for Climate Protection (CCP)" Campaign. Through the discussions at the workshop among municipalities participating the Campaign as well as the ICLEI members in Asia and the Pacific, the "Guidelines for Local Action Plans for Climate Protection in Asia" will be finalized to help local governments in Asia and the Pacific develop action plans for climate protection.

Forum on Global Warming - Challenge of Global Citizens to Stop Climate Change

4. A special symposium, entitled the "Forum on Global Warming - Challenge of Global Citizens to Stop Climate Change", was held in the morning of the first day, with more than five hundred audience. It was commenced with opening addresses by Messrs. Yoshihiko Tsuchiya, Governor of Saitama Prefecture and Kenji Tanaka, Director General, Planning and

Coordination Bureau, EAJ, followed by the welcome address by Mr. Noboru Asako, Speaker, Saitama Prefectural Assembly.

5. Messrs. Hikaru Kobayashi, Director, Control and Cooperation Division, Global Environment Department, EAJ and Philip Jessup, Director, CCP Campaign, ICLEI World Secretariat made keynote addresses on "International Challenge on Climate Change" and "CCP Campaign: Challenge by Local Governments' Initiatives" respectively. Professor Takashi Onishi, Tokyo University delivered the main address entitled "Actions by Citizens and Enterprises for Climate Protection".

Conduct of the workshop

6. The workshop elected Mr. Saburo Kato, Senior Executive Director, ICLEI Asia Pacific Secretariat as Chairperson.

7. Presentations on status-quo of the CCP Campaign and on the summary of the Saitama Summit were made respectively by Ms. Tanya Imola, CCP Campaign Coordinator, ICLEI World Secretariat and Mr. Ken-ichi Nakano, Deputy Director General, Environment Department, Saitama Prefecture. Overview of Japanese action plans on climate change, CCP Campaign in North America and in Europe were also presented respectively by Mr. Hikaru Kobayashi, Director, Control and Cooperation Division, Global Environment Department, EAJ, Ms. Imola and Dr. Klaus Müschen, Head of the Energy Planning Division, Berlin.

CCP toolkit and draft guidelines for local action plans for climate protection in Asia

8. The participants took note with appreciation of the brief explanation on CCP toolkit applicable for world-wide cities and the draft guidelines for local action plans for climate protection specifically developed for Asia and the Pacific, which were felt very useful for developing local action plans for climate protection.

9. Comments on the toolkit and the draft guidelines include:

(a) Simpler worksheet approach may also be developed to prepare inventories.

(b) Importance of public awareness and education, cross-sectoral approach, and economic instruments should be further emphasized.

(c) Mitigation measures for methane from landfill sites should be placed as one of the priority options. Composting should also be considered as a good mitigation measures in waste management.

(d) Reporting of implementation of action plans should be integrated as the sixth step of the planning process.

(e) Survey on the present stage(s) at which local authorities are in the planning process may also be very useful in promoting exchange of information and experiences among members of CCP Campaign.

(f) It was clarified that the time frame to develop local action plans would be within three years after joining the Asian CCP campaign and that the local governments have flexibility to set the target year of their action plans. These should be specifically mentioned in the guidelines.

(g) Taking into account the situation of many countries of Asia and the Pacific, description on vulnerability assessment and adaptation measures should also be incorporated in the draft guidelines.

(h) Better communication and coordination between the national and local governments should be established on the climate change problem.

(i) Target groups of the guidelines should be the local governments in Asia and the Pacific including Japan.

10. It was confirmed that the local governments in industrialized nations participating in the CCP Campaign have flexibility in setting the targets in their local action plans, taking account of their local circumstances, although they are encouraged for a target of 20 % reduction of GHG emissions from 1990 levels by the years 2005-2010. Local governments in developing countries have more flexibility in setting the targets, depending on their local and national circumstances.

11. It was pointed out that a series of national and/or regional workshops on Asian CCP Campaign should further be undertaken in this region to build capacity of the local governments in developing local action plans as well as to review the progress of and exchange experiences on the campaign.

Technical discussions

12. It was pointed out that CO_2, CH_4 and N_2O are the priority items particularly in developing countries and that appropriate methodologies applicable to the countries of the Asian and Pacific region should further be elaborated. It was emphasized that some actions could be taken even in the process of elaborating the local emission inventories.

13. Various measures on energy efficiency improvements, such as the followings, were introduced by the participants as possible options to be included in the guidelines for climate protection in Asia and the Pacific:

- District heating networks;
- Combined generation of electricity and heating and/or cooling;
- Energy saving or audit systems for public and commercial buildings and households;
- Better insulation of public and commercial buildings, and households;
- Active recycling, reduction and reuse of wastes, and methane capture;
- Better transportation management through, such as promotion of eco-driving, park and ride systems, use of non motorized vehicles like bicycles, better maintenance and inspection systems, more fuel efficient vehicles, cargo transport improvement and so on;
- Improvement of life styles through, e.g., household eco-account books and environmental education.

14. Better use of solar heating, photovoltaic power generations, wind power and biomass were considered crucial for the promotion of renewable energy. Natural gas and other low GHG emitting fuels were also recommended to be widely used.

15. The importance of vulnerability assessment and adaptation strategies in the region, especially in South Pacific, was stressed by the participants. Regional cooperation on these topics was also considered crucial.

Future actions

16. The participating governments of the workshop were encouraged to join the Asian CCP Campaign, if they have not yet done so. Considering that at present only seven local governments are the members of the Asian CCP Campaign, the workshop expressed its strong

desire that many local governments in Asia and the Pacific, particularly the signatories to the Asian CCP Campaign, would become members of the Asian CCP Campaign at their earliest convenience.

17. It was felt that more active dissemination of information on the Asian CCP Campaign, such as case studies of success stories, should be undertaken to facilitate the participation in the campaign.

18. It was emphasized that better understanding and cooperation by national governments are very important. Regional cooperative activities in this field may also involve governments in a more direct manner. In this connection, it was noted with appreciation that USEPA and EAJ had initiated to provide technical and financial support with the CCP campaigns in respective countries. The local governments in respective countries were requested to consider best use of such support to expand their campaign activities.

19. It was also stressed that capacity building through training, workshops etc. are crucial in promoting the Asian CCP Campaign. Technology transfer and better involvement of private sector, especially through activities implemented jointly (AIJ) were considered important.

20. Participants of the workshop were requested to send comments on the draft, if any in addition to those expressed during the workshop, to the ICLEI Asia Pacific Secretariat by December 31, 1996. The draft guidelines should also be sent to the signatories for their comments. Based on the comments during the workshop and thereafter, the ICLEI Asia Pacific Secretariat will finalize the guidelines by March 31, 1997 and accordingly send them to the participants and others as appropriate. The participants were requested to consider the ways to make best use of the guidelines and identify the needs for further support.

21. Specific methodologies appropriate for Asia and the Pacific should be developed and included in the CCP Toolkit. More case studies should be collected and included in the CCP Newsletters and the CCP Toolkit. In this connection, the local governments participating in the Asian CCP Campaign were encouraged to provide information on the progress of the implementation on the campaign to the ICLEI World Secretariat. Japanese local governments were recommended to more actively translate their experiences into English and provide them to the ICLEI World Secretariat.

22. It was emphasized that a series of national and/or regional workshops should be undertaken to build capacity for developing local action plans etc.

23. The participants took note with appreciation the progress on the establishment of the Environmental Information Center on Climate Change, reported by Saitama Prefecture as the follow up of the Saitama Summit, and welcomed the Saitama's initiative to make arrangements for opening an Internet home page on climate change from the next year.

24. It was felt that the collaboration should be promoted with the CCP Campaign in the other regions - North America, Europe, Africa, Middle East and Latin America.

25. It was agreed to change the name of the "Asian CCP Campaign" to the "Asia Pacific CCP Campaign" to expand the geographical coverage.

26. The participants discussed the possible inputs to COP3, which will be further discussed and decided at the Fourth Local Government Leaders' Summit.

27. It was pointed out that local governments could influence the international negotiations by demonstrating, prior to COP3, their initiatives to attain more stringent targets, and that COP3 could also have positive influence on local governments in facilitating their climate protection initiatives.

28. The workshop participants were unanimous in their deep gratitude to the organizers of the workshop for enabling such a well organized exchange of information and experiences relating to the follow up of the Saitama Summit and the Asian CCP Campaign.

Omiya City, Saitama, Japan
21 November 1996

Saburo Kato
Chairperson
Workshop on Asian Cities for Climate Protection Campaign

Status-Quo of the Cities for Climate Protection Campaign

Workshop on Asian Cities for Climate Protection Campaign
November 19-21, 1996

HISTORY OF THE CAMPAIGN

- The Urban CO_2 Reduction Project
- Municipal Leaders' Summit on Climate Change (1993)

GOALS OF THE CAMPAIGN

- impact emissions
  - already at over 4% of global emissions
- to support initiatives being undertaken at the local level
  - ICLEI's research projects (Green Fleets, Green Buildings, etc.)
- to assist local governments in developing a local action plan
  - example of CO_2 cities
- to foster the development of new technologies and innovative strategies
  - use of telecenters; school retrofit project, etc.
- to foster the development of sustainable practices at the local level
  - Denver Sustainable Project example
- to provide a collective voice for municipalities internationally
  - role in SBSTA and the United Nations

REVIEW OF ICLEI REGIONS

- Africa
  - membership
  - activities
- Asia
  - membership
  - activities
- Europe
  - membership
  - activities: Heidelberg
- Latin America
  - membership
  - activities
- Middle East
  - membership
  - activities
- North America
  - membership
  - activities

THE FUTURE OF THE CAMPAIGN

- progress reports
  - Campaign survey
- Nagoya Summit
  - COP3
  - international awards
- recruitment of new members
  - goal to account for over 10% of global emissions

Report on U.S. CCP Activities

Ms. Tanya Imola
CCP-Campaign Coordinator
ICLEI World Secretariat

I. Introduction to Cities for Climate Protection Campaign-U.S.

A. Purpose of the U.S. Campaign - political context
   1. President's Climate Change Action Plan
   2. build public support - EPA funding

B. The U.S. Office
   1. Overhead #1 chart depicting CCP-U.S. programs
   2. describe different programs, how they fit together
      a) CCP
         - Sustainable Transportation Program
         - Green Fleets
         - Climate Wise

C. U.S. Campaign Participants
   1. Overhead #2 lists the participants
   2. U.S. CCP jurisdictions represent x population, x CO_2 emissions, and x % of total U.S. CO_2 emissions (data included in overhead)

II. What the U.S. Office Offers (Overhead #3)

A. Technical Assistance
   1. publications
   2. person-to-person contact: phone, meetings, help with individual requests for assistance and information

B. Training
   1. workshops
      a) dual track: technical training for staff, public awareness-building for elected officials
      b) future workshops in November '96, January and June '97
   2. CCP Toolkit
      - how to do emissions analysis
      - how to do emissions forecast
      - developing the local action plan
      - examples of municipal best practice in energy efficiency, greenhouse gas reduction

C. Information
   1. coordinate peer sharing of information
   2. Fact Sheets, e.g.: Economic Power of Energy Efficiency
   3. One-Stop Guide to Federal Energy Conservation Programs for Local Governments

D. Build Public Awareness
   1. facilitate local media coverage (workshop, With statement, WHO report)
   2. co-sponsor town meetings
   3. produce public ed/promotional pieces (fact sheet on global warming)

E. Grant Funding
   1. Climate Wise
   2. Transportation Partners

III. Status of the U.S. Campaign

A. Overhead #4: What U.S. Campaign Participants Pledge
   1. Conduct a base-year greenhouse gas emissions (CO_2 & CH_4) analysis and forecast
   2. Adopt and emissions reduction target - most U.S. jurisdictions have pledged to reduce greenhouse gas emissions by 20% below 1988 or 1990 levels by the year 2010
   3. Develop and implement a Local Action Plan to meet the target
   4. Also: lead by example: get the municipal house in order first; increase public awareness

B. Unique Aspects of the U.S. Campaign
   1. building partnerships with local businesses
   2. focus on transportation sector

C. What Are U.S. Jurisdictions Doing?
   1. Overhead #6: Municipal Retrofit Projects
      a) Saint Paul
      b) San Jose
   2. Overhead #7: Residential Programs
      a) Santa Monica Energy Fitness Program
      b) Berkeley RECO
   3. Overhead #8: Commercial/Industrial Programs
      a) Portland (BEST)
   4. Overhead #9: Transportation Programs
      a) Denver Municipal Fleet Reduction program
      b) Missoula Free Fare Days program

IV. What's Next?

Training
Procurement Campaign for fuel efficient vehicles
Town Meetings
3 extra overheads: $ savings, job creation, multiple benefits

Overview of Cities for Climate Protection Campaign in Europe

Klaus Müschen
Energy Planning Department
Ministry of Urban Development,
Environmental Protection and Technology
City of Berlin

The Cities for Climate Protection Campaign was conceived at the first Municipal Leaders' Summit on Climate Change held at the UN in New York in January 1993. The more than 60 cities in Europe which has joined the campaign have pledged to develope and implement a local action plan to reduce greenhouse-gas emissions on the local level.

Two years ago the Heidelberg Conference on „How to Combat Global Warming at the Local Level" took place. After discussing creative approaches to deal with global and local environmental problems on a local level the participants, Mayors and authorized representatives of local authorities, signed the Heidelberg Declaration. The signatories plegde to take actions necesary to reduce CO_2-emissions by 20% from 1987 levels by the year 2005.

In March 1995 we held the Second Municipal Leaders'Summit on Climate Change in Berlin parallel to the Conference of the Parties (COP) of the UN Framework Convention on Climate Change and in October 1995 the Third Local Government Leaders'Summit on Climate Change here in Saitama. The summits gave us all presentations of the climate-protection initiatives and discussions on local strategies for combatting the problem of global warming. In Berlin the Summit also presented an Action Plan to the UN Conference. Key elements included:

- strong support for the Alliance of Small Island States (AOSIS) protocol calling on developed nations to commit themselves to a 20% reduction in CO_2-emissions;
- formal COP recognition of the municipal sector for the purpose of future consultation through the Subsidiary Bodies;
- a call to the COP to establish jointly with minicipalities worldwide the Local Authority Climate Assembly, which would seek to coordinate and facilitate municipal action on climate change in concert with national governments'national action plans.

Two month ago the Heidelberg Declaration Follow-Up Workshop was held in Heidelberg again. The leading questions were as follows:

- What progress have the cities made to meet the commitments they made by signing the Heidelberg Declaration and by joining the CCP?
- Which programmes have been successfully implemented to reduce greenhouse-gas emissions?
- Which approaches were less successful and why?

In Heidelberg cities of Japan, USA, Peru, Uganda, Canada and Europe discussed their experiences. The following european cities gave reports on their activities at the Heidelberg Workshop:

- Barcelona, Spain
- Berlin, Germany
- Freiburg, Germany
- Gdansk, Poland
- Graz, Austria
- Hanover, Germany
- Helsinki, Finland
- Heidelberg, Germany
- Karlsruhe, Germany
- Katowice, Poland
- Leipzig, Germany
- Lucerne, Switzerland
- Lviv, Ucraine
- Palermo, Italy
- Montpellier, France
- Newcastle upon Tyne, UK
- Rome, Italy
- Saarbrücken, Germany
- Viernheim, Germany
- Warsaw-Mokotóv, Poland
- Zurich, Switzerland

Local Action Plan

All cities already established local action plans to increase greenhouse-gas emissions. The main problem still is the evaluation of the enforced measures. The databases for evaluation must be improved to ensure a detailed monitoring of the action plan. The available instruments of the action plan can be classified in regulation and standards, funding, self-obligation, education and information.

Building Stock

The projects Thermo Profit (Graz) and Energy Saving Partnership (Berlin) started to finance retrofitting and energy efficency measures for estate administration in a contracting model. A number of houses were offert to private energy service companies for a 10 (ore more) years contract. The investment for energy efficiency will be financed by the energy cost savings.

Many cities started to increase the share of district heating and natural gas for the housing stock, so replacing lignite (Heidelberg, Katowice, Berlin, Saarbrücken, Leipzig).

At the local level there is an increase in the use of small combined heat and power plants (Berlin, Leipzig, Saarbrücken). Typical applications are hospitals, school or sporting centers, industrial use of heat and power, new housing areas.

Municipal Buildings

The key to reduce energy consumption in the public sector is to develop and implement a centralised energy management. Many cities have already established a Municipal Energy Management with special responsibilities in controlling the energy consumption and in coordinating the measures (i.e. Graz, Heidelberg, Saarbrücken, Berlin).

Many cities set low energy standards for new public buildings because national standards often miss the state of the art of energy conservation. (Heidelberg, Berlin)

The City of Berlin operates approximately 6000 buildings of various sizes and conditions. The energy-costs of of the real estate amount to about DM 500 million annually. According to a number of studies, the cost-cutting and energy-saving potential of these buildings is on average 30 %. So we initiated a new model: Energy Savings Partnership Berlin (ESP). The objective is to transfer the energy management of a pool of buildings to an energy saving partner. This private energy service company is responsible for the planning, constuction, financing, operation as well as the servicing of all energy-relevant installation components of the buildings. The pool of buildings presents a various cost cutting potential. This mix minimizes the risk for the energy saving partner in predicting the energy conservation. The energy saving partners will be required to reach a minimal energy cost savings of 6 % annually. Any surplus coming from additional saving measures is to be shared with the City of Berlin.

Last summer we start the bidding for the first pools, 50 buildings. The procedure comprehends the following steps:

- Public announcement for bidding firms and consortia
- Initial selection of 10 bidders
- Negotiation, comparison and optimization of bids
- award of contract

The results of the bidding are a great challenge for both the city of Berlin and the energy saving partners. We stipulated two 12 years contracts - 50 buildings each - with guaranteed 9% and 11.25% reduction of energy costs for the Berlin budget. Because the real cuts in energy costs are approximately 25 - 30%, the difference flows in the budget of the energy saving partners to refinance their investment of the energy saving measures. This underlines the cooperative idea of the model: „The best way to save is to share". Now we are preparing the next pools for bidding.

Low Energy Houses

Pilotprojects in many cities demonstrate the use of solar energy and the state of the art of low (or Zero) energy houses (Graz, Heidelberg, Berlin). The biggest problem is still to reduce the additional cost of the advanced energy standards of these buildings. However there are examples now to build low energy houses with a requirement of less than 40 kWh/m^2*a at the same costs as normal standard houses with more than the double energy consumption.

Solar Energy and Renewables

Most of the CCP cities started promotion campaigns on Solar Energy and Renewables. This includes funding and financial support for these energy systems. A very interesting action is shown by the city of Graz, where prominent people build their own solar energy system.

In Berlin we initiated a Solar Forum together with the Technical University Berlin and the Berlin Technology Foundation. The idea is to promote solar energy systems among different actors in this fields like companies, architecs, planners, associations, administrations. The issues of the last meetings were the Solar Ordinance, Cost Covering Compensation for solar power and the use of daylightning.

The Berlin Parliament (Berliner Abgeordnetenhaus) approved a law in 1995 allowing the governing Senat of Berlin to enforce a Solar Ordinance, which foresees a 60% use of solar warm water für new houses. The discussion on the Solar Ordinance is still going on because the resistence of the association of trade and industry, which prefers a self-obligation instead the Solar Ordinance to promote the use of renewables.

More than 10 cities in Germany deal with different models of cost covering compensation for feeding solar power to the grid. Because the cost of solar power is still more than 1$/kWh, a cost covering compensation can cause a growth in the market without burdening the public budget. The result is a very low increase of the price for electricity for all consumergroups in the city.

Industrial and Commercial Sector

The City of Graz starts a consulting initiative for energy efficiency in the industrial and commercial sector named EcoProfit. This includes consulting about funding and financing of energy concepts especially for small and medium enterprises (SME).

In many regions, energy agencies were started to support this consulting process. A priority is given to measures which do not need extra financial support like contracting and third-party-financing for the diffusion af small cogeneration systems and the use of waste heat.

Transport Sector

The transport sector presents the biggest problems in reaching the goals on reducing greenhouse-gas emissions. The experiences of many cities are hopefull:

The City of Graz (Austria) established a plan called „EcoDrive" promoting Ultra-Low Emission Vehicles (e.g. electric and solar vehicles) through pilot projects and incentive systems.

