MODERN BIOENERGY

2013: 23 EJ…

2030: 93 EJ !

MODERN BIOENERGY=SUSTAINABLE BIOENERGY

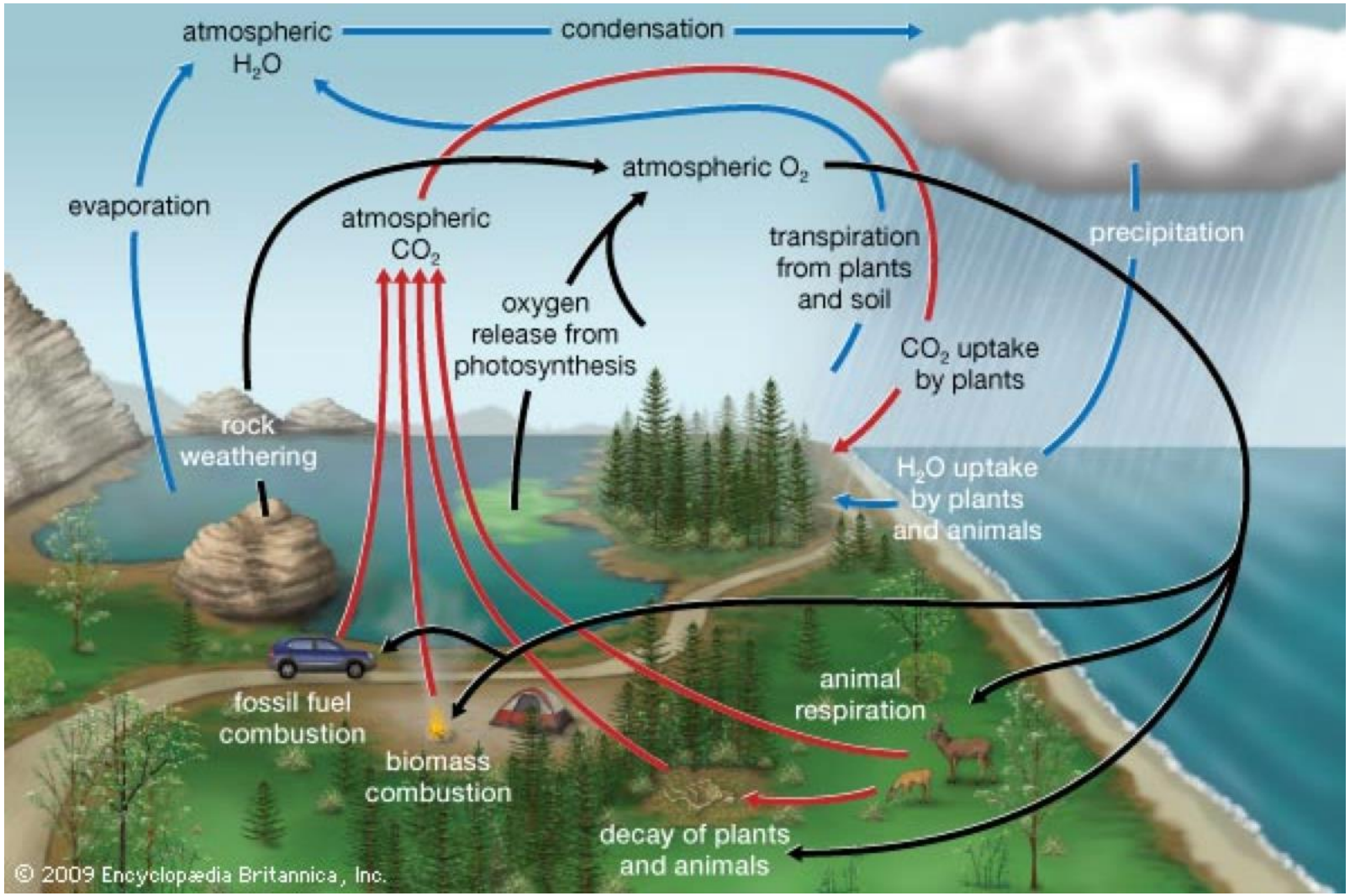
2013: 23 EJ…

2030: 93 EJ !

