



## Europass Curriculum Vitae

### Personal information

First name(s) / Surname(s) **Diego Marazza**  
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E-mail(s) diego.marazza@unibo.it  
Nationality Italian  
Date of birth 25/01/1970  
Gender Male

### Desired employment / Occupational field

#### **SYSTEM ANALYSIS AND SUSTAINABILITY IN THE BIOBASED ECONOMY.**

Sustainability reporting and assessment, compliance assessment, environmental management. Green House Gas savings. Knowledge transfer. Specific applications: biomass treatment, biomass-based value chains, circular economy and sustainable consumption in retail.

### Work experience

My responsibilities range in the following areas of project development and knowledge transfer in the bioeconomy and circular economy with special regard to bioenergy and biobased products.

Activities and responsibilities include:

- developing industrial partnerships; e.g. advising on new technologies, recommending R&D path and proposing the realization of novel projects;
- leading and/or managing projects in partnership with companies;
- preparing projects;
- team coordination;
- planning and designing of research activities.

Within the Environmental Management Research group of Interdepartmental Center of Research for Environmental Science (CIRSA) – University of Bologna, I am managing the research line on biorefinery chains and industrial by-products and bioenergy, aiming to ensure an adequate knowledge of the value chains in the region, of the relevant players, of the on-going trends and of the threats and opportunities. I act also as the innovation expert for the bioeconomy after indication of the regional innovation agency Aster and as a reference fellow for the regional innovation community (RIC) of the Climate KIC initiative. I am invited lecturer in the course on Environmental Management Systems, Environmental Policy and Economics (6 ECTS) within the Master's Degree on "Environmental analysis and management" of the University of Bologna. Subjects of my classes are: sustainability principles, common pool resources, game theory and environmental economics. I also act as assistant supervisor for MSc and BSc thesis.

Dates 01/04/2011 – onward

Employer	Biomass Unit - Interdepartmental Center for Industrial Research (CIRI)- Energy and the Environment – and Interdepartmental Center of Research for Environmental Science (CIRSA) - Technopole of Ravenna - <b>University of Bologna</b> <a href="http://www.energia-ambiente.unibo.it/">http://www.energia-ambiente.unibo.it/</a> via S. Alberto 163, 48123 Ravenna (Italy)
Occupation or position held	Research fellow - post PhD <a href="http://www.unibo.it/SitoWeb/default.aspx?UPN=diego.marazza@unibo.it">http://www.unibo.it/SitoWeb/default.aspx?UPN=diego.marazza@unibo.it</a> <a href="https://www.researchgate.net/profile/Diego_Marazza">https://www.researchgate.net/profile/Diego_Marazza</a>  Coordinator: prof. Andrea Contin <a href="mailto:andrea.contin@unibo.it">andrea.contin@unibo.it</a> tel.: +39 0544 937333
Main activities and responsibilities	<p><b>Latest projects and achievements</b></p> <p>The Biorefineries in Emilia Romagna (BIOREFER Project, financed by the Emilia-Romagna Region, led to the realization of a database of 90 companies including biomass providers, treatment companies and sites and to the development of specific indicators. Several collaborations with the Emilia-Romagna Regional government and companies stemmed from this research line:</p> <ul style="list-style-type: none"> <li>– <b>Joint thermochemical process and reforming applied to residual biomass and zero-waste approach</b> The project is aimed at developing 2 innovative processes and related prototypes to treat pruning, wine marc, tomato peels and agro-energy residues such as digestate, garden residues and the organic fraction of urban wastes. My role is addressing the organization and achievements of results for process and prototype (2) and I am involved in the sustainability assessment of the considered processes.</li> <li>– <b>GoBioM - Improving the biomethane technology and discovering novel opportunities at different nodes of the value chain</b>, project funded by the Emilia-Romagna Region within the program European Regional Development Fund 2014-2020, proposes the technological optimization of regional / national chain of biomethane, with the overcoming of the major current problems, which are: the lack of Italian technology in the upgrading of biogas to biomethane, the need to use local residual biomass and the need to insert the biomethane plant in the biorefinery and green economy concepts. I have been assigned the task of mapping residues and wastes in the region in order to (i) determine the availability of substrates and agricultural and industrial sources (ii) to define the suitability of sources and to (ii) locate promising hotspots.</li> <li>– I am the <b>environmental manager</b> of a long-term project on scientific and technical support on environmental matters to the International Airport of Palermo management company (GESAP S.p.A.), which delivered, e.g., the technical analysis concerning the environmental indicators to be adopted and included in the "Regulated Tariff Contract" between GESAP S.p.A. and the Italian Government.</li> <li>– Together with the company resitalia.org I have been developing a <b>biochar value chain</b> to support a novel agro-ecology systems: by identifying, selecting and supporting a biochar provider in the region (large scale) : 3200tons/y of biochar meeting Italian and REACH regulations; setting up an industrial lab analysis provider (up to 20 biochar samples/day); pursuing an industrial research activity to use biochar as compost improver.</li> <li>– I have been invited by Prof. Zichichi to contribute to the 49th Session of the International Seminars on Planetary Emergencies at the Ettore Majorana International Foundation and Centre for Scientific Culture, in Erice, from 20h to 23th August 2016, in collaboration with the World Federation of Scientists and the ICSC World Laboratory at the subject of <b>"The New Manhattan Project Science for Peace the World Over"</b></li> <li>– I am collaborating with resitalia.org for the realization of a thermochemical apparatus for <b>weed control</b>, powered by renewable biomass. I am sharing the patent</li> <li>– I am leading a thesis project <b>From petrochemical poles to green chemistry poles. Development of a model of transition</b>. The project consists of research and dissemination of transition models from the industrial configuration of the great centers of the petrochemical industry to a production model directed to green chemistry and the <b>recycling and recovery of materials</b> and related reorganization and conversion of industrial plants in "Eco Industrial Parks". The geographical area of the project reference is that of the so-called Quadrilateral chemistry (Ravenna, Ferrara, Mantova, Marghera), yet the scope of project is European.</li> <li>– The "Green Lab Valley" Project. The challenge is to design a versatile and attractive "biomass hub". A technological report concerning upstream biomass and biomass waste provisions have been published (<a href="http://www.ervet.it/ervet/wp-content/uploads/downloads/2015/10/Rapporto_ERVET_CIRI-CFR-DEF.pdf">http://www.ervet.it/ervet/wp-content/uploads/downloads/2015/10/Rapporto_ERVET_CIRI-CFR-DEF.pdf</a>). This project is covering biomass availability and regulation barriers/opportunities.</li> </ul>

