ENERGY FOR NATIONAL SUSTAINABLE DEVELOPMENT

PVN's Human Resource Development (HRD) and Management Strategy to Meet The Increasing Demand And Challenges of Human Resources for the Refining and Petrochemical Industry in Vietnam.

Presented by : Dinh Van Ngoc

at the 32nd JCCP International Symposium

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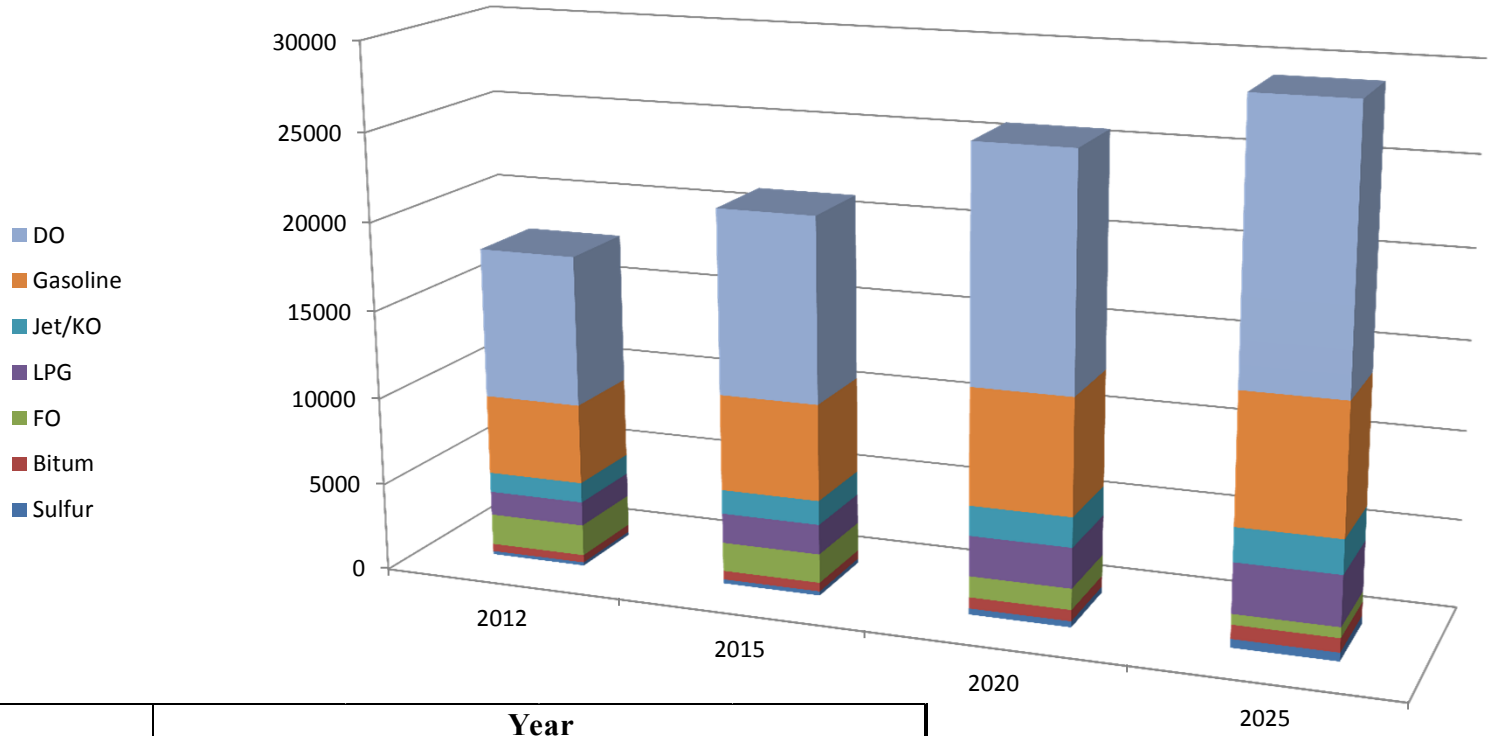
- Overview of Vietnam's Refining and Petrochemical Industry
- PVN Human Resource Development
- HR Demand and Challenges
- Management and Development Strategy

