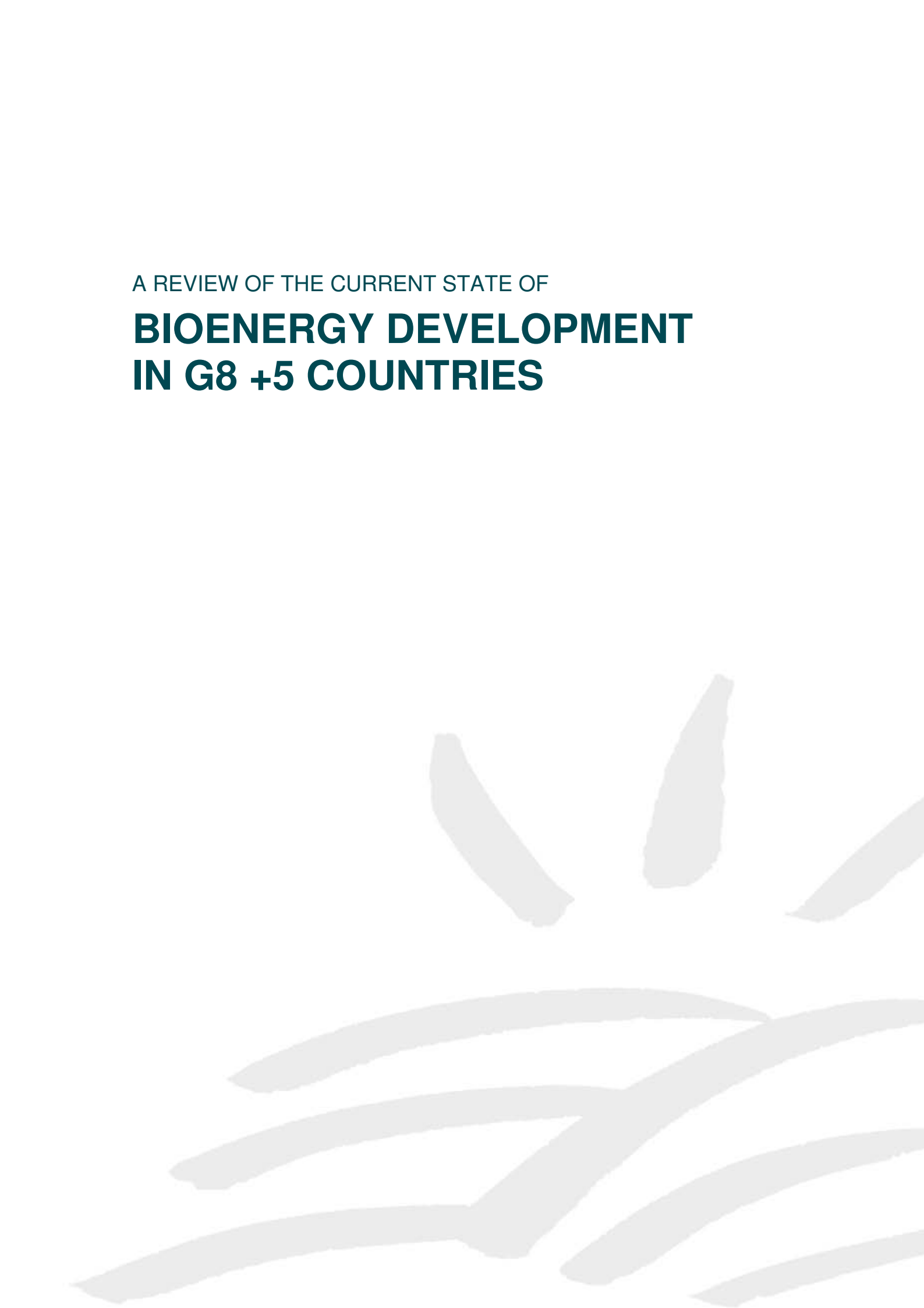
A REVIEW OF THE CURRENT STATE OF

BIOENERGY DEVELOPMENT IN G8 +5 COUNTRIES



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Dear Colleagues,

Bioenergy has rapidly emerged as a top priority on the international agenda. The Global Bioenergy Partnership builds its activities upon three strategic pillars: energy security, food security and sustainable development. It was established to implement the commitments taken by the G8 +5 Countries in the 2005 G8 Summit in Gleneagles, and was recently invited by the G8 Summit in Heiligendamm to "continue its work on biofuel best practices and take forward the successful and sustainable development of bioenergy".