Following the BIOREFER Project, I have been named as the bioeconomy expert for Emilia-Romagna Region in the framework of the **Climate KIC projects**; participation in the activities of Climate KIC and in particular in bioeconomy platform activities.

In 2015-2016 I shared the responsibility of coordinating the preparation of the an European project related to call H2020-WASTE-2015-two-stage (proposal number: 688477) and collaborated to the preparation of the following projects: 4 ERDF projects (1 M€ each), an H2020- LCE-12-2015 project , an Innovative Training Network – European Industrial Doctorate (ITN-EID) – Marie Skłodowska Curie Action – concerning Environmental Management of Ports and one project responding to the call H2020-LCE-2016-2017, topic LCE-08-2016- 2017, the preparation of an Expression of Interest for the "Selection of six Model Demonstrator Regions to receive Advisory Support from the European Sustainable Chemicals Support Service", financed by the European Commission, Coordination and preparation of the project SESTER (sustainable and innovative esters from residual vegetable oils and byproducts from slaughterhouses), addressing the European Regional Development Funds (ERDFs) in collaboration with a large company dealing with ester synthesis. The project was key to initiate a long term business relationship with the company, which is now financing the R&D activities concerning the recovery of high-boiling residues.

I am also co-tutoring some Master Thesis to flank and support the research activities, among which:

- Greenhouse gases (GHGs) balance related to the treatment of sewage sludge by an intermediate pyrolysis auger reactor combined with a reforming process, also known as Thermo-Catalytic Reforming (TCR).
- Retrofitting the chemical industrial district of Ravenna: the bioeconomy scenario.

### **Main achievements 2014-2011**

Successful results in the Industrial Project "**Environmental Management and Bioenergy**", commissioned by Unigra InC. (agri-food division). The challenge was to improve the biogas yields of an unconventional anaerobic digestion plant. I managed and oversaw the following activities: diagnosis, chemical analysis, experimental tests, data analysis and reports. This activity followed a three years long collaboration with this company which led to the preparation of a report under the standard required by the Global Reporting Initiative (GRI).