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs

Sustainability is the capacity of our human society to continue indefinitely within earth's natural cycles (biogeochemical cycles)

Carbon cycle – Water cycle – Nitrogen cycle – Phosphorus cycle – Sulfur cycle



The natural cycling of nutrients (chemicals) from the abiotic components of the ecosystem (water, air, soil, rock) through the biotic components (plants, animals, fungi, bacteria)

FAPESP Bioenergy Research Program BIOEN

Fundamental knowledge and new technologies

- **Academic Basic and Applied Research**
  - **Since 2009, 211 grants, +400 Brazilian researchers**
  - **– Regular, Theme and Young Investigator Awards**
  - **Open to foreign scientists who want to come to Brazil**
  - **R$ 109 million (FAPESP), R$ 55 million (State Government), R$ 20 million (industry), R$ 55 million (universities)**

- **SPBioenRC**
  - **State of São Paulo Bioenergy Research Center**
  - **FAPESP, USP, UNICAMP, UNESP, State of São Paulo Government**
  - **Creation of a Bioenergy PhD Program**

- **Partnerships**
  - **United States, United Kingdom and The Netherlands, Brazil**
  - **Oak Ridge National Laboratories, UKRC, BBSRC, BE-Basic, GSB, LACAF, BOEING, BP, Braskem, Dedini, ETH, Microsoft, Oxiteno, PSA Peugeot Citroën, Vale, EU**

- **Innovation Technology, Joint industry-university research (5 years)**

BIOEN network

RESEARCHERID

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You are viewing the ResearcherID Labs page for **FAPESP, BIOEN (H-6149-2012)**

Publications network: 30% of the articles derive from international cooperation

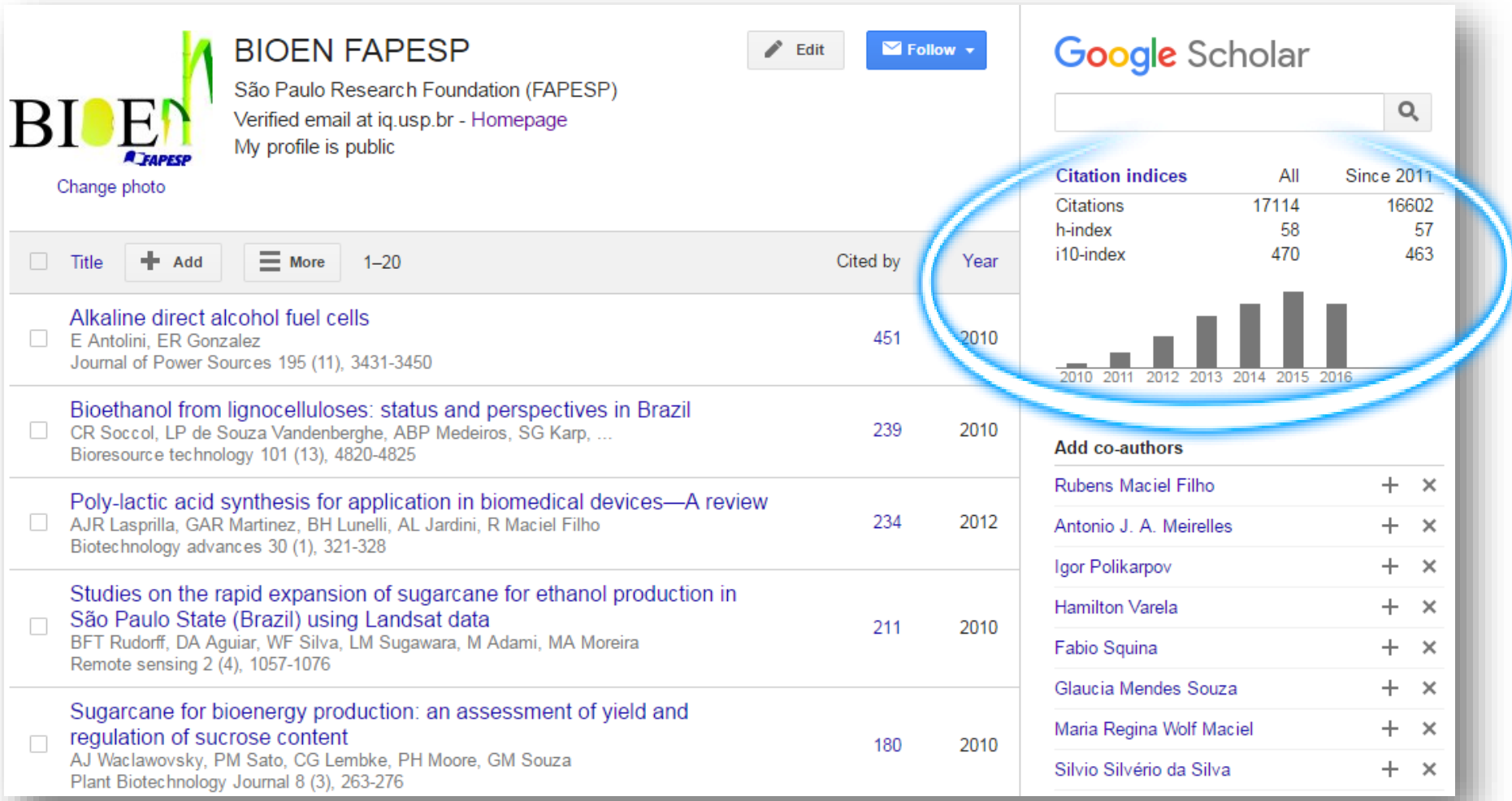
Publication type	Number
Articles	930
Book Chapters	81
Books	7
Doctoral theses	56
Master's dissertations	117
Abstracts	371
Awards	5
Patents	19
Software	1