This Report represents a strategic tool to respond to this mandate furthering the global goal of sustainable bioenergy development.

Bioenergy production and use is increasing inexorably all over the world and although priorities may vary, its reasons are shared by most countries:

- rising oil prices and energy security considerations are forcing countries to look for alternative fuels;
- biofuels can play a role in rural development in some countries, providing energy access to remote communities and creating employment;
- last but certainly not least, climate change benefits that can be realized through reduction of GHG emissions.

We are keenly aware that a fast growth in bioenergy demand and supply bears some risks for food security and for the environment. Rising demand for bioenergy has already caused a surge in the use of grain and other food crops for energy and some crop commodities prices have risen. Bioenergy also poses environmental challenges, for instance increasing mono-cropping practices and greater fertiliser and pesticide use may jeopardise water and soil quality. Perhaps of highest concern is land use change and the risk that large areas of natural forests and grasslands be converted to energy crop production, which not only would threaten biodiversity preservation and other ecosystem services, but also result in additional greenhouse gas emissions.

In this respect, sustainability is a key objective and it is wise to put in place the necessary safeguards to ensure sustainable management of the entire production chain – feedstock production, processing and use of biofuels. An enormous amount of work needs to be done to develop, disseminate and implement these safeguards and best practices. If bioenergy production systems are not developed so that they can be sustained over time, bioenergy supply will not reach its potential and therefore will not deliver the expected benefits.

Life cycle analysis, labelling and "certification of origin" of biofuels should be agreed internationally and introduced into the global energy market. GBEP is already looking into the harmonization of methodologies to measure GHG impacts of biofuels used for transportation as contribution to this end. Certification and labeling mechanisms should be used to ensure sustainable development, environmental gains and to promote social equity but not to introduce barriers to trade.

Accelerating bioenergy innovation and tackling its main challenges will require strong cooperation, and the Global Bioenergy Partnership aims to play an important role. This overview of current bioenergy developments in G8 +5 Countries should help identify where there is common ground in policy priorities and opportunities for international cooperation, as well as provide guidance on what still needs to be done for a sustainable development of bioenergy.

The Global Bioenergy Partnership should take advantage of the current momentum to make sustainability criteria and best practices a major area of its work.

Take action now!

Corrado Clini
GBEP Chair

Alexander Müller
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Executive Summary

Bioenergy sits at the intersection of three of the world's great challenges - energy security, climate change, and poverty reduction - and has received an enormous amount of attention in the past few years. Joint work on these issues is vital considering that together, the G8 +5 Countries account for about 55 percent of the world's population, 70+ percent of global GDP, and about 72 percent of world energy-related and industry CO_2 emissions (excluding deforestation).

Bioenergy statistics are inadequate and not up to date. They are essential to understand the dynamics of bioenergy systems; evaluating the role played by different types of biofuels in the energy sector and supply sources; assessing the share of biomass used (directly and indirectly) for energy purposes; assessing the role of biofuel in GHG inventories; and formulating sound policies.

According to the best data available, bioenergy provides about 10 percent of the world's total primary energy supply (47.2 EJ of bioenergy out of a total of 479 EJ in 2005, i.e. 9.85 percent). Most of this is for use in the residential sector (for heating and cooking) and is produced locally. In 2005 bioenergy represented 78 percent of all renewable energy produced.

A full 97 percent of biofuels are made of solid biomass, 71 percent of which used in the residential sector. Biomass is also used to generate gaseous and liquid fuels, and growth in demand for the latter has been significant over the last ten years. Biomass provides a relatively small amount of the total primary energy supply (TPES) of the G8 Countries (1-4 percent). By contrast, bioenergy is a significant part of the energy supply in the +5 Countries representing from 5-27 percent of TPES. China with its 9000 PJ/yr is the largest user of biomass as a source of energy, followed by India (6000 PJ/yr), USA 2300 PJ/yr, and Brazil (2000 PJ/yr), while bioenergy's contribution in Canada, France and Germany is around 450 PJ/yr.

The bioenergy share in India, China and Mexico is decreasing, mostly as traditional biomass is substituted by kerosene and LPG. However the use of solid biomass for electricity production is important, especially from pulp and paper plants. Bioenergy's share in total energy consumption is increasing in the G8 Countries especially Germany, Italy and the United Kingdom.