**Collaboration agreement between the University of Bologna and Fraunhofer Gesellschaft Fraunhofer Umsicht - branch Sulzbach Rosemberg** signed end of 2013. The agreement concerns the development of fast analytical methods for the characterization of pyrolysis oil and bio-char, biological upgrading of pyrolysis slurry and obtainment of hydrocarbons, chemicals and coal substitutes, system analysis and market opportunities. I took care of activities and events to promote and implement the agreement, among which the organization of the event " Innovative products, New processes, Future markets - Meet Fraunhofer Umsicht ". Collaboration with the Fraunhofer Institute – Umsicht branch Sulzbach Rosemberg aimed at the development of joint research projects on energy storage and biomass reforming (biobattery concept). My role is to develop the system analysis of the selected technologies within the project "Market analysis of the italian market potentiality in Emilia-Romagna for decentralized bioenergy systems based on the biobattery concept."

Within the **Pioneer into Practice - Climate KIC** I developed an innovation project addressing bioenergy and innovation and put it into practice thanks to a placement at the Aston University, Birmingham UK, contributing to a project on the realization of a management scheme for the "Bioenergy Support Systems" in the Interreg Project BioenNW, and to the development of a business plan scheme aimed to support and score bioenergy projects. Successful completion of the following **Climate KIC pathfinder projects**: Biohorizon - Horizon scanning the European Economy and Mubigen - Municipal Bioenergy Generation in collaboration with IREN-Ambiente.

In 2011 I have been invited as an independent expert assisting the Emilia-Romagna in order to implement regional policies addressing new biomass plants. I in particular developed a GHGs saving index according to Dir. 2009/28/CE and other requirements and criteria in order to improve authorisation procedures. Since this appointment I have been involved in the following regional initiatives regarding bioenergy and biobased products

Completion in 2013 of the project ""**Bioraffinerie, bioplastiche e filiere della biomassa in Emilia-Romagna**" (Biorefineries, bioplastics and value chains in region Emilia-Romagna) collaboration with ASTER, aiming to build three value chains: biodiesel from used fried oils, polyhydroxyalcanoates (PHA) from lignocellulosic sources, Polylactic Acid from the cheese industrial sector.

Participation to the industrial symbiosis project "**GREEN – Industrial Symbiosis**" lead by the regional

innovation agency ASTER. In 2012 bio-plastic innovation in Emilia Romagna: preparation of a short report within the Plastica project. In 2012 I have been the rapporteur for the final document "Technological Scenarios for the Emilia-Romagna Region - section Green Economy" - Biorefinery expert. In 2011 I took part to a regional delegation and presented the regional policies and innovation activities in Hangzhou (China) .

I participated to the project "**Coupled pyrolysis and anaerobic digestion**" (PYDA) regarding anaerobic digestion of pyrolysis oil and byproducts. I took care of the mass-energy balance and GHGs savings. In collaboration with the chemistry research group I prepared and managed the research industrial project "biopolymers from pyrolysis oil of residual by-products"

Name and address of employer	interdepartmental center for industrial research - University of Bologna via S. Alberto 163, 48123 Ravenna (Italy)
Type of business or sector	Education
Dates	01/01/2003 - 31/03/2011
Occupation or position held	research fellowship
Main activities and responsibilities	Collaboration in the project URAL RIVER PARK PROJECT URAL RIVER PARK PROJECT - -Unesco/MAB Biosphere. Logical framework project. State of the art reports. Mission to Kazakhstan- Almaty  Independent expert of the European Commission acting as evaluator in the evaluation of research proposals in relation to FP7-2011-ECO-INNOVATION-TwoStages  Index of sustainability in retail: publication of a work; presentation activities. Collaboration with Coop Adriatica.  Project for the sustainability assessment of one of the largest Italian oils and fats company: carbon emission savings of palm oil  Organization of a Fulbright Specialist Program in collaboration with Paolo Ricci from Amherst University  Coordination of the Sustainability Education Center in Faenza  Organization and scientific coordination of the University of Bologna summer school "Environmental risk management"  Tutor for an international internship in a project regarding environmental epidemiologic, air quality in the environmental management of the area of Faenza  Sustainable Production and Consumption (PCS): responsible of the organization of a seminar in the Ecomondo fair with Barilla, Coop Italia, SCS consulting, Studio LCE.  Organization and scientific coordination of the University of Bologna summer school "Sustainable patterns and lifestyles" Organization and scientific coordination of the University of Bologna summer school "Environmental risk management"  Project management and scientific coordination: "dall'etica all'etichetta" ("ethic, etiquettes and bar codes") aimed at measuring sustainability consumption trends in the large scale distribution funded by the Region Emilia-Romagna under the INFEA framework in partnership with Coop Adriatica  Implementation and maintaining of environmental management system ISO14001 of international airport "Falcone-Borsellino" of Palermo  Contribution in the project application to the EU 7th FP - COLLABORATIVE PROJECT - LARGE SCALE INTEGRATING PROJECT - ENV.2009.3.3.2.2 SUSTAINABLE BIOREFINERIES - proposed project name "BIOSUPPORT" (SUSTAINABLE USE OF PHOTOSYNTHESIS PRODUCTS FOR OPTIMUM RESOURCE TRANSFORM  Responsible for the EMAS and ISO14001 registration maintenance programme of the following towns:

Riolo Terme  
Casola Valsenio  
Brisighella

Follow up of the regional project "dashboard of the sustainability" <http://g5.ambra.unibo.it/KRUSKOT/>

Responsible for the Italian environmental commission in the framework of the "Espace Rivière Europe"-  
E.R.E – InterregIIIC-SUD project, project development – institutional implementation  
data collection and management; assistant for the scientific design; indicators setting;

Name and address of employer University of Bologna - CIRSA (Inter-Department Center for the Environmental Research)  
Via S.Alberto 163, 48123 Ravenna (Italy)

Type of business or sector Education

Dates 30/06/2004 - 31/01/2005

Occupation or position held Education methods specialist

Main activities and responsibilities adult training coordinator in the project "Piccoli Risparmatori di...Energia" linked to the European funded  
project "Kids for Energy" (SAVE)  
project implementation; educators selection; teacher of the educators (15 hours class); theory of the  
environmental communication; organization of the training modules; steering committee; reporting

Name and address of employer AISA – Italian Association of Environmental Science  
1 p.zza della Scienza, 20126 Milano (Italy)

Type of business or sector Professional, scientific and technical activities

## Education and training

Dates 2003 - 2007

Title of qualification awarded PhD in Protection and Management of Natural Resources

Principal subjects / occupational skills covered Environmental management systems; environmental information systems; environmental data collection  
and management; environmental reporting and indicators.

Name and type of organisation providing education and training University of Bologna (Doctorate school in Earth and Environmental Sciences)  
Piazza di Porta San Donato, 1, 40126 Bologna (Italy)

Level in national or international classification ISCED 6

Dates 2003

Title of qualification awarded degree in environmental science

Principal subjects / occupational skills covered geology, chemistry, physics, mathematics; economy and legislation; computer science, models  
development and land representation

Name and type of organisation providing education and training University of Bologna (university)  
Via Zamboni, 33, 40126 Bologna (Italy)

Level in national or international classification ISCED 5

Dates 1993

Title of qualification awarded Diplôme d'étude approfondis (DEA)

Principal subjects / occupational skills covered Chimie Marine, Chimie Fine

Name and type of organisation providing education and training Université Bretagne Occidentale, Brest, France (University)  
avenue Le Gorgeu C.S, 20, 29285 CEDEX Brest (France)

Level in national or international classification ISCED 5

## Personal skills and competences

Mother tongue(s)  
 Other language(s)  
 Self-assessment  
 European level (\*)  
**English**  
**French**  
**Spanish / Castilian**

**Italian**

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
C1	Proficient user	C2	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user
C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	B2	Independent user
A2	Basic User	A2	Basic User	A2	Basic User	A2	Basic User	A2	Basic User

(\*) [Common European Framework of Reference \(CEF\) level](#)

**Additional information**

Publications

Marazza D. "Il Quadrilatero della Chimica nella Pianura Padana" - *Ecoscienza* n.4 October 2016 (Regional Environmental Protection Agency – Italy) . <http://www.arpae.it>

Righi S., Bandini V., Marazza D., Baioli F., Torri C., Contin A., Life Cycle Assessment of high ligno-cellulosic biomass pyrolysis coupled with anaerobic digestion Article Type. Submitted to *Bioresource Technology* [www.journals.elsevier.com/bioresource-technology](http://www.journals.elsevier.com/bioresource-technology)