Overview of Vietnam's Refining and Petrochemical Industry

VIETNAM'S ESTIMATED OIL PRODUCTS DEMAND THROUGH 2025

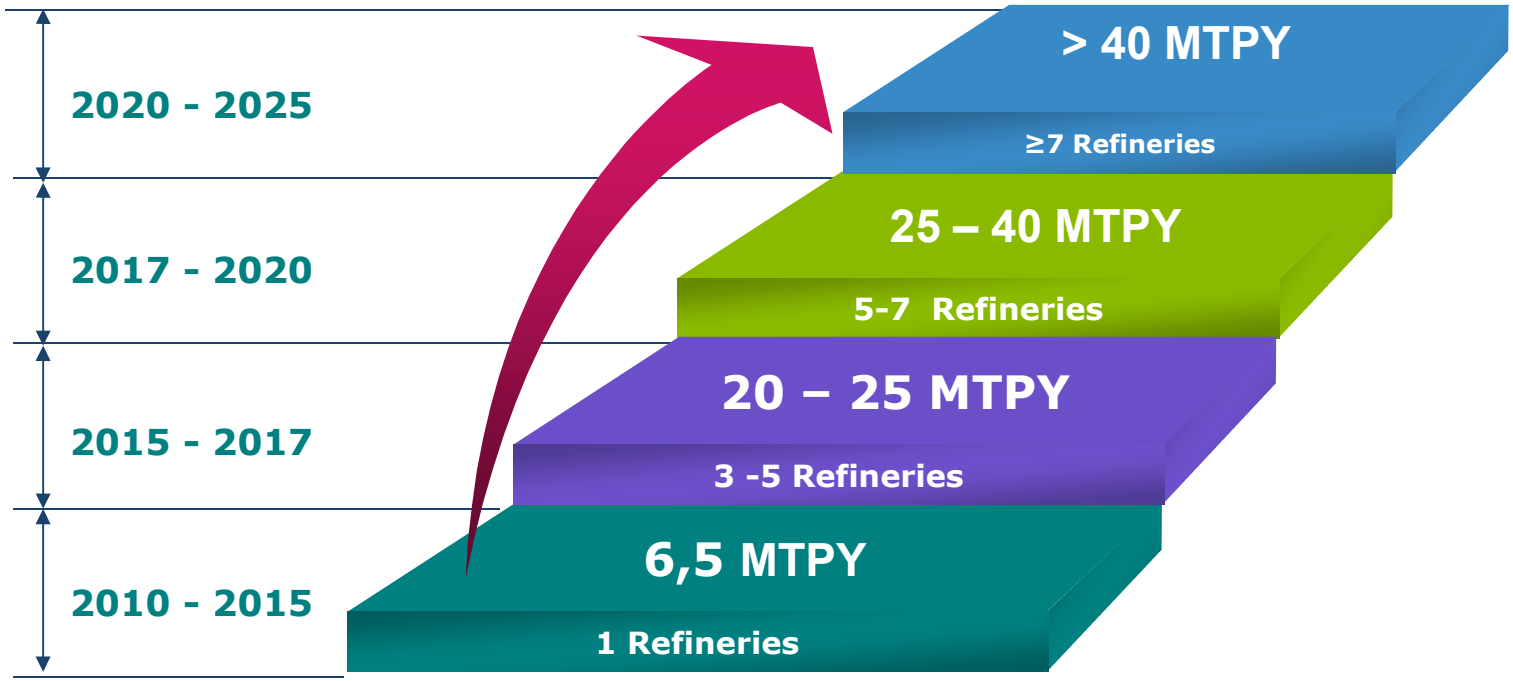


Products (Thousand tons)	Year			
	2012	2015	2020	2025
Sulfur	186	234	343	484
Bitum	432	500	637	793
FO	1773	1647	1202	598
LPG	1367	1701	2288	2838
Jet/KO	1139	1368	1695	1922
Gasoline	4541	5454	6589	7338
DO	8510	10420	13144	15285
Total	17948	21324	25898	29258

Source: PFC, Pvpro, 2012

REFINING & PETROCHEMICAL PLAN

Estimated total output refining capacity as follow: (list of refining and petrochemical projects demonstrated in Attachment1)



- At the year 2020 , VN reaches (then surpasses) the balance state of its domestic refining products market.

- There are several petrochemical projects proposed from 2016 to 2020.

PVN Human Resource Development

PVN TOTAL RECRUITMENT AND TRAINING OF O&M PERSONNEL FOR OIL&GAS PROCESSING PROJECTS AND ELECTRIC POWER FROM 1998-2012

No.	Project name	Operation	Manpower		Training courses	Participants	Average training cost (Million VND)	Total Training cost (Million VND)
			Engineer	Technician				
I	**Refining and Petrochemical Projects**							
1	Dinh Cố Gas processing Plant	1998	31	24			33	1.807
2	Condensate processing Plant	2001	4	85	3	100	3	259
3	Dung Quất Refining Plant	2009	551	495	530	20.928	230	240.567
4	Dung Quất Polypropylene Plant	2010						
5	Phú Mỹ Fertilizer Plant	2004	114	235		1.221	71	24.686
6	Cà Mau Fertilizer Plant	2012	173	283	82	1.712	200	91.146
7	Đình Vũ Petrochemical Plant (PET)	2013	63	464	12	2.284	53	27.868
8	Dung Quất Bio-Ethalnol Plant	2013	41	96	53	610	48	6.653
9	DA NMSX Ethanol Phú Thọ	-	24	114	4	147	22	3.010
II	**Electric Power Projects**							
11	Cà Mau 1 Plant	2008	48	23	15	596	94	6.695
12	Cà Mau 2 Plant	2008	46	34	9	428	90	7.228
13	Nhơn Trạch 1 Plant	2009	51	74	63	1.179	45	5.619
14	Nhơn Trạch 2 Plant	2011	74	60	52	779	206	27.573
15	Vũng Áng 1 Plant	2013	139	341	195	4043	155	88.566
	Total		**1.408**	**2.387**	**1.051**	**34.558**	**137**	**521.033**

More than 4000 engineers and technicians for operations and maintenance have been trained and employed in new projects. Each newcomer has been trained on average in 8-10 training courses before reaching full employee status.

PVN Human Resource Develoment

PVN Recruitment in Refining & Petrochemical Sector

AVAILABLE RESOURCES FOR RECRUITMENT:

- **Petrovietnam Training Organizations**
  - Petrovietnam Manpower Training College
  - Petrovietnam University
  - Vietnam Petroleum Institute
- **National Training and Education System**
  - **2 National Universities**
  - **8 Regional Universities**
  - **88 Public Universities**
  - **23 Academies**
  - **23 Local Universities**
  - **61 Private Universities**
  - **300 Colleges with 3 year programs after high school.**
  - **More than 400 Vocational Colleges with 2 year programs after high school.**
- **From other countries including from foreign universities with branches in Vietnam (16)**

PVN Human Resource Development

Recruitment

After passing the entrance examination, applicants shall be pre-employed for training. During this training period, there are tests which require passing grades. Successful trainees shall be introduced to the project to be trained by contractors, licensors, and manufacturer (OEM) experts during MC, Pre-commission, Commissioning and Start-up. A probation period will apply to ensure the employee is suitable for the job.

