

FARAMARZ BAIRAMIJAMAL

📍 9710 Traville Gateway Drive, Suite 251 Rockville, MD 20850 📞 (240) 426-9474

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www.EVISA-Engineering.com www.ZeroCO2FossilEnergy.org

PRINCIPAL CHEMICAL PROCESS ENGINEER

PROFILE

Principal process engineer with comprehensive expertise in technology development and EPC Engineering in the fossil energy sector for oil and gas, thermal power generation and chemical plants. Amid the new process developments, the introduction of five transformational technologies have been carried out. The experience encompasses midsize and large scale commercial plants, capital projects to over a Billion Dollar face value, from new concept, Front End Engineering Design, then Basic and in many sections Detail Engineering encompassing the construction, permitting, Cold and Hot Commissioning with Guarantee Test Runs till the Final Acceptance Certificate for new plants, as well revamping, de-bottle necking, optimization, retrofitting, and re-powering of existing plants.

Special field of expertise comprises the present-day and near future advanced hydrogen production by Steam Methane Reforming SMR, Dry Reforming (for reuse of captured CO₂ for sustainable and renewable fossil energy Green Products e.g. ammonia, methanol, urea, gasoline, jet fuel, etc.) as well as via the coal gasification technology over syngas, in particular for ammonia, methanol, power generation with 100% carbon capture. Prior projects include the most advanced technology for the reuse of captured carbon dioxide as a new fossil energy resource for the syngas, Green Hydrogen, Blue Ammonia, and Green Oxygen v.i. current project development referred to Zero-Carbon-Emission and Zero-Pollution technologies. Previous projects also included Substitute/Renewable Natural Gas, nitric acid, urea, UAN and melamine as well.

Introduction of two new thermodynamic cycles into the technology, the First and the Second Bairamijamal Cycles, v.i. for the patent US 11,512,402 B2 granted on November 29, 2022. The associated process CPCE; Carbon Power and Chemicals Economy also includes the process patent for the Advanced Combustion for the 100% CO₂ capture and removal of pollutions in all kind of fossil power plants and the gasification ongoing with the US16/820,610 in continuation of v.s. the parent patent and the first patent in continuation.

Author of the book "Advances in Sustainable Net Zero CO₂ and pollution-free Fossil Energy", for reuse of carbon dioxide to syngas generation, a prerequisite to Net Zero-Carbon-Emission with emphasis on waste heat recovery to useful energy (i.e. the first new Bairamijamal thermodynamic cycle). These technologies include Advanced Combustion for obtaining high concentrated CO₂ containing flue gas, Dry Reforming, and thermal gasification as well as high pressure electrochemical reactors (for the HP liquid CO₂-water electrolyte) to the CO₂ conversion to Green Syngas and Green Oxygen. The book is currently in edition with references to public amenable by George Olah, and own publications and issued patents (vide infra for publications and EVISA Engineering activities).

Specialized discipline in Fossil Energy stands in Chemical Reaction and Reactor Design, both catalytic as well as non-catalytic reactors, vide publications and patents.

SUMMARY OF QUALIFICATIONS AND EXPERIENCE

- SME, Subject Matter Expert in Clean Energy for syngas and hydrogen i.e. steam reforming, autothermal reforming, coal gasification, carbon capture for reuse as a new fossil energy resource, CO₂ as new energy carrier, CO₂ sequestration/EOR, carbon power and conversion of CO₂ for power generation. Expertise comprises in process engineering, specifications for mechanical equipment, comprehensive expertise in process control architecture, design of special equipment for midsize and large scale plants for various process media i.e. gaseous, liquid, liquefied gases (carbon dioxide, anhydrous ammonia, LNG, oxygen), bulk solid material (powder, granulate, coal dust) as well processing with flammable, explosive, corrosive and dangerous process media (syngas, hydrogen, synthetic oils, molten salt heat carrier, natural gas, etc.).

