



Sustainability, Risk Management and Governance

Energy

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First InPrInt Seminar

Partnership Building towards
Stronger Engagement in International Collaboration

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How PrInt/UFMG changes the ways we collaborate?

Matrix of the Institutional Project of Internationalization

Themes → contemporary challenges

	Sustainability, Risk Management and Governance	New Technologies and Frontiers of Science	Health and Well-being	Human Rights
Aging			*	
Agro- and bio-business		*		
Basic science and its applications		*		
Big data and artificial intelligence		*	*	*
Biotechnology		*		
Borders and migrations	*			
Chronic, emergent and neglected diseases			***	
Cities and territories	*	*		*
Climate change	*			
Development, inclusion and exclusion	*			
Education		*		*
Energy	*			
Industry 4.0		*		
Languages, gender and identity		*		*
Natural resources	*	*		
Novel materials and nanotechnology		*		
Public policies and political regimes				*
Traditions, cultures and arts				*
Violence, conflicts and regulation				*

Thematic axes (*: number of projects in interaction)

- Actions building on a matrix of four themes (contemporary challenges) and 28 thematic axes (projects) aligned with the United Nations Sustainable Development Goals
- PhD Programs are expected to work together with partner institutions abroad to develop cross-cutting research aligned with the PrInt/UFMG themes and projects
- Funding will be allocated to outgoing and incoming mobility actions within the four themes by means of internal calls

- To foster and enhance collaboration with partner universities worldwide by means of joint innovative research and capacity building of human resources
- To consolidate the training and experience abroad of UFMG faculty members with both a junior and a senior profile as visiting professors at partner universities
- To train PhD students abroad through internships at partner universities with a strong focus on cotutelle (double PhD degrees)
- To recruit postdoctoral fellows and early-career researchers with experience abroad to work at UFMG within the PrInt themes and projects
- To attract internationally renowned visiting professors with highly recognised experience for short stays (15 days) at UFMG

OUTGOING

- PhD mobility grants for internships abroad (six to twelve months)
- Junior Professor grants for visiting professorships abroad (six months)
- Senior Professor grants for visiting professorships abroad (six months)

INCOMING

- Postdoctoral grants for activities at UFMG (12 months, renewable)
- Early-career researcher grants for activities at UFMG (12 months, renewable)
- Senior Professor grants for international visitors at UFMG (15 days)

UFMG Graduate programs taking part in the Energy project

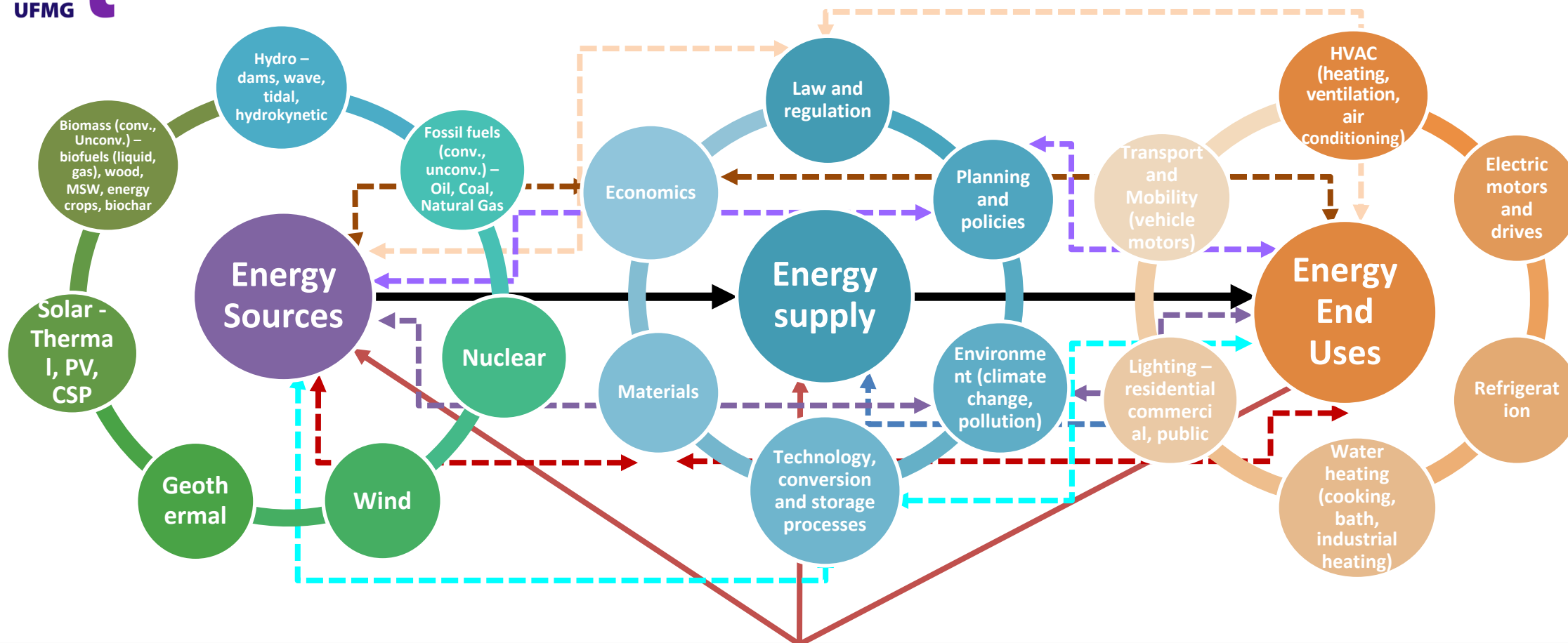
- Physics
- Chemistry
- Nuclear Science and Technology
- Mechanical Engineering
- Structural Engineering
- Geography
- Sanitation, Environment and Water Resources
- Economics
- Built Environment and Sustainable Heritage

Partner institutions willing to collaborate with UFMG in this project (so far)

- University of Cape Town
- KTH Royal Institute of Technology
- University of Glasgow
- RWTH Aachen University
- Huazhong University of Science and Technology
- Universidad Nacional Autónoma de México
- University of Technology Sydney
- University of Alberta
- University of Auckland
- Auckland University of Technology
- University of Brandenburg
- University of Canterbury

New collaborations will be most welcome!