In Katowice (Poland) the local government rebuild the public transport sector, to cut the increase in the use of private cars especially in the last years.

In the City of Heidelberg the new traffic plan was coordinated by the Traffic Forum Heidelberg with the participation of the citizens. Representatives from all groups, associations and institutions interested in the traffic situation of the city discussed the objectives of an ecological and economic mobility. The priority list of the plan includes the construction of new tram routes, increasing the frequency for public transport, introduction of local trains, expansion of traffic networks and a parking management.

Different public transport companies offered job tickets and student tickets for public transport.

A speciall new measure is the Karlsruhe (Germany) Track-Sharing Model. After investigation the model consists of three components:

- a vehicle able to use regional German Railway (DB) tracks and light rail tracks in the city center;
- connecting DB tracks to the already existing tramway system;
- building new stops on existing heavy-rail lines which can be served without lengthening travel times because the improved acceleration of light rail vehicles.

Since 1992 the first line is in operation. The number of users have more than doubled compared with the former heavy-rail trains. Corresponding, the use of cars has decreased. The model is particularly suited for medium-sized cities and regions with 200.000 - 500.000 inhabitants. Other cities - Geneva, Saarbrücken, Kassel, Ulm - have or will adopt the track-sharing model too.

Utilities

Many cities are promoting energy service companies or local energy agencies. Especially the public utilities owned by the city could be forced to offer new energy services such as demand-side-management, contracting models, premium programmes, cogeneration and district heating.

Others activities

- Energy Efficient Student Hotels (Graz)
- Bonus-Systems for schools participating in energy and cost savings (Hannover)
- Local Agenda 21 (Heidelberg, Saarbrücken, Helsinki, Berlin, etc.)
- Public-Awareness / Climate Campaigns and Energy Dialogue (Heidelberg, Berlin)
- Contracting , Third Party Financing

Conclusion

Although I was able to describe only a small part of the activities of cities in the Climate Protection campaign in Europe there are some conclusions at the Heidelberg Workshop. Two other networks of european cities - the Climate Alliance and the Energie-Cités attending the Heidelberg Workshop aggreed with these conclusions:

- In evaluation of local action plans is a gap to the evaluation of different measures. On particular measures we have well known results like the energy savings or reduction in greenhouse gas emissions. But we need calculated data bases and balances for the hole action plans of cities.
- We have to work harder on the transport sector. The reduction in greenhouse-gas emissions in other sectors will be (over-)compensated by the increase in transport and car use. In Germany the free time activities are responsible for more than 50% of the car use. Normal cars become more efficient and we are talking about the 3-liter-car. In USA the most popular off-road cars still need 20 l per 100 km.
- We also have to work harder at the national and international level. The Berlin Summit had presented an Action Plan to the UN Conference demanding a national and international support for the municipal climate activities. We need higher and effective energy taxes to internalize the social and ecological costs of the use of energy. Higher energy prices affect a higher public awareness on energy conservation and lead the actors towards economic efficiency and energy saving measures.
- We need more cooperation and coordination among the city networks in Europe. The Cities Climate Protection campaign, the Climate Alliance of European Cities and the Energie-Cités are acting on the same issues.
- Last but not least we have to awake the interest of other cities and convince them to join the Cities for Climate Protection campaign. Together we can compare different experiences and learn from each other about new solutions and models of saving energy and reducing greenhouse gas emissions.

Overview of Measures Japanese against Global Warming in Japan
(Resume)

November 19, 1996
ACCPC Workshop
Hikaru Kobayashi
Environment Agency of Japan

This paper does not refer to the contents of actual measures. It focuses on the dimension of system where measures are dealt with. Namely, it explains ① the "mechanism" which promotes measures against global warming in Japan and ②the "role" played by local governments there.

1. The mechanism of the national-level measures against global warming

(1) Basic Environment Law, 1993

Having superseded the Basic Law for Environmental Pollution enacted in 1965, a new Basic Environment Law was enacted in 1993. Strongly aware of global environment issues, particularly global warming, this law is intended for measures against such issues to be actually implemented. From the beginning, it put people and local governments under obligation to reduce burden on the environment spontaneously so as to protect environment, including global environment.

(2) Basic Environment Plan, 1994

This plan dealing with policies on measures towards indivisual environment issues such as global warming etc. was decided at the Cabinet meeting. As for the global warming issue, it indicated policies such as ①implementing "Action Plan to Arrest Global Warming" (decided at the meeting of concerned Cabinet members in 1990) for the time being, ②participating in the development of a framework on international measures while taking intiatives in implemening measures in Japan in the mid-term range and ③ aiming at the achievement of the final goal of Framework Convention in the long run.

(3) Action Plan to Arrest Global Warming, 1990

This plan was decided at the meeting of concerned Cabinet members. It presents the target and menu of measures of Japan. The target is to stabilize CO2 emission at the

1990 level after the year 2000. The plan lists all the conceivable measures which would contribute to the reduction of carbon dioxide emission in five fields, namely, improvement in city and local infrastructure, transportation system, manufacturing structure, energy structure and lifestyle.

(4) Action Plan for Greening Government Operations, 1995

Having decided at the Cabinet meeting, this plan took a special notice on the role of the central government as a consumer and aimed for greening of government operations. It set up several numerical goals in 12 items such as recycling, energy and water saving, introduction of low-pollution emission vehicles etc.. Through these measures, the plan aims to stabilize the amount of CO2 emitted by the central government operations at the 1990 level.

2. Support of Central Government for Measures against Global Warming Taken in Local Governments

(1) Survey and information provision regarding the movement of local governments
(2) Subsidy for the development of measures plan in local governments
(3) Subsidy for projects on measures by local governments
*It is not necessarily solely for measures against global warming.

3. Cooperation of Central Government for the Support of Japanese Local Governments to Overseas Local Governments

(1) Preparation of a system to promote activities implemented jointly (AIJ) based on the resolution of the First meeting of the Conference of Parties to the United Nations Framework Convention of Climate Change
(2) Provision of subsidy for AIJ carried out by Japanese local governments (tentative)

4. Policy Performance

(1) Compared to the results in 1990, the emission of CO2 has increased by 7% in 1994 as a whole.
(2) Given the advance of the industrial structure, the industrial sector decreased the emission in the '80s, which, however, was ceased in the '90s and even began to increased slightly in recent years. (Behind this is the weak yen and inexpensive energy cost). The power generation sector offset the increase of emissions caused by an increase in electric

power demand by improvement of energy efficiency and use of nuclear power to some extent, though it did show a small increase. Nevertheless, the most significant growth can be seen in households, offices and automobile transportation. The emission from those areas grew approximately 10% in 1994 compared to that in 1990.

(3) The insufficiency of the amount of measures that have been implemented is the one and the only reason and cause for insufficient performance. Behind that are several factors: ①Having few measures that directly deals with global warming, we are obliged to depend on measures that have other purposes but would indirectly serve against global warming (for example, energy saving standard of products and plants based on the Energy Saving Law are virtually the only regulatory measures. This, however, is determined, given consideration to other factors such as energy security and economic development.), ②There are many performers with different positions without any principles or rules that determine reduction quota for each performer and ③ performers and general citizens have only a slight sense of crisis, or even those who have those sense more or less may feel helpless thinking that their performance may amount to nothing , or are alarmed that they may come out on the wrong side by carrying out such measures.

5. The Status quo of measures against global warming by local governments

According to the survey by the Environment Agency (these figures are subject to change as they are yet to be published), following are the examples of measures taken in the field of global warming in 1995. (Cases taken here are limited to those done by prefectures and large cities with a population of more than one million. Measures dealing with global environment issues in general are excluded.)

(1) Developing plans for measures - 46 cases (among which, 21 cases are covering overall global warming issue, while 25 cases involved particular issues such as transportation.)
(2) Organizing local groups for the implementation of measures - 25 cases
(3) Public projects - 83 cases
(4) Taking initiatives in greening as consumers - 127 cases
(5) Supporting measures taken in smaller municipalities within their jurisdiction - 19 cases
(6) Establishment of ordinance regulating business activities and lifestyles of the citizens - 2 cases
(7) Conclusion of spontaneous agreements with business operators - 6 cases
(8) Economic support for measures taken by business operators - 76 cases
(9) Public relation activities, events and environment education etc. - 144 cases

As shown above, measures haven't become compulsory yet: the majority take the

position to support excellent measures.

6. The problems local governments are facing

(1) The responsibility of local governments to fight against global warming is not clearly defined.
(2) There is no law authorizing local governments authority to take measures regarding CO2 emission.
(3) It is difficult to reason out why amount of CO2 emitted should be stabilized at a certain level in a particular area.
(4) As construction of power plants and main roads is carried out under the decision made in national level local governments are not authorized to reduce the emissions from them.
(5) When the treatment methods are limited to a certain extent as in such case as harmful substances, they can provide technical instructions to the business operators. However, in the case of CO2, detailed knowledge that would cover such range as manufacturing process is required, for which they do not have enough expertise to give instructions.
(6) Large investments are required for the improvement of urban infrastructure, which is far beyond the budget for environment related departments in local governments.
(7) With use of energy being limited, policies with high demand from local residents, such as promotion of plant construction or invitation of commercial facilities, is restricted.

Guidelines for Local Action Plans for Climate Protection in Asia

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Chapter One: Purpose of Guidelines for Local Action Plans in Asia

1 Background

the New York Declaration 31 March 1993

Heidelberg Mayors' Declaration 9 September 1994

Berlin Communique 29 March 1995

the Saitama Declaration 26 October 1995

2 Common Understanding

Special role and undeniable responsibility of local governments

Industrialized and developing nations

Goal of greenhouse gas in FCCC

Necessity of reducing greenhouse gas emissions

3 Tasks of Local Governments in the Asia–Pacific Region

Energy conservation
Active promotion of renewable energy sources
Expansion and considerations for greenhouse gas absorption sources
Improvement of adaptability to climate change
Others

4 Guidelines for Local Action Plans for Climate Protection in Asia

Chapter Two: Steps to a Local Action Plan

Step One:Identify greenhouse gas inventory

○ The Urban Energy System

Energy supply and distribution
Energy services and end uses
Land use
Lifestyle patterns and behavior

○ The Base−year Inventoy

Municipal energy profile and energy system
Base−year
Collecting date

Step Two:Develop a Reference Projection

Future reference
Collecting date
Reference projection

Step Three:Identify Measures to Limit/Reduce Greenhouse Gas Emissions

Increase the efficiency of energy services
Changing urban land−use patterns
Substitute lower carbon for higher carbon fuels
Substitute renewable energy for fossil fuels
Change urban surface color and carbon absorption capacity

Step Four:Establish a Greenhouse Gas Limitation/Reduction Target

○ Evaluation of Measures

Potential for big impact
Municipal power
Municipal benefits
Public support
Short-term versus long-term effects
Clear parameters

○ Political Commitment:"The Toronto Target"

Step Five:Make a Portfolio of Practical Policies and Programs

Regulation
Economic instruments
Consumer education
Working with utilities
Infrastructure investments

Chapter Three: Listing of Policies and Measures

1 Energy and Transformation Industries

2 Industry

3 Residential,Commercial and Institutional

4 Transportation

5 Industrial Processes

6 Agriculture

7 Land Use Change and Forestry

8 Waste Management and Sewege Treatment

Case Presentation

Matters Concerning the Local Promotion of Measures to Arrest Global Warming in Saitama Prefecture

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1. Implementation Targets

The global warming phenomenon is caused by the considerable utilisation and consumption of energy and natural resources in the social economic activities of citizens and entrepreneurs alike, hence we are causing a phenomenon and at the same time worrying about its consequential effects. Furthermore, it is not just a national problem, but one that arises on a global scale. Accordingly, measures concerning the arrest of global warming in this action program were implemented with the view that while both international co-operation and national strategies are important, the active implementation of local measures according to the particular traits of each region are also vital.

2 Details Concerning the Implementation of the Action Program

The Saitama Prefectural Government Special Committee for the Implementation of the Local Action Program Concerning Countermeasures Towards Global Warming which comprises of 10 representatives from areas such as academic specialists, industrial representatives, consumers and private bodies was established with the aim of implementing the measures outlined in the Action Program. The Committee met five times, one of which included a field trip to the various advanced facilities concerned with the arrest of global warming. The results of these meetings led to the various adjustments in the implementation measures.

In addition, this program was determined and adjusted according to the opinions and ideas raised by the various representatives in the Inter-divisional Conference for the Promotion of Global Environmental Preservation, as well as the proposals and opinions received from the various local authorities and other bodies concerned with environmental issues throughout Saitama Prefecture.

3 Description of the Program

This program is being implemented as a program which, taking into account the Basic Environmental Action Plan that aims towards the construction of a sustainable society (the fundamental idea underlying the Basic Environmental Regulations), comprehensively and strategically promotes measures to counteract global warming as applicable in Saitama Prefecture.

4 Targets of the Action Program and Implementation Period

(1) The measures to counteract global warming are based on the issue of how much we can decrease the level of carbon dioxide, one of the constitutes of global warming. The reduction targets are outlined below:-

- To maintain the level of carbon dioxide emission per person at around the 1990 level for the year 2000 and beyond.

- To strive towards reducing the level of carbon dioxide emission per person by 20% during the five year period between 2005 and 2010 (based on the 1990 level).

(2) The targets for this program reach as far as 2010. The year 2000 will act as a half-way point for any necessary reviews of the program.

5 Carbon Dioxide Emission Levels and Future Predictions for Saitama Prefecture

Realisation of Emission Levels

- The level of carbon dioxide emission was calculated by adding together emissions arising from the consumption of energy by energy conversion, industrial, domestic/private sectors, and transportation sectors; emissions arising from the consumption of limestone as used in factory processing sector; and also in emissions arising from waste incineration.

- Total emission level for 1990 10,795 thous. tonnes(3% of the national total)
- Emission level per person in 1990 1.69 tonnes

Future Predictions (assuming no special measures are taken)

Year		
(1990	**10,795 thous. tonnes**	**1.69 tonnes per person)**
2000	**12,828**	**1.79**
2010	**13,542**	**1.73**

6 Reduction Targets for Carbon Dioxide Emission Levels

(1) Target for the Year 2000 work towards stabilising the emission level per person (1.79 tonnes) at the 1990 level (1.69 tonnes)

(2) Target for the Year 2010 strive to reduce the emission level per person (1.73 tonnes) to 20% of the 1990 level (1.69 tonnes) making 1.35 tonnes per person.

7 Priority Measures

(1) Measures to limit carbon dioxide emissions

Industrial and Domestic/Private Sectors

- Application of natural energy such as solar power, wind power and biomass energy etc.
- Use of heat energy from the incineration of waste
- Introduction of heat insulation material in the construction of buildings
- Introduction of local air-conditioning/heating systems
- Introduction and promotion of co-generation systems
- Promotion of energy efficiency and conservation in the home and office

Transportation Sector

- Minimise the use of the automobile ('No-Car-Day', encouraging the use of public transportation etc.)
- Introduction and promotion of vehicles which are low polluting and efficient consumers of fuel (electric cars, vehicles appointed as low-polluting etc.)
- Efficient operation of heavy goods vehicles and the promotion of joint transport and delivery systems
- Ensurance of a smooth traffic system through the improvement of intersections and the number of two-level crossings on main roads.

Energy Conversion Sector

- In this prefecture, this sector is represented by the cement industry.
- The raw ingredient in the cement process, limestone, contains carbon dioxide and so by reducing the amount of limestone used, the level of carbon dioxide emission can also be reduced.
  The slag and ash from blast furnaces are being used as a substitute for limestone at present. (The resulting cement is known as 'eco(logical) cement')

Waste Related Sector

• Limiting the amount of waste	encouragement of individual refraint from the use and manufacture of disposal products, use of recycled resources etc.
• Promotion of recycling	promotion of separated garbage collection and group disposal, development and promotion of recycled products and so on.

(2) Measures Concerning Carbon Dioxide Absorbents

The use of plant photosynthesis as a means for the absorption and fixation of carbon dioxide.

- maintenance of forestry preservation, conservation of flatland woods and mountainous regions.
- ensurance of greenery at home, in the workplace and so on (roof gardens, wall greenery etc).
- maintenance of roadside trees and city centre parks.

- rational use of timber resources
- conservation of tropical rainforest timber (promotion of international co-operation)

(3) Miscellaneous

- research concerning the technology of the break down, fixation and disposal of carbon dioxide.
- monitoring of the concentration of carbon dioxide in the atmosphere
- promotion of environmental education
- promotion of international co-operation in areas such as technology transfer and mutual implementation of programs in developing countries.
- investigation into the introduction of an environmental tax.

CO_2 Control Strategies for Protection of Global Environment from Climate Change

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1. Introduction

Economic development and environmental protection are interrelated with each other. Recent climate changes, an important global environmental problem clarified that our environment has limited capacity while we believed it has possessed infinite purification capability against wastes and exhausts emitted from anthropogenic activities in the past time. In this world, each country has its own economic structure, its own history and its own environmental problems. However, there are many factors in common that we share an earth only. It is very necessary for all countries should work together to find a strategy and philosophy for the protection of global environment from climate change.

2. Relationship of human activities and global climate change

The global climate change is mainly caused by the increase of the atmospheric content of greenhouse gas, such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbon, in it, the CO_2 is main greenhouse gas, it comes from the combustion process of fossil fuels, and is the main energy for existence of the human. CO_2 concentration in the atmosphere and amounts of CO_2 from different kinds of emission sources due to human activities are shown in Table 1. The main greenhouse gases emitted from some contries are listed in Table 2.

Table 1. CO_2 concentration in the atmosphere and kinds of the emission sources

Year	CO_2 (ppm)	Total CO_2 emitted (10^6 ton-C)	CO_2 emitted (%)				
			Solid fuel	Liquid fuel	Natural gas	Flare gas	Cement production
1950	316.6	1,638	66	26	6	1	1
1955	316.6	2,050	59	30	7	2	1
1960	316.6	2,586	55	33	9	2	2
1965	320.0	3,154	47	39	11	2	2
1970	325.5	4,091	38	45	13	2	2
1975	331.1	4,629	36	46	13	2	2
1980	338.7	5,264	36	46	14	2	2
1985	345.9	5,416	41	40	15	1	2
1990	354.1	6,097	40	41	16	1	3

3. Economic development and climate change problem in China

First of all, China is a country with the largest population in the world and a fair poor

Table 2. Greenhouse gas emitted from some countries in 1990 (Unit: 10^6 ton)

Nation	CO_2 emitted				Methane	CFC
	Total	ton-C/person	Energy consume	Industry		
World	22,300	1.1	21,613	687	275	0.60
Australia	287	4.6	283	4.2	5.0	.008
Canada	461	4.7	435.4	25.7	3.7	0.014
China	2,517	0.6	2,414	103	40	0.012
England	-	-	608	-	4.4	-
For-USSR	3,674	3.5	3,604	69.8	34	67
France	454	2.2	405.8	48	-	-
Germany	980	3.4	957	23	6.2	0.045
Italy	511	2.4	418	92	2.5	0.025
Japan	1,126	2.5	1,079	47	1.3	0.11
USA	5,067	5.5	5,035	32	37	0.13

economy, and developing economy in order to shake off poverty is a chief task. China has welcomed in a new era of rapid economic growth since 1978 when implemented a series of reforms and open policies. Within ten years after the reform, the economy grew at 9.6%/yr. In 1992, the economic growth rate reached 12.8% and industrial production grew even faster, with about 20%. In the Ten-Year Plan of National Economy and Social Development, the specific objectives for the 2000 are to maintain the high growth rate. However, economic development and energy consume had caused a series of environmental problems.

Because energy consumption of China depends heavily on the coal, the total CO_2 emission is very large. The CO_2 emission per unit heat generated from various fuels is shown in Table 3.

Table 3. CO_2 emission per unit heatgenerated from various fuels

Fuel	CO_2 (g/kcal)
Coal	0.098
Oil	0.079
Natural gas	0.056

According to Report of World Resouces (1988-1989), as shown in the Table 4 , the total CO_2 emission of China from fossil fuel combustion and cement production was $0.7*10^9$ ton-C/yr. in 1989, about 12% of the whole world.