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- The experience includes process development, basic and in some fields detail process engineering, process optimization, evaluation, case and feasibility studies (for economics, financial analysis) i.e. for gasification, syngas and hydrogen generation (for power, chemicals, ammonia, methanol), natural gas treatment, LNG, crude oil treatment, air separation for LOX/GOX, gaseous and liquid oxygen, carbon dioxide purification, condensation (to beverage grid), nitric acid, urea and melamine plants. Engineering of these plants spans high pressure (e.g. ammonia, methanol, carbon dioxide, steam reforming, gasification, urea, and melamine), middle and low pressure plants (e.g. nitric acid, CO₂ removal via AGR, SNG, and desulfurization). SME experience includes site and project evaluation, technical and financial feasibility study; support for legal contractual affairs as well permitting and approval procedure with authorities and regulative agencies. The background in power generation encompasses fossil power generation with gas turbine (GE and Siemens CTs in simple/combined cycle), fuel treatment and conditioning, HRSG for steam generation and steam turbine for state-of-the-art as well as engineering and proto design of advanced sustainable fossil energy technologies (i.e. sliding pressure operation for CO₂ cycle, ultra-superheated Direct Steam generation, syngas turbine, oxygen turbine). The process engineering in power generation comprises fossil energy only (vide patents and publications in power generation).
- Specific field of expertise in chemical reactors comprises conception, operation, process control and detail mechanical design of chemical reactors for both catalytic and non-catalytic reactors; endothermic indirect fired reactors (e.g. primary steam reformer with CH₄/H₂O, dry reformer CO₂/CH₄), exothermic direct fired reactors (e.g. gasification of crude oil, coal, nitric acid reactor), indirect heated/cooled reactors (ammonia, methanol, CO water shift converter) and non-catalytic reactors (urea, melamine), vide patents and publications in chemical engineering.

SUMMARY OF EXPERIENCE:

- Lead process design engineer for energy and chemical plants as well in conventional and gas turbine power plants, involving FEED, detailed engineering, construction, and commissioning supervision. Process engineering comprises site evaluation, plant island arrangement, plant operation analysis, environmental approval and permitting procedures, detailed process control architecture, process simulation, HAZOP, HAZID, Risk Assessment, safety pressure relief and flare criteria (e.g. for methane, syngas and hydrogen) with the relevant Standards and Codes. Skilled conventional and advanced power generation with expertise in coal gasification, gas turbine, IGCC, and carbon dioxide power cycle, high pressure ultra-superheated Direct Steam generation. Design lead engineer for fuel gas processing by fuel gas cleaning, preheating, conditioning, pressure control system for the gas turbine power plants, and auxiliary units for HRSG, multistage turbines for steam generation, CO₂ recovery, oxygen, syngas, and off gases, including the re-superheating sections. Skilled in commissioning of industrial plants i.e. loop tests, functional tests, fine tuning of control valves, stabilization of steady state mode of operation, by-pass operation of turbines, steam balancing, load rejection. Experience includes utility plant units for cooling water, electrolysis for hypo-chlorination (in pulp and paper industry), cooling tower, MSF, DEMIN and BFW preparation, condensate polishing. Senior process engineer for evaluation and result assessment for upgrading commercial plants in process development, implementation of new technologies, improvement, or optimization of existing operation for increase of plant output, validation of new/alternative technologies. Duties have included technical presentations to existing and new customers, financial audience, authorities for permitting and supports for proposal department. Experienced in planning, construction and operation of plants based on U.S. and international codes, standards and regulation e. g. ASME, API, NFPA, NACE, ATEX, AD 2000, DIN, Explosion Protection Zones, and European Standards e.g.

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TUEV, DVGW for hazardous, flammable, explosive and corrosive process media according to OSHA and EHSS Standards

EDUCATION

- MS (MSChE) University of Erlangen/Nuremberg, 1990;
Mathematical reactor modeling and reactor design for heterogeneous catalytic Dry Reforming of carbon dioxide and methane via a pioneering reaction for syngas $2\text{CO}/2\text{H}_2$ primarily for the hydrogen to ammonia and methanol. The facility was built and proven in Stuttgart –Germany in the German Aerospace Institute.
- BS (BSChE) in Chemical Engineering from University of Erlangen/Nuremberg, Germany, 1987.
Area of concentration: Characterization of magnetic properties of heterogeneous catalysts on partial oxidative methane reaction to higher value fuels.

Both works had been accoladed with summa cum laude under direct auspices of Professor DDr. Hanns Hofmann in Chemical Reaction and Reactor Design Institute at the University of Erlangen, Germany.

- University of Erlangen/Nuremberg, Germany is an ABET accredited university.

GRANTED PATENTS, PATENT APPLICATIONS, SIGNIFICANT PUBLICATIONS, AND INNOVATIONS:

1. Extension of the patent US 11,512,402 B2 under purview of the US 61/850, 685 filed as the first patent application in continuation with the US 16/820, 610 on June 08, 2020 with the embodiment for CO_2 containing side streams processed for generation of high temperature process heat and syngas by use of Dry Reforming via gasification (more commonly termed later by United States Department of Energy as "Advanced Combustion" vide website for publications). Based on the recent communication with USPTO, this patent will be officially granted within the next weeks.
2. US patent US 11,512,402 B2 granted on November 29, 2022 previously under application US 61/850, 685, then under national phase with US 14/392, 066 with the priority date of February 21, 2013.