Collaboration Network

The map graph below displays (up to) the top **500 geographic locations** for this researcher's co-authors. Scroll over the map and place your cursor on a pin to view city, state, and country information. Clicking on the pin will display bibliographic data for the paper that has cited the researcher's publication(s).

Top: Authors | Research Areas | Countries/Territories | Institutions | Map |

BIOEN production



BIOEN FAPESP

São Paulo Research Foundation (FAPESP)

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Title	Add	More	1–20	Cited by	Year
Alkaline direct alcohol fuel cells E Antolini, ER Gonzalez Journal of Power Sources 195 (11), 3431-3450				451	2010
Bioethanol from lignocelluloses: status and perspectives in Brazil CR Soccol, LP de Souza Vandenberghe, ABP Medeiros, SG Karp, ... Bioresource technology 101 (13), 4820-4825				239	2010
Poly-lactic acid synthesis for application in biomedical devices—A review AJR Lasprilla, GAR Martinez, BH Lunelli, AL Jardini, R Maciel Filho Biotechnology advances 30 (1), 321-328				234	2012
Studies on the rapid expansion of sugarcane for ethanol production in São Paulo State (Brazil) using Landsat data BFT Rudorff, DA Aguiar, WF Silva, LM Sugawara, M Adami, MA Moreira Remote sensing 2 (4), 1057-1076				211	2010
Sugarcane for bioenergy production: an assessment of yield and regulation of sucrose content AJ Waclawovsky, PM Sato, CG Lembke, PH Moore, GM Souza Plant Biotechnology Journal 8 (3), 263-276				180	2010

Google Scholar

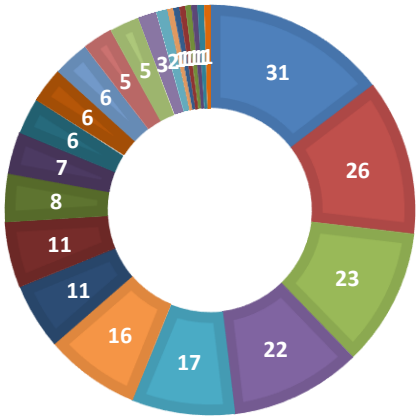
Citation indices	All	Since 2011
Citations	17114	16602
h-index	58	57
i10-index	470	463

Add co-authors

- Rubens Maciel Filho
- Antonio J. A. Meirelles
- Igor Polikarpov
- Hamilton Varela
- Fabio Squina
- Glaucia Mendes Souza
- Maria Regina Wolf Maciel
- Silvio Silvério da Silva

