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Polypropylene Project
Market and Economic Review

Prepared For:
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Cairo, Egypt

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Zurich, Switzerland

June 27, 2009

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INTRODUCTION

The aim of this study is to update and reconfirm the terms of economic and market viability of the EPPC PP project in the current global market and economic environment and in view of the upcoming new investments and competitors.

This project market and economic feasibility study represents an opportunity to review what has changed since the original considerations in 2006 that lead to the investment decision and what possible technical, market, economic, financial and commercial measures should be considered in light of this review.

SRI Consulting in this study provides recommendations on the market and financial viability of the project with a comparative review of the project in relation to relevant competitor's economics.

Detailed capital cost, technology evaluation, Individual propane commercial terms and detailed strategic analysis were not a substantial part of this survey although if and where an anomaly has been encountered; SRIC would include its comments to the Client.

SRIC at the best of its knowledge (please refer to our standard disclaimer note in the Definitions section below) express its opinion on the project and suggest possible opportunities and threats.

We want to express our thanks to EPPC's management for their availability and support to provide basic information and clarifications on the project and for the trust granted once again to SRI Consulting in this endeavor.

The project, SRIC's analysis and assumptions are briefly described in Appendix C and D.

DEFINITIONS

Client and/or Client's Project: EPPC propane and PP project in Al Gemal, Port Said.

BM: Blow Molding

CFR: Product delivered to the port.

DEL: Delivered Price. In the case of PP this is equivalent to the domestic price delivered to the converters.

F&S: Film and Sheet

FOB: Free on Board price. In the case of PP this is equivalent to the export price.

FD: free delivered

IM: Injection Molding

PDH: Propane Dehydrogenation

PP: Polypropylene

Regional Breakdown: Turkey is included in the ME. Asia does not include China and Japan which are accounted separately. In appendix A we include the region definitions.

SWOT: Strength, Weakness, Opportunity, Threats

IRR: Internal rate of return

NPV (at 6%): Net present value of cash flows at a 6% interest rate

DISCLAIMER

The information in this booklet has been based on information, which to our best knowledge we consider reliable and it has been assembled in good faith. While our clients may use such