International patent application above under US 11,512,402 B2 (US 61/850, 685 referred to CPCE, Carbon Power and Chemicals Economy) with the PCT/EP2014/000443, PCT as of February 19, 2014.

3. PCT/US 2010/002482 Process invention for high pressure dry continuous supply of single precursor or blended material e.g. coal/petcoke/biomass to pressurized gasification reactor (publication No. US- 2012-0182827-A1 with the publication date of 07/19/2012). EP patent granted on May 06, 2015.
4. PCT WO 02/12206; High pressure melamine reactor cascade for melamine manufacturing PCT/EP2005/008323.
5. High-pressure vertical multistage melamine reactor PCT/EP01/07039.

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6. High pressure dry process for production of pure melamine
7. Three international patent applications in the field of fuel gas supply (Syngas, natural gas) and conditioning for gas turbine based power plants; reserved for Siemens Energy Inc., Orlando, FL.
8. Conception and detail design of a new gasification reactor, currently in development and preparation

Extracurricular activities to the advancement of the Western Philosophy:

An avid devotee to the Western Philosophy, from the fundamental principles as reflected in the Old and New Testament to the present time with particular emphasis for the commencement of the Western Culture with the enactment of the Seven Laws post the Great Flood to Noah; the begin of the Western Civilization for republicanism, democracy, rule of law, and the uncompromised proposition that all mankind is created equally by Creator with the three unalienable rights founded by Father Abraham, and reaffirmed by the High Priest; as well as the outset of the Western Mentality initiated with the dispensation of the Ten Commandments, up to the Cyrus Cylinder decree, the rise of Christianity, Magna Carta, into the Age of Enlightenment, the Common Wealth principals, to the U.S. Constitution, the Gettysburg Address, amid others yet all to the order of Abraham, then to present day obligations and unwavering commitments for life, liberty, and pursuit of happiness for all mankind.

The current activities imply for instance the upholding of the United States democracy -the crest of the Abrahamic Civilization in our age- safeguarding conservatism, and republicanism (supporter of The Lincoln Project). Yet, most decisively, the persuasion of the dissolution of the rogue states and the mega-criminal nations of Austria and Germany by the verdict of all nations' vote on the U.N. General Assembly at large impaneled by the U.N. International Criminal Court for their egregious multitudes of crimes' against the Western Civilization, Western Culture, Western Mentality and against the humanity unto ca. 25 millions of minorities from all races and ethnicities at the present time alone; vide publications of Holocaust Today organization e.g. Mission Statement, Precept for Transparency, The 12 Volumes of the Indictment, Open Letter to His Holiness Pope Francis, and others amenable in www.HolocaustToday.org for further references.

The international litigation also implies the Supplementary Volumes for the overt and covert clandestine operations of the AustroGerm's thousands of operatives deployed into other Western nations to propagate pre-Nazi, Nazi and post-Nazi socio-political mechanisms. These dysfunctions are steered by the AustroGerm's elements to cause division, hate, racism, judicial decadence, the AustroGermic Positive Christianity, antisemitism, anti-Muslim, mass psychological diseases for contagious and inheritable megalomania, paranoia, and sadism, acknowledged as precursors to sociopathy and psychopathy (collectively referred as AustroGerMania Disease and disseminated by the AustroGerMitis Bacillus) unto other nations, likewise the AustroGerm's crimes in the world economy, inflections in global finances, schisms unto NATO, amid other sections.

MEMBERSHIPS:

AIChE; American Institute for Chemical Engineer, since August 2010

Member of Good Shepherd Lutheran Church in Gaithersburg, Maryland, since May 2010

CITIZENSHIP:

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United States citizen with no second citizenry; eligible for attainment any class of Security Clearance.

LANGUAGES:

English and German, both at business level

Farsi (mother language, high school level)

PROFESSIONAL EXPERIENCE IN CHEMICAL ENGINEERING

EVISA-ENGINEERING LLC, ROCKVILLE MD

Principal Chemical Engineer

May 2015 till present

Various contractual assignments either directly under EVISA Engineering LLC, or as sub-contractor or assigned via Personnel Resourcing Companies for fossil energy, chemical plants, power generation.

January 2023 to present:

Current activities ongoing for the commercialization of the CPCE patents for two commercial plants; one the CO₂/Waste Heat-To-Green Gasoline with the approximate target of \$1.35 per gallon to customers, the other for CO₂/Waste Heat-To-Green Ammonia/Methanol Complex plant. One plant is intended to be built in the United States, the other oversee. Either plant shall be built best adjacent to an existing coal power plant and shall demonstrate the capability for Zero-CO₂-Emission and Zero-Pollution. In one option, the CO₂/Waste Heat-To-Green Ammonia/Methanol Complex plant will upgrade an existing ammonia plant for the production of methanol or additional ammonia by utilizing the carbon dioxide from the sources of the existing ammonia plant.