Table 4. Comparison CO_2 emitted between China and Globe in 1989

Emission	China	Globe	Low- and mid-income country	High-income country
Total (10^9 ton-C/yr.)	0.7	5.8	2.0	2.7
Per Capita (ton-C/yr.capita)	0.59	1.12	0.50	3.26
Per Output (ton-C/yr. 10^6\$)	1547	327	614	186

The CO_2 emission per capita was 0.59 ton-C/capita close to that of low- and mid- income country, 53% of the global average and 18.1% of the high-income country.

The CO_2 emission per output was 1547 ton-C/10^6 \$, nearly 4.7 times of global average, 2.5 times of low- and mid- income country and 8.3 times of high-income country.

The influences of global climate change on China are uncertainty, but some simple prediction have

been done as follow:

There are both positive and negative effects on agricultural production by climate change. The former includes: the increase of temperature will raise the active accumulated temperature and prolong the period of effective growth. The increase of the carbon dioxide in the atmosphere will accelerates the photosynthesis of crop and raise agricultural production. The negative effects are: the evaporation of surface water will give rise to harm to crop growth due to drought, desertification, salinization and grassland degradation in North China and North-west China. The frequency and strength of typhoon will be increased so that it aggravates the wind and flood in coastal area.

The rise of sea level threatens the economic development of coastal area which is the advanced development area of both industry and agriculture in China with highest density of population. It is estimated that sea level will be risen to 20 cm in 2030. The rise of sea level caused by climate change will seriously influence the Chinese economic development. It has been estimated that 70% of the population and 80% of industry in Tianjing city, the third largest city in the country, will be menaced if the sea level is increased by 65 cm that was predicted by IPCC of the climate change committee of government.

Climate change shifts vegetation zone of natural ecosystems and influences biodiversity. The methods for mitigation of the global climate change have been studied. In technological aspect, methods fixing carbon dioxide have been tested in laboratory and equipments efficiently using energy have come into effect. In biological aspect, along with the forestry ecological engineering, a large quantity of tree have been planted that will absorb and reserve carbon dioxide from the atmosphere. According to the study, it is estimated that the existing agroforestry systems in China, comprising of $2*10^6$ ha. of crop-tree mixed plantation and $1*10^6$ ha. of farmland shelterbelt, can sequester about $1.2*10^6$ tons of carbon per year, which is 0.16% of total carbon emitted from fossil fuel combustion and cement production.

4. The strategy for thecontrol of CO_2 emission in Shenyang

As one of the most typical serious air polluted city in the world and the largest heavy industrial city in China, Shenyang is the capital of Liaoning province. The coal consume in 1992 was $9.971*10^6$ ton, accounts of about 67% supplied energy in the city. The characteristic of air pollution are pollution sources centralized in the central section of city where emitted more various of and larger amount of pollutants.

Shenyang is located at 122°25′-123°48′ East longitude, 41°11′-42°17′ North latitude in the southern part of Northeast China. It has a semi-moist continental climate affected by monsoon on the north temperate zone. There are long period of time in the winter, what north and northwest wind are prevailing. January is the coldest time in a year with the temperature falling on -31℃. The mean temperature during winter season is -12.7℃. The urban territorial area is 12080 km^2.

The air pollution in Shenyang is mainly caused by pollutants emitted from coal combustion, and then influenced by natural sand, automobile exhaust etc.

The most serious air pollution appeared in winter season. In winter, the wind filed was prevailed by gentle breeze under the control of high pressure from Changbaishan Mountain. The inversion was happened about 20 days monthly (the thickness of inversion layer is about 100 m), and it

caused model "heat-island" pollution in the central section of the city. In the previous decades, the average temperature in the winter became higher 0.3-1.0 ℃ than 30 year ago; during this century, the warmest winter appeared in 1991. The colder days decreased with increased accumulated temperature in a year. The "heat-island" effect causes a 0.6-1.3 ℃ of temperature difference between the urban area and suburbs within a year; in winter, the temperature difference is about 3-5℃, and sometimes 7-10℃.The studied results had made clear there was the feature in yearly for the variation of "heat-island" effect in Shenyang, the order of strength was: winter > spring >autumn > summer. The center of "heat-island" was appeared in the center section of city with $5*10^{-4}$ sec^{-1}. The strength of "heat-island" was 3.5 ℃ (the calculation is as follow: $\triangle t = P^{0.25}/(4*u^{-0.5})$, in where, P is the population in the city; u is average wind speed in a year), moreover, the center of "heat-island" had changed with the different weather condition.

As a large city in the poor developing country, local government of Shenyang was clear understood about the relationship between economic development and environment, according to the guidance of Chinese government "prevention mainly, on the combination of prevention and control":

First item is to bring environmental protection into the city Ten-Years economic and social development plan. It also sets the tasks of preventing and controlling industrial pollution and others. The environmental protection is under the guarantee of a plan.

Second item is to strengthen the environmental management of newly-built, expanded and renovated projects, and to strictly control the new pollution.

Third item is to control comprehensively the urban environment. Along with the adjustment of urban programs and patterns, measures were taken to close down those industries that have serious pollution, stop their production, merge them; to change the urban, especially in center sector, energy structure and burning methods.

Next item is to apply a system of fee for pollutants discharge. The enterprises whose discharge exceeds the standards are asked to pay compensation fees, this is playing important role in decreasing pollution.

Last, it is to combinement encourage and imposition, to change the energy structure, use advanced and feasible technologies, at same time, suppressed old type products according to the economic situation.

Two specific instance of strengthen supervision and management are given in the following:

Management of coal combustion facilities. There are about 13,000 boilers using in the city, in it, boiler that heat load lower than 10 ton/h accounts for 89.2% of the total amount of the city. The charge principle is the different with the boiler output, permit must be obtained on the basis of city plan when new heat sources are built. The boiler that heat output lower than 10 ton/h is prohibited to build in urban area. The charge for the pollutants is decied on the basis of total amount of pollutants, heat output of boiler, and position in urban area. As the same amounts of coal consume, the collected charge is 2.3 times and 3.1 times for the different boilers. For example, the charge, for the heat output source is 4 ton/h * 5 boiler, is as 2.3 times as the heat output source is 10 ton/h * 2
boiler; as 3.1 times as the heat output sources is 20 ton/h * 1 boiler. In accordance with this principle, CO_2 emitted are calculated for various kinds of boilers at same amounts of heat output as shown in Table 5:

Table 5. Comparison of CO_2 emitted for various kinds of boilers

Heat output (ton/h)	Heat efficiency (%)	CO_2 emitted* (kg/h)
2	60	3100
4	75	2480
10	>80	2325
20	>85	2188

*CO_2 emission coefficient is: CO_2/coal = 0.62 kg/kg.

This charged method promotes rational utilization of energy, and reduces CO_2 emitted. As the same heat output (20 ton/h), CO_2 could be reduced 29.4%.

Intensification of application of coal briquette. On the basis of the experiment, amounts of CO_2 emitted from combustion of coal briquette and raw coal are listed in Table 6.

Table 6. Comparison of CO_2 emitted for coal briquette and raw coal

Heat output	4 (ton/h)		2 (ton/h)	
Kind of coal	Briquette	Raw coal	Briquette	Raw coal
Load of boiler (%)	81	72	101	102
Heat efficiency (%)	74.1	60.9	77.4	63.3
Consume of coal (kg/h)	385	448	213	316
Coal saving (%)	21.7	-	22.3	-
CO_2 reducing (%)	13.5	-	13.8	-

At same stoves, the comparison reducing rate of CO_2 emitted from raw coal and coal briquette is shown in Table 7.

Table 7. Comparison reducing rate of CO_2 emitted from raw coal and briquette

Combustor	Stove	
Kind of coal	Briquette	Raw coal
Heat efficiency (%)	65	40
Fired rate of fuel (kg/h)	0.94	1.9
CO_2 emitted (kg/h)	0.58	1.178
Reducing rate of CO_2 (%)	50.8	-

There are 210 thousands of resident using coal as fuel for the daily life, after utilization of coal briquette, CO_2 emitted had been reduced (0.598Kg/h * 10^3 * 8 h/d * 152 d/yr * 210 * 10^3 =)152.7 * 10^3 ton/yr.

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Measures Considered for Environmental Protection (to address climate changes) in the City of Kuala Lumpur

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MEASURES CONSIDERED FOR ENVIRONMENTAL PROTECTION (TO ADDRESS CLIMATE CHANGES) IN THE CITY OF KUALA LUMPUR

GENERAL

Kuala Lumpur is rapidly developing into a metropolitan city forming a continuous conurbation spreading from Kuala Lumpur to Klang some 40 km away in the west. The whole Klang Valley in fact will become a continuous urban conurbation and plans have been drawn up in the Klang Valley Regional Development proposals to cater for such an eventuality. However, to divert the pressure down the Klang Valley corridor, an alternative development corridor has been created from Kuala Lumpur to Putra Jaya - the future site of government administrative centre, in the south; and from Kuala Lumpur to Rawang and beyond in the north.

The city of Kuala Lumpur has a land size of 243 square km. The centre is situated on the confluence of the Klang River and Gombak River. The population is at 1.2 million (1990 census) with an estimated day-time population of nearly 1.8 to 2.0 million. Administratively, the city is being run by City Hall Kuala Lumpur (CHKL) and is divided into six zones, viz, City Centre, Damansara, Setapak, Kepong, Cheras and Klang Lama.

KUALA LUMPUR STRUCTURE PLAN

CHKL has adopted the Structural Planning System(1). The Structure Plan establishes the broad framework for the planing of Kuala Lumpur within a perspective period of twenty years (1980 - 2000). Provision is made to review this plan periodically to accommodate the changing circumstances and possible changes in regional and national policies. The first stage is in the form of a written statement containing policies and proposals in relation to the planing area. The second stage is concerned with the preparation of Local Plans for more detailed implementation of policies and proposals stipulated in the Structure Plan.

The strategy of the plan is to have balanced development of Kuala Lumpur through moderate growth in the City Centre and much faster development of the outlying areas especially in the new Growth Areas such as Damansara, Wangsa Maju, Bandar Tun Razak and Bukit Jalil. The strategy will decentralise some existing activities of the City Centre and reduce commuting to the City Centre. It will establish a hierarchy of urban centres where the New Growth Areas can function as the residential cum employment zones, resulting in a better physical environment and structure of Kuala Lumpur.

VISION OF KUALA LUMPUR AS A 21st CENTURY METROPOLIS

In line with the nation VISION 2020, KLCH has recently formulated several visions towards the achievement of Kuala Lumpur as a model and progressive city of the 21st century. (2)

The Visions for Kuala Lumpur are :-

- Centre for National and International Trade, Business and Convention. - 'A BUSINESS CITY';
- Centre for Tourism and Culture - 'A TOURIST CITY';
- Centre for Human Development - 'A PEOPLE CITY';
- Centre for Cleanliness and Beauty - 'A GREEN CITY';
- Centre for Modern Transportation Facilities and Traffic Management - 'AN EFFICIENT CITY';
- Centre for Innovative Housing Designs and Human Settlements - 'A RESIDENTIAL CITY';
- Centre for History and Culture - 'A HERITAGE CITY';
- Centre for Intellectual Development - 'AN INTELLECTUAL CITY';

AIR QUALITY IN THE KLANG VALLEY

A study on air quality in the Klang Valley Region was carried out between January 1992 to June 1993 under the assistance of the Technical Co-operation Programme of the Japanese Government. Throughout the study period the annual and daily averages of PM-10 at Shah Alam exceeded the Malaysian Guideline. The hourly measurement for CO, SO_2 and NO_2 at CHKL, Petaling Jaya and Shah Alam exceeded the recommended guidelines. The study predicted that by the year 2005, the concentration of NO_2 in Kuala Lumpur would exceed the target value of 37 ppb and SO_2 would exceed 20 ppb if no control measure is imposed (3).

The correlation between pollutant concentration and meteorological parameters was also observed. It was found that for SPM, CO, NOx and hydrocarbon there was a decrease in concentration with increase in wind speed. However, under strong stable wind condition the concentrations are higher with O_3 showing the reverse. Overall, the study concluded that the air pollution in the Klang Valley was relatively serious and could worsen if meteorological conditions were unfavourable and control measures not urgently instituted.

The main source of air pollution is from motorised vehicles. Efforts are being taken to control smoke emission from motorised vehicles. Long term planning to reduce motorised vehicles will be realised with the implementation of the improved network of public transportation systems within the city.(4),(5)

TRANSPORTATION SYSTEM

In a move to reduce traffic congestion , roads in the city will be linked to highways in stages. The government is planning to restrict the entry of vehicles into the city by imposing a fee through the introduction of the Area Road Pricing System. The introduction of the zoning system will be carried out as the volume of traffic has increased tremendously and after the Light Rail Transit (LRT) and other public transportation systems are well established before the turn of the century. (6)

In addition to the construction of new highways, road widening, construction of interchanges to cater for the tremendous increase in the number of vehicles on the road into the city, City Hall Kuala Lumpur has introduced SCATS System of traffic light control. The Concessionaire of the highways are encouraged to use modern traffic control and surveillance methods automatically controlled by computer system.

To reduce dependence on cars gaining access to the City Centre, the main terminals and interchanges will include car parking facilities. Commuters and visitors will be able to drive to these interchanges and transfer to public transport systems leaving their vehicles behind during the day.

The Public Transport System will be enhanced further with the Commuter Electric Train Service (CETS) which was started in 1995. It made used of the redundant railway lines to carry conventional but modern trains to the main city interchanges. The first phase of the Light Rail Transit System (LRT) has started its operation in November 1996. The construction of the other phases are in progress. There will be an additional People Rapid Transport System to complement with the development of the KL Linear City along its Klang River and Gombak River.

CHKL is phasing out the mini buses and replacing it with a single amalgamation of the bus companies operation within the city. This will ensure efficiency in the system.

Kuala Lumpur will have a place named KL Sentral where all the various public transport systems meet and interconnect. From KL Sentral there will be an Express Rail Link (ERL) joining the new Kuala Lumpur International Airport located some 65 km down south.

PEDESTRIAN MOVEMENT

CHKL has constructed many overhead bridge pedestrian crossing. The walking malls are planned wider and more attractive for pedestrian movement. Jogging tracks, footpath system and bicycling tracks are being incorporated into city development in the residential areas to be connected to public parks.

Storm drains though essential are unsightly, inconvenient and hazardous. They take up space which could be given back to the pedestrian. A programme is therefore being implemented to cover over storm drains with priority being given to covert to major pedestrian routes. (7)

KUALA LUMPUR AS AN 'INTELLIGENT CITY'

Kuala Lumpur aims to achieve its objective of making the city into another international centre for trade, commerce and financial centre in the region. In the era of technological innovation of computers and telecommunication, the city has therefor initiated the construction of 'high-tech' office premises generally referred to as 'intelligent buildings' equipped with sophisticated control system and with flexibility layout to cater for the demand of international companies.

Energy efficiency is of major concern. Increased energy consumption results in increased pollution and the depletion of natural resources. The design of the building can also play major part in energy conservation. Thus building orientation and sun shading devices coupled with solar resistant glass can dramatically reduce the cooling load of a building thus reducing capital expenditure on plant, as well as maintenance and running costs.

The government announced the development of Multimedia Super Corridor which will extend from the new Kuala Lumpur International Airport through the new government administrative centre in Putra Jaya and extending to the Petronas Twin Towers - Kuala Lumpur City Centre (the highest building in the World) in Kuala Lumpur. The responsibility to develop this corridor has being given to Multimedia Development Corporation Sdn. Bhd.

ELECTRICITY

The function of generation of electricity, previously carried out by the government has been privatised to Tenaga Nasional Berhad (TNB). The electricity generation mix by capacity and installation in Peninsular Malaysia is given below.

ELECTRICITY GENERATION MIX BY CAPACITY AND INSTALLATION
(W. MALAYSIA)

PLANT TYPE	1994		1995	
	Capacity (MV)	(%)	Capacity (MV)	(%)
Gas Turbines (Gas & Distillate)	1,402	(19.15)	2,646	(35.40)
Steam Turbines (Oil & Gas)	2,189	(29.91)	1,815	(24.28)
Steam Turbines (Coal)	909	(12.42)	600	(8.03)
Hydro	1,085	(22.41)	1,239	(16.57)
Combined Cycle	1,640	(22.41)	1,152	(15.41)
Diesel	94	(1.29)	23	(0.31)
Total	7,319	(100.0)	7,475	(100.0)

Source : Tenaga Nasional Berhad - Corporate Report 1994 and 1995.

This shows a change policy on the use of fossil fuel towards renewable resources for generation of electricity. TNB capacity is expected to reach 9,529 MW by 1998.(8). The National Grid high voltage transmission lines spanning the whole of Peninsular Malaysia consists of :-

- 4,608 km of 275 kV transmission lines;
- 8,182 km of 132 kV transmission lines/cables;
- 400 km of 66 kV transmission lines; and
- 264 high voltage substations with a total capacity of 35,230 MVA.

The existing transmission system is further strengthened with 500 kV lines. Initiatives are taken for the implementation of substation automation. TNB is also enhancing system condition monitoring with the commissioning of the Supervisory Control and Data Acquisition System (SCADA), the Automatic Generation Control (AGC) and Energy Management System (EMS). TNB is upgrading the National Load Despatch Centre (NLDC) workstations and the Regional Control Centre link. Efficiency is enhanced through the measure and analysis of harmonic and voltage dips.

TNB has also submitted a proposal to develop and invest in a co-generation project in the city for heating and cooling system to be provided surrounding buildings around its project.

CONCULSION

Though, CHKL has not signed in to join ICLEI's Cities for Climate Protection Campaign (CCPC), CHKL will not neglect its important role in disseminating and acquiring information on policies and best practices on appropriate technologies for climate protection. CHKL is ever willing to engage this information exchange. However, CHKL needs to work things out on an unattached schedule for attaining the specific target to reduce greenhouse gas emission. The government of Malaysia, has given a high priority on the use of renewable resources with the commencing of the mega project on Bakun hydropower electricity generation. The government will continue to engage actively in the promotion of development that produce less greenhouse gases.

Presented at : "The Workshop on Asian Cities for Climate Protection Campaign",
19 - 21, November, 1996.
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Decreasing the Threat of Global Warming through the use of municipal facilities

— Programs for the Reduction of Vehicle Energy Consumption —

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1. Outline of Plan to Reduce the Threat of Global Warming

September 7 to 9, 1994 Kumamoto City participated in the OECD environmental committee workshop at the Heidelberg Conference during which it signed the Heidelberg Declaration. Since that time we have been developing a variety of programs whose purpose is the protection of the global environment.

In March 1990 Kumamoto City presented its global warming prevention plan aimed at reducing the amount of CO_2 exhausts by 20% of 1990 volumes. To achieve that goal we have initiated the following projects:

1. Awareness campaigns - such as environmental fairs
2. Promotion of public transportaion including the introduction of our Park-and-Ride system.
3. Promotion of environmental education and study - the establishment of an environmental studies promotion program
4. Development of green belts and zones along such concept lines as the "Fragrant Forest"
5. The establishment of an action plan calling for a 15% reduction in

energy consumption by municipal facilities and vehicles.

2. Target: A 15% Reduction in Energy Consumption

A. Energy Consumption Overview

In March 1996 Kumamoto City established an action plan, based on the Heidelberg Declaration, to reduce the energy consumption of building facilities and vehicles under city management by 15%.

As of 1995 the total energy consumption by municipal facilities and vehicles was some 305,000 G Calories, of which 276,000 G Calories involved city facilities, and 29,000 G Cal involved city-owned vehicles. This is equivalent to 3.8% of the total energy consumed by Kumamoto City in 1990. It is also the equivalent of the energy consumption of 25,000 households in the city.

The carbon dioxide emitted through energy consumption is estimated to be 326,000 tonnes-C in total - 295,000 tonnes-C from the previously mentioned facilities, and 31,000 tonnes-C from the vehicles. Therefore, an achievement of a 15% reduction in energy consumption would reduce carbon dioxide emissions by 49,000 tonnes-C.

B. Reduction Measures

In order to achieve a 15% reduction in energy consumption, the plan offers 18 points of action. The following are the measures and the estimated effect on reduction.

i. Estimated Reduction Rate: 5.8%: Turning off office automation devices, lights, air conditioning/heating when not specifically needed.

ii. E.R.R. 5.9%: Through improved energy efficiency such as inverter lighting, liquid crystal displays, and better building insulation.

iii. E.R.R. 3.6%: Through new energy systems such as solar power generators, and increased promotion of solar water heaters and power generators which utilize the heat produced as a byproduct of waste incineration.

iv. E.R.R. 0.6%: Energy-efficient transport management and improved efficiency in scheduling.

v. E.R.R. 0.1%: Through the introduction of such energy-efficient vehicles as electric and hybrid cars.