Initial Employment as Trainee

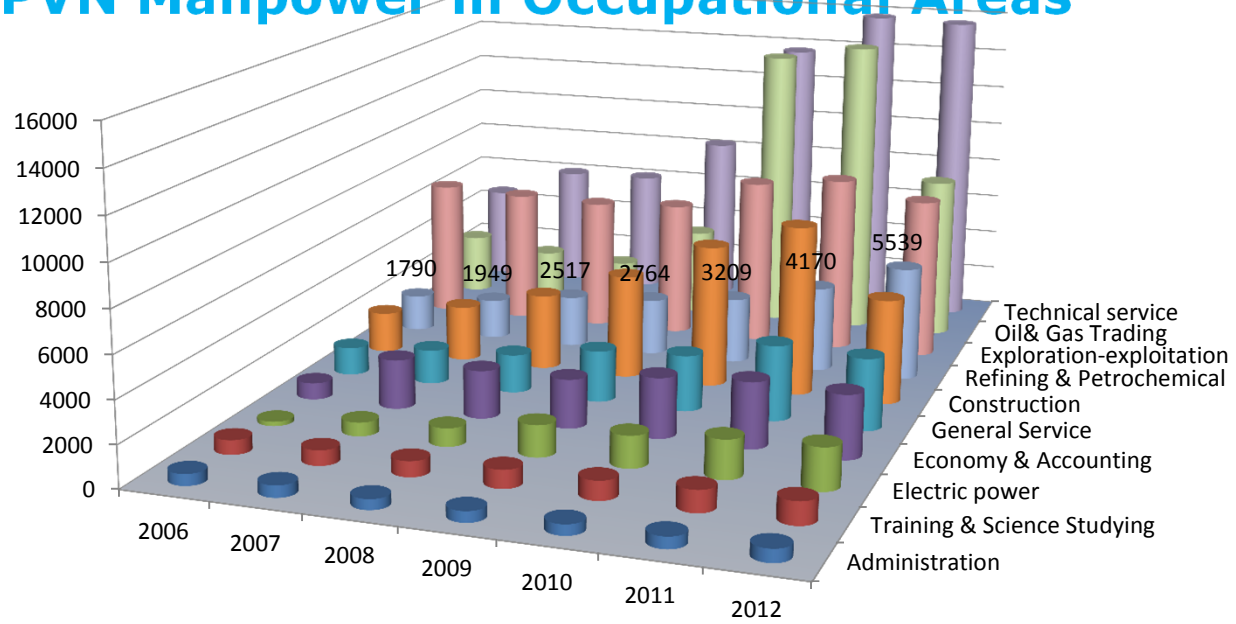
Qualification Testing and Probationary Period

Employee Training Programs, OJT

After completing the probationary period successfully, an employment contract will be signed for 1 year, and then 3 years. Afterwards, there is no time limit. The career of every employee will depend on personal competency, performance, attitude, and aptitude/bent.

PVN Human Resource Development

Current PVN Manpower in Occupational Areas

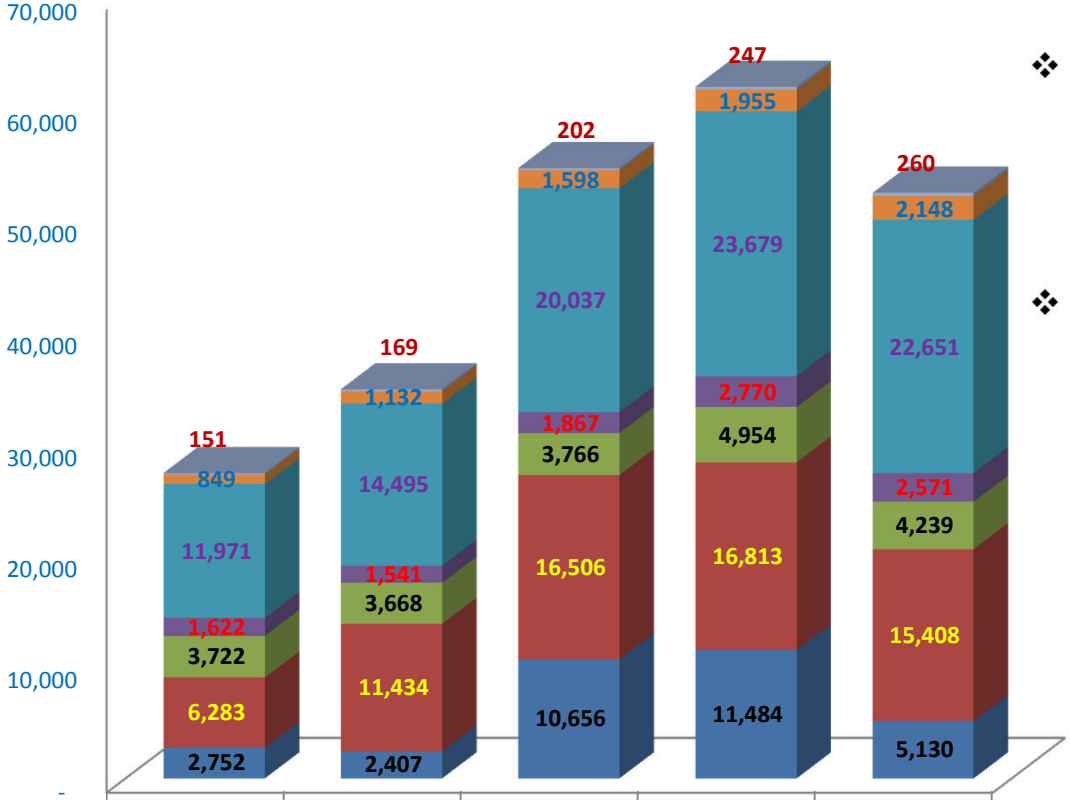


Manpower in Refining & Petrochemicals has been increasing gradually since 2006-2011 because of companies- including Dung Quat Refinery, fertilizer plants, bio-ethanol plants, and a PET plant- which are in service.