There are four key factors driving interest in bioenergy: rising prices for fossil fuels, in particular oil prices; energy security; climate change; and rural development. Bioenergy markets are largely policy dependent in most of the world, as the production of biofuels in most countries is not at this point competitive with fossil fuels. Nearly all countries reported that energy security and climate change are the most important drivers of their bioenergy development activities. Overall there are few differences between the policy objectives of G8 Countries and the +5 Countries. Rural development is more central to the +5 Countries' focus on bioenergy development, and this is often aligned with a poverty alleviation agenda.

Feed-in tariffs, taxes, guaranteed markets (i.e. renewable energy and fuel mandates, and preferential purchasing), compulsory grid connections, other direct supports (i.e. grants,

loan guarantees, subsidies, construction incentives, etc.), and R,D&D are the principal policy mechanisms being deployed by the G8 +5 Countries to encourage bioenergy development. Bioenergy markets are further influenced by general energy, agriculture and forestry, climate change, and environmental policies.

Feed-in tariffs are currently the world's most widespread national renewable energy policy and are in use in over half of the G8 +5 Countries. They are often crafted for renewable energy generally but are sometimes directed at bioenergy specifically. The feed-in tariff is the policy tool that has been most effective in stimulating renewable energy markets, however feed-in tariffs need to be differentiated by technology and biomass treated individually, in order to specifically boost bioenergy.

A variety of tax incentives and penalties are used by governments to foster bioenergy development and they are one of the most widely used support instruments. Taxes affect the cost-competitiveness of bioenergy vs. substitutes and therefore bioenergy viability in the marketplace.

National targets and public incentive systems have been effectively used in many countries, in particular for liquid biofuels for transport. Among the G8 +5 Countries, only Russia has not created a transport biofuel target. Voluntary quota systems or targets are common for biomass energy for heat, power and transport fuels in the G8 Countries, however, blending mandates enforceable via legal mechanisms are becoming increasingly utilized. Blending targets are less established in the +5 Countries but they are under discussion or awaiting approval. Preferential purchasing by governments can also be a powerful tool when effectively implemented. In policies relating to biofuels for transport, there is a trend towards policies such as blending mandates which don't require direct government funding, although publicly financed support remains significant.

Most countries use some form of direct loans or grants. The G8 +5 Governments are conducting research and development in their own laboratories and institutes and many are supporting public private partnerships and various forms of demonstration projects. Direct supports and R,D&D are being used in a number of G8 Countries to accelerate the commercial development of second generation biofuels for transportation.

A few governments are moving towards performance focused policies. Rather than mandate an amount of fuel to be consumed, these governments are mandating the amount of GHG reductions required. This strategy to harness market forces is rapidly gaining interest in Kyoto signatory countries that are looking for the most cost-effective GHG emission strategies.

There is a growing recognition that not all biofuels are "green." New schemes are under way to promote sustainability as well as link funding to sustainability. The European Union and some of its member states are working toward sustainability standards to attach to mandatory targets. Brazil has created its "social seal" and has tied it to its blending mandates.

The importance of developing bioenergy in a sustainable manner is universally recognized, yet no international sustainability assurance system exists for biofuels or bioenergy more broadly. Sustainability requirements will eventually need to be agreed upon internationally,

applied locally and to all biomass regardless of end use, if leakage effects or impact shifting is to be avoided.

There is a move towards harmonization of technical standards regionally and internationally. This is vital for quality assurance, equipment compatibility, and the facilitation of trade. Historically, biomass and biofuel trade flows have been limited, as most of the production has been for domestic consumption. However, in the coming years, international trade in biofuels and feedstocks is expected to escalate rapidly to satisfy increasing worldwide demand.

The World Trade Organization (WTO) does not currently have a trade regime specific to biofuels. International trade in biofuels falls, therefore, under the rules of the General Agreement on Tariffs and Trade (GATT 1994). In addition to the WTO, several regional and bilateral trade agreements, mostly involving the United States and the EU, currently regulate biofuels trade. International trade in biofuels and related feedstocks may provide win-win opportunities for some countries: for several developed countries imports are a necessary precondition for meeting the self-imposed blending targets; for several developing countries producing and exporting biofuels may provide new business opportunities and new end-markets for their agricultural products. For small and medium-sized developing countries, export markets may be necessary to initiate their industries, however, tariffs and other barriers are currently restricting trade.

Government policies play a key role in influencing investment in bioenergy. When carefully balanced with environmental and social conditions, such policies will also determine the long-term viability of this important emerging opportunity.