Simple calculations for the total cost needed to execute the above measures gives an estimate of slightly more than ¥16 billion. However, the financial burden of these measures would be reduced if implemented when new construction/purchases would be naturally carried out.

According to approximate calculations concerning the City Hall, successful energy reduction over eight years would cover the costs necessary to implement the measures.

C. Plan Promotion

In February 1994 Kumamoto City set up the "Eco Office" promotion committee for the purpose of raising awareness among city workers concerning environmental preservation actions in routine office actions, and to serve as a role model for individuals and businesses in our city.

THE PROGRAMME OF HANOI CITY FOR IMPLEMENTING UNITED NATIONS FRAMWORK CONVENTION ON CLIMATE CHANGE

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and Environment

INTRODUCTION

Hanoi city is constructed nearby Red River which locates in a transitional area from Midland region to Red River delta region. There are 4 districts within City with the population of 1 million and 6 outskirts districts with the population of 2 millions.

The population growth rate decreases from 1.72% in 1991 to 1.46% in 1995.

For the past five years, Hanoi City had been surmounted the economic recession and then it's economy began development. The GDP Anual growth rate increased 11.9%, GDP per capita was 695 US $ in 1995.

By Hanoi economic structure, industry reached 33.1%, commercial, tourist and services are 61.6%, agriculture : 5.3%. From now, Hanoi City will be developing by hight level on urbanization and industrialization. One million Square meters of residential house is constructed. Improving roads system inside and outside Hanoi Center, water supply system, drain water system... is carried out. Many new industrial point : Saidong, Socson, Noibai is established.

The outskirt districts are the main agricultural production area. Based on biodiversity, intensive cultivation and rotation, so the agricultural production in 1995 are two times higher than for agricultural production in 1991 with the haverst of equivalent 3 millions VND per hecta.

ORIENTATION FOR DEVELOPING HANOI SOCIO - ECONOMY UP TO 2000

The main objective are :

- GDP average Anual growth rate : 15%
- GDP per capita Anual growth rate : 11%
- 1100 US $ per capita in 2000 year

1/ INDUSTRY :

Industry reaches in GDP to about 39-40% with attaching important to the industry of mechanize, electricity, election, food stuff, construction.

The main measures are :

- Investment in depth, transformation on facilities and technology, protection pollution in industrial area.

- Expanding and establishing new manufactures in Caudien, Nghiado. Chem, Donganh, Caubuou...

- Promotion of constructing new industrial area such as : Saidong, Donganh, Socson, Noibai, North and South of Thanglong bridge.

2. URBAN CONSTRUCTION.

-The Improving of urbant construction quanlity particulaly the environment quality. To rebuild the old urbant area by building the new one.

- Constructing and modernizing the infrastructure with steps by steps, constructing some big cross ways, surrounding Hanoi ways, expanding and modernizing Noibai Intentional airport.

- Processing urban solid waste and liquid wastes. Improving and completing water supply and drainage systems.

- Proving the investment to constructive first step (1996 - 2005) on the urban sub-area of Xuanmai - Hoalac way in order to decrease the population in Hanoi Center.

Hanoi National University, Vietnam tourist villages, hight technological Centers, Hanoi - Bavi hight way, Mieumon International Airport, Dongmo tourist Country is located nearby this sub - area.

3. AGRICULTURE :

Improving cropping system, husband animal in order to get higher production quality, great exchange value, suability for ecological environment. Developing outskirt economy including foodstuff industry. Bringing models scientific and technology progress to clean agriculture in Hanoi outskirt.

CLIMATE CHANGE AND ITS IMPACTS IN HANOI

1. Some conclusions on Climate change affecting directly to Hanoi

1.1. In the last 100 years the average annual number of typhoons has been 5. In recent decades it has come to 6 - 7 annually. Similarly the average annual number of typhoon affecting North Vietnam has increase from 1.5 in last 100 years to 1.8 in the decade 1981 - 1990.

1.2. Temperature, especially summer temperature, in Hanoi has increased significantly in the 1986-1995 compared to those in previous decades.

1.3. Generally rainfall has shown no clear indication of change. Yet the annual begin and end of rainy season have more fluctuated in recent decades. Due to the change of precipitation and rain intensity the probability, intensity and the peaks of floods at Red River tend to in crease.

2. The Climate Change potential impacts on Hanoi socio-economic activities in Hanoi

2.1. The warming Climate affect the life and socio benifits of Residents

- Decrease people' health and increase the hazards and diseases -
- Increase the energy demand
- Decrease the productivity of labour

2.2. The warming Climate affect agricultural production

- Period of rice growth and plant seed would be changed.
- The period that high temperature harms to plants would be prolonged
- The costs for the supply of water resources in agriculture would be increased

2.3. The more of typhoon number cause the more of heavy raining.

- To increase the demand for urban drainage

- To increase the costs in the activities to prevent disasters of typhoons and floods.

3. Residental Activities would impact to the urban Climate

- Residental Wastes, Industrial Wastes and emissions from transportation activities would affect Climatic conditions of the city.

THE POLICIES RESPONDING TO CLIMATE CHANGE

1. The policy to mitigate greenhouse gas emissions

1.1. Use more clean energy in activities of industris, transportation and the living.

1.2. Make use of new technological processes and mitigate the consumption of fossil fuels.

1.3. Strictly observe and control the factor of ecological environments, greenhouse gas emissions and industrial wastes

1.4. Strictly manage land use for development of industry and urban

1.5. Manage, protect and develop plants in urban parks and lakes.

2. The policies responding to Climate Change

2.1. Better the adaptability of agriculture, restructure the distribution of plants and crop seasons to avoid unfavorable climate conditions and unexpected weather.

2.2. Observe the Change of underground water and water level of natural lakes.

2.3. Protect damp and dyke

2.4. Prevent and mitigate disasters.

3. Policies on the compiling and implementation of law

3.1. Promulate decrees and guidelines on the implemention of certain laws concerning the response to Climate Change .

3.2. Enforce administrative measures to deal with serious vislations of the state provisions on environment related to Climate Change.

3.3. Guide to implement decrees and laws related to Climate Change issues.

4. Policies on Strengthening international cooperation

4.1. Take part in activities of the International and regional Community

4.2. Develop Projects and ask for international Assistance on Technology and Finance.

ACTION PLAN AND IMPLEMENTATION MEASURES

1. Undertake activities of the Climate Change Office in Hanoi

2. Develop Regulations related to use of fossil fuels, means of transport.

Subsidize the expenses of research project to improve and increase the effectiveness op energy use.

3. Inventory greenhouse gas emission for sectors in Hanoi

4. Mitigate Greenhouse gas emission and enhance greenhouse gas sinks

5. Prevention and mitigation of natural disasters

6. Study characters of Climate change and develop measures to respond to Climate Change

7. Promulgate, train for enhancing public awareness

8. Develop and implement projects.

Climate Protection Measures in Hamilton

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1 Introduction

The purpose of this paper is to report on the local initiatives taken in the city of Hamilton towards global climate protection.

The beauty of local action is, of course, that it allows for the development of appropriate responses which are tailored to suit specific situations. There is no doubt that much can be achieved by "thinking globally" and "acting locally" and Hamilton has had many demonstrable successes as a result of adopting this philosophy. There are also, however, national characteristics and policies which affect local people and the ability of local governments to act. In developing appropriate responses at a local level, therefore, it is important to have some understanding of the national influences which contribute to shaping the local situation. The first part of this report is therefore given over to a brief overview of New Zealand as a whole.

2 National Influences on Local Action

2.1 Profile of New Zealand

New Zealand lies in the Southern Pacific some 1,600 kilometres from its nearest neighbour Australia and currently has a population of just under three and a half million people. The country has a temperate climate with plentiful rainfall and sunshine which is well suited to the major agricultural and horticultural industries which have developed.

New Zealand's agriculture sector produces sheep meat, beef, wool, butter, cheeses, and hides. Major horticultural exports include kiwifruit, apples, cut flowers and a range of exotic fruit. There is also a sizeable forest industry based largely on the exotic, pinus radiata. The main market for New Zealand manufactured goods is Australia. Most products are specialist including things such as wood furniture, sports-wear, computer hardware and products based on primary industry. Approximately two thirds of the country's GDP is from the service sector. The tourism industry is well developed with more than million tourists visiting the country each year.

New Zealand is a multicultural society with two main ethnic groups; the Pakeha (European) people and the indigenous Maori. Unlike the long established cultures of

Asia and Europe, New Zealand's culture is still emerging. Over the past twenty or so years there has been a marked shift for New Zealanders from seeing themselves as a colony of the UK, to an independent Pacific Nation. At the same time there has been a change in lifestyles for many New Zealanders. While farming has been New Zealand's traditional economic base, the notion of New Zealanders as a nation of farmers no longer holds true. Today more New Zealanders (approximately two thirds) live in urban environments than in rural ones.

New Zealand has a highly deregulated economy following the removal of restrictions from industry, the removal of state subsidies and the privatisation of state enterprises. This situation presents some difficulties for local action planning in that information which used to be in the public domain (local energy consumption for example) is now the property of private companies, is considered commercially sensitive, and is therefore unavailable. At a national level, there has been a reliance on market forces to provide solutions to environmental externalities in terms of greenhouse gases. The country is currently enjoying relatively high rates of growth with relatively low inflation and unemployment.

2.2 New Zealand's Energy Consumption

The availability and comparatively low cost of fossil fuels in New Zealand has meant that little attention has been paid to seeking renewable alternatives with low environmental impact. New Zealand energy needs are therefore still reliant on non-renewable sources, i.e. 78 percent of total energy consumption is from oil coal and gas. However, this compares favourably to other OECD countries, e.g. Germany had a 98.8 percent reliance on non-renewable energy in 1993, Japan 97.4 percent and the UK 97.75 percent. Just over 21 percent of the country's total energy consumption is from renewable sources (99.75 percent of which is from hydro electric sources and the remaining 0.25 percent from biogas and wind).

New Zealand has a high level of energy consumption per capita compared to other developed western economies. In addition, unlike the OECD countries, New Zealand's energy intensity (i.e. total energy supply divided by GDP) increased significantly during the period 1980 -1990. New Zealand's per capita energy consumption continues to rise. A graph of total energy consumption in New Zealand is given in Appendix II

2.3 New Zealand Transport

New Zealand is a car dependent society where motor vehicles account for approximately 40 percent of CO2 emissions and contribute about 80 percent of total air emissions. The government has recently produced a national Land Transport Pricing Study which is designed to provide a framework for a rational and sustainable transport system for New Zealand in the 21st. Century, but at this time, public transport is not particularly well developed either within or between cities. Changing this situation will take time, money and political expediency and New Zealand appears set to maintain its car dependency for a significant period to come.

2.4 New Zealand's Greenhouse Gas Emissions.

Greenhouse gases are, as we know, primarily emitted from two sources:

- the combustion of fossil fuels as an energy source
- land use practices which involve the emission of methane from livestock, increase the extent of arable land and reduce the standing biomass of forest.

New Zealand's emissions profile varies from the norm in that methane (CH_4) rather than carbon dioxide (CO_2) is the predominant greenhouse gas. CH_4 accounts for an estimated 54 percent of total greenhouse gas emissions. Emissions of nitrous oxide (NO) are also significant. (See Appendix III). This situation results form the country having a small population and manufacturing industry sector producing CO_2, relative to a large intensive agriculture sector producing CH_4. In addition, CO_2 emissions are not simply an industrial / energy problem in terms of fossil fuel use and economic production: they also include changes in the way land is used and managed and hence the carbon stored in the biomass of forest, scrub and soils. The magnitude of carbon flows resulting from changes in land use in New Zealand are known to be significant. As a result, New Zealand has higher per capita CO_2 emissions than other developed countries.

New Zealand's international commitments cover all greenhouse gases but to date these commitments have only been expressed in a target relating to CO_2. This target is to maintain **net** CO_2 emissions at 1990 levels by the year 2000. Despite some success in implementing voluntary agreements, recent projections of emissions and absorption by forest suggest that, in the absence of further policy initiatives, New Zealand will not meet its target level of net emissions by the year 2000. In terms of gross CO_2 emissions, there was an increase of 7 percent between 1990 and 1994 and among developing nations only our biggest trading partner, Australia, had a worse record.

2.5 The Resource Management Act

New Zealand's Resource Management Act (RMA) of 1991 aims to sustain and protect natural resources by setting environmental standards. This Act is unusual in that it integrates a series of previous laws in a resource management system which allows the balancing of a wide range of interest and values. Sustainable management in the Act is defined as meaning:

".....the management of resources in a way or at a rate which enables people and communities to provide for their well-being while sustaining the potential of resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; safeguarding the life supporting capacity of air, water, soil and ecosystems; and avoiding, remedying or mitigating adverse effects."

While the Minister for the Environment has the ability to set environmental standards by regulation, much of the Act is administered by regional and territorial Councils who may set standards of their own, provided they are higher than any set at a national level. Regional Councils have been given primary responsibility for pollution control and the management of water, soil, and geothermal resources through regional policy statements setting out the objectives for managing all resources in the region in an integrated manner. Territorial authorities (district and city councils) have primary responsibility for land use management through a District Plan.

The RMA currently makes no provision for the control of CO2 or CH4 at either a national or regional level. Regional governments are generally looking to national government to take the initiative on the management of greenhouse gases but debate continues in the country as to whether a National Policy Statement should be made under the RMA to control CO2 emissions, or whether a carbon tax or tradable permit system would be preferable. To date, the debate has largely ignored the question of CH4.

3 Hamilton

3.1 Population and Environment

Hamilton is located in the Waikato Region of New Zealand's North Island and has a population of 106,700 or three percent of New Zealand's population. (See map Appendix I). It has the second highest population density after Auckland's North Shore and an above average proportion of Maori and people aged between 15 and 25.

Although the local architecture is rather uninspiring, there is an excellent natural environment. The Waikato river runs through the centre of the city and there are numerous and large green spaces. There is also a system of gullies in city containing native trees and shrubs.

Hamilton's total land area represents less than 0.1 percent of the New Zealand land mass.

3.2 Energy

Hamilton, like any other modern city relies heavily on the use of fossil fuels to support its daily activities. In line with New Zealand generally, we have increasing energy use. Fossil fuels such as coal, natural gas and petrol are used widely in Hamilton. Environmental concerns about coal use have seen this decline as a source of fuel while the use of lower impact alternatives, LPG (liquid propane gas) and CNG (compressed natural gas), has increased. As elsewhere, however, the availability and comparatively low cost of fossil fuels has meant that little attention has been given to different alternatives.

3.3 Transport

In 1992 it was estimated that 50,000 vehicles in Hamilton city used an average of 1500 litres of fuel a year. That amounted to 75 million litres of fuel per year - in local terms, a major use of resources and source of atmospheric pollution. Since that time Hamilton has experienced a growth of around 1.5 percent per year and increasing fuel consumption of 4.8 percent per annum. There appears to be considerable resistance in the city to measures which would restrict the use of private motor vehicles in a city without significant problems of traffic congestion.

Public transport in the city is in the form of buses which are all run on CNG. However, in a city which has been planned for the car, and where car ownership is high, there are difficulties in providing a comprehensive public transport system which will attract sufficient passengers to be profitable.

3.4 Industry

As can be seen form the graph in Appendix IV, the industries of greatest importance to Hamilton are in the service sectors of government, finance and retail with little in the way of manufacturing.

4 Hamilton City Council and Environmental Policy

4.1 Corporate Environmental Policy

Hamilton City Council was the first local authority in New Zealand to produce a Corporate Environmental Policy in 1992. Outcome two of this policy sets out the Council's Policy in relation to the reduction of the "emission of gases which contribute to global warming or ozone depletion" (Appendix V).

4.2 City Strategic Plan

The Hamilton City Strategic Plan will shortly to be published. It is the first plan of its type for the city and has been developed in partnership with the community through an extensive consultation and participation process which began with a clean sheet in August of 1994. The plan is not just a plan for Council. It is a plan for the whole community and will provide direction and ensure the sustainable development of the city through to at least the year 2017.

Hamilton's Strategic Plan is underpinned by the philosophy and principles of Agenda 21 to which New Zealand is a signatory nation. In acknowledgement of Agenda 21 and the Treaty of Waitangi principles, which emphasise the empowerment of indigenous peoples, a parallel strategic planning process specifically for Maori was undertaken by local Maori. This included a Pou Whenua (taskforce on land environment and health).

The Draft Strategic Plan outlines a series of desired outcomes which relate, in one way or another, to climate protection under environmental sections on Air, Energy, Transport, Soil, Waste, Biodiversity, etc., as well as on Economic Development and City Growth. Specifically, the plan calls for the development and implementation of a Local Energy Strategy. Once finalised, the plan, and the city's progress towards sustainability, will be closely monitored.

5.0 Hamilton City Council and Climate Protection

The development of a detailed action plan for climate protection in Hamilton has been delayed until the Strategic Plan is finalised and future directions are confirmed. Once this has happened the recently published ICLEI Greenhouse Gas Emissions Handbook will be used to compile a Municpal Energy profile on which an action plan will be based. A target for emissions reductions will be set following the compilation of baseline data in the profile, according to the sample calculations laid out in the handbook. The plan and the suggested target will then require Council approval and resourcing.

Council aims to form partnerships with the community wherever possible and it is intended that this action planning work should be carried out in conjunction with the university of Waikato which is located in Hamilton.

Despite these delays in implementing a more structured approach to climate protection, much is already being done in Hamilton to address many of the areas of concern. The following sections outline relevant initiatives both within the organisation and in the wider community.

5.1 Council In-house Climate Protection Measures

5.1.1 Environmental Management and ISO 14,000

Council is currently investigating the implementation of a comprehensive environmental management system with a view to obtaining to ISO 14,000 accreditation. This will system will help to ensure that the in-house component of our climate protection plan will be properly implemented and monitored. It is intended to carry out this work next year following completion of ISO 9,000 accreditation in Council which will provide a framework on which ISO 14,000 systems will be based.

5.1.2 Use of Methane

The Water Treatment Station and Wastewater Treatment Plant for the city have been managed by energy conscious staff for the past ten years. While flows have steadily increased with the growth of the city, energy consumption has decreased due to the implementation of a raft of energy efficiency measures and, in particular, the on-site production of energy using CH_4 gas from sewage. The plant now generates half of its own energy requirements.

The use of CH_4 is also being explored at the city's landfill site where a new gas collection system is currently being installed. This is a Council initiative but the system will be owned and operated by a private company. The amount of energy which will be generated by the system is therefore commercially sensitive information. It is expected, however, that gas will be collected for a period of up to 50 years following closure of the landfill. It is not yet known how the company intend to sell the energy but there are possibilities of, either installing a gas turbine to produce power to sell to the national grid, or cogenerating electricity for a nearby dairy factory.

5.1.3 Energy Auditing

Energy audits were commissioned by the Hamilton City Council to investigate the energy efficiency of Council facilities. These audits have provided an outline of the work required to achieve energy savings. Further thought is now being given to the design of actions resulting from recommendations requiring large capital expenditure.

An energy monitoring system is being developed for one part of the organisation which can be used as a guide for other facilities. Council is also working with its energy distribution company to obtain higher quality information from them in terms of billing which more precisely identifies the amounts of energy consumed in each of the organisation's units. Current billing is done through accounts which cover some quite large, and not necessarily identifiable, areas of the organisation. This will greatly ease the process of targeting energy efficiency measures.

While it was generally found that management are aware of and either have, or are in the process of, implementing further energy savings, a comprehensive education and awareness campaign for all staff is planned to coincide with other energy saving work.

5.1.4 Municipal Vehicle Fleet

The Council is currently reviewing its vehicle fleet with the intention of modernising and fuel switching. A more modern fleet would contain a higher percentage of more fuel efficient vehicles and those which could run on more sustainable fuel sources. Our current New Zealand alternative fuels, i.e. CNG and LPG, have lower emissions than petrol or diesel and are already being used throughout the Hamilton City Bus fleet. As the major vehicle manufacturers are now starting to mass produce electric vehicles with good range and performance, this is now also a more realistic option. The barrier to taking these steps is, as is so often the case, the difficulty in justifying extra expenditure for "greener" alternatives and, in this case, fears concerning the resale value of unusual vehicles.