	2006	2007	2008	2009	2010	2011	2012
Administration	545	560	489	510	498	542	604
Training & Science Studying	688	724	736	865	905	1030	1079
Electric power	211	655	876	1515	1520	1848	2002
Economy & Accounting	800	2385	2313	2351	2887	3156	3039
General Service	1351	1654	1858	2488	2704	3630	3457
Construction	1982	2707	3700	5063	6909	8252	5079
Refining & Petrochemical	1790	1949	2517	2764	3209	4170	5539
Exploration-exploitation	6757	6590	6482	6704	8214	8696	7927
Oil& Gas Trading	2961	2456	2247	4291	14057	14784	8023
Technical service	4634	6058	6132	8295	13729	15794	15658

PVN Human Resource Development

Manpower Educational Levels

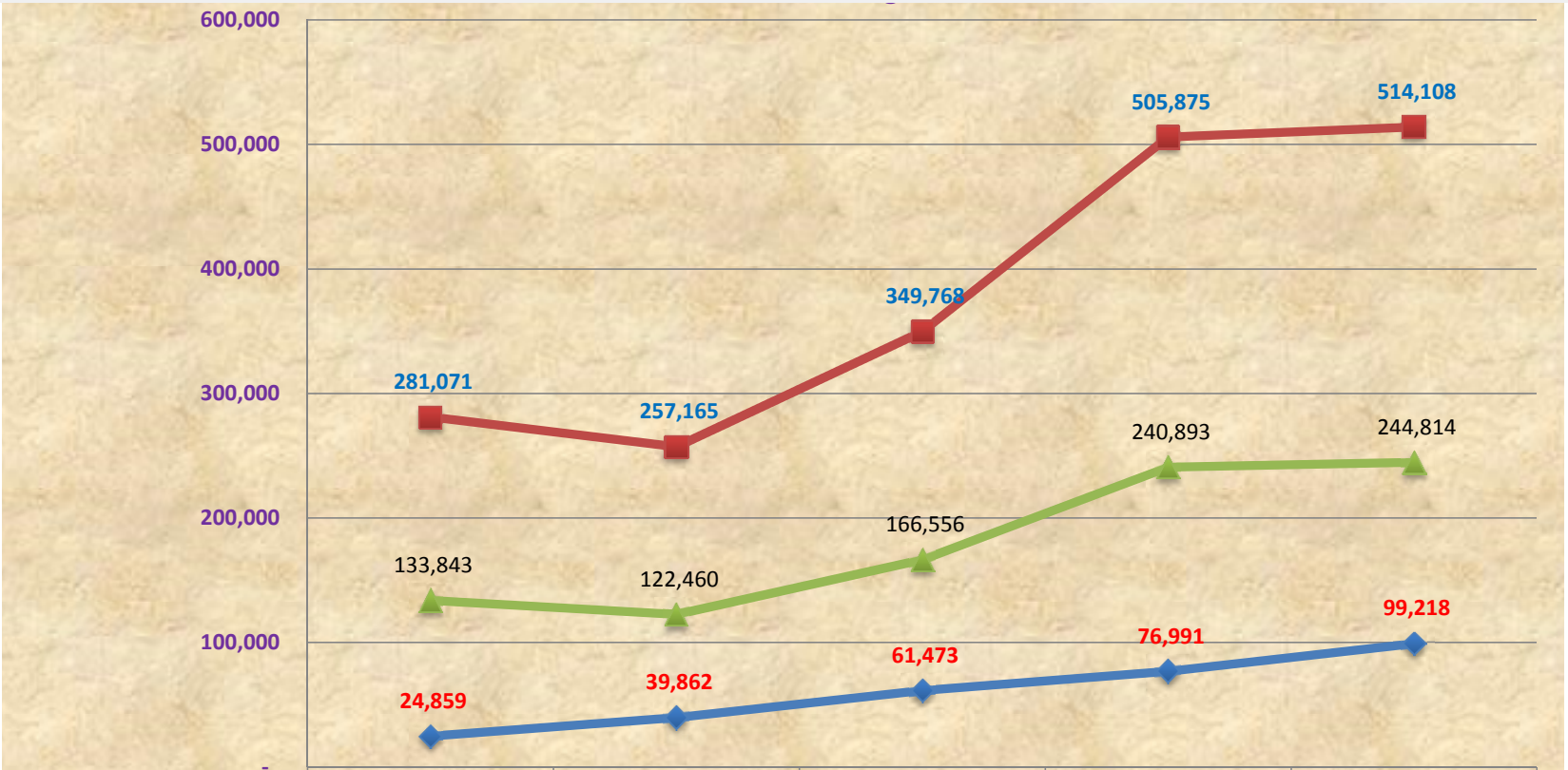


	2008	2009	2010	2011	2012
Doctor	151	169	202	247	260
Master	849	1,132	1,598	1,955	2,148
University	11,971	14,495	20,037	23,679	22,651
College	1,622	1,541	1,867	2,770	2,571
Intermediate	3,722	3,668	3,766	4,954	4,239
Technical Worker	6,283	11,434	16,506	16,813	15,408
Unskilled worker	2,752	2,407	10,656	11,484	5,130

- University graduated employees and Technical workers have been increasing dramatically but gradually.
- The number of unskilled employees sharply increased in 2010 then dropped to 5130 employees in 2012.