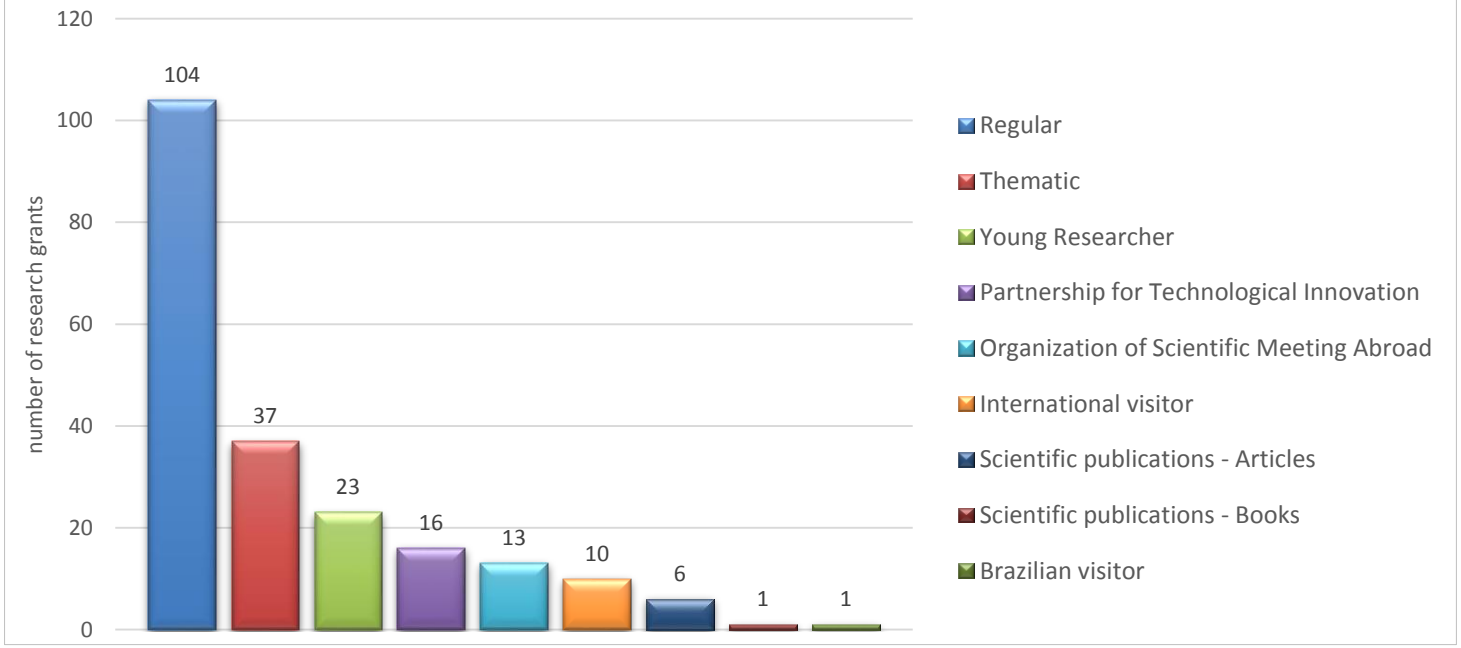
A multi-disciplinary Program: 24 FAPESP Areas

BIOEN Projects per field of knowledge



- Agronomy
- Biochemistry
- Chemistry
- Agricultural Engineering
- Botany
- Economics
- Sanitary Engineering
- Ecology
- Geography
- Forest Engineering & Resources
- Mathematics
- Nuclear Engineering
- Chemical Engineering
- Genetics
- Microbiology
- Interdisciplinary
- Food Science and Technology
- Mechanical Engineering
- Biophysics
- Physics
- Electrical Engineering
- Geosciences
- Metallurgical and Materials Engineering
- Political Science

BIOEN Projects per grant type



FAPESP-BIOEN support in numbers	
Ongoing research grants	61
Completed research grants	150
Ongoing scholarships in Brazil	77
Completed scholarships in Brazil	368
Ongoing scholarships abroad	9
Completed scholarships abroad	27
All research grants and scholarships	**692**

BIOEN DIVISIONS

BIOMASS
Contribute with knowledge and technologies for sugarcane improvement
Enable a systems biology approach for biofuel crops

BIOFUEL TECHNOLOGIES
Increasing productivity, energy saving, water saving and minimizing environmental impacts

ENGINES
Flex-fuel engines with increased performance, durability and decreased consumption, pollutant emissions

BIOREFINERIES
Complete substitution of fossil fuel derived compounds
Sugarchemistry for intermediate chemical production and alcoholchemistry as a petrochemistry substitute

SUSTAINABILITY AND IMPACTS
Studies to consolidate sugarcane ethanol as the leading technology path to ethanol and derivatives production
Horizontal themes: social and economic Impacts, environmental studies and land use

Primary energy use at 550 EJ
87% not renewable

Emissions at 32 Gt CO2/yr

1.2 billion people without regular energy access

Oceans are acidifying
Loss of biodiversity

1 billion cars in the world

Extreme weather events
Loss of ecosystems

Created in 1988

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. The UN General Assembly endorsed the action by WMO and UNEP in jointly establishing the IPCC.