What do we mean by “Energy”?



UFMG Graduate Programs – PRINT Theme 1.6 – Energy

Sanitation,
Environment and
Water Resources

Structural
Engineering

Chemistry

Nuclear
Science and
Technology

Physics

Geography

Economics

Built Environment
and Sustainable
Heritage

Mechanical
Engineering

Previous and ongoing projects

Sanitation, Environment and Water Resources: 2 large projects on **Energy recovery from Biogas:** i) **National Institute of Science and Technology on Sustainable Sewage Treatment Plants (various topics); Food Waste and Municipal Solid Waste Mechanization Plants.** 17 graduate students and post-docs, and 12 professors involved. Collaborations with TU Delft, Cranfield University, Newcastle University, Universidad de Valladolid. Financial support from CNPq, CAPES and FAPEMIG. **Contact : Prof. Carlos Chernicharo** (calemos@desa.ufmg.br).

Mechanical Engineering: 5 large projects in **Energy storage, Photovoltaics, Biodiesel reactors, Heterogeneous catalysis of agricultural waste, and Biochar.** Financial support from CNPq, CAPES and FAPEMIG. **Contact: Prof. Leandro Soares de Oliveira** (leandro@demec.ufmg.br).

Structural Engineering: 3 large projects in **Development of Computational Design Tools in Wind Power Generation Systems Using Composite Materials, New Structures for Power Lines and New Formulations for Realistic Crack Propagation.** 7 graduate students and post-docs, and 7 professors. Collaboration with Haiyang University, University of Shanghai for Science and Technology, Balasingham University. Financial support from CNPq, CAPES and FAPEMIG. **Contact: Prof. Felício Bruzzi Barros** (feliciobbarros@gmail.com)

Previous and ongoing projects

Chemistry: 12 large projects in **materials/devices: supercapacitors, rechargeable batteries (lithium and sodium ions), battery/supercapacitor hybrid systems, fuel cells, photovoltaic solar cells; sensors for combustion processes; new biodiesel and bio-kerosene production processes; heterogeneous catalysts for biodiesel; conversion of glycerol from biodiesel; development of analytical methodologies for fuel analysis; development of materials for the oil and gas industries.** 40 graduate students and post-docs, and 16 professors involved. Collaborations with MIT, Università Degli Studi di Pavia, Helmholtz Zentrum Berlin, Instituto Nacional del Carbón, Northeastern University, Rice University, Politecnico di Torino, L' Istituto di Tecnologie Avanzate per L'Energia "Nicola Giordano", Universidad Industrial de Santander, Institut Polytechnique de Grenoble, Universidad de la República, Universidad Nacional de San Luis, Universidad de La Habana. Financial support from AEC, NSF, MES/Cuba, CEMIG/ANEEL, CNPq, CAPES and FAPEMIG. **Contact :** **Prof. Rodrigo Lassarote Lavall** (rodrigo.lavall@qui.ufmg.br).

Physics: 5 large projects in **New PV materials, Novel PV architectures, and Materials for Bioenergy.** 21 graduate students and post-docs, and 6 professors. Collaborations with Universidad de La Habana, Universidade de Aveiro, Iberian International Nanotechnology Laboratory, Polytechnique Montreal, University of Southampton and Politecnico di Milano. Financial support from AUF, FCT, MES/Cuba, CNPq, CAPES and FAPEMIG. **Contact:** **Prof. Juan Carlos González Pérez** (gonzalez@fisica.ufmg.br).

Previous and ongoing projects

Economics: Large projects in **Energy costs and planning, Socioeconomic impacts of energy efficiency, changes in the energy grid, and renewable energy sources**. Collaboration with University of Illinois at Urbana-Champaign and University of Victoria, Melbourne. Financial support from REDECLIMA, CNPq, CAPES and FAPEMIG. **Contact: Prof. Aline Souza Magalhaes** (alinesm@cedeplar.ufmg.br).

Nuclear Science and Technology: 1 large Project in **Safety Analysis for Nuclear Power Plants**. Collaboration with Universitat Politècnica de València. Financial support from CNPq, CAPES and FAPEMIG. **Contacts: Prof. Sonia Seger Pereira Mercedes** (sonia@nuclear.ufmg.br) and **Prof. Carlos E. Velasquez** (carlosvelcab@nuclear.ufmg.br)

Concluding remarks for the project on Energy

- A global and interconnected perspective of Energy Sources, Supply and End Uses.
- Large tradition in working with Energy
- Large variety of research projects and scientific interests
- 9 graduate programs working with Energy
- Large number of graduate students, post-docs and professor involved in international collaborations
- 28 established international partners
- 12 international institutions willing to collaborate
- Large theoretical and experimental installed capacity
- A good and working infrastructure