PVN Human Resource Development

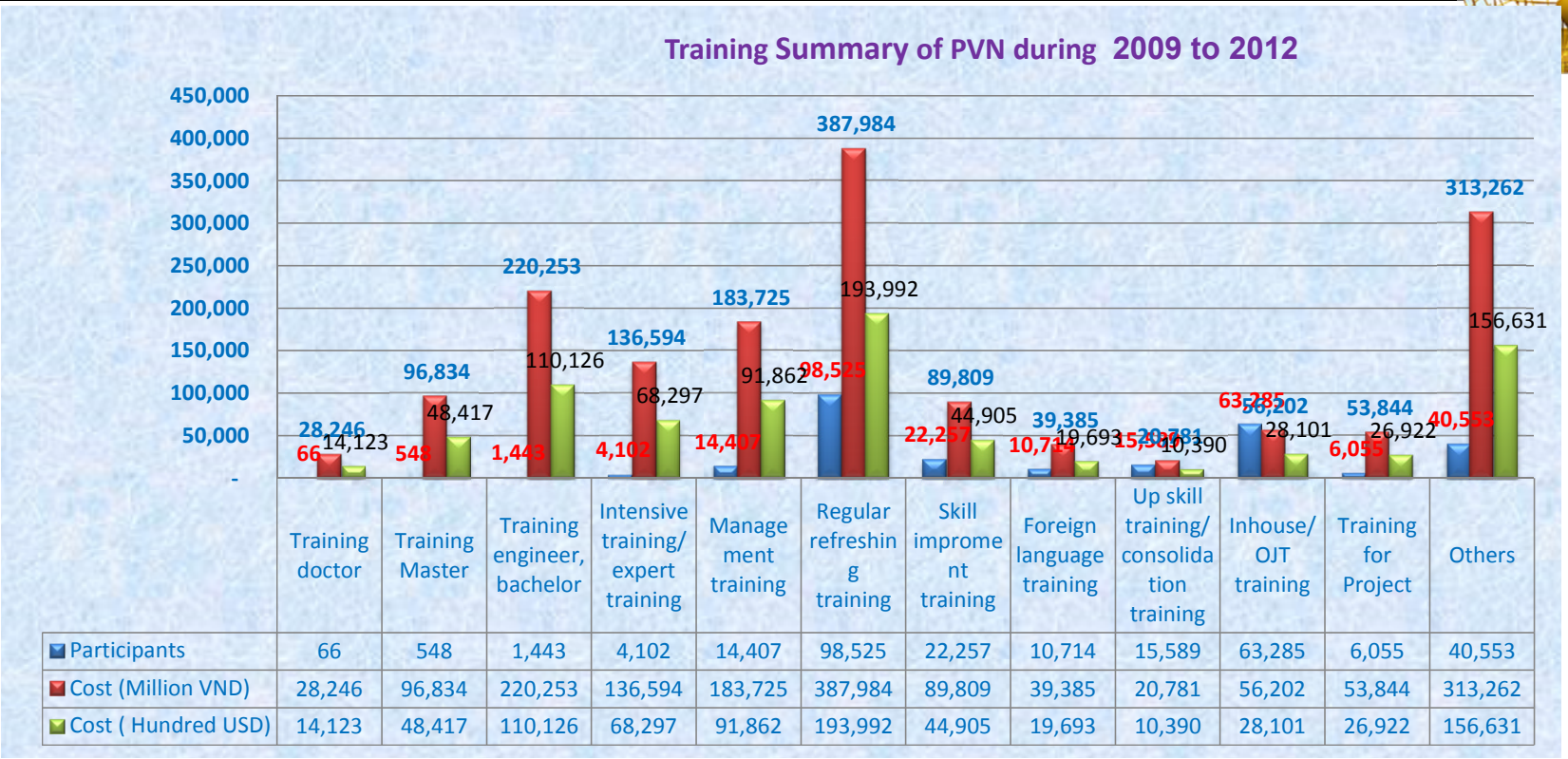
PVN Investment in Training



	2008	2009	2010	2011	2012
Participants	24,859	39,862	61,473	76,991	99,218
Cost (million VND)	281,071	257,165	349,768	505,875	514,108
Cost (Hundred USD)	133,843	122,460	166,556	240,893	244,814

PVN Investment in Training has continuously increased.

PVN Human Resource Development



	Training doctor	Training Master	Training engineer, bachelor	Intensive training/ expert training	Manage ment training	Regular refreshin g training	Skill impreme nt training	Foreign language training	Up skill training/ consolida tion training	Inhouse/ OJT training	Training for Project	Others
Participants	66	548	1,443	4,102	14,407	98,525	22,257	10,714	15,589	63,285	6,055	40,553
Cost (Million VND)	28,246	96,834	220,253	136,594	183,725	387,984	89,809	39,385	20,781	56,202	53,844	313,262
Cost (Hundred USD)	14,123	48,417	110,126	68,297	91,862	193,992	44,905	19,693	10,390	28,101	26,922	156,631

- The main reason for this investment in training is to maintain and increase the current KSAs or competencies. .
- Engineering and BS training/education is the second largest category for upgrading the quality of employees, and for training young students to have the skill sets to be employable.
- Management training, and intensive training have become more important recently.
- Master's degrees are also being obtained to improve the professional knowledge and skills of key personnel.

HR Development at Binh Son Refining and Petrochemical Company (BSR) as a typical example

No	Qualification	Number
1	MA/MSC/Doctorate	**55**
2	Engineer/BSc… (university graduate)	**714**
3	College certificate (3 years after high school)	**136**
4	Technical School (2 years after high school)	**121**
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6	Unclassified labor	**02**
	Total manpower	**1.417**