5.1.5 Energy Efficiency in Council Housing

There is little Council owned housing in Hamilton but work is under way in conjunction with New Zealand's Energy Efficiency Authority who may also provide a grant for the work, to design a retrofit for 100 pensioner housing units which the council owns. The retrofits will involve measures such as installing floor, ceiling and

wall insulation, weather stripping, double glazing, installing improved insulation for hot water systems and improving the energy efficiency of lighting.

5.1.6 Environmental Purchasing

Council has recently established a Green Purchasing Policy. This policy states that environmental issues must be considered in any purchase made by Council. A Green Purchasing Guide has been distributed to all Units of the organisation which includes a section on energy and natural resource use taking a "life-cycle" approach. This requires that energy use is considered in the production, use and disposal of products. It is hoped that, given the local importance of council as a purchaser, this new policy can have a significant impact on local energy use. A further guide to "green" contracting is in preparation.

5.1.7 Open Space

Hamilton is fortunate to have large areas of green space within the city including a network of natural gullies with native forest and scrub. It is Council policy to maintain and enhance these areas which act as a significant local carbon sink.

5.2 Climate Protection Measures in the Community

Council's work in the community is aided by the efforts of the Community Environmental Programme (CEP) which was established in 1994. This group is a Council funded, but community based, voluntary programme which aims to achieve good environmental outcomes for the city. The CEP involves representatives from community groups, industry, environmental organisations, educational authorities and other interested individuals. The belief is that many environmental issues can be most effectively addressed through collective community action where the community has ownership of, and control over, its own problems and their solutions.

5.2.1 Vehicle Emissions Project

There are currently no national or local regulations covering vehicle exhaust emissions in Hamilton. In 1995 Council entered into a partnership with Environment Waikato (the Regional Council) to establish a motor vehicle exhaust emission testing programme.

The aims of this programme were:

1. to raise public awareness of the environmental damage caused by motor vehicles in general and to encourage the consideration of alternative modes of transport

2. to persuade vehicle owners to have car engines adjusted to run more efficiently

3. to gather statistical information which could be used to help persuade national government that vehicle testing of this nature should become mandatory

4. to provide training and experience for a group of long-term unemployed.

The Emissions testing campaign is still ongoing and offers motorists free testing of their vehicles at participating garages around the city. Several unemployed persons have been trained and given paid work carrying out the testing. To date, around 6,000 vehicles have been tested.

Comparatively lenient standards were set for the two main measures of carbon monoxide (CO) and hydrocarbons (HC). These standards were chosen to match what could be realistically expected from a national requirement were one to introduced.

The standards were:

Age of Vehicle	Performance at Idle carbon Monoxide (CO)	Hydrocarbons (HC)
Pre 1982	4.5 percent	800ppm
1982 - 1990	3.5 percent	400ppm
Post 1990	2.5 percent	400ppm

Despite the leniency of these standards, the results showed a high failure rate:

Pre 1982	CO fail 50.6 percent HC fail 12.7 percent	9.2 percent of all tests.
1982 - 1990	CO fail 32.7 percent HC fail 12.1 percent	78.4 percent of all tests.
Post 1990	CO fail 20.2 percent HC fail 3.1 percent	12.4 percent of all tests.

Although this programme is not measuring greenhouse gases directly, because CO and HC contribute to increasing tropospheric ozone, they are also indirect contributors to the emissions responsible for global warming. An important part of the testing programme is that these tests can be used as a diagnostic tool for engine tuning. It is clear from the results that a high percentage of vehicles are running inefficiently and using substantially more fuel than is necessary. Making customers aware of the potential savings in fuel costs by having their engines tuned provides them with a good incentive to reduce consumption and reduce emissions at the same time.

5.2.2 Energy-Wise Project

In January 1995 the Energy-Wise Hamilton Project was initiated. The project, which was carried out by Council in partnership with Waikato Electricity, the Hamilton Gas Centre and the Energy Efficiency and Conservation Authority (EECA), sought to assist local residents to conserve energy. While there were national initiatives in existence to assist business reduce energy consumption through efficiency and conservation measures there were no similar programmes aimed at local residents.

The goals of the project were:

1. to identify opportunities for energy efficiency and conservation measures in residential homes

2. to provide information to residents on how to conserve energy

3. to provide training and experience for a group of long-term unemployed

4. to estimate the opportunities for City-wide energy efficiency and conservation measures in the residential sector.

Free walk through audits were offered to residents and an extensive publicity campaign was initiated. Each audit involved the collection of basic data after which any recommendations were discussed with the householder and appropriate advice offered. A follow-up survey was developed to determine whether or not householders had implemented the audit recommendations and to identify the barriers to implementation.

A total of 690 audits were conducted and auditors also dealt with a large number of enquiries relating to energy issues. A total of 2100 recommendations were made and over 80 percent of these were completed by the householder at no significant expense. It was estimated that the potential energy savings totalled 300,000 MW/hrs, or $2.4 million dollars for the 35,000 city households.

Despite the comprehensive publicity, only two percent of households responded. It seems that, at least at present, energy efficiency and conservation issues do not rate highly with residents.

It is hoped that local energy supply agencies may establish a fund to support energy efficiency measures of this kind in the future.

5.2.3 Enviro-Schools Project

The main features of the Enviro-Schools concept are as follows:

1. encourages a whole-schools approach to environmental education

2. draws together all of the various environmental education programmes operating in schools and develops new approaches

3. involves not just teachers but also other staff of the school, parents, Board of Trustees

4. includes all subjects and components of the curriculum.

The Enviro-schools concept provides a strong framework for environmental education and helps develop attitudes whereby the full community of the school examines the school as a system, works together by consultation and agrees to monitor environmental management practices of the school as part of the school's environmental education programme.

The concept has been tested in three schools and a full report will be published shortly. It is hoped to employ a co-ordinator / environmental education trainer to take the programme to all Hamilton Schools in the near future.

A primary focus of Enviro-schools will be energy and funding is currently being sought from the local energy supply company to purchase "Energy Action" resource packs for all Hamilton schools which can be used in conjunction with the programme and supported with teacher training.

5.2.4 Waikato Environmental Business Network

Last year saw the establishment of a Waikato branch of the National Environmental Business Network with the aid of a Council grant. This network will, amongst other things, promote, and provide advice and support for, the implementation of cleaner production and environmental management systems in local business. This work will build on the cleaner production work carried out by Council in earlier years. In addition, the network will promote the idea to the business community at large, that caring for the environment makes good business sense and that failure to address greenhouse gas emissions on a voluntary basis is likely to result in the imposition of costly carbon taxes.

To date the network has in the region of 150 members and this looks set to grow rapidly in coming years.

5.2.5 Eco-house

The Council has co-ordinated the design of an environmentally friendly house that will serve as an example to the building industry and home buyers generally on what is new, best and different in efficient homes. The design is based on a two storey, three bedroom, two-bathroom, 200 square metre house with family room, study and attached double garage. The aim is to demonstrate new ways of designing and building using materials and technology most of which are readily available but not in common use in New Zealand. These are features such as solar heating, waste heat recovery, water collection systems and landscaping for solar use. In addition the design incorporates materials from sustainable sources.

It is hoped that the design will soon be used in a proposed new riverside housing development which will also incorporate on site-water and sewage treatment using the latest environmental technologies.

6 Conclusions

Much has been achieved in Hamilton through the "think globally, act locally" philosophy and local politicians have demonstrated their commitment to climate protection issues by supporting the initiatives listed above. Furthermore, Hamilton has signed the agreement with ICLEI under the Cities for Climate Protection Campaign. There is, therefore, every reason to be optimistic that this commitment will continue and that the city of Hamilton will have a structured Local Climate Protection Action Plan in place shortly.

What is less certain at this stage, however, is what level of political commitment would be forthcoming for an ambitious emissions reduction target, given that so much of New Zealand's greenhouse gases are originating from the rural rather than the urban situation, and that central government is not currently providing a lead by implementing policies and actions to meet national targets for CO2.

At a local level, as at a national one, governments face the problem that unless there is some uniformity of action then there will be economic penalties for those who take radical steps to reduce emissions, while the emissions will merely be shifted elsewhere to the economic benefit of the new emitter.

There are also difficulties in persuading people of the necessity to control the emissions of gases they are unable to see, in an environment which is generally unpolluted and of a high quality. This is particularly the case if it involves restrictions on the use of private cars in a city which has no significant traffic congestion problems.

Auditing, education programmes and voluntary agreements are therefore likely to continue to form the basis of Hamilton's climate protection initiatives but with better analysis of emissions and an agreed action plan, these can be carried out in a more systematic and targeted fashion.

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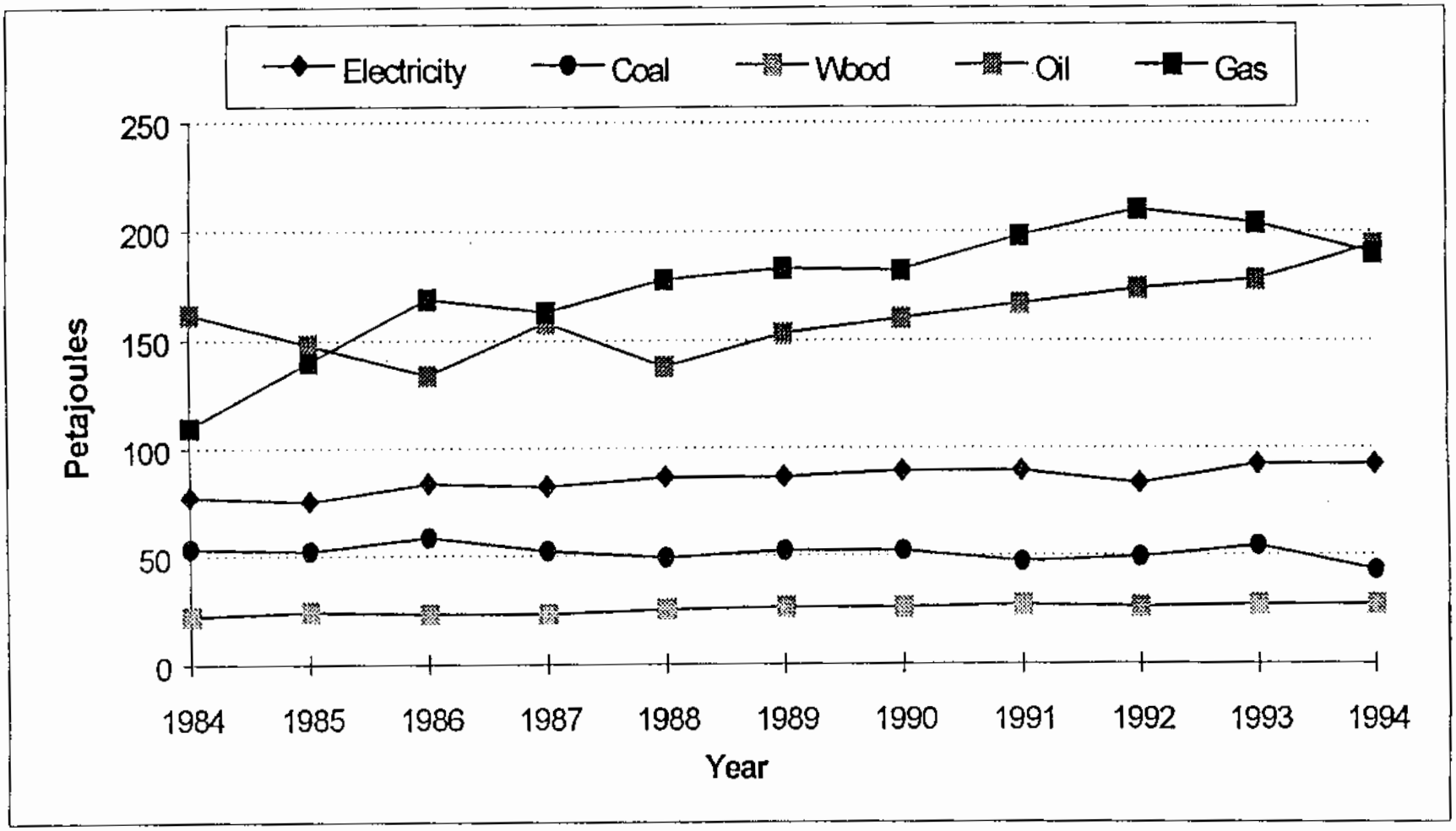
APPENDIX II

Energy Consumption 1984–1994

New Zealand



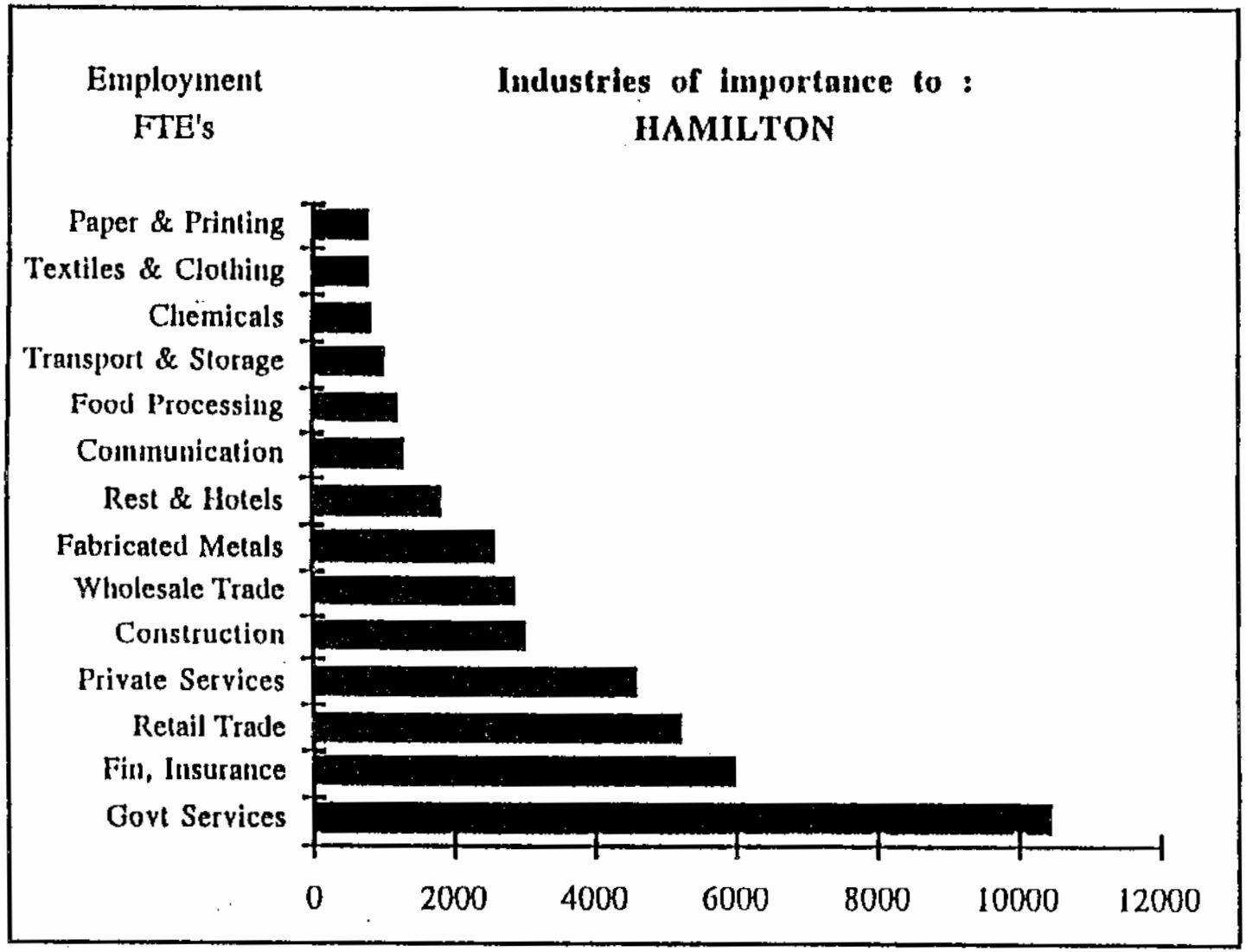
Source: Statistics New Zealand Yearbook 1995.

APPENDIX III

New Zealand's Estimated Greenhouse Gas Emissions (1994)

Gas	Gross Emissions ('000t)	CO^2 equiv ('000t)	% of Total	Net Emissions ('000t)	CO^2 equiv ('000t)	% of Total
CO^2	27430	27430	37.1%	13633	13633	22.7%
CH^4	1888	39648	53.6%	1888	39648	65.9%
N^20	19.2	5952	8.0%	19.2	5952	9.9%
PFCs	0.1	920	1.2%	0.1	920	1.5%
Total		73950	100%		60153	100%

APPENDIX IV


Employment
FTE's
Industries of importance to :
HAMILTON
Paper & Printing
Textiles & Clothing
Chemicals
Transport & Storage
Food Processing
Communication
Rest & Hotels
Fabricated Metals
Wholesale Trade
Construction
Private Services
Retail Trade
Fin, Insurance
Govt Services
0
2000
4000
6000
8000
10000
12000

APPENDIX V

Outcome 2

Reduce the emission of gases which contribute to global warming or ozone depletion.

Enabling Policies

- Liaise with Government departments, industry and the community on methods of reducing the use of energy.
- Liaise with other environmental interest groups in developing further education packages on the subject.
- Liaise and assist industries involved in the recycling of ozone depleting substances
- Promote the environmental policy of this Council to act as an example to the community.
- Maintain the promotion campaign which produced Hamilton's Ozone Friendly Policy.
- Encourage the development and use of an energy efficient transport system.

Regulatory Policies

- Council undertakes to consider what measures it can take under existing and future Town Planning legislation to enforce the reduction of energy use and encourage the use of non-polluting energy sources.

Service Policies

- To undertake an energy audit of all of council's operations with a view to ensuring efficient use and, where possible a reduction in encourage consumption
- Eliminate where possible the use of ozone depleting substances in Council service delivery or corporate organisation.
- Encourage the public use of non-polluting transport.

Climate Protection - The Fiji Situation

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1 Introduction

Fiji is an island group of nation in the central Pacific Ocean comprising of some 332 islands varying in size from 10,000 sq. km to tiny islets few meters in circumference.

The main two islands, Viti Levu (Area 10429 sq. km) and Vanua Levu (Area 54560 sq. km).

The capital of Fiji - Suva is located on the island of Viti Levu.

Within the Fiji context, the local government is mostly self-autonomous and it is established under the Local Government Act.

Its link with the central government is through the ministry of local government, urban development and environment.

This type of government is limited to towns and cities only and it is different from the local authorities which operate in the rural areas and which are established under the Public Health Act.

2 Fiji's Sustainable Development Act

At this point in time there is a draft act called the Fiji's Sustainable Development Act already submitted to the government with a purpose of allowing cabinet to review the document and for introducing such document to parliament for discussion and approval.

This is a comprehensive and integrated new act which will consolidate and update existing and resource management legislation and create new legal framework for -

*Climate protection
*Environmental impact assessment (EIA)
*Pollution and waste management
*Integrated natural resource management

while establishing effective administrative and enforcement mechanisms.

It is not envisaged that the department of environment should expand to become a United States of America styled Environmental Protection Agency (EPA) with complete in-house expertise and capability to undertake all environmental management measures. This will require a major resource allocation and expansion in terms of personnel and finance.

Fiji Government simply does not have the ability to commit such resources. These functions will continue to be undertaken by relevant ministries / departments although increasing by local government authorities and necessary the private sector.

2.1 Climate Change and Ozone Depletion Protective Measures

The new act will provide for implementation of obligation of relevant international conventions including the Vienna Convention for the Protection of the Ozone Layer, the Montreal Protocol on Substances that Deplete the Ozone Layer and the Framework Convention on Climate Change.

Fiji does not produce or export any "controlled" ozone depleting substance, but imports CFC's {CFC-11, CFC-12 and CFC-15} for servicing refrigerators and air conditioners, as well as for production of foams and for use in aerosols. Methyl chloroform and carbon tetrachloride are imported as bulk chemicals for use as solvents.