On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground

Svante Arrhenius

Philosophical Magazine and Journal of Science
Series 5, Volume 41, April 1896, pages 237-276.

The New York Times

World

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS | OPINION

AFRICA | AMERICAS | ASIA PACIFIC | EUROPE | MIDDLE EAST

Global Warming Talks Open in Kyoto

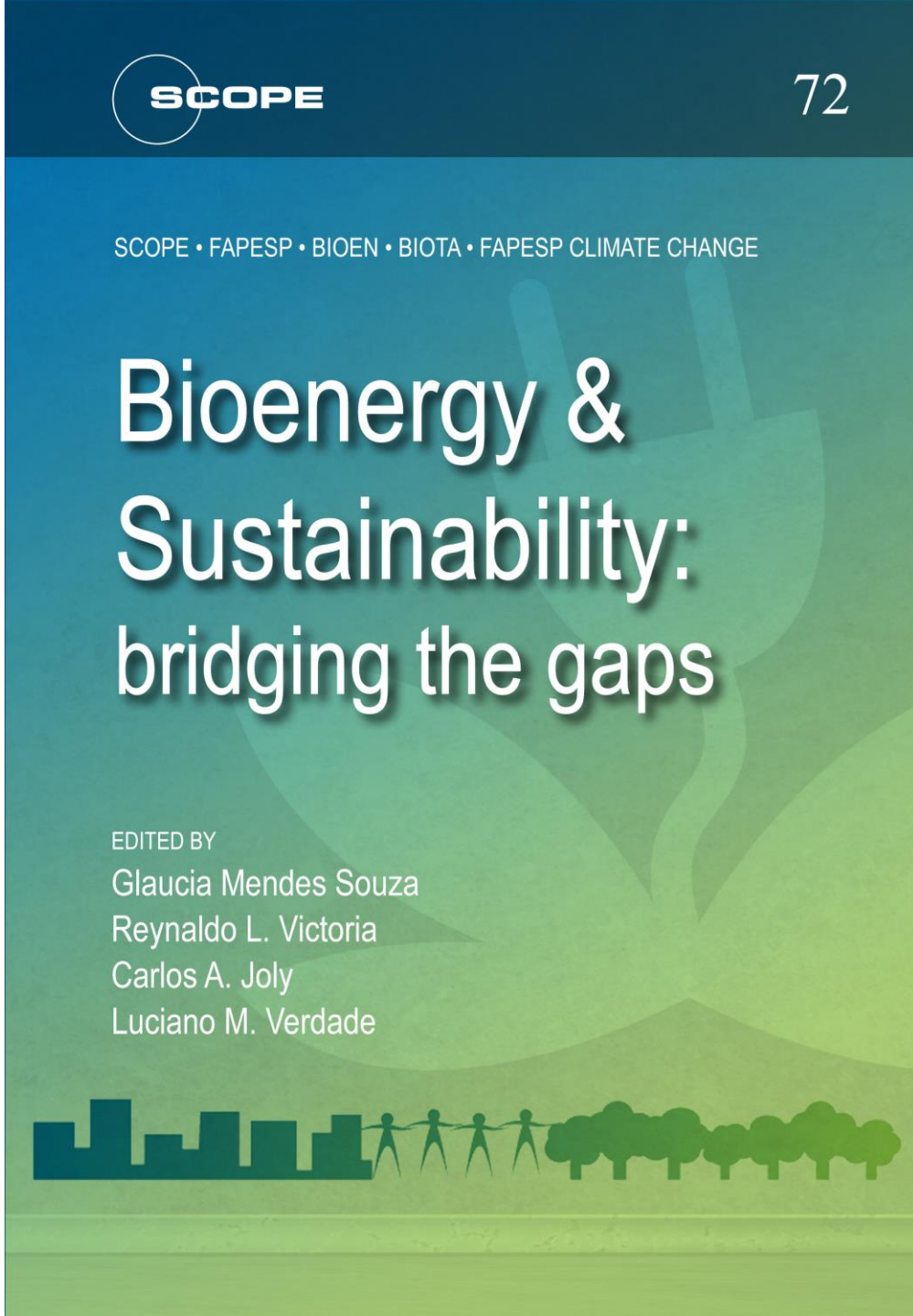
By WILLIAM K. STEVENS
Published: December 2, 1997