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Acronyms

AAFC Agriculture and Agri-Food Canada
ABIP Agricultural Bioproducts Innovation Program of Canada
ACP African Caribbean and Pacific
ADEME Agence Pour l'Environnement et la Maîtrise de l'Energie
AEEG Italian Regulatory Authority for Electricity and Gas
AII French Agency for Industrial Innovation
APEC Asia-Pacific Economic Cooperation
ASGISA Accelerated and Shared Growth Initiative for South Africa
ASEAN Association of Southeast Asian Nations
ASTM American Society for Testing and Materials
BDFZ German Research Centre for Biomass
BOPI Biofuels Opportunities for Producer Initiatives
BNDES Brazilian Development Bank
BSI Better Sugarcane Initiative
BSO Biofuel Sustainability Ordinance
CAFTA US-Central America Free Trade Agreement
CAP Common Agriculture Policy
CBERA Caribbean Basin Economic Recovery Act
CBI Caribbean Basin Initiative
CBTPA Caribbean Basin Trade Partnership Act
CDM Clean Development Mechanism
CEN European Committee for Standardization
CEF Central Energy Fund
CFS Canadian Forest Service
CHP Combined Heat and Power
CIAA Brazilian Inter-Ministerial Board for Sugar and Ethanol
CIPE Inter-Ministerial Board for Economic Programming for Italy
CNG Compressed Natural Gas
CNPC China National Petroleum Corporation
CONAMA National Council for the Environment
CONACYT Mexican National Council of Science and Technology
CREB Clean Renewable Energy Bonds
CRE Mexican Energy Regulatory Commission
CTE-SS Committee on Trade and Environment Special Session
CTFCA Canadian Transportation Fuel Cell Alliance
DDGs Dried Distillers Grains with Solubles
DBERR UK Department for Business, Enterprise and Regulatory Reform
DEFRA UK Department for Environment, Food and Rural Affairs
DOE U.S. Department of Energy
DOD U.S. Department of Defense
DOT U.S. Department of Transportation
DME South African Department of Minerals and Energy
DNA South African Designated National Authority
DTI UK Department of Trade and Industry
EC European Commission
EEC UK Energy Efficiency Commitment
EC DG European Commission Directorate General

EcoABC Eco Agriculture Biofuels Capital Initiative
EBA Everything But Arms Initiative
EBB European Biodiesel Board
EEG Germany's Renewable Energy Act
EIA US Department of Energy
ENEA Italian Agency for New Technologies, Energy and Environment
EPA US Environmental Protection Agency
EPACT Energy Policy Act
EPFL École Polytechnique Fédérale de Lausanne
ERC Energy Research Centre
EMBRAPA Brazilian Agricultural Research Corporation
EWG Energy Working Group
EGNRET Expert Group on New and Renewable Energy Technologies
EU European Union
EEP Ethanol Expansion Programme
EPA U.S. Environmental Protection Agency
ESCO Energy Service Company
ESMAP Energy Sector Management Assistance Programme
ETBE Ethyl tertiary butyl ether
FAEE Fatty Acid Ethyl Ester
FAME Fatty Acid Methyl Ester
FAO Food and Agriculture Organization of the United Nations
FFV Flexible Fueled Vehicles
FLO Fairtrade Label Organization
FSC Forest Stewardship Council
FTA US and Canada Free Trade Agreement
GATT General Agreement on Tariffs and Trade
GBEP Global Bioenergy Partnership
GEF Global Environment Facility
GHG Greenhouse Gas
GIS Geographical Information System
GOM Government of Mexico
GM General Motors
GREET Greenhouse gases Regulated Emissions and Energy use in Transportation
GSP Generalized System of Preferences
GTZ German Technical Cooperation
HS Harmonized System
IAA Sugar and Ethanol Institute
IATP Institute for Agriculture and Trade Policy
IBF International Biofuels Forum
IBSA India-Brazil- South Africa
IDB Inter-American Development Bank
IEA International Energy Agency
IFOAM International Federation of Organic Agricultural Movements
IGCC Integrated Gasification Combined Cycle
ILO International Labour Organization
ITABIA Italian Biomass Association
ISO International Standards Organization
INMETRO National Institute of Metrology, Standards and Industrial Quality of Brazil
I- WESTAT Interactive-Wood Energy Statistics of FAO