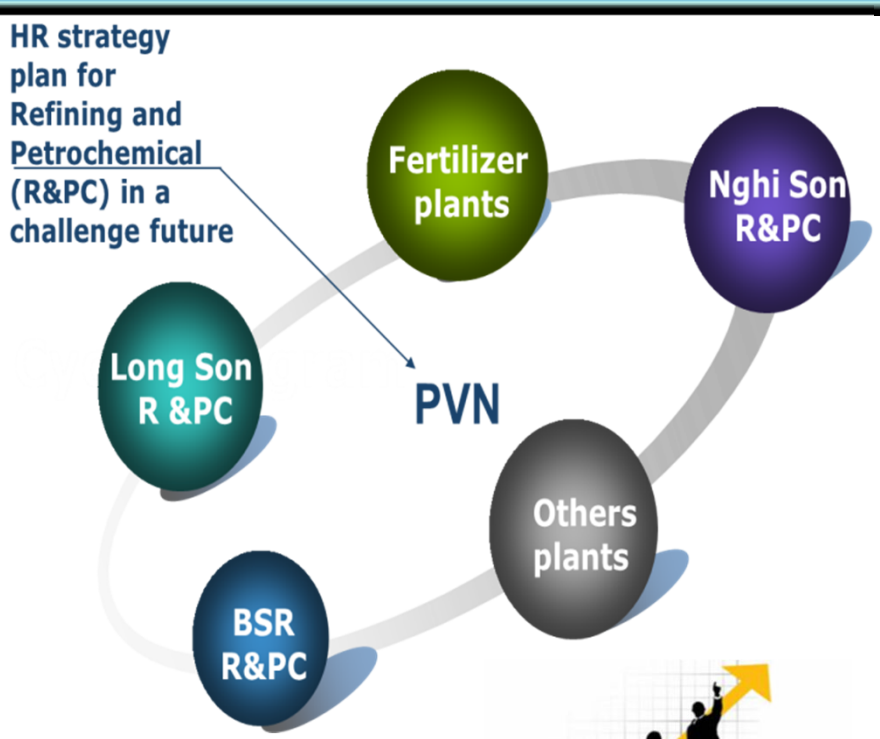
No	Training	Participants	Programs	Place	Trained by
1	Domestic Training during Project period	**993**	Core program, Technical English, Laboratory, Harbor Operation	Vũng Tàu, HCM City	PVMTC & Petroconsult, PV – Pro, Transportation Uni.
2	Abroad Specific Training and OJT Training during Project period	**330**	Technology, Operation, Maintenance, HSE	Romania, Taiwan, Russia, Indonesia, Malaysia, Korea, USA	Luck oil Refinery, Yaroslav, Pertamina, Technip, Melaka Ref., HEC, UOP, CTCI…
3	Contractor Specific and OJT Training during Project period	**2348**	Specific, OJT, Vendor, Cascade, Simulation…	BSR Site	EPC Contractor, Aramis, Petroconsult, Petronas
4	Procedure Training and testing.	**1.989**	Procedure Training and testing for Operation, Maintenance, HSE, Lab	BSR Site	BSR, Vendors.
5	First TA Training	**11.864**	HSE, Maintenance, Operation Procedures for TA	BSR Site	BSR, TA Contractors
6	OJT, HSE, In-house Training, Outsourced Training 2009 - 2013	**25.728**	OJT, Special Incident/Trouble Shooting Training for Operation, Maintenance, HSE, Fire fighting, Specific Training, Foundation Training, Intensive Training, Soft Skills Training, and Management Training…	BSR Site	EPC Contractor, O&M Contractor, Vendors, Licensors, BSR, Outside Training Contractors.

HR Development at Binh Son Refining and Petrochemical Company (BSR) as a typical example

- From 2009 to 2012 BSR focus has been on Operation and Maintenance handover training (knowledge, skills, experience via OJT and hands-on) from O&M contractor to BSR.
- During 2013 BSR fostered OJT, and handover training, and also started to receive more training from outside:
  - Management Training
  - Intensive Training
  - Soft-Skills Training
- Launched the Accelerated Training Program to quickly qualify specialists for 29 key subject areas.
- In 2014, BSR will start applying Competency Based Training Programs to ensure employees are ready to do the work effectively and to increase efficiency. This is to impact on the succession and promotion plan. Competency Based Training is more effective because it addresses actual rather than perceived gaps in KSAs.

Please see Attachment 2 for detailed information

HR Demand and Challenges



1. **Demand and Challenges of Manpower up to 2020:**
   - ✓ As many as 7 refining and petrochemical complexes
   - ✓ 10 – 15 petrochemical plants

2. Demand and Challenges of being professional in HR as an engine for the sustainable development of PVN Refining and Petrochemical sectors.

In order to succeed (considering the demand and challenges) the advantages and disadvantages need to be addressed.

HR Demand and Challenges

1. **Advantages:**

- Almost all Projects/Plants are working stably and efficiently.
- Manpower capability is being well developed along with the step-by-step replacement of experts from outside Vietnam.
- Reasonable training costs and increased project efficiency.
- The PVN training organization is making improvements in training effectiveness and overall performance.
- Training grounds exist at Refining & Petrochemical plants, fertilizer plants, gas processing plants, and at the PET plant.
- HR experience is available from existing projects.
- Both the National and PVN strategies strongly intend to improve the overall HR Development (HRD) strategy.

2. Disadvantages

- The Recruitment Resource or pool of available candidates is limited in language skills beyond Vietnamese. Levels of specialized training and experience, and applicants' KSAs are very uneven.
- Construction schedules and training schedules are not well synchronized.
- The welfare policy for trainees has not been lucrative enough to attract quality applicants.
- The current training system is also still top heavy in theory. Competency assessments are now required.
- There is also a lack of highly skilled personnel, specialists, and experts.
- New projects will attempt to take trained and experienced personnel from BSR/PVN. A workable solution must be devised in advance to prevent this.

Management & Development Strategy

Leadership Qualities,
Creativity, Determination, and Accountability

Well Developed Competencies
KSAs

Optimistic Mindset,
Discipline, Results Oriented,
Developed Behavior

TARGETS

1) An Effective HR Management System.
2) Empowerment and Leadership.
3) Technical and Functional Competencies.
4) Building a Modern, "Valid", Results-Oriented Training and Development System.
5) Develop a Highly Competent, and Expanded Recruitment Labor Pool.
6) Excellent Performance in a Motivational and Learning Culture and Environment.

Management & Development Strategy - PVN ACTIONS

1. Building an effective HR & Training Management System in PVN and its subsidiaries.
2. Planning responsive training for mid and upper-level managers, and fast-track personnel in parallel with a staff development program (University, Master's Degree, or Ph.D. programs).
3. Foster intensive training and accelerated training programs to more quickly develop high-end specialists and experts; Building and developing in-house training capabilities, OJT, a Mentor-Mentee system, and rotate in-house trainers among PVN organizations. Develop the policy for in-house trainers, and utilize training services supplied by the PVN training organizations.

Management & Development Strategy - PVN ACTIONS

4. More investment in VPI, PVU and PVMTC, and foster the Oil and Gas Academy Project. Establish co-operation with universities to produce higher quality graduates and candidates.

5. Co-operation between existing companies and projects, sharing experts, and utilizing manpower for the benefit of all parties.