E. Hodgson, M. E. Ruiz-Molina, D. Marazza, E. Pogrebnyakova, C. Burns, A. Higson, M. Rehberger, M. Hiete, M. Gyalai-Korpos, L. Di Lucia, Y. Noël, J. Woods, J. Gallagher, Horizon scanning the European bio-based economy: a novel approach identification of barriers and key policy interventions from stakeholders in multiple sectors and regions. Article in *Biofuels Bioproducts and Biorefining* 10(5) · July 2016

Circular economy patterns and the bio-economy: general principles and specific applications in Organic Waste treatment - The potential of the bioeconomy and the consequent transition towards circular economy patterns - Contributions to the 49th Session of the International Seminars on Planetary Emergencies - Erice, 20-23 August 2016

Marat Karatayev, Andrea Contin, Diego Marazza (2015) Renewable energy technologies adoption in Kazakhstan: potentials, barriers and solutions – Proceedings of the European Geosciences Union – Göttingen - Germany

Bandini V., Righi S., Buscaroli A., Marazza D., Torri C. (2014) Biorefining of high ligno-cellulosic waste biomass via pyrolysis coupled with anaerobic digestion. An LCA study. A cura di FAVA F. *Green economy e sua implementazione nel Mediterraneo*. Ecomondo 2014. Rimini, Italy. 5-8 novembre 2014. (pp. 635-640) ISBN: 978-88-916-0850-5. RIMINI: Maggioli Editore.

V Bandini; S Righi; A Saliani; C Torri; D Marazza; D Bersani; D Fabbri, *Energy and carbon LCA of high ligno-cellulosic biomass pyrolysis coupled with anaerobic digestion*, in: *Life Cycle Assessment e ottimizzazione ambientale: esempi applicativi e sviluppi metodologici*, Roma, ENEA, 2013, pp. 148 - 154 (atti di: VII Convegno della Rete Italiana LCA, Milano, 27-28 giugno 2013) [Contributo in Atti di convegno]

Bandini V.; Righi S.; Marazza D.; Torri C.; Buscaroli A.; Salieri B.; Fabbri D.; Contin A., Preliminary life cycle assessment of energy and carbon results of high ligno-cellulosic biomass pyrolysis coupled with anaerobic digestion, in: *Sustainability Assessment in the 21st century. Tools, Trends & Applications*, Brussels, SETAC Europe, 2012, pp. 138 - 138 (atti di: SETAC Europe 18th LCA case study symposium, Copenhagen, 26-28 November) [atti di convegno-abstract]

Torri C.; Bandini V.; Marazza D.; Buscaroli A.; Righi S.; Fabbri D.; Contin A., *Uso delle biomasse di tipo lignocellulosico nella filiera energetica per la produzione di biogas e biochar*, in: *10 anni di Tecnologie Chimiche per l'Ambiente e per la gestione dei Rifiuti*, s.l, s.n, 2012, pp. 47 - 52 (atti di: Strategie di sviluppo industriale in una prospettiva di Green Economy, Rimini, 16 aprile 2012) [Contributo in Atti di convegno]

ANALYSING LOCATIONS FOR THE BIOBATTERY CONCEPT Biomass Conference Proceedings 2014. <http://www.conference-biomass.com/>

THE SUSTAINABILITY ASSESSMENT OF BIOMASS POWER PLANTS AND BIOREFINERIES FOR REGIONAL AND NATIONAL POLICIES 2012-07-01 A Biomass Conference Proceedings 2012 sustainability, assessment, policies, greenhouse gases (GHG), water footprint, social acceptance. <http://www.conference-biomass.com/Conference-Proceedings.961.0.html>

The sustainability assessment of biomass plant and biorefineries for regional and national policies 2011-11 Author Ecomondo 2011. Proceedings (Rimini, 3-6 novembre 2011) (ISBN:8838769869)

This work concerns an assessment scheme of the biorefineries and the use of energy from biomass according to sustainability criteria. The proposed assessment scheme considers 4 threshold requirements and 7 bonus requirements. The main requirement meet the standard of the Renewable Energy Directive 2009/28/CE (RED) concerning the green house gases (GHG)savings. According to this standard the GHG saving shall be at least 35%. The work highlights those conditions occurring along the production pathway which is necessary to control in order to fulfill the GHG criteria.

