



JINDAL, BOTSWANA

Jindal Mmamabula Energy Project Botswana (JMEP)

EXPRESSION OF INTEREST

FOR

MULTIPLE PACKAGE MODE

FOR

4X150MW (NET) THERMAL POWER PLANT AT BOTSWANA

1.0.0 INTRODUCTION

Jindal Power Limited (JPL) is a leading Indian power company with a diverse energy portfolio encompassing thermal and renewable sources. With an impressive installed capacity of 4300 MW, JPL has been instrumental in meeting the nation's growing power demands. Pioneering the establishment of an Independent Power Plant (IPP) in 2007 with its 4x250 MW thermal power unit in Chhattisgarh's Raigarh district, JPL has continued its expansion in Tamnar with a 2400 MW (4X600 MW) thermal power plant.

JPL energy portfolio includes 3400 MW at Tamnar, Chhattisgarh and 600 MW at Simhapuri Andhra Pradesh & 300 MW at Shirpur, Maharashtra. By leveraging cutting-edge technologies and best practices, JPL has set new standards in India's power sector.

The company's vision is to emerge as a significant player in the industry, contributing to the nation's development. Committed to renewable energy sources, JPL aims to substantially increase the share of power generated through sustainable means. As the 5th largest integrated power producer in India, based on million units of generation, and with three captive mines, JPL stands as a key player in the sector. The company envisions establishing benchmarks in renewable energy, carbon emissions, and environmental protection. Furthermore, JPL is a trailblazer in community development and welfare initiatives.

1.1.0 Express of Interest (EOI)

Jindal Power Limited (JPL) / Jindal Mmamabula Energy Project Botswana (JMPEP) herein after referred as JPL invites Expression of Interest (EOI) from interested agencies/companies having past experience in designing/developing and executing Thermal Power Plants in multiple package mode for similar capacities or higher.

1.2.0 About the Project

Jindal Group through Jindal Energy (Botswana) Proprietary Limited, JEBPL, Botswana proposes to develop a 300 MW (Net) [2x150 MW Net] coal fired sub critical thermal power project in at Mmamabula in the Country of Botswana in Africa. The minimum gross capacity of the plant shall be 2x175MW. In addition, Jindal is an advanced stage of negotiation with Botswana Government for additional 2x150MW (net) Thermal Power Plant in the same Power plant complex.

Jindal proposes to carry out the execution of the project in multiple package mode. The tentative list of packages are listed below in clause 1.4.0.

The Commercial Operation Date (COD) schedule for the 4 x 150MW (net) is as follows:

1. 1st Unit - by Dec'26
2. 2nd Unit - 4months after 1st Unit COD
3. 3rd Unit - 4 months after 2nd Unit COD
4. 4th Unit - 4 months after 3rd Unit COD

1.3.0 Project details and Project Execution

The project covers the design, finance, construction, ownership, operation, maintenance and decommissioning at the end of its economic life (minimum 30 years) of a 300MW net (Greenfield coal-fired power plant in Botswana as an independent power producer (IPP)).

Plant Life	30 years
Plant Availability	90% (average)
Rated Plant Capacity (net)	2 x 150 MWe
Gross Capacity	2 x 175 MWe
Auxiliary load capacity (kW)	50 MWe
Emissions Control (SOx/NOx) Compliance	
<p>Guaranteed gaseous Emissions (including SOx, NOx, Particulates) at design conditions</p> <p>i. SOx</p> <p>ii. NOx</p> <p>iii. Particulates</p>	<p>i. <400 mg/nm³</p> <p>ii. < 200 mg/nm³</p> <p>iii. <50 mg/nm³</p>
Noise level guarantees near field noise 85dB@1m from the equipment and 1.5m above the floor	<p>< 85 dBA</p> <p><105 dBA for safety valve</p>
Minimum Contracted Capacity (net)	75 MW / unit (average)
Raw water storage capacity	The capacity of the storage reservoir designed to store 15 days of total Power plant water requirement.
Demineralised water storage capacity	<p>2 x 100%</p> <p>Each 24 hrs storage capacity</p>
Coal storage capacity at maximum boiler capacity	50 days is considered as per Tender.
Power factor (SA Grid code compliant)	Compliance to SA Grid code