LAFRE Law for the Utilization of Renewable Sources of Energy
LCFS Low Carbon Fuel Standard
LFG Landfill Gas
LSPEE Mexican Public Electricity Service Act
MAPA Ministry of Agriculture, Livestock and Food Supply of Brazil
MIFAP Italian Ministry of Agriculture
MDB Multilateral Development Bank
MEA Multilateral Environmental Agreement
MERCOSUR Southern Common Market
MFN Most-Favoured Nations
MIT Massachusetts Institute of Technology
MSW Municipal Solid Waste
MTBE Methyl tertiary-butyl ether
NAFTA North American Free Trade Agreement
NAMA Negotiating Group on Non-Agriculture Market Access
NBA National Biofuels Action
nBAp National Biomass Action Plan
NGB Non Grain Based
NDRC National Development and Reform Commission of China
NFFO Non-Fossil Fuel Obligation
NNFCC National Non-Food Crops Centre
NIST US National Institute of Standards and Technology
NRCan National Resources Canada
OECD Organisation for Economic Co-operation and Development
OERD Office of Energy Research and Development
OPA Ontario Power Authority
PCHs Small Hydroelectric Centrals
PDD Project Design Document
PERD Programme on Energy Research and Development
PFV Powering Future Vehicles
PIN Project Idea Note
PM Particulate Matter
PROBIO National Biofuel Programme for Italy
PROINFA Brazilian Renewable Energy Incentive Program
PRONAC Mexican National Sugar Development Plan
PNVBAF Italian National Programme for the utilization of Agriculture and Forest Biomass
PNERB Italian National Programme of Biomass Renewable Energies
PSE Mexican Sectoral Programme of Energy
PTC Production Tax Crdeit
R & D Research & Development
R, D & D Research, Development & Demonstration
RE Renewable Energy
RECS Renewable Energy Certificate System
RES Renewable Energy Systems
RES-E Renewable Energy Source Electricity
RES-H Renewable Energy Source Heat
RETP Renewable Energy Technologies Programme
RES Renewable Energy Sources
RFA Renewable Fuels Association
RFS Renewable Fuels Standard

REPI Renewable Energy Production Incentive
RO Renewable Obligation
RPS Renewable Portfolio Standards
RSB Roundtable on Sustainable Biofuels
RTRS Roundtable for Responsible Soy
RTFO Renewable Transport Fuel Obligation
SBA Sustainable Biodiesel Alliance
SENER Mexican Ministry of Energy
SIEPCRM Integrated Energy Services for Small Rural Mexican Communities
SINOPEC China Petroleum and Chemical Corporation
SVO Straight Vegetable Oil
TB Treated Biogas
TEAM Technology Early Action Measures
TGAP Taxe Générale sur les Activités Polluantes
TIC Taxe Intérieure de consommation
TEC Common External Tariff
TFC Total Fuel Consumption
TPES Total Primary Energy Supply
TRQ Tariff Rate Quota
VAT Valued Added Tax
VEETC Volumetric Ethanol Excise Tax Credit
VOC Volatile Organic Compounds
UNEP United Nations Environment Programme
UNCTAD United Nations Conference on Trade and Development
UNIDO United Nations Industrial Development Organization
UNFCCC United Nations Framework Convention on Climate Change
USAID U.S. Agency for International Development
USDA U.S. Department of Agriculture
WTO World Trade Organization
WWF World Wildlife Fund

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Introduction

The Global Bioenergy Partnership (GBEP) was established to implement the commitments taken by the G8 +5 Countries in the 2005 Gleneagles Plan of Action to "promote the continued development and commercialisation of renewable energy by […supporting] wider, cost effective, biomass and biofuels deployment, particularly in developing countries where biomass use is prevalent".

In 2007 it was given a renewed mandate by the G8 Heiligendamm Summit to “continue its work on biofuel best practices and take forward the successful and sustainable development of bioenergy”.

This report is part of GBEP’s ongoing efforts to monitor the status of bioenergy development in the member countries and create a basis for future discussion of sustainability criteria and possible guidelines for sustainable bioenergy development.

It was requested by the GBEP Steering Committee and provides an overview of current bioenergy policies, strategies and legislation in G8 +5 Countries which represents a basis for recommendations on the future program of work of GBEP in order to promote sustainable development of bioenergy.

The information contained in Executive Summary and Chapters 1 and 2 does not necessarily reflect the views of GBEP Partners. Additionally, with the exception of India, the information in the country profiles and hence the information used for the analysis and comparisons, are based upon the documentation suggested and/or made available by the countries themselves.