Currently all countries in world produce "greenhouse gases" that have been scientifically prevent to cause climate change which can result in a variety of serious environmental and social problems, including sea level rise. The consequences of sea level rise are a major concern internationally, especially for island countries such as Fiji where a considerable area of existing land surface may disappear. Although Fiji produces only a small amount of greenhouse gases, principally through the escape of gases from various sources, it is important the country plays its part in reducing global levels of greenhouse gas emission.

2.1[a] International Framework Convention on Climate Change

Within the Fiji context the implementation of the United Nations Framework Convention on Climate Change will be achieved through

the establishment of the following -

[i] A national inventory of climate change emission sources and discharge rates

[ii] The setting of realistic and achievable emission reduction goals - in consultation with industry and other affected parties

[iii] The establishment of guidelines and codes of practice for the achievement of emission reduction targets

[iv] The development and promotion of new and innovative technologies (through economic incentives) and the facilitation of their introduction into Fiji - subject to the usual EIA process.

The new act will specify private and public sector roles, responsibilities, target dates and the consultation process that is to be implemented to achieve this programme.

3 Major Difficulties

This new act will increase the responsibilities and functions of local governments / authorities in terms of enforcement of the provisions of the act including the drafting of relevant regulations and by-laws.

Within the Fiji context, the major difficulties faced by the local governments / authorities in effectively implementing the new act programme as outlined under the sub-heading United Nations Framework Convention on Climate Change (Items I-iv) are as follows-

3.1 Drafting of Regulations and By-laws

Deficiency of expertise and experience in both technical and legal in the production of the above legal documents which can be technically correct and complete as well as legally sound in order to address all relevant issues

3.2 Enforcement for Compliance of the Laws

3.2.1 Personnel - lack of training in this field

3.2.2 Field Equipment - No field equipment for measuring level, etc.

3.2.3 Laboratory - no certified laboratory as yet

However the major constraint is that this new act is yet to be passed by Parliament.

4. Recommendation

Notwithstanding that the Fiji Sustainable Development Act is yet to be passed by Parliament, the ICLEI must now actively assist the Fiji Local Government Association by addressing the issues outlined under major difficulties.

Bangkok's Role in the Global Warming Context

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1. GENERAL VIEW

Thailand is 513,111 squarekilometers. It has a population of 6.1 million in 1996 with only 1.4 percent growth rate (TEI,1996). The geographic location is at 5-21 N and 97-106 E. The land-use ratio is as follow:

Forest	26.6 %
Paddy	21.5 %
Field crops	20.0 %
Urban etc.	

The energy consumption of Thailand is 44,000 KTOE in 1994. Green house gas (GHG) emission records of 1990 are as follow:

TABLE 1 EMISSION RATE OF GREEN HOUSE GASES IN THAILAND

	Million tons	
GAS	Emission	CO2 Equivalent
CO2	182	182
CH4	5.6	137
N2O	0.04	13

According to WRI(1994). the global emission of CO2 was 26,000 million tons and methane emission was 250 million tons. When comparing Thailand's emission with the global figures, the contribution of Thailand to the global warming is very small as follow:

Methane	CH4	2.2	percent and
Carbon-dioxide	CO2	0.7	percent

The anaerobic decomposition of organic carbon in the bio-masses eventually produces Methane and Carbon-dioxide.

$$2CH2O \longrightarrow CH4 + CO2$$

However the bio-mass CH2O has been produced originally together with Oxygen in the photo-synthetic process:

$$CO2 + H2O \text{ ------> } CH2O + O2$$

The natural agriculture produces an equivalent of atmospheric oxygen for every gram of the agricultural bio-mass produced in the natural growth process. The decay or combustion of the bio-mass is naturally sustainable although green house gases are produced. The stock-pile of bio-mass such as wooden houses and gardens is an equivalent of increase in oxygen storage in the atmosphere. The incineration of garbage should be avoided in that sense.

The government of Thailand realizes the need to minimize all the potential green house gases and the careless loss of energy. Energy management agencies such as the Electrical Generation Agency of Thailand has already launched programs of electricity saving. The agency subsidizes high efficiency airconditioners and fluorescent lamps. The government also subsidizes lead-free gasoline to prevent the toxic lead pollution.

TABLE 2 SECTORIAL CONTRIBUTION TO THE GLOBAL WARMING IN THAILAND 1990

Sector	million tons CO2 equivalent	% of total
All energy	95	29
Industrial processes	10	3
Solvent & other products	0	0
Agriculture	126	38
Land-use & Forestry	96	29
Wastes	4	1
Wet-land	1	0.1
TOTAL	332	100

2. LOCAL GOVERNMENTS

The environmental Conservation Law of B.E. 2535 requires every Major of a local authority to prepare an environmental development plan. If he fails to do so, the provincial governor is empowered by the law to carry out this responsibility. Most of the the provincial governors of Thailand are appointed by the Ministry of Interior. Many provincial cities have asked for the governors to take this responsibility and the governors ask the Department of Public Works of the Ministry of Interior to prepare sewerage and garbage disposal master plans. There are two ministries in concerning with the allocation of budgets for environmental related projects for cities. One is the Ministry of Science in charge of the National Environment Policy, the other is the Ministry of Interior in charge of infrastructure.

The capital city of Bangkok has a population of 5.9 million. This is about 10% of the whole population of the country. However,the area is only 0.3 percent. The area of BMA is about 1,500 sqkm. The next largest provincial cities are Chiengmai, Nakorn Ratchasima and Hat Yai with populations of only around 200,000 persons. The BMA is serving the whole country in the supporting roles of social, economy and culture.

The new buildings of the urbanization boom period from 1960 turn Bangkok into a large mixture of economic activities with industrial, trade and residential settlements. The urbanization is sprawling all over the two banks of the Chaopraya River and frontage of the buildings face the road to provide access and the water courses behind them serve as sewers. The pollution to the water courses is mainly from the domestic sewage but trade and industrial wastes are also found in many districts such as Ratburana, Yanawa, Nongkhaem etc. The anaerobic decay of wastes in the stale sewage is one of the green house gases.

There will be 10 treatment plants to cover Bangkok (JICA, 1981). Construction of 4 sewerage basins are now in progress. The service will cover at least 3 million people within the year 2000.

3. LAWS AND REGULATIONS

Thailand realized the threat of pollution since early 1950 when water pollution of the capital city of Bangkok was addressed. The anaerobic decomposition of polluted water and the bottom-mud produce methane and carbondioxide. The Public Health Law originally aimed at the prohibition of access of persons to the pollution and infection. The new Environmental conservation Law of 1992 specifies the concerns to to prevent the pollution of water and the atmosphere and conserve the natural resources.

Traditionally, fecal waste waters in urban areas of Thailand would be ingressed into the soil through cess-pits, while the other domestic waste-waters were considered unpolluted. However, the authority realized the short-coming of these concepts and treatment technology. More than 20 years ago the Department of Public Health Promotion of the Ministry of Public Health in 1974 introduced the proposal that every newly built housing-estate should build sewerage. The Ministry also advised old buildings to replace cess-pits with aerated biological treatment systems and public waterways should add aeration systems to prevent septicity.

4. NATIONAL ENVIRONMENTAL COMMITTEE

The basic legislation affecting the control of the atmospheric pollution is the Environmental Conservation Law of BE 2535 (1992). This Law specify the environment as all the physical and biological objects which are either of natural creations or those artificially created to provide for the existence and the eventual well being of the population.

The environment according to this law should have a specified quality. The quality means a stage of stability or balance among animals plants and natural resources together with the objects artificially created to provide for the existence and the eventual well being of the population.

The law defines pollutants "Molapit" as harzardous materials, polluting materials and residues of those materials together with radiation, heat, light, noise, odor, vibration and other causes of nuisance. The action taken with this law starts when an area has been declared a Pollution Control Area. Before that other laws will be used.

This Law specify a committee chaired by the Priminister and other ministers concerned with eight experts to specify regulatory sector. This committee is most important as the national policy maker on the environment with the following specific tasks:

1 Propose the national policy on the conservation of the environment.

2 Set the standards of the environment.

3 Approve national implementation plans.

4 Approve local (provincial) implementation plans.

5 Propose financial plan, taxes and revenue to support plans.

6 Propose additional and amendment of laws to improve the environment.

7 Approve action plans to protect the environment and end the incidences.

8 Approve emission standards.

9 Supervise the preparation of standards and regulatory measures.

10 Submit the method of corrections to the priminister to order a government agency in case pollution of the environment is due to such a government agency.

11 Prepare measures to coordinate and promote the cooperation between the government and the private sectors on the environmental conservation.

12 Manage the environmental conservation fund.

13 Submit annual reports of the environmental qualities.

14 Enforce and enact every other aspects of the Environmental Conservation Law.

The Committee has a broad authorization of the committee and the direct access to the administrative authority of the Priminister. It is fully responsible for the environmental qualities of Thailand.

In the effect, the Ministry of Science first proposed to the National Pollution Control Committee where to declare as a pollution control area. After which measures can be taken to relief the pollution. However, the definition of pollution and pollutants are all referring to the prosperity of man rather than the environment itself. The usefulness of this law is to heal an ailment rather than to protect the environment. It is necessary to utilize the environmental conservation law to safeguard the biological diversity or other irreversible natural damages. Therefore, corrective measures are not truly effective as an environmental conservation tool.

5. NATIONAL POLLUTION CONTROL COMMITTEE

The Environmental Conservation Law of BE 2535 (1992) give birth Technology namely:

The Office of Environmental Policy and Planning.
The Department of Pollution Control.
The Department of Environmental Quality promotion.

The Environmental Conservation Law of BE 2535 (1992) also set up another committee called The National Pollution Control Committee. The chairperson of this committee is the secretary of the National Environment Committee. This committee is very important as it can specify the level of tax and fees for the "Polluters Pay Principle". When the secretary is successful to convince the National Environment Committee (NEC) to declare a city or a province as a "Pollution Control Area". He can then proceeds to call on the pollution control committee which he is pollution control plan and lay-out of a polluter-pay fees and proceed with what ever the committee found suitable. The committee has already declared five provincial cities "Pollution Control Areas" in 1993.

6. SOLID WASTES MANAGEMENT

Solid waste dumps and land-fills are significant sources of air pollution and green-house gases such as carbondioxide and methane. Bangkok is the largest producer of garbage in the whole of Thailand.

The widely spreading urban sprawl of Bangkok makes it very costly to transport the refuse to the disposal site. The BMA has 2,274 trucks in 1995. The collection of refuse are mainly from public spaces such as market places. At such places, containers. The individuals help to complete the system by bringing the refuse to the provided facilities.

The amount of refuse collected by the BMA has increased rapidly from 2,400 tons/day in 1984 to a huge amount of about 4,500 tons per day in 1992 and 6,530 tons per day in 1995. Private contractors now disposed off about half of the refuse collected in the neighboring provinces. However, some proper disposal methods exist. They include composting 1,000 tons/day, land-filling 2,000 tons/day and incineration of harzardous wastes 10 tons/day. The compost plant for 1,000 tons refuse per day(20 hours) needed 368.9 million Baht(14.756 million $US) investment. It started to operate early in 1993 with good results. The plant is an aerated rotary drum and curing yards which increases the temperature to 60 Celsius for 20-30 days. It disinfects and turns garbage into compost for agricultural applications. The product is good for the creation of parks and golf-courses in the urban area. Although the contribution of wastes in Thailand to the global atmosphere (see TABLE 3) is very small, the aerobic process eliminate the methane emission which is one of the major green-house gases. The permanent stock-pile of organic carbon also guarantee the oxygen balance in the atmosphere.

TABLE 3 METHANE EMISSION IN THAILAND

	Thousand tons
Global	250,000
Thailand total	5,609
Rice	4,398
natural oil/gas	482
Livestock	473
Wastes	146
Wet-land	48
Forest clearing	31
Field burning	19
Fuel combustion	12

The city growth will bring the total daily amount of collected refuse up to 9,500 tons per day by the year 2000 (TAMS,1988). The future solid waste management problems of other urban cities in the future with be similar to Bangkok.

7. TRAFFIC CONGESTION

Traffic congestion is another source of GHG. The development of Bangkok urbanization is strongest at the center of the city "Concentric pattern of growth". Most of the main roads and expressways lead into the focal point at Silom Road and the Bangkok Port.

The main radial roads and the streams of motor-vehicles converge at the same point. The traffic speeds in many stretches of main roads are less than 10 km/h during the rush-hours. Motor-cars can no longer compete with bicycles on speed. The car sales are still increasing due to the better safety comfort and prestige.

Some people suggested that the BMA improves walk-ways and bicycle lanes but most of the population in Bangkok are still depending on city buses which run only on main-roads. Informal traveling means such as converted trucks and motorcycles help filled the gap between homes and the main roads.

Traffic congestion on the roads of Bangkok and the other provinces have caused severe pollution problems within the urban areas but the contribution of the exhausts to the global warming and climate changes are very small (see TABLE 4). However, the government accepts that the air pollution is important. The subsidizes unleaded gasoline. Thailand is also planning to promote four stroke engines to replace the two-stroke ones which are now popular. There is nearly 1 million motorcycles in Bangkok. Most of them have two-stroke engines.

TABLE 4 CARBONDIOXIDE EMISSION BY VARIOUS SECTORS
THAILAND 1991

CARBON DIOXIDE	Thousand tons
Wood-biomass	90
Transport	34
Power	28
Forest clearing	25
Industry	12
Industrial Proc.	10
Small combustion	8
GLOBAL	26,000,000

The population of Bangkok is larger in day-time than in night-time. Originally, most of the social and economic activities concentrate in the central area of the city. The residential areas developed by the private sectors spread steadily into the outer suburbs.

TABLE 5 NITROUS OXIDE EMISSION BY VARIOUS SECTORS
THAILAND 1991

	Thousand tons
TOTAL	39.9
Forest clearing	20.98
Agricultural soils	17.58
Transport	0.56
Field burning	0.52
Small combustion	0.19
Power	0.07

New production and industrial centers are also emerging around the city core. They have created additional heavy traffics of workers who need to travel across the city in the morning and in the evening. Thousands of idling cars in the traffic jam is a

major concern of the public health authorities but this source of Nitrogenoxides in the atmosphere is less important(see TABLE 5).

Improved road traffic flow will reduce GHG from the vehicles. The Police Department of the Ministry of Interior is in charge of the traffic control. The Express Way and Rapid Transit Authority construct the elevated toll-roads. The Public-works Department of the Ministry of Interior is responsible for the bridges across the rivers. The BMA plays a smaller role in the Bangkok traffic as it deals only with the improvement of neighborhood roads, traffic signs and pavements.

8. IMPACT OF SEA LEVEL RISE

An important impact of the climate change to Thailand is the increase of flood depth and duration due to the rising levels of sea water. The growth center of the country concentrates on the undulating tidal delta of three rivers. The area has also been subsiding at a rate of about 10 centimeter per year for many decades (AIT, 1981)(RAMNARONG, 1983). The flood-plain covers about 12,000 square kilometers of fertile river sediments and levies. This area is naturally flood prone due to the run-off from the north and the tidal surge from the sea. The annual rainy season which started in May produce accumulations of run-off which add up to the plain gradually until in October when the spring tide period comes around. On this occasion the river city reaches 2.2 m+MSL (Mean Sea Level) while parts of the urbanized areas are 1.0 m below the MSL. Bangkok needs to find effective measures to reduce the persisting flood damages (see TABLE 6).

TABLE 6. FLOOD DAMAGE RECORDS (25 Baht = 1 $US).

Year	Damage million Baht	Specific damage million Baht/km2
1975	1,110	0.7
1978	280	0.18
1982	1,093	1.83
1983	6,600	4.2
1995	1,000	5.0
1996	800	5.0 *

* Estimated by the author

The vicinity of Bangkok is often hit by late depression storms of the year in October and November during the spring-tide periods that cause inundation of 20 to 100 cm on many low lying neighbor-hood roads.

Inspite of the much improved pumping capacity every year, many areas of the city are often flooded. Schools had to be called off for a few days on various occasions to avoid inconveniences and probable accidents to the children.

Flooding is an inherent damage to the central area of Thailand, especially in Bangkok and the vicinity. The present flood control measures are still not adequate to ensure safety against the annual recurrences.

In 1968, the first Master plan for Sewerage, Drainage and Flood protection systems was made (CDM, 1968). The major recommended solution was to divide the area into several units (polders) that would be protected separately against over-spills from the river and the over-land flow from the east and west flood-plain from Tachin River and Pasak River. Other master plans improved the details on the internal drainage mangement (JICA, 1985)(NEDECO,1987). The study in 1996 (TAC, 1986) pointed out the importance of the tidal surge from the sea which equals to the strongest sorm run-off from the north. A sea-barrier is needed in this case.The storm-water run-off pumping when the exterior water levels are high. Dikes and the pumping stations are the major of investment cost of every system (see TABLE 7).

TABLE 7. INVESTMENT COST OF POLDER SYSTEMS (1$US=25 Baht)

Projects	Dikes		Pumping station		Area
	length km	cost Million Baht	number	cost Million Baht	Sqkm
1. City core	15.7	222	5	218	96
2. Eastern-suburbs	6.2	40.3	6	130	260
3. Thonburi	108	261	12	133	340
4. Smuthprakarn	52.4	501	13	104	220

The river dikes to reach from km 0 to km 70 at the border-line of the Bangkok Metropolitan plus the other 100 km sea-walls at the mouth of the river. The estimated investment cost of 2,000 $US per meter of the dike will bring the total investment to 480 million $US. Maximum level of water in the estuary has risen every year since 1970 flood protection facilities become increasingly expensive. A diking project which covered 360 sqkm will cost 1.3 million $US per sqkm. The pumping cost at 0.04 million $US per km2 per year and the increasing structural investment cost of dikes are important.

9. CONCLUSION

The rise of water level poses a threat for investment, operation costs and the safety level of the flood control system. The major part of the existing flood control scheme relies strongly on the protection of Bangkok city against the rising level of the estuary water and sea level. Pumping cost may rise 20 million city of Bangkok per meter of the increase of water level.

The authorities must pay attention to the global warming effects which cause the sea level to rise. The Bangkok Metopolitan

Administration is ready to participate in the environmental conservation and pollution control programs. The City Hall encourages the exchange of experience and knowledge obtained in other countries. The global climate problems require cooperation all over the world to prevent damages and reduce the costs of the global climate changes.

There should be a world wide program to increase the stock pile of bio-masses and vegetation growths to compensate the lost of atmospheric oxygen by and ozone layer by promoting re-forestation and green urban land-scaping.

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Items to be Discussed on Possible Future Actions

1. Active recruitment of local governments in Asia and the Pacific to the Asian CCP Campaign
   - How to encourage local governments to participate in ICLEI and Asian CCP Campaign ?
   - More active dissemination of information on Asian CCP Campaign should be undertaken to facilitate recruitment of local governments in Asia and the Pacific.
   - Taking into account that USEPA and EAJ initiated to provide technical and financial support with CCP campaigns in respective countries, the local governments should consider to make best use of such support to expand their campaign activities.

2. Schedule on finalization of the "Guidelines for Local Action Plans for Climate Protection in Asia and the Pacific"
   - Participants of the workshop are requested to send comments, if any more, to the ICLEI Asia Pacific Secretariat by December 31, 1996. The draft guidelines should also be sent to the signatories for their comments.
   - Based on the comments during the workshop and thereafter, the ICLEI Asia Pacific Secretariat will finalize the guidelines by March 31, 1997 and accordingly send them to the participants and others as appropriate, for the development.
   - Participants are requested to consider the ways to make best use of the guidelines and identify the needs for further support.

3. Inclusion of more information on activities relating to the Asian CCP Campaign into the Newsletters on CCP Campaign and in the CCP Toolkit
   - Specific methodologies appropriate for Asia and the Pacific will be developed and included in the CCP Toolkit.
   - More case studies should be collected and included in the Newsletters and the CCP Toolkit. In this connection, the local governments participating in the Asian CCP Campaign are encouraged to provide information on the progress of the implementation on the campaign to the ICLEI World Secretariat. Japanese local governments are recommended to more actively translate their experiences into English and provide them to the ICLEI World Secretariat.

4. Organization of a series of national and/or regional workshops to build capacity for developing local action plans etc.