6. Existing companies should be proactively planning to avoid the risk of an exodus of high quality personnel to other projects.

7. Building an advanced management and learning culture in the company. Develop personnel policy which includes career path planning, competency and performance management, and compensation comparable to other companies/projects in order to attract and retain a highly qualified work force.

Management & Development Strategy
- ACTIONS FOR NEW PROJECTS

1. Recruitment and training need to be prioritized as soon as possible, and scheduled in harmony with the project schedule.
2. The employee base should be made up of local labor possessing strong company loyalties. The benefits and compensation plan should be suitable and competitive in order to attract and retain highly qualified personnel.
3. Pro-active, cooperative relationships with suitable vocational schools, universities, and companies to design effective, work related content for courses and training programs.
4. Optimize the regional domestic training resources. Utilize existing “similar” plants and incorporate those with related training plans, training programs, and trainers to improve hands-on training, broaden KSAs, enhance safety, and maximize performance.

ENERGY FOR NATIONAL SUSTAINABLE DEVELOPMENT

PETROVIETNAM

Thank You for Your Attention!

ENERGY FOR NATIONAL SUSTAINABLE DEVELOPMENT

PETROVIETNAM

ATTACHMENT 1
REFINING AND PETROCHEMICAL PROJECTS

Presented by : Dinh Van Ngoc

at the 32nd JCCP International Symposium

ATTACHMENT 1: REFINING PROJECTS

REFINING PROJECTS

No.	Project	Location	Capacity (MTPY)	Feed	Main Products	In operation	Manpower
1	Binh Son Refining & Petrochemical Co. Ltd. (PVN)	Dung Quat, Quang Ngai	6,5	White Tiger	Fuels, Polypropylene	2009	1417
2	Binh Son Refining & Petrochemical Co. Ltd. Expansion Project (PVN)	Dung Quat, Quang Ngai	8	White Tiger + Middle East crude oil	Fuels and Petrochemical Products	2019	1450
3	Nghi Son Refining & Petrochemical Complex (PVN)	Nghi Son, Thanh Hoa	10	Middle East crude oil	Fuels and Petrochemical Products	2017	1300
4	Long Son Refinery (PVN)	Long Son, Baria Vung Tau	10	Import crude oil	Fuels, Coke, S, Naphtha	2020-2025	1300
5	Vung Ro Refining & Petrochemical Plant (Phu Yen Province)	Hoa Tam Industrial Zone in Nam Phu Yen Economic Zone	8	Import crude oil	Fuels, Polypropylene	2017-2018	1300
6	Nam Van Phong Refining & Petrochemical Plant (Petrolimex)	Van Phong Economic Zone, Khanh Hoa	10	Import crude oil	Fuels and Petrochemical Products	2020-2025	1300
7	Nhon Hoi Refining & Petrochemical Complex (Binh Dinh Province)	Nhon Hoi Economic Zone, Binh Dinh Province	30	Import crude oil	Fuels and Petrochemical Products	2020-2025	2000
8	New Plant or Expansion mentioned plants		20-25	Import crude oil	Fuels, Base Oil, Bitume, Petrochemical Feed/Products, Aromatics…	After 2020	

Summarized from Vietnam Oil&Gas industry Development Plan (2009), PVN Accelerated Development Plan (2010) and announced Projects

PETROCHEMICAL PROJECTS

No.	Project	Location	Capacity (TPY)	Feed	Main Products	In operation
1	Dung Quat PP Plant	Dung Quat Quang Ngai	150.000	Propylene from DQ Refinery	Polypropylene	2010
2	Phu My fertilizer Plant	Phu My, Baria Vung Tau	800.000	Natural gas	Urea	2004
3	Expansion of Phu My Fertilizer Plant	Phu My, Baria Vung Tau	540.000 NH3	Natural gas	NH3, NPK, CO2	2016-2020
4	Ca Mau fertilizer Plant	Khanh An, U Minh, Ca Mau	800.000	Natural Gas from PM3	Urea	2012
5	Dung Quat Bio Ethanol Plant	Dung Quat Quang Ngai	80.000	Cassava chips	Ethanol 99.7%	2013
6	Binh Phuoc Bio Ethanol Plant	Bu Dang, Binh Phuoc	80.000	Cassava chips	Ethanol 99.7%	2012
7	Long Son Petrochemical Complex	Long Son Vung Tau	450.000 (PP) 450.000 (HDPE) 500000 (LLDPE) 400 (VCM)	Ethylene, LPG, Naphtha	PE, PP, VCM	2020-2025
8	PVTex Dinh Vu (Polyester)	Dinh Vu, Hai Phong	175.000	PTA, MEG	Polyester Staple Fiber (PSF), Filament Yarn (POY/DTY), Chip	2013

PETROCHEMICAL PROJECTS

No.	Project	Location	Capacity (TPY)	Feed	Main Products	In operation
9	Phu Yen Petrochemical	Dong Hoa, Phu Yen	200.000 PE 300.000 PP 240.000 EDC 600.000 MEG 240.000 ET 130 Butadiene	Naphtha	Propylene, PP, EDC, MEG, Ethylene Butadiene	2017-2018
10	Bitumen plant	The South or in the Mentioned Refinery	750.000-1.000.000	Import or from refinery	Bitumen	2016-2025
11	PVC Plant	The South	300.000	VCM	PVC	2016-2020
12	MEG Plant	The South	200.000	Naphtha	MEG	2016-2020
13	Methanol Plant & Formalin, Formaldehyde Adhesive	The South	300.000 (Methanol) 200.000 (Formalin) 100.000 (Formaldehyde Adhesive)	-	Methanol Plant & Formalin, Formaldehyde Adhesive	2016-2020
14	Melamine	The South	50-100	Urea	Melamine	2016-2020