The proposed Thermal Power Plant with support facilities includes four units comprising of four (4) Circulating Fluidized Bed (CFBC) Coal fired Steam Generator; four (4) Steam turbine complete with needed integral facilities, but not be limited to the following:

Mechanical (for each unit including common facilities)

- CFBC Coal fired Steam Generator and Auxiliaries
- Steam Turbine and Auxiliaries (Not in scope of this EOI)
- Feed water heating system.
- Power cycle pumps and accessories
- Condensate system
- Coal handling system
- Bottom Ash handling system
- Fly ash handling system.
- Fuel oil system.
- Closed cooling water and Auxiliaries.
- Raw water system
- Plant water treatment & wastewater treatment systems.
- Sewage treatment plant
- Fire detection and Protection System

- Compressed Air system (instrumentation & service air)
- Heating, Ventilation & Air conditioning system
- Cranes and Hoist.
- Piping, Valves, specialties, fittings, supports etc.
- Workshop, Chemical Laboratory and Stores.
- Air cooled condenser and Auxiliaries
- Waste Water Treatment System
- Thermal Insulation
- Weigh Bridge
- Mandatory spares
- Start up and commissioning spares.
- 3 years Operation and maintenance spares
- Special Tools and tackles for erection & maintenance
- Fire tenders.
- Suitable nos. of Nitrogen Cylinders to Purging along with Nitrogen Cylinder Manifold, Valves, Instruments and Piping.

Any other systems as required to complete the project shall be included.

Electrical (for each unit including common facilities)

- Generator and auxiliaries
- Generator Transformers, Station Transformers & Unit Auxiliary Transformers
- Isolated, Segregated Phase & Non-Segregated Phase Busducts
- Control & Relay panels.
- 400 kV outdoor Switchyard and its control & communication system
- Two circuits of 400 kV Transmission lines and LILO interconnection with BPC grid
- Neutral grounding system
- 6.6 kV Switchgears
- LV Switchgears and panels
- Service Transformers
- Electric motors and actuators
- Emergency Diesel-Generator set
- DC system with Batteries and Battery chargers
- Uninterrupted Power Supply (UPS) system with Batteries
- Illumination and small power distribution system
- Earthing and Lightning protection system
- Communication and Public address systems
- Power and control cables
- Cable installation system
- Elevators
- Chimney Electrification
- Construction Power substation and distribution
- Interconnection of electrical system at various terminal points.
- Mandatory spares
- Start up and commissioning spares.
- 3 years Operation and maintenance spares
- Special Tools and tackles for erection & maintenance
- Any other systems as required to complete the project shall be included.

Control & Instrumentation System (for each unit including common facilities)

- Plant Distributed Control System
- Operator Station, Engineering Station, LVS, Historian, Performance Calculation station, SOE station & other stations along with all necessary furniture's
- Steam Turbine, Steam Generator control and protection system.
- Vibration monitoring and analysis system

- GPS / Master & slave clock system
- SWAS (Steam and water analysis system)
- CEMS (Continuous emission monitoring system)
- Flue gas measurement system
- PLC /Microprocessor based local control systems for offsite plants.
- Relay based local control system.
- All local mounted Instruments, sensing elements, switches, transmitters etc.
- Local instrument enclosures/racks with transmitters
- Flow elements/Control valves/ other pipe mounted instrumentation Plant security & surveillance system.
- Instrument lab equipment with all the furniture.
- Ambient Air Quality Measurement system (AAQMS)
- Plant Security & Surveillance System
- Instrumentation/Signal, control cables, Fibre optic cables and special cables
- Electronic earthing
- Erection hardware for all I&C systems
- All other I&C items, works and services.
- Mandatory spares
- Start up and commissioning spares.
- 3 years Operation and maintenance spares
- Special Tools and tackles for erection & maintenance
- Any other systems as required to complete the project shall be included.

Civil Structural & Architectural Work (for each unit including common facilities)

Listed below are the Civil, Structural and Architectural works that are required for the Power Plant.