5. Establishment of the Environmental Information Center on Climate Change
   - Report of the progress by Saitama Prefecture as the follow up of the Saitama Summit

6. Collaboration with the CCP Campaign in the other regions - North America, Europe, Africa, Middle East and Latin America

7. Possible input to COP3, which will be further discussed and decided at the Fourth Local Government Leaders' Summit

8. Proposal to change the name "Asian CCP Campaign" to "Asia Pacific CCP Campaign"

Schedule of the relevant meetings in 1997 in Japan

Local Governments are encouraged to partipate in the following meeting to be held in Japan.

- Seventh Asia Pacific Seminar on Climate Change: Summer, Yamanashi, Japan
- Forth Local Government Leaders' Summit on Climate Change: end of November, Nagoya, Japan
- Third Conference of the Parties to UNFCCC: December 1-12, Kyoto, Japan
- Meeting(s) by the Climate Forum (a NGO similar to the Klima Forum 95)

References

Workshop on Asian Cities for Climate Protection Campaign

A G E N D A

Tuesday, 19 November

Auxiliary Hall 2nd Floor

10:00–10:30	Opening Addesses Mr.Yoshihiko Tsuchiya, Govenor of Saitama Prefecture Mr.Kenji Tanaka, Director General, Planning and Coordination Bureau, Environment Agency Mr.Noboru Asako, Speaker, Saitama Prefectural Assembly
10:30–12:00	Keynote Addresses International challenge on climate change by Mr. Hikaru Kobayashi, Director, Control & Cooperation Division, GED, Environment Agency CCP Campaign: challenge by local governments' initiatives by Mr.Philip Jessup, Director CO2 project, ICLEI World Secretariat Main address Actions by citizens and enterprises for climate protection by Professor Takashi Onishi, Tokyo University
12:00–13:30	Lunch break

International Conference Room 4th Floor

13:30–13:40	Appointment of Chairperson Chairperson's Greetings, Recognition of the Agenda
13:40–14:00	Status–quo of the CCP Campaign by Ms.Tanya Imola, CCP Coordinator, ICLEI World Secretariat
14:00–14:15	Summary of the Saitama Summit by Mr.ken–ichi Nakano Dupity Director, Environment Department Saitama Prefecture
14:15–14:30	Discussions
14:30–15:00	CCP toolkit prepared by ICLEI World Secretariat by Mr.Philip Jessup, ICLEI World Secretariat
15:00–15:15	Discussions
15:15–15:30	Coffee break
15:30–16:00	Overview of Japanese action plans for climate protection by Mr. Hikaru Kobayashi, Director, Control & Cooperation Division, GED, Environment Agency
16:00–16:30	Draft guidelines for local action plans for climate protection by Mr.Yukio Okuma, Deputy Executive Director, Japan Office, ICLEI Asia–Pacific Secretariat
16:30–17:30	Discussions
18:30–20:30	Reception hosted by the organizers at Palace Hotel Omiya 402,403

Wednesday, 20 November — International Conference Room 4th Floor

09:30–10:00	Overview of CCP campaign in North America by Ms.Tanya Imola, CCP Coordinator, ICLEI World Secretariat
10:00–10:30	Overview of CCP campaign in Europe by Dr.Klaus M Ü schen, Head of the Energy Planning Division, City of Berlin
10:30–11:00	Discussions
11:00–11:15	Coffee break
11:15–12:15	Topic discussions (I) on Emission Inventory Presentation by Mr.Takeshi Kokubo, Director, Environment Development Division,Saitama Pefecture
	Comments and discussions
12:15–13:45	Lunch break
13:45–14:45	Topic discussions (II) on Renewable Energy Presentation by Dr.Zainol A.Pawanchee, Deputy Director of Health 1, Kuala Lumpur
	Comments and discussions
14:45–15:45	Topic discussions (III) on Energy Saving Presentation by Mr.Seiichi Matsubara, Director, Environment Planning Division, Kumamoto City
	Comments and discussions
15:45–16:00	Coffee break
16:00–17:00	Topic discussions (IV) on Adaptation strategies Presentation by Mr.Ilitomasi B.Verenakadavu, Director Health Services Suva City
	Comments and discussions
17:00–17:30	Overall discussions

Thursday, 21 November — International Conference Room 4th Floor

09:30–11:00	Discussions on future actions
11:00–11:30	Summing up by the Chairperson
	Closing remarks
13:00–17:30	Field visit Omiya–Tobu Environment Center (Recycle Center) (Omiya City) Togyoku Dolls Land (Iwatsuki City)

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Campaign Update
Winter 1996 – 97
Nº 3
Cities for Climate Protection Campaign

•I•C•L•E•I
International Council for Local Environmental Initiatives

Looking Back to the Future: ICLEI's Urban CO_2 Reduction Project

On June 12-14, 1991, 50 officials from 14 municipalities in the US, Canada, and Europe met in Toronto, Canada to launch ICLEI's Urban CO_2 Reduction Project. After first sharing information about their cities, they decided the Project's aims and created a work plan to develop municipal approaches to reduce urban greenhouse gas emissions (GHGs).

The German Marshall-Fund of the US, the City of Toronto and the Municipality of Metro Toronto co-sponsored the workshop. The US Environmental Protection Agency, the W. Alton Jones Foundation, and the Pew Memorial Trusts also generously funded the Project.

The Project's participants eventually laid the political and analytical foundations for ICLEI's Cities for Climate Protection campaign. Their work – Bologna, Chula Vista, Copenhagen, Dade County, Denver, Hannover, Metro Helsinki, Minneapolis, Portland (Oregon), Saarbrücken, Saint Paul, and Toronto – fostered local political commitments and action plans that are today inspiring over 150 participants in ICLEI's climate campaign.

Continued on page 8

DIRECTOR'S LETTER

This fall I returned with great pleasure to Heidelberg, Germany to attend an international workshop co-sponsored by the City and ICLEI. We gathered to see what progress signatories to the Heidelberg Declaration – mostly municipalities in the Cities for Climate Protection (CCP) – had made since signing the Declaration in 1995 (see article on page 4).

The Neckar River valley where Heidelberg nestles was asplash with fall colors. German hospitality, rested after a busy tourist summer, was in peak form. Mayor Beate Weber and her colleagues on city council were outstanding hosts!

At city hall we mingled with wedding parties of various shapes and sizes. A wonderful exhibition by a local artist of sensuous photos of the physically impaired lured many away from the proceedings. These experiences reminded me that European city halls are the social heart of the community, not just a place for citizen services.

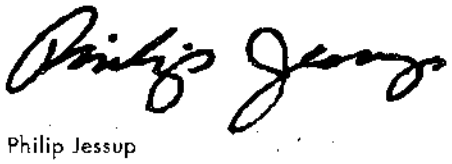
In my remarks to my colleagues, I reported on several discouraging international trends. According to the OECD, for instance, total energy supply per capita in most developed nations is the same today as it was in 1980. That means total energy production and consumption are increasing apace with population growth.

Meanwhile, energy use *per capita* has been growing steadily in some countries, such as Spain, Italy, and Greece, which are enjoying robust economic growth, as well as Japan and Australia. In developing nations, especially in Asia, energy use per capita has galloped at rates approaching 5% annually in some regions since 1971.

Indeed, the International Energy Agency estimates that world energy use per capita will increase at the average rate of one-half percent, causing greenhouse gas emissions worldwide to rise as much as 1.7% annually over the next 15 years.

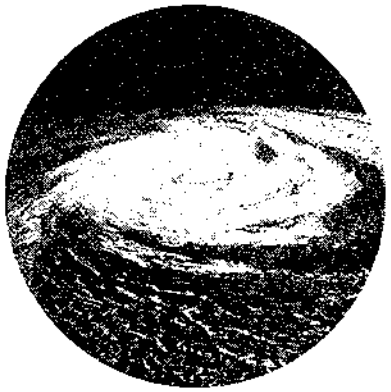
Listening to the many positive progress reports of cities attending the workshop really encouraged me. Heidelberg officials, for instance, reported results on several fronts, including building monitoring and retrofit projects that are reducing local emissions while saving money. At the conclusion of the workshop, I realized that we at ICLEI must strive in the year ahead to gather and report such results from participants across the campaign.

The reason I believe reporting will be important is that the United Nations is approaching the third Conference of the Parties meeting in December, 1997. News that municipalites have set firm targets and timetables and can now report emissions reductions will be an antidote to the naysayers seeking to block progress on strengthening the Framework Convention on Climate Change. So in the year ahead, ICLEI staff look forward to working with all CCP participants to chart our collective progress, a process that we should heartily thank Heidelberg for starting.



Philip Jessup

November 3, 1996



A Reinsurer Speaks Out On Global Warming

Franklin W. Nutter, President,

Reinsurance Association of America

From the insurance industry's point of view, Mother Nature has attracted our attention in a way never before experienced. As we approach the second millennium, our collective societies world-wide have experienced dramatically increased incidence of natural catastrophes including earthquakes, hurricanes, tornadoes and floods.

While the frequency of natural catastrophes is certainly startling, from the insurance industry's point of view the magnitude of these catastrophes and the size of the insured loss is far more notable.

It is imperative that the insurance industry in the United States become cognizant of changes occurring in our climate and its causes. We recently committed to Vice President Al Gore our willingness to address the issue of climate change, to examine the scientific data and to assess its potential affect on land areas exposed to flooding, hurricanes and other windstorms in the United States. It is also crucial that we enhance the dialogue we have begun with climatologists and other experts studying climate change and the impact it may have on the future. We also committed to the Administration that insurers will become better informed about energy efficient technology that is now available, and that which will become available. There by allowing technology to be integrated into the strategic actions our industry takes to rebuild homes and buildings following a major catastrophe, or as incentives for new construction through the use of risk based premiums. We are already supporting research on better construction materials, building design and techniques, and should encourage the use of energy efficiency and renewable technology as part of efforts to preserve the future and our role in it.

There are few scientists in the insurance industry in the United States, however, we cannot ignore the dramatic increase in insured claims as a result of natural catastrophes. There are some clear objective reasons for these changes, yet the fate of our industry is so intertwined with weather and nature that it is imperative that we engage in the analysis of the causes of natural catastrophes and those acts within human control that can reduce the loss of life and property. As with all industries, eventually consumer and corporate economics drive our initiatives. In the case of natural catastrophes, it is also right as a responsible corporate citizen that we utilize our knowledge and open our minds to the knowledge of others about initiatives within our direction.

Adapated with the permission of Gerling Akademie Verlag and Franklin W. Nutter, from the "Climate Change and the Financial Sector: The Emerging Threat" publication edited by Jeremy Leggett.

Hannover, Germany

Hannover has undertaken a project that aims to reduce energy demand in schools and its resulting CO_2 emissions. Key elements are: (a) financial incentives that permit the participating schools to keep part of the energy savings; and (b) a project team of teachers, students, and a technician that work with the City to design the proper energy saving measures. In the first six months, an initial 14 schools have saved 4% of their electric energy, and 8% of their heating energy!

Heidelberg Sponsors International CCP Workshop

The Heidelberg Declaration *Follow-Up Workshop* was held on September 26-27, 1996, just two years following the Heidelberg Conference on *How to Combat Global Warming at the Local Level.* The Workshop convened local decisionmakers and administrators from 42 cities in 23 countries in Europe, Africa, Asia, and North and South America. Representatives from national governments and international institutions also attended. The City of Heidelberg generously funded the meeting.

The purpose of the Workshop was to survey progress municipalities have made towards meeting the commitments specified in the Heidelberg Mayors' Declaration, which many adopted at the 1994 conference. This commitment was to reduce CO_2 emissions by 20% by the year 2005 from 1987 levels.

A variety of local climate protection initiatives were presented by 21 CCP cities. Their presentations covered energy, transportation, waste management, and public awareness. Progress reports showed municipal governments are, indeed, making strides towards reducing greenhouse gas emissions, including notable examples such as:

- significant reductions of methane (CH_4) from changes in waste management practices (Barcelona and Toronto);
- up to 50% reductions of CO_2 emissions from retrofits of municipal buildings and operations (Saarbrücken and Heidelberg);
- successful integration of energy planning into municipal governance (Berlin, Graz, Newcastle Upon Tyne, Rome, and Zurich); and
- promising educational initiatives (Hannover).

The session also revealed, however, that progress is slow in developing countries, where compelling social and economic problems compete for attention. In addition, major obstacles to progress in developed nations were discussed. These include severe municipal budget constraints, inadequate support from higher levels of government, and persistent global energy trends such as low prices and utility deregulation.

It was concluded that progress to date demonstrates that municipal governments can clearly achieve the Heidelberg target of 20% emissions reductions in their own operations, but reaching this target for community-wide emissions may prove more elusive. (A few municipalities who can effect a major switch from coal to natural gas in electricity generation, such as Copenhagen, may be the exception.) The overwhelming attraction of the car to individual lifestyle was cited as a major barrier to achieving success, and participants singled out the transportation sector as the most difficult challenge locally.

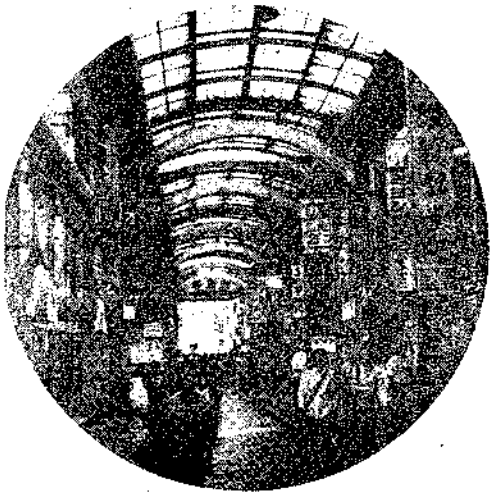
In order to address the continuing lack of political support from higher levels of government, participants sent a letter to national governments and the European Union, asking them to recognize and support the commitments made by municipalities with policy initiatives and financial resources. The letter also urges the nations that signed the Framework Convention on Climate Change to commit to legally binding reduction targets for CO_2 emissions at the next Conference of the Parties (COP 3) in Kyoto, Japan in December, 1997.

It was also decided at the Heidelberg Workshop that a follow-up workshop would be held in 1998 to report on further municipal progress. A compendium of abstracts, as well as the letter drafted at the Workshop, are available from Ms. Virginia Sonntag-O'Brien, CCP Europe Coordinator, at the ICLEI European Secretariat.

City and County of Denver, USA

Denver's abandoned Stapleton Airport promises to become a redevelopment model for planning new suburban communities that emit lower fossil fuel emissions, while lowering the municipal infrastructure maintenance costs typically associated with conventional subdivisions. A key aim of the Stapleton project is to demonstrate that CO_2 emissions can be reduced by 50% per capita in more compact neighborhoods. (See related ICLEI Case Study # 32: "Victoria, Australia – Greenhouse Neighborhood Project: The Low Energy Suburb".)

CCP–ASIA PACIFIC HOLDS FIRST TRAINING WORKSHOP



As a follow-up to the successful Third Local Government Leaders' Summit on Climate Change, held in Saitama Prefecture in October, 1995, the ICLEI Japan Office is co-sponsoring with the Prefecture government the first training workshop for the region. Local governments in the Asia Pacific will gather from November 19-21 in Omiya, Japan. Key purposes of the workshop are to:

- review global activities on climate change;
- facilitate the development of local action plans;
- design elements for a methodology *Tool Kit* for the region; and
- further recruit participants to the CCP campaign.

Approximately 40-50 municipal officials will be attending from Australia, Bangladesh, China, Fiji, India, Indonesia, Japan, Korea, Malaysia, Nepal, New Zealand, Philippines, Thailand, and Vietnam.

Thanks to the support of the Japan Environment Agency, Japanese cities have become Asian Leaders in the development of Local Action Plans. For instance, up to 20 local governments have completed or will have completed a Plan by the end of 1996. The agency is also a co-sponsor of the workshop. ●

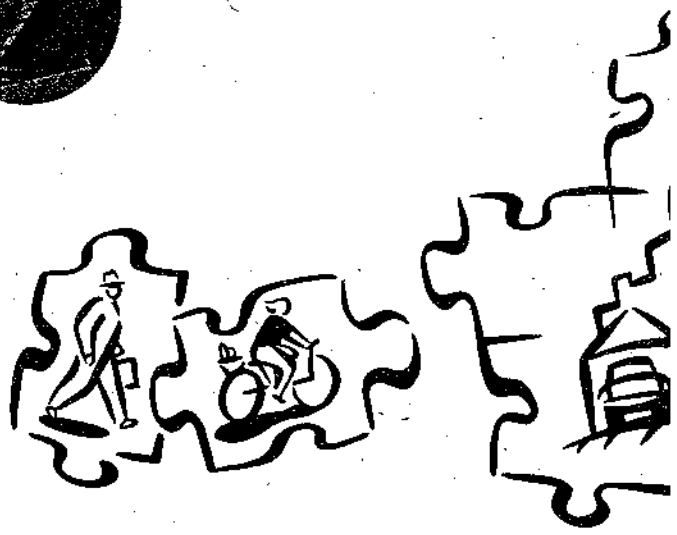
Toronto, Canada

With $30 million (CDN) from federal, provincial, and private sources, Toronto's Better Buildings Partnership will retrofit 100 commercial and institutional buildings. The pilot is part of the City's ambitious city-wide retrofit initiative, which began with a $18 million retrofit of its own facilities. Implemented by three energy service companies, the Partnership will reduce CO_2 emissions by 40,000 tonnes annually. The energy savings will create a revolving fund that seeds future retrofits.

On The Campaign Trail...

CAMPAIGN RECRUITMENT NEARS HALF WAY POINT

Participation in the CCP campaign has grown to 163 local governments worldwide. Most recent members joining in the fall of 1996 include: Suva City, Fiji; Durham, North Carolina, USA; and Bernalda, Italy. ICLEI's recruitment effort has benefited from productive partnerships with national municipal associations. In the US, for instance, Public Technology, Inc. has worked closely with the CCP – US to recruit 13 new participants in 1996. It is estimated that CCP participants worldwide account for just over 4% of global CO_2 emissions! The campaign's goal is to recruit municipalities accounting for a total of 10% of global emissions.



GREEN FLEETS PUBLICATIONS

The CCP – World Secretariat is completing a series of Green Fleets manuals and case studies, published in collaboration with Public Technology, Inc.. The first policy and practice manual, ***Commuting in the Greenhouse***, was published in early 1996. It offers practical advice and examples to municipalities wishing to incorporate employee trip reduction measures into their Local Action Plan. A second manual, ***Greening Municipal Fleets***, will be published by the end of 1996. It shows municipal decision-makers and fleets managers how to reduce the greenhouse gas emissions and air pollutants from fleet operations. A variety of measures are covered, including procurement of fuel efficient and alternative fuel vehicles, driver training and route optimization, and shifting to transit and bicycles. Case studies just published include:

- Case Study No. 42 – *Dayton, Ohio, USA - Police on Bikes Program;*
- Case Study No. 43 – *Chula Vista, California, USA - Telecommuting Promotion Program*; and
- Case Study No. 44 – *Edmonton, Alberta, Canada - Driver Training and Route Optimization Program.*

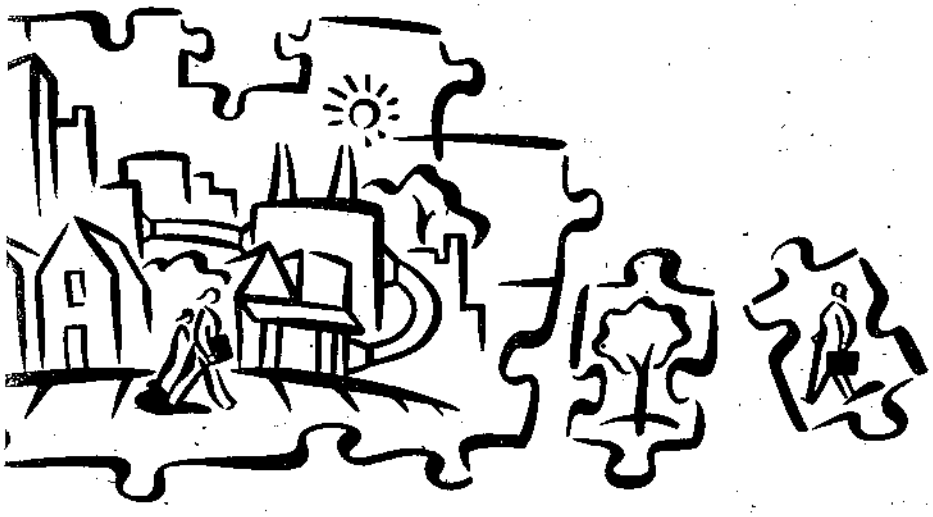
The Green Fleets publication series was funded by the US EPA and co-funded by the Consumers Gas Company of Toronto.