PETROCHEMICAL PROJECTS

No.	Project	Location	Capacity (TPY)	Feed	Main Products	In operation
15	PET	The North	270.000	PTA, MEG	Polyester Staple Fiber (PSF), Filament Yarn (POY/DTY), Chip	2016-2020
16	PP Plant	The North	300.000	Propylene	PP	2016-2020
17	PS Plant (Polystiren)	The North	60.000	Imported, Domestic	Polystyrene	2016-2020
18	PTA Plant ($C_6H_4(COOH)_2$)	The North	300.000	Naphtha	Purified Terephthalic Acid (PTA)	2016-2020

Summarized from Vietnam Oil & Gas industry Development Plan (2009), PVN Accelerated Development Plan (2010), Vietnam Petrochemical Development Plan (2010) and Vietnam Chemical Development Plan (2013)

ENERGY FOR NATIONAL SUSTAINABLE DEVELOPMENT

PETROVIETNAM

ATTACHMENT 2
HR DEVELOPMENT AT BINH SON REFINING AND PETROCHEMICAL COMPANY (BSR) AS ATYPICAL EXAMPLE

Presented by : Dinh Van Ngoc

at the 32nd JCCP International Symposium

ATTACHMENT 2 HR Development at Binh Son Refining and Petrochemical Company (BSR) as atypical example

BSR manpower Qualification

No	Qualification	Number
1	MA/MSC/Doctorate	**55**
2	Engineer/BSc… (university graduate)	**714**
3	College certificate (3 years after high school)	**136**
4	Technical School (2 years after high school)	**121**
5	Vocational technical school	**389**
6	Unclassified labor	**02**
Total manpower		**1.417**

Domestic Training

No	Training subjects	Participants	Place	Training Center
1	Core program, Technical English	930	Vũng Tàu	PVMTC & Petroconsult
2	Laboratory	26	HCM City	PV - Pro
3	Harbor Operation	37	HCM City	Transportation Uni.
Total		**993**		

After recruitment, the employees signs a temporary one-year contract solely for training in Petrovietnam Manpower Training College.

The training program supplies important basic but comprehensive knowledge of the petroleum industry to the trainee (API Core Program, simulator training, and foreign language.

After passing the final examinations, the new employees will enter further company training programs and begin working for Vietross/The Project Management Board.

After basic training in PVMTC, employees were trained in engineering assignments by qualified employees and engineering contractor personnel.

Key personnel were also sent abroad for 1 year to receive training in specific areas for technical knowledge and OJT experience.

BSR HR Development

Abroad specific training and OJT training

No	Training Subjects	Participants	Location	Training Center
1	Refining Operation	30	Indo.	Pertamina
2	Refining operation	30	Yaroslav	LB Nga
3	Operation/maintenance/HSE	60	Rumania	Petroconsult
4	Operation	63	Many countries	Technip
5	OJT	105	Malaysia	Melaka
6	Operation	24	Korea	HEC
7	Refining technology	18	Mỹ	UOP
	Total	**330**		

Contractor Specific and OJT training

No	Subjects	Courses	Participants
1	Specific, OJT	88	1.648
2	Cascade Training	27	284
3	Vendor Training	55	322
4	Laboratory	2	40
5	Simulator Training	9	54
Total		**181**	**2.348**

Those returning to Vietnam joined the management team on-site to help supervising and support contractors with work to improve the project progress (equipment installation, cable pulling and checking against the P&IDs, and identifying defective work…etc.). This. In parallel with the contractor training specific knowledge, and OJT at site for employees assigned to the unit.

During Pre-commissioning they joined a team with contractors to check, clean up system, isolated and started to commission package by package. At this time, operating procedures were being written by BSR, Contractors, and support team from Petronas and JGC.

Being lead by the EPC Contractor and O&M Contractor, BSR's employees started up and operated the refinery successfully and safely.

OJT, HSE, and In-house Training 2009-2011

No	Subjects	Course	participants
1	OJT, special incident/trouble shooting training for operation, maintenance ….	9	2.427
2	HSE introduction, JSA, FM200 operation, Fire fighting Working at height, confined space, PTW, gas detector, Electric Safety …..	30	2.925
3	Specific training for accounting, admin, commercial, warehouse…	98	3.767
	Total	**137**	**9.119**

Procedures Training and Testing for 100% of Production Section Manpower

No	Procedure System	Number
1	Operation procedures	1.500
2	Maintenance procedures	138
3	HSE Procedures	44
4	Lab Procedures	307
Total		**1.989**

1st Turn Around Training

No	Subjects	Courses	Participants
1	HSE	64	5.666
2	Maintenance procedures	214	443
3	HSE for contractors	137	5.755
Total		**415**	**11.864**

BSR HR Development

No	Training	Participants	Programs	Place	Trained by
1	Domestic Training during Project period	**993**	Core program, Technical English, Laboratory, Harbor Operation	Vũng Tàu, HCM City	PVMTC & Petroconsult, PV – Pro, Transportation Uni.
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4	Procedure training and test.	**1.989**	Procedure training and test for Operation, maintenance, HSE, Lab	BSR Site	BSR, Vendors.
5	First TA Training	**11.864**	HSE, Maintenance, Operation Procedures for TA	BSR Site	BSR, TA Contractors
6	OJT, HSE, In-house Training, Outsourcing training 2009 - 2013	**25.728**	OJT, special incident/trouble shooting training for operation, maintenance, HSE, Fire fighting, Specific training for accounting, admin, commercial, warehouse…, Foundation training, intensive training, soft skill training, Management training…	BSR Site	EPC Contractor, O&M Contractor, Vendors, Licensors, BSR, Outside Training Contractors.

At the point when BSR started-up the plant, test run, initial acceptance test, and accepting full ownership of the plant from TPC, there were 170 O&M experts supporting BSR in O&M.

After 3 years of operation experience and management of the plant with O&M, BSR replaced 140 experts with self-standing BSR employees (remaining are 30 positions required for a longer period of time before BSR will be self- standing).

In the year 2013, since 28 Aug 2012, BSR has achieved more than 470 non-stop operating days. And during November BSR had already achieved its production target (54 days earlier).