SCOPE-FAPESP
Reporting a global assessment of
Bioenergy & Sustainability
137 experts from 24 countries

Bioenergy now
Bioenergy expansion
Energy security
Food security
Environmental and climate security
Sustainable development and Innovation
The much needed science

Developed and developing regions
Numbers, cases, issues, solutions

779-page Ebook
Download at http://bioenfapesp.org



Bioenergy, a renewable energy source, has the potential to move the planet into a more sustainable future. Today fossil fuels supply almost 82% of the world's energy demand. The resulting green house gas emissions (GHG) impact Earth's systems and human health and wellbeing.

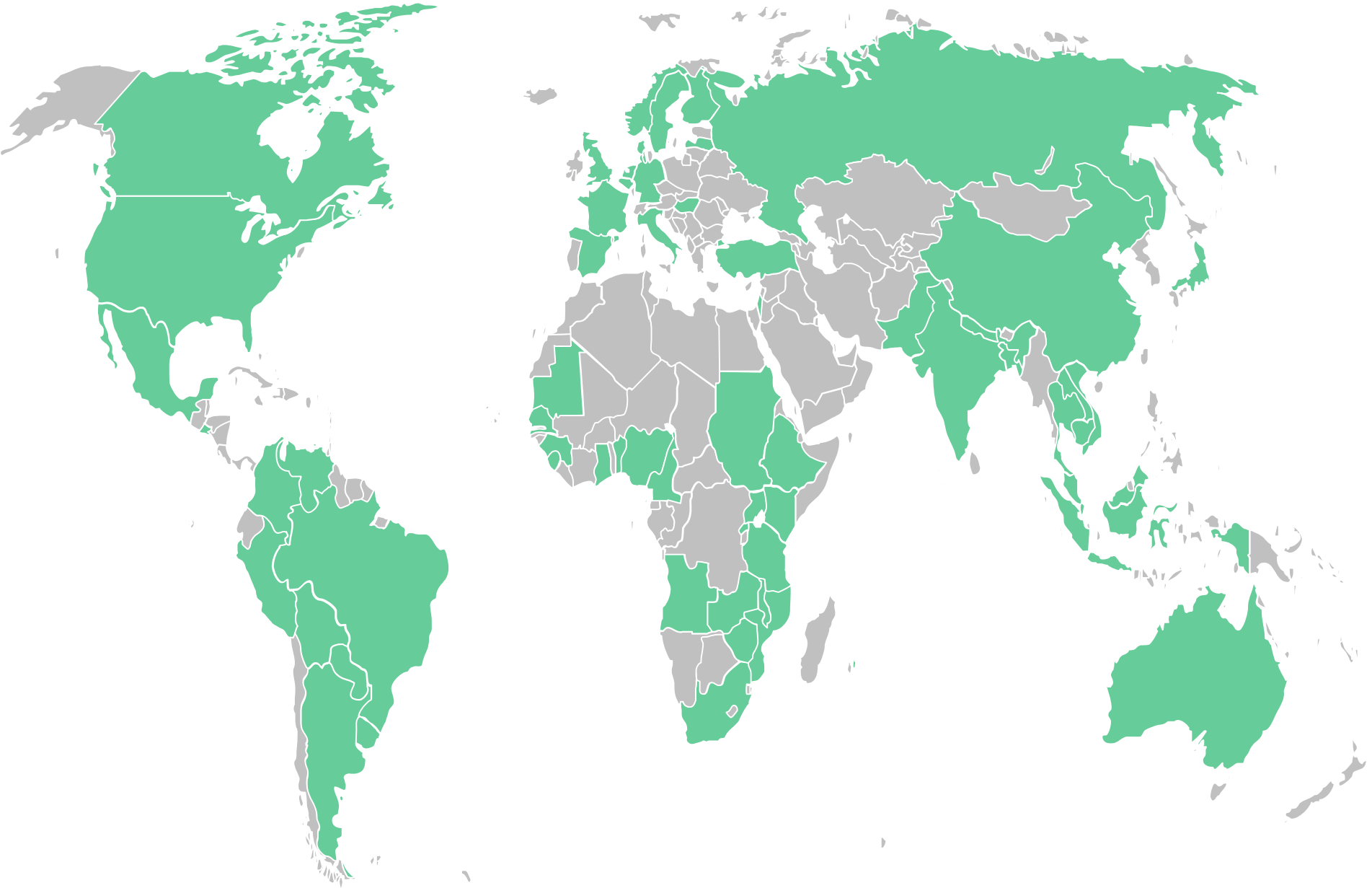
Currently bioenergy contributes approximately 10% of the world's primary energy supply. Bioethanol and biodiesel provide about 3% of the world's transportation fuels, but biofuels could provide up to 30 % by 2050 with projected improvements in technology. Bioenergy - developed knowledgeably and implemented considering local and regional needs - can help:

- increase resilience in food supply both locally and globally
- decrease pollution
- preserve biodiversity
- improve human health
- rehabilitate degraded land
- mitigate climate change
- provide economic and business oportunities

http://bioenfapesp.org/scopebioenergy/index.php/policy-brief

SCOPE FAPESP Bioenergy & Sustainability

A comprehensive integrated scientific assessment of bioenergy



World Road Transport Liquid Biofuels Demand

2010 2050

3% Biofuels 27%

800 million cars

100-million

50 countries, including many developing countries, now have biofuels mandates with blends of 5-27%, many driven by climate change

2.1 billion cars

Advanced automotive technology has expanded the use of ethanol
Biofuels could contribute to up to ~30%
Electricity, hydrogen, CNG/LPG to ~20%

Since 2003, Brazil's use of sugarcane ethanol has avoided **242 million tons of carbon dioxide emissions**

Lessons learned - more than 50 countries and regions
Liquid biofuels, bioelectricity, biogas and heat

Aviation has no substitute power systems for the foreseeable future
Biomass can help fill a gap with low-carbon profile fuels

The aviation industry worldwide deeply committed to reducing CO_2 emissions

Since 2011, over 2500 commercial passenger flights
blends of up to 50% jet biofuel: used cooking oil, jatropha, camelina, and algae

Sugarcane farnesene (10%)

Coordinated development of the biomass AND biofuel supply system and its utilization

Carbon Neutral Growth (CNG) by 2020

50% reduction in net CO_2 emissions over 2005 levels by 2050

A six-month commercial flight use study did not show adverse effects in the engines

Five production pathways technically certified (2015)

16 more certifications in preparation


Nations Unies
onférence sur les Changements Climatiques
COP21/CMP11
Paris, France

SCOPE Bioenergy & Sustainability

WORKSHOP BIOENERGY & SUSTAINABILITY: LATIN AMERICA AND AFRICA

A SCOPE MINI RAPID ASSESSMENT PROCESS (MINI-RAP)

FAPESP

November 1st, 2016
8 a.m. – 5 p.m.

Under the leadership of FAPESP Bioenergy, BIOTA and Climate Change Research Programs in collaboration with colleagues from 24 countries, we launched in 2015 a global scientific evaluation on Bioenergy & Sustainability under the aegis of the Scientific Committee on Problems of the Environment (SCOPE).

We are very much aware that since the preparation of our assessment many new developments have taken place in science, policy and industry related to the field. To revisit the conclusions of the SCOPE Bioenergy & Sustainability with a focus on Latin America and Africa we invite you for a workshop to be held at FAPESP premises in São Paulo November 1st, 2016.

We have confirmed participation of 50 experts from Kenya, Mozambique, South Africa, Egypt, Sierra Leone, Zambia, Argentina, Brazil, Colombia, Uruguay, Norway, The Netherlands, Portugal, UK, Germany, USA and Brazil.

For additional information on the project visit:
http://bioenfapesp.org/scopebioenergy/index.php

VENUE

FAPESP
Rua Pio XI, 1500 – Alto da Lapa – São Paulo, Brazil

REGISTRATION AND PROGRAM

http://fapesp.br/eventos/scope2016

ORGANIZATION

BIOEN

Biota FAPESP

FAPESP MUDANÇAS CLIMÁTICAS

SEI STOCKHOLM ENVIRONMENT INSTITUTE

World Agroforestry Centre

SCOPE