CCP – EUROPE

The CCP – Europe co-sponsored with the City of Heidelberg an international Follow-up Workshop for CCP participants, held in Heidelberg October 26 - 27 (see article, page 4).

CCP – ASIA PACIFIC

The CCP – Asia Pacific co-sponsored with Saitama Prefecture the first training workshop for the region on November 19-21, 1996 (see article, page 5).

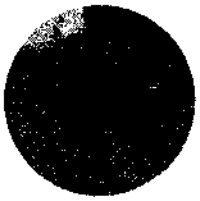


GREEN FLEETS FORUM

On December 2, 1996, a Green Fleets Forum will be held in Toronto, Canada. The Forum, as a part of Mayor Barbara Hall's Anti-Smog Plan, will solicit input from public institutions and private companies regarding how best to develop and implement a city-wide initiative to reduce emissions from vehicle fleets. Participants will include local governments in the Metro Toronto region, public utilities and universities, as well as courier and taxi companies. The Forum is being co-funded and sponsored by the Toronto Atmospheric Fund, Ontario Hydro, and Environment Canada. ●

CCP – US WORKSHOP

In June, 1996, ICLEI, Public Technology Inc., and funders co-sponsored the second workshop for the 41 municipalities participating in the CCP – US. The meeting was notable for the participants' swift completion of preliminary inventories of local energy use and greenhouse gas emissions. As expected, energy use per capita varied from one urban area to another, due to differences in land use, climate, and other factors. A follow-up workshop for CCP municipalities will occur in Philadelphia on November 24, 1996, repeating the training for CCP – US municipalities that missed the Berkeley workshop. The Berkeley workshop was funded by the US EPA, the City of Berkeley, and The Climate Institute. ●



Looking Back to the Future... *Continued from page 1*

HISTORY WAS MADE

The Toronto workshop was just the first in a long series of ICLEI sponsored activities that evolved as the Project grew, including seven subsequent workshops. Looking back, however, the meeting was historic for several reasons.

The event was especially memorable because it launched ICLEI's first international project. Indeed, as ICLEI's first workshop, it set a standard for later workshops because of its practical work oriented agenda, attendance by elected officials accompanied by technical staff, and strong local sponsorship.

The Toronto workshop was also the first international event to focus on climate change and urban concerns (together with a Climate Institute conference, *Cities and Global Change*, held in conjunction with the workshop). While many municipalities developed energy policies to respond to the 1980's oil shocks, only a few (Toronto and Hannover, Germany) adopted CO_2 reduction targets to guide their energy policies. By the 1990s, it was time for broader consideration of climate change as a local energy issue.

Finally, the workshop convened soon after the 2nd World Climate Conference. The Conference issued a declaration that eventually led to the Framework Convention on Climate Change (FCCC) adopted at the Earth Summit. However, despite the European Community's announcement of a commitment to stabilize CO_2 emissions, international negotiations had stalled by mid-1991. Broader political support from local government was needed.

So the Toronto workshop was timely. Addressing the workshop, Philip Jessup, the Project's director, said: "What ICLEI expects from you is deliberate action: a commitment from your local governing council to reduce CO_2 emissions significantly over the next 10 - 20 years."

By mid-1996, most of the participants of the Project had made such commitments and were thus broadening local support for national climate action plans.

ACCOMPLISHMENTS

The Project sought to develop:

- a generic framework for urban energy analysis and action to reduce GHG emissions that would be widely applicable; and
- analytical tools to better enable municipalities to make effective policy decisions to reduce GHG emissions.

In addition, the Project aimed to create networks among cities to encourage wider municipal interest and action on global warming.

What did the Urban CO_2 Reduction Project actually accomplish? Until ICLEI's initiative, national energy policies were largely concerned with utility regulation, international energy flows, and national security. They still are. The Urban CO_2 Reduction Project, however, helped distinguish urban energy use as a strategic opportunity for GHG reductions by characterizing energy patterns occurring under the authority of municipal governments.

For instance, the Project found that municipal operations, such as buildings, industrial type facilities, vehicle fleets, and employee travel, may account for as much as 5-10% of total urban GHG emissions when methane emissions from municipal landfills are considered.

Through their detailed inventories of local energy patterns, the Project's participants identified multiple leverage points for municipal action. In addition to municipal operations, these include:

- regulatory authority over commercial and residential buildings;
- investments in roads and transit;
- ownership and control of local utilities; and
- management of land use.

Dade County, Florida, USA

Dade County in partnership with Habitat for Humanity is developing its first residential community, Jordan Commons, modeled after the County's Traditional Neighborhood Development Ordinance. The 40-acre tract – a low-income neighborhood devastated by Hurricane Andrew – will incorporate energy conserving measures to significantly reduce the cooling load, with energy savings predicted at 50% compared with conventional Florida sub-divisions. The design of the new community will emphasize walking and cycling over car use.

The land use connection stood out in the Project's findings. Local energy use per capita was shown to vary proportionately with population density in most cities, corroborating pioneering academic research by Peter Newmann and Jeff Kenworthy.

The Project also developed a distinctive framework for urban energy analysis, adapted from traditional methods of energy analysis widely practiced in other sectors. ICLEI will soon publish this framework as a *Tool Kit* customized initially for American cities.

In sum, the Project cities laid the analytical foundations for ICLEI's CCP campaign by establishing a credible case for the municipal role in energy policy, while creating practical tools that will enable municipal officials to develop and effectively implement local action plans.

LESSONS FOR THE FUTURE

Looking forward, ICLEI has learned valuable lessons from the Project that will strengthen future campaign activities.

The foremost lesson is that strong peer relationships among municipal officials coming from different communities forges strong political champions. Such relationships motivate participants to do the hard work required to develop a meaningful local action plan. They also serve to disseminate practical, innovative examples of municipal policies and practices.

For instance, after seeing the benefits of compact urban settings firsthand at European workshops, American officials in the Project developed "new urbanism" projects locally to showcase CO_2 reductions by as much as 50% compared with conventional suburban sub-divisions (see Denver and Dade County bylines).

Second, quantification of local energy use and emissions is a powerful framework for setting targets, prioritizing policies, and deciding how best to allocate precious resources. For example, Toronto's inventory showed that commercial and institutional buildings were the major source of emissions locally. Further analysis revealed that significant energy efficiency gains could be made at little net cost to the City (see Toronto byline).

Finally, municipal bans of CFCs in the US and Canada in the late 1980s showed that local governments could tackle global issues and influence national policy in positive ways. The growing municipal network fostered by the Project, together with global summits sponsored by the UN in New York, Berlin, and Saitama Prefecture, Japan, is gradually having an impact.

National governments are paying attention. Deliberations in the UN Conference of the Parties that oversees the FCCC now include consideration of municipal policies and measures. If municipal leadership hasn't "landed" in most national climate action plans as yet, municipal policies and measures are now at least on the radar screen of many national governments. After five years of hard work by the Project participants, cities are pointing the way to significant global GHG reductions.

Says Ralph Torrie, long-term advisor to ICLEI: "Global warming will be averted largely because municipal governments themselves will transform their physical and spatial forms in ways that reduce energy use per capita worldwide over the long term."

Donor Spotlight: US EPA Supports Municipal Climate Action

David Gardiner, EPA Assistant Administrator, presents Pam O'Conner, Council Member for Santa Monica, California, with Municipal Achievement Award.

The US Environmental Protection Agency (EPA) in Washington DC is leading the federal government's effort to stimulate greenhouse gas reductions at the municipal government level. By providing direct support to initiatives such as ICLEI's Cities for Climate Protection Campaign and Green Fleets Project, the US EPA is extending its "voluntary challenge" programs to municipalities. By cultivating champions for climate action at the local level the US EPA is creating local models of action and success and, at the same time, improving the effectiveness of its own programs.

The EPA's municipal outreach is being led by two offices: the Office of Policy, Planning and Evaluation (OPPE), David Gardiner, Assistant Administrator; and the Office of Air and Radiation (OAR), Mary Nichols, Assistant Administrator.

OPPE programs such as State and Local Outreach, Climate Wise, Transportation Partners, and Constituencies at Risk are sponsoring technical assistance, education, and grants directly to local governments. The effort is building a strong national network of municipal leaders and model programs that are demonstrating that climate change is growing in importance locally as climate change issues become more integrated into concerns about air pollution, quality of life, and economic competitive-

Helsinki Area Metropolitan Authority, Finland

As a part of their Local Action Plan, Helsinki has committed to reduce local transportation energy use by 20% by 2020. The municipal government aims to reduce auto use by expanding light-rail, advocating fuel tax increases, amending land use policies, and promoting telecommuting. Helsinki already has one of the most extensive bicycle networks of any northern city. (See related ICLEI Case Study # 36: "Portland, Oregon – Integration of Transportation and Land Use Policies.")

ness. OPPE supported activities include:

- development of the Cities for Climate Protection Campaign – US, including support for recruitment, capacity building activities, training materials, and quantification research (the network now numbers 41 local governments), with recruitment efforts being assisted by Public Technology, Inc. (PTI);
- grants to municipalities to encourage them to recruit local companies to reduce greenhouse gas emissions, as well as undertake retrofits of their own industrial-type operations such as wastewater treatment;
- grants to support model transportation projects designed to reduce automobile travel demand and improve alternate transportation choices; and
- a study of the risks of climate change to urban populations in the US.

The EPA's initiatives are getting results. "Municipal action to increase energy effeciency and reduce fossil fuel use are extremely significant in protecting our climate, both nationally and globally. The leadership shown by Cities for Climate Protection will result in tangible benefits such as improved air quality, new job opportunities, and lower greenhouse emissions. Your actions are to be applauded." Said David Gardiner, speaking at the second US Cities for Climate Protection workshop in June, 1996.

OAR programs include voluntary challenges such as Green Lights and Energy Star initiatives. Through its support of a Climate Institute, PTI, and ICLEI collaborative effort, the OAR is providing technical assistance to local governments in order to spur energy efficiency retrofits of municipally owned buildings and facilities.

EPA's local government initiatives are evolving into a broad partnership that is nourishing the local support needed for a new round of federal actions designed to reduce greenhouse gas reductions after the year 2000 to below their 1990 level. Negotiations for the post 2000 targets will take place at COP 3 in December of 1997. Municipal leaders, for their part, recognize the value of combining local with global concerns. "Federal action alone will not achieve the US target; cities must take a leadership role. Cities sharing what they have learned will help us suceed," says Vera Katz, Mayor of Portland, Oregon.

ONE-STOP GUIDE TO US EPA CLIMATE RESOURCES ON WORLD WIDE WEB

NAME OF PROGRAM	BOOKMARKS
US EPA Home Page	**http://www.epa.gov**
Office of Air & Radiation	http://www.epa.gov/oarhome.html
Energy Star Programs	http://www.epa.gov/energystar.html
Buildings	http://www.epa.gov/GCDOAR/esb-home.html
Green Lights	http://www.epa.gov/greenlights.html
Office Equipment	http://www.epa.gov/office.html
Homes	http://www.epa.gov/GCDOAR/homes.html
Landfill Methane Outreach	http://www.epa.gov/methane.html
Office of Solid Waste and Emergency Response	http://www.epa.gov/epaoswer/index.htm
Guide to Waste Management	http://www.epa.gov/epaoswer/non-hw/muncpl/dmg2.htm
Municipal Solid Waste Factbook	http://www.epa.gov/epaoswer/non-hw/muncpl/factbook.htm
Office of Policy, Planning and Evaluation	http://www.epa.gov/docs/oppe/oppe.html
Economy and Environment Program	http://www.epa.gov/docs/oppe/oppe.html
Transportation Policy	http://www.epa.gov/oppe/transpo/index.htm
Transportation Partners	http://www.transact.org/tp/index.htm
Other Valuable US Resources	
US DOE Home Page	http://apollo.osti.gov/home.html
Cites and Counties Project	http://www.nrel.gov/documents/cities_counties/cities_counties.html
Energy Efficiency and Renewable Energy Network (EREN)	http://www.eren.doe.gov
Clean Cities	http://www.ccities.doe.gov
PTI's Energy Efficiency Services	http://pti.nw.dc.us/ESASI.htm
Center for Renewable Energy and Sustainable Technology (CREST)	http://solstice.crest.org

PARTICIPANTS IN THE CITIES FOR CLIMATE PROTECTION CAMPAIGN

1 ABU DHABI, United Arab Emirates
2 ACCRA, Ghana
3 ALBUQUERQUE, New Mexico, USA
4 AMSTERDAM, Netherlands
5 ATLANTA, Georgia, USA
6 AUSTIN, Texas, USA
7 BARCELONA, Spain
8 BAUTZEN, Germany
9 BELO HORIZONTE, Brasil
10 BERKELEY, California, USA
11 BERLIN, Germany
12 BERLIN-KÖPENICK, Germany
13 BERNALDA, Italy
14 BIRMINGHAM, UK
15 BOLOGNA, Italy
16 BOUCHERVILLE, Quebec, Canada
17 BOULDER, Colorado, USA
18 BROWARD COUNTY, Florida, USA
19 BUDAPEST, Hungary
20 BURIEN, Washington, USA
21 BURLINGTON, Vermont, USA
22 BURNABY, British Columbia, Canada
23 BURNLEY BOROUGH COUNCIL, UK
24 CAJAMARCA, Peru
25 CALGARY, Alberta, Canada
26 CAMBRIDGESHIRE COUNTY COUNCIL, UK
27 CAMPBELL RIVER, British Columbia, Canada
28 CHICAGO, Illinois, USA
29 CHITTENDEN COUNTY, Vermont, USA
30 CHULA VISTA, California, USA
31 COPENHAGEN, Denmark
32 DADE COUNTY, Florida, USA
33 DELTA COUNTY, Michigan, USA
34 DENVER, Colorado, USA
35 DIDSBURY, Alberta, Canada
36 DRESDEN, Germany
37 DUBLIN, Ireland
38 DUNDAS, Ontario, Canada
39 DURHAM, North Carolina, USA
40 DÜSSELDORF, Germany
41 EASTLEIGH BOROUGH, UK
42 EDMONTON, Alberta, Canada
43 ENERGIESTADT, Switzerland
44 ENTEBBE, Uganda
45 ERFURT, Germany
46 ERLANGEN, Germany
47 ESPOO, Finland
48 EXETER, UK
49 FED. OF CDN MUNICIPALITIES, Canada
50 FEDERATION of PEI MUNICIPALITIES, Canada
51 FORT SMITH, Northwest Terr., Canada
52 FLORENCE, Italy
53 FREIBURG, Germany
54 GDANSK, Poland
55 GONDOLA POINT, New Brunswick, Canada
56 GÖTEBORG, Sweden
57 GRAND CENTRE, Alberta, Canada
58 GRAZ, Austria
59 GULU, Uganda
60 HAMILTON, New Zealand
61 HAMILTON-WENTWORTH, Ontario, Canada
62 HANNOVER, Germany
63 HEIDELBERG, Germany
64 HELSINKI METROPOLITAN AREA, Finland
65 HILSBOROUGH COUNTY, Florida, USA
66 HUDSON'S HOPE, British Columbia, Canada
67 IUMKREIS, Germany
68 IROQUOIS FALLS, Ontario, Canada
69 JERUSALEM, Israel
70 JINJA, Uganda
71 KALININGRAD, Russia
72 KALLITHEA, Greece
73 KAMAKURA, Japan
74 KAMLOOPS, British Columbia, Canada
75 KARLSRUHE, Germany
76 KATOWICE, Poland
77 KITCHENER, Ontario, Canada
78 KOSHIGAYA, Japan
79 KRISTIANSAND, Norway
80 KRNOV, Czech Republic
81 KUMAMOTO CITY, Japan
82 LEICESTER, UK
83 LEIPZIG, Germany
84 LINDSAY, Ontario, Canada
85 LINZ, Austria
86 LISBON, Portugal
87 LITTLE ROCK, Arkansas, USA
88 LIVORNO, Italy
89 LJUBLJANA, Slovenia
90 LONDON, Ontario, Canada
91 LOS ANGELES, California, USA
92 LÜBECK, Germany
93 LUCERNE, Switzerland
94 LVIV, Ukraine
95 MANCHESTER, UK
96 MAPLEWOOD, New Jersey, USA
97 MATSQUI, British Columbia, Canada
98 METROPOLITAN TORONTO, Ontario, Canada
99 MILAN, Italy
100 MILWAUKEE, Wisconsin, USA
101 MINNEAPOLIS, Minnesota, USA
102 MISSISSAUGA, Ontario, Canada
103 MISSOULA, Montana, USA
104 MONTREAL EAST, Quebec, Canada
105 MOUNT RAINIER, Maryland, USA
106 NAPLES, Italy
107 NEWARK, New Jersey, USA
108 NEWCASTLE- UPON-TYNE, UK
109 NORTH VANCOUVER, British Columbia, Canada
110 NORTH YORK, Ontario, Canada
111 OAKLAND, California, USA
112 OLYMPIA, Washington, USA
113 ORANGE COUNTY, Florida, USA
114 OTTAWA, Ontario, Canada
115 OTTAWA- CARLETON, Ontario, Canada
116 OVERLAND PARK, Kansas, USA
117 PALERMO, Italy
118 PETERSBURG, Virginia, USA
119 PITTSBURGH, Pennsylvania, USA
120 PONOKA, Alberta, Canada
121 PORT ALBERNI, British Columbia, Canada
122 PORT MOODY, British Columbia, Canada
123 PORTLAND, Oregon, USA
124 PRAGUE, Czech Republic
125 REGINA, Saskatchewan, Canada
126 RHEDA-WIEDENBRÜCK, Germany
127 RIGA, Latvia
128 ROME, Italy
129 ROTTERDAM, Netherlands
130 ROVIGO, Italy
131 SAARBRÜCKEN, Germany
132 SAINT PAUL, Minnesota, USA
133 SAITAMA PREFECTURE, Japan
134 SAN FRANCISCO, California, USA
135 SAN JOSE, California, USA
136 SANTA FE, New Mexico, USA
137 SANTA MONICA, California, USA
138 SARASOTA COUNTY, Florida, USA
139 SCHWERIN, Germany
140 SÉTUBAL, Portugal
141 SHEFFIELD, UK
142 SIOFOK, Hungary
143 STRATHCLYDE REGIONAL COUNCIL, UK
144 STRATHCONA COUNTY, Alberta, Canada
145 SUVA CITY, Fiji
146 SWALE BOROUGH, UK
147 TACOMA PARK, Maryland, USA
148 TAMPA, Florida, USA
149 TEHRAN, Iran
150 THE PAS, Manitoba, Canada
151 TORINO, Italy
152 TORONTO, Ontario, Canada
153 TUCSON, Arizona, USA
154 VANCOUVER, British Columbia, Canada
155 VENICE, Italy
156 VICTORIA, British Columbia, Canada
157 VIERNHEIM, Germany
158 WARSAW-MOKOTOW, Poland
159 WARSAW-ZOLIBORZ, Poland
160 WEST HOLLYWOOD, California, USA
161 WHITEHORSE, Yukon, Canada
162 WROCLAVIA, Poland
163 ZÜRICH, Switzerland

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International Council for Local Environmental Initiatives

CITIES FOR CLIMATE PROTECTION

The Cities for Climate Protection is a campaign that seeks to engage municipalities around the world in climate change abatement policy. The Campaign's goals are to:

- strengthen local commitment to reduce greenhouse gas emissions;
- develop and disseminate tools that increase local capacity and enhance strategies for energy efficiency;
- promote best practices to reduce energy use in buildings and transportation; and
- provide a collective voice for municipalities internationally.

The Campaign is a project of the International Council for Local Environmental Initiatives (ICLEI), a membership organization of local governments and their associations. The Council is dedicated to building local government capacity worldwide to support both local and global environmental protection and sustainable development activities at the urban level.

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