- Powerhouse Building for Steam Turbine & Generator and Foundations.
- Equipment foundation for STG, Switchyard, Transformer yard, ESP, Air cooled condenser foundations, DG sets and other Auxiliary equipment foundation etc.,
- RC Chimney, Bottom ash silo, & Mill and Bunker Bay, CCW pumps & Heat exchangers and Condensate storage tank.
- Water Intake system including Raw water reservoir, Raw water Pump house.
- Pipe and Cable Trenches & Racks
- AHP Control room, Switchyard Control room building ESP control room, CHP maintenance & Control building and Main plant compressor building.
- Coal handling structures –Conveyor Galleries, Conveyor gallery supporting Trestles, Crushed coal stockpile, Coal pile run off pit.
- Ash handling structures – Bottom ash Silo, Fly ash silo, Mill Reject Silos, Compressor house.
- Fuel oil tank farm Area – Fuel oil unloading area, Fuel oil tank, Fuel oil pump house, dyke wall and unloading area drains.
- Potable water tank, filtered water tank, Fire Fighting water tank, Fire water pump house, Water Treatment Plant WTP, DM water tank, RO plant and Effluent Treatment Plant
- Workshop building, Dozer shed, Chemical unloading & Storage area, and Neutralization pit.
- Non-Plant buildings and facilities – Gate House, Car Parking, Fire station, Weigh bridge, Security room, Canteen, Store and Service building etc.,
- Site enabling works - Site Grading, Approach Road, Plant roads, Drains, Precast Boundary wall, Storm Water Drainage System, Sewerage System, Street and Boundary Lighting.
- All other civil and structural works as required for the power plant.

The above-listed scope is only for reference. JPL/JEBPL will provide the Specification for the packages to the selected bidder. The tentative package list is provided below in clause 1.4.0:

1.4.0 Package List

Package List for Botswana 2x175 + 2x175 Units

SI.No.	Particulars	Scope
A: Local Site Enabling Packages from agencies at Botswana		
Package-A-01	Site levelling	E
Package-A-02	Fencing works	S+E
Package-A-03	8 nos. Borewells including piping, pumps with motor and controls for Plant Requirement	S+E
Package-A-04	Construction water from 2 borewells upto camp and plant	S+E
Package-A-05	Tanks and pipelines connecting the 8 nos. of borewells upto site	S+E
Package-A-06	Construction power from Isang Substation- Transmission lines & Transformers (5MW for Township/Camp Office and 5MW for Construction Power), Internal distribution system at Plant and Township/ Camp area	S+E
Package-A-07	Approach Roads and Drains (Tropic of Capricorn point on A1 highway to site)	S+E
Package-A-08	Security	E
Package-A-09	Porta Cabins	S
Package-A-10	Township buildings construction, Quarters, Canteen, Guest House, Hostel, Hospital, Auditorium, Security camp etc.	S+E
Package-A-11	Misc. Works for Electrical and Civil	S+E
Package-A-12	Weigh Bridge	S+E
Package-A-13	Architectural, Landscaping and Master Plan for Township, Service Buildings, Auditorium, Admin Building, BoP service buildings like switchyard, DM Plant etc.	C + Sup
Package-A-14	Any Environmental Impact / Social impact assessment study	
Package-A-15	Fire tenders	S
B: Supply on FoB Local designated Port Basis		
Package -B-01	Steam Turbine including Lube Oil system, etc., Gland Steam Condenser, LP heater, HP heaters, all "piping, electrical, instrumentation" within the steam turbine island.	D+S+Sup
Package -B-02	Boiler +Deaerator, BFP suction piping, BFP, all piping within Boiler Island, Critical piping - Main, cold & hot reheat steam piping upto Steam turbine inlet, Bypass lines.	D+S+Sup
Package -B-03	ACC + Ducting from Turbine outlet to ACC +CEP+ Condensate Storage tank	D+S+Sup
Package -B-03B	Fin-fan cooler or Auxiliary Cooling tower	
Package -B-04	Water system - Raw water Pretreatment, DM water system including SWAS, Effluent and Sewage Treatment	D+S+Sup
Package -B-05	AHP	D+S+Sup
Package-B- 06A	Limestone system	D+S+Sup
Package -B-06	CHP	D+S+Sup
Package -B-07	Fire Fighting system	D+S+Sup