Activities implies the formation of a consortium with technology providers in other Plant Islands e.g. GTL for the conversion of Green Syngas to gasoline, collaboration with ammonia/methanol licensors, OEMs and Special Equipment manufacturers and other key equipment vendors under the EPC Engineering for the site owners on two locations.

The overall objectives of the CPCE Consortium encompasses the commercialization of CPCE process for upgrading of nearly 4000 existing Stationary Sources for CO₂-emitting plants, mostly in the ammonia/methanol, and power generation to the Zero CO₂ Emission and Zero-Pollution plants.

Most previous commitment:

Previous assignment had been in the metallurgical sector for a U.S. Defense Department's associated company for June 2022 till end of November 2022. Three main projects have been commenced, each one either conceptualized for a new technology, prepared in Basic Engineering for plant optimization, and two solutions worked out, all together to the extent of several tens of millions of Dollars additional revenue. The solutions were handed down to site's senior process engineers for detail engineering and executions.

United States National Civil Action

September 09, 2019 till present

None-profit organization founded to advance the two technological feasible and profitable solutions to resolve the Global Warming and secure the existence of currently operational fossil energy plants.

http://www.evisa-engineering.com/data/civil-action/pdf/US_NCA_Objectives_Criteria.pdf

EVISA-ENGINEERING, ROCKVILLE, MD

Principal Chemical Engineer

June 2014 till April 2015

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Site energy and process optimization with increase of reactor performance, generation of ancillary steam with heat recovery as well the feasibility study for a Power Island (CHP, CoGen, industrial gas turbine CC) in a chemical manufacturing site in United States. This service comprised also a new improvement in processing with major business effect with a patent disclosure in favor of the client.

Principal Chemical Engineer

November 2009 - April 2014

Consulting engineer in various projects pertaining process and power engineering, technology assessment, chemical engineering, process analysis and technology development in power generation (coal, gas turbine, bio mass) and chemical plants (revamping, repowering, de-bottle necking, energy efficiency, process optimization and modification).

Consulting contract in 2014 in cooperation with ProEnergy Inc. for engineering and commissioning services for Arabian BEMCO and SEC Saudi Electricity Company in Saudi Arabia associated with the 3800 MW gas turbine combined cycle blocks in Qurayyah, Block#6, PP10 and PP12 the world largest gas turbine power plant in KSA.

Noramtec Consultants, Inc

April 2008 – August 2009

(Projects in Orlando, FL and Kansas City, MO)

Senior process chemical engineer for Siemens Energy Inc. Clean Energy Division in projects for international gas turbine power plants and Integrated Gasification Combined Cycle (IGCC). Responsible for chemical process engineering, customer supports, oral and written presentations, start-up, shutdown, and flare system procedures. Projects included Secure Energy Inc. (in Decatur, IL) Coal to SNG gasification, Summit Power, Tenaska Taylorville as well as natural gas conditioning and supply for the power plants BREAMAR 450 MW with three SCPP, Queensland, Australia; and NEERABUP 300 MW with two SCPP islands, Western Australia.

TBFA Fischer, Bodenheim, Germany

June 2005 - March 2008

Senior design engineer for natural gas supply and conditioning for the Siemens F and H Class gas turbine power plants in SUGEN 1100 MW re-gasified-LNG consisting of three CCPP power blocks in India; and 750 MW SUMGAI consisting of two CCPP power blocks in Azerbaijan.

TB Engineering, Linz, Austria

June 2000 - May 2005

Senior process engineer for EPC Engineering, consulting, technology development and improvement, technology assessment and project management for numerous chemicals, power generation and process industry customers in Europe.

Agrolinz Melamine Borealis, Austria

August 1991 - March 2000

Technology manager for the N-fertilizers primary products for a number of plants i.e. large scale ammonia, nitric acid, urea as well as technical gas production (CO₂, N₂, O₂, H₂, Ar, He), melamine and other nitrogen based urea, biuret, UAN production facilities. Provided system and process design, operations, EPC Engineering, pollution control and permitting support, technology improvements, development of new processes, economic and safety retrofits, safety, and hazards evaluation.

Frauenaurach Municipal & Coal Power Plant, Germany

June 1990 - June 1991

Plant assistance for process engineering in a 420 MW coal-fired power plant utilizing dry process operation for flue gas desulfurization and cycle optimization activities to enhance thermal efficiency for higher profitability through economical design techniques.