A composite indicator on environmental sustainability performance at urban scale: the K8 approach 2011 Co-author ESEE 2011 - 9th Conference of the European Society for Ecological Economics: Advancing Theory and Practice, Bogazici University, Istanbul, 13-17 June, 2011  
information platform; indicators; target; aggregation method; sustainability; performance

Costruzione di un un indice di sostenibilità del consumo al dettaglio di prodotti con caratteristiche di pregio ambientale 2010-11-05 Author Ecomondo 2010. Proceedings Atti dei Convegni (Rimini, 3-6 novembre 2010) ISBN: 978-88-387-5935-9

sustainability index has been defined by assessing 7 product features (PF) for food commodities and 8 PF for non-food commodities, e.g: eco-labels, packaging type, recycling extent, design for disassembling the product and the packaging, the provenience

INDICATORS, EMERGETIC THRESHOLDS AND CONSTRAINTS FOR COASTAL SPATIAL PLANNING AND MANAGEMENT Co-author

2010-10-20 7th Biennial International Workshop Advances in Energy Studies 2010 Can we break the addiction to fossil energy? Barcelona, 19-21 October 2010

key words: Integrated coastal zone management, indices, MCA, emergy synthesis

AGRICULTURAL RESIDUES FOR ENERGY PRODUCTION AND CARBON STORAGE INTO SOILS: A WIN – WIN OPTION? 2010-10-20 Co-author

7th Biennial International Workshop Advances in Energy Studies 2010 Can we break the addiction to fossil energy? Barcelona, 19-21 October 2010

key words: residual biomass, biochar, emergy synthesis, carbon storage

Local and regional resource and landscape management from the point of view of the next larger scale: the emergy synthesis perspective 2010-02 Co-author FIFTH BIENNIAL EMERGY RESEARCH CONFERENCE, Gainesville, FL, January 31 - February 2, 2010. Book of abstracts in press

key words: Emergy, environmental management, landscape metrics, energy planning, ecosystem functions

Ranking environmental aspects in environmental management systems: A new method tested on local authorities Author 2010-02 Environment International Elsevier, Volume 36, Issue 2, February 2010, Pages 168-179

key words: ISO 14001; EMAS; Significance; Local authorities; Environmental aspect; Environmental management system

Assessment of land use changes through an indicator-based approach: A case study from the Lamone river basin in Northern Italy 2010-01 Co-author Ecological Indicators, Volume 10, Issue 1, Landscape Assessment for Sustainable Planning, January 2010, Pages 4-14

key words: Land use change; DPSIR framework; Landscape; Multi-criteria decision analysis

Verso la gestione integrata del bacino del Lamone - 2009-05 Author Environmental Regional Agency, ARPA Rivista N. 3 key words: decision support systems, European framework directive, DPSIR, stakeholder mapping, public participation

ENERGY PLANNING AT THE LOCAL LEVEL IN ITALY 2008-02 Co-author - FIFTH BIENNIAL EMERGY RESEARCH CONFERENCE, Gainesville, FL, January 31 - February 2, 2008. Book of abstracts; key words: energetic planning, emergy, sustainability

Putting hands into the mechanisms of the local authorities: working on EMAS in the CIRSA-AISA garage team 2005-04 Author Conference on the International Launch in Higher Education (U.N. Decade 2005-2014), "Committing Universities to Sustainable Development" (20 – 23 April 2005, Graz – Austria)  
key words: EMAS, communication, Agenda 21, Eco-Schools

Environmental management systems in the high education area as a framework for pedagogy, organisational change, policy and ethos  
2004-04 Author - ENCOS 1st European Networks Conference on Sustainability in Practice, Proceedings, (1 - 4 April 2004, Berlin, Germany)  
key words: Local authorities, EMAS, EMS, environmental indicators, significance, contractor and subcontractors, number of green clauses in the contracts, schools, participatory framework

Environmental science for coastal management 1998-04 Co-author  
Proceedings of International workshop: Education and training in Integrated coastal Area Management: The Mediterranean Prospect, Atti II Conferenza ICCOPS, Genova  
key words: zoning, ecosystem, market opportunities, land uses

Effect of Ammonia on Survival and Adenylate Energy Charge in the Shrimp *Palaemonetes varians*  
1996-07 Author Elsevier, Ecotoxicology and Environmental Safety, Volume 34, Issue 2, Pages 103-108  
key words: sublethal concentrations, lethality, ATP, adenylate nucleotide levels, adenylate energy charge (AEC) index, environmental stress



UPDATED SEPT 2016