Package -B-08	Compressed Air System	D+S+Sup
Package -B-09	Heating, Ventilation and Air Conditioning System (HVAC)	D+S+Sup
Package -B-10	Fuel Oil System (FOS)	D+S+Sup
Package -B-11	LP Piping	S
Package -B-12	ACW, DMCW system	D+S+Sup
Package -B-13	Common Lab - Mech, Elect, C&I lab	S + Sup
Package -B-14	Power Transformers GT, UT, ST, NGT and Township/construction power Transformer	S
Package -B-15	LT Transformers i.e. Service Transformers	S
Package -B-16	HT, LT Busducts	S
Package -B-17	HT, LT, Control Cables & OFC Cables	S
Package -B-18	HT & LT Switchgear & DCDBs including cable glands, Lightning Protection	S
Package -B-19	Batteries, Inverters and UPS	D+S+Sup
Package -B-20	DG Sets	S
Package -B-21	Elevators,	D+S+Sup
	Cranes and Hoists	D+S+Sup
Package -B-22	Cable Trays	D+S
Package -B-23	Total Lighting including emergency lighting	D+S
Package -B-24	Control & Instrumentation system including, PA system, Telephone (Plant Communication), CC TV, AAQMS, CEMS, SWAS, VMS/ VMAS, Gate Access Control	D+S+Sup
Package -B-25	400 KV Switchyard equipment along with control, relay and metering panels.	D+S+Sup
Package -B-26	400 KV and 33 KV or 66 KV Transmission materials Towers, Insulators, Conductors clamps, fasteners, foundation bolts, etc.	D+S+Sup
Package -B-27	33 KV or 66 KV Transmission materials Towers, Insulators, Conductors clamps, fasteners, foundation bolts, etc.	D+S+Sup
Package -B-28	Civil Contractor for all Offsite packages (All Civil & Structural Works) including unloading of material for CHP, AHP, Water Systems, Compressors etc..	D+S+Ex
Package -B-29	Civil Contractor # 1, #3 (All Civil & Structural Works) including unloading of material for Boiler, Turbine, ESP, ACC and associated auxiliaries (excluding structures of Boiler & TG hall).	D+S+Ex
Package -B-30	Civil Contractor # 2, # 4 (All Civil & Structural Works) including unloading of material for Boiler, Turbine, ESP, ACC and associated auxiliaries (excluding structures of Boiler & TG hall).	D+S+Ex
Package -B-31	Admin Building and Service Building,	D+S+Ex
Package -B-32	Erection Contractor # 1 # 3 (Mechanical + Electrical + C&I) including unloading of material for Boiler, Turbine, ESP, ACC and associated auxiliaries along with the structures.	D+S+Ex
Package -B-33	Erection Contractor # 2 # 4 (Mechanical + Electrical + C&I) including unloading of material, for Boiler, Turbine, ESP, ACC and associated auxiliaries along with the structures.	D+S+Ex
Package -B-34	Switchyard and Transmission Lines erection Contractor including unloading of material	D+S+Ex

Package -B-35	Erection Contractor for all Offsite packages (All Civil & Structural Works) including unloading of material for CHP, AHP, Water Systems, Compressors etc..	D+S+Ex
Package -B-36	Workshop	S + Sup
Package -B-37	Coal Transportation MGR/CCPC system	D+S

D: Handling at destination port, local transportation, transit insurance, including route survey and necessary permits		
Package -D-01	From Durban Port: South Africa (for Containers)	Complete
Package -D-02	From Richards Bay Port: South Africa (for Break Bulk)	Complete
Package -D-03	From Maputo Port: Mozambique	Complete
Package -D-04	From Walvis bay Port: Namibia	Complete

Note: **D- Design,**
 S-Supply,
 Sup—Supervision,
 Ex- Execution (Erection, testing and Commissioning)

1.5.0. Upon receipt of responses against this EOI, Jindal will review the responses to ascertain suitability of the offer and shortlist Prospective Collaborators for further discussions. The detailed terms and conditions shall be mutually agreed upon subsequently on case-to-case basis.

2.0.0 SITE CONDITION

2.1.0 Location and existing Infrastructure

The plant location details are as follows:

Location	:	Mmamabula Latitude : 23°37' S (Firm coordinate at later stage) Longitude : 26°44' E (Firm coordinate at later stage)
Nearest Airport & Distance from Site	:	Gaborone airport, 180 km from site
Nearest Harbour & Distance from Site	:	Durban, 1400 km from site, Maputo (Mozambique)-1100 kms, Walvis bay (Namibia)-1600 kms
Access Road	:	National Highway (A1) connecting Gaborone and Francistown passing through Mahalapye, Site is off 23 km from A1 at the Tropic of Capricorn line

2.1.1 Geological Conditions

The land area does not have much undulation and some amount of levelling and grading work will be required during project implementation stage.

The top 2m of soil consists of Kalahari sand which is not suitable for any foundation except for flexible structures. The Foundation system shall be designed on the basis of findings and recommendations of detailed geotechnical investigation to be carried out during project execution stage.

2.1.2 Seismic intensity

A general seismic investigation and site specific hazard study indicated that the proposed plant area can be expected to have a 10% probability of peak ground acceleration (PGA) of 0.16g being exceeded in a 50 year period, the recommended norm for the maximum design earthquake (MDE).

2.2.0 Meteorological conditions

Parameter	Values
Maximum Temperature (°C)	: 41
Minimum Temperature (°C)	: 5
Design Ambient Conditions:	
• Temperature for Electrical Equipment (°C)	: 50
• Relative Humidity (%)	: 75

(Above temperature and ambient condition are the base values. Same shall be validated by the bidder by adopting the Metrological data (No. Of years shall be minimum of last 20 years) and design condition shall be validated based on the most likely occurrence. If the values arrived by the bidder is different from the base level, more stringent shall be considered for the design condition. This design condition subjected to the owner's approval.)

Average Annual Rainfall (mm)	: 400 mm
	: Min 3 mm recorded in April 2009 in Mookane
	: Max 637 mm recorded in Jan 2009 in Mookane
Maximum Precipitation over 24 hours period	: In excess of 125mm of rain in 24 hour period recorded.
	: Approx. 70mm occurred in one hour
Maximum Ambient Humidity (%)	: 100
Annual Mean Relative Humidity over 12 years (%)	: 60
Maximum steady wind velocity (km/h)	: 160
Dust concentration in the air under dust storm condition (gm/cum)	: 100

Wind

Basic Wind Speed : 44.5 m/s

The basic wind velocity to be considered is 44.5 m/s for determining the effect on buildings and structures in Power Plant site.

Distribution of wind pressure, shape factor and other related criteria shall be based on the recommendation of ASCE 7. The wind pressure variation with height shall be considered.

3.0.0. The EOI Proposal: The Proposed Association shall be initially valid for a period of two years. Interested companies may submit their Expression of Interest by **3.00 pm on 25th March, 2024**. Expression of Interest should be accompanied by all the details as listed elsewhere in this EOI document.

4.0.0 Additional Details to be furnished along with EOI proposal.

- a. The proposal for association.
- b. Details / documents on company profile, Certificate of Registration or Incorporation (**Form-1**).
- c. Products and Services offered - Technical features/ product range.
- d. Specific Experience details.
- e. Reference List: Prospective EPC Party shall furnish a summary of their product/project reference as detailed below for major supplies in last 10 years (**Form -2**).
- f. Audited annual financial reports for at least last three years along with their authenticated translations in English.
- g. Profit & Loss Statement and Balance Sheets certified by CA for last three financial years and Bank Certificate not older than 3 months from date of opening of EOI.
- h. List of major T&P available with the bidder for erection and Commissioning works to be executed at Botswana.
- i. Experience/Credentials of projects completed in African continent.
- j. Please mention package names clearly, under which company is showing the interest to be part of. If company shows interest in multiple packages, please mention them clearly in response/reply.

5.0.0 Contact Details The proposal complete in all respect is to be sent to following address:

Office Address at New Delhi	Jindal Power Limited, NTH Complex, A2 Shaheed Jeet Singh Marg, Qutub Institutional Area, New Delhi 110067
Contact Person	D.V.Lakshmipathy, Head Engineering and Project Management Phone: 011-48187346 Mobile : 7303654524 Email : dv.lakshmipathy@jindalpower.com
Office Address at Gurugram	Power Plant Engineers Limited, 3 rd Floor, Tower-B, Jindal Centre, Plot No-2, Sector 32, Gurugram 122001.
Contact Person	Sanjeev Sharma, EVP Head Engineering and Project Management, Power & Spl. Steel Projects. Phone: 0124 661 2005 Mobile: 85277 50666 Email: Sanjeev.sharma1@jindalsteel.com
Office Address at Botswana	Jindal Energy (Botswana) (Proprietary) Limited Plot 75739, First Floor, Left Wing, Setilhoa, Gaborone, Botswana Postal address: Private Bag 00350, Gaborone, Botswana
Contact Person	Neeraj Saxena Country Director Mobile : +267-71333586 Email: Neeraj.saxena@jindalafrica.com

6.0.0 Right to accept or reject any or all Applications:

- a. Notwithstanding anything contained in this EOI, JPL reserves the right to accept or reject any response at any time without any liability or any obligation for such acceptance, rejection and without assigning any reasons thereof.
- b. JPL reserves the right to verify all statements, information and documents submitted by the respondent against the EOI. Any such verification or lack of such verification by JPL shall not relieve the respondent of his obligations or liabilities hereunder nor will it affect any rights of JPL.
- c. The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at New Delhi (India) shall have exclusive jurisdiction over all disputes arising under, pursuant to and / or in connection with the EOI process.
- d. Response from the Countries, Organisations, Groups, Individuals etc. with whom Import/Export are banned/prohibited as per the Indian Foreign Trade policy shall not be considered.

7.0.0. DISCLAIMER

1. All information contained in this Expression of Interest (EOI) provided/clarified are in good interest and faith.
2. The information contained in this EOI or subsequently provided to the respondent(s) whether verbally or in documentary or any other form, by or on behalf of JPL, is provided on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.
3. The purpose of this EOI is to provide interested parties with information that may be useful to them in the formulation of their response for qualification and subsequent selection pursuant to this EOI.
4. This EOI is not an offer by JPL to the prospective respondent(s) or any other person. This EOI is neither intended nor shall it be construed as creating or requiring any ongoing or continuing relationship or commitment with any party or person. This is not an offer or invitation to enter into an agreement of any kind with any party. Though adequate care has been taken in the preparation of this EOI document, the interested firms shall satisfy itself that the document is complete in all respects.
5. The information is not intended to be exhaustive. Interested Agencies are required to make their own enquiries and assumptions wherever required. Intimation of discrepancy, if any, should be given to the specified office immediately. If no intimation is received by this office by the date mentioned in the document, it shall be deemed that the EOI document is complete in all respects and firms submitting their interest are satisfied with the EOI Document in all respects.
6. The issue of this EOI does not imply that JPL is bound to select and shortlist respondent(s) for next stage or to enter into any agreement(s) with any respondent(s). JPL reserves all right to reject any response submitted against this EOI document at any stage without assigning any reasons thereof.
7. JPL also reserves the right to withhold or withdraw the process at any stage. Neither JPL nor its employees and associates will have any liability any loss, expense or damage which may arise from or be incurred or suffered in connection with anything contained in this EOI document or any matter deemed to form part of this EOI document, the information and any other information supplied by or on behalf of JPL.

8. JPL accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance/use of any statements/information contained in this EOI by the respondent(s).

9. JPL is not making any representation or warranty, express or implied, as to the accuracy or completeness of any information/statements made in this EOI. The respondent shall bear all its costs associated with or relating to the preparation and submission of its response including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by JPL or any other costs incurred in connection with or relating to its response. All such costs and expenses will remain with the respondent(s) and JPL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by any respondent(s) in preparation or submission of the respondent(s), regardless of the conduct or outcome of the EOI.

General Information

1. Name of the Company:

2. Place of Incorporation/ Registration:

3. Year of Incorporation/Establishment:

4. Address of the company(Head Office, Registered Office, Business Office)
Address:

Telephone:

E-mail:

Web site:
5. Address of factory/Works:
Address:

Telephone:

E-mail:
6. Authorized representative of the company to contact:

Name(s):

Designation:

Address:

Telephone:

E-mail:

Form 2

Package Sl.No. and Package Particulars as per above table.
(Details of each package should be provided on separate sheets)

Reference List of the supplies/ projects executed by contractor in last 10 years

Sl. No	Contract No & Date	Project details	Project Capacity	Scope of work	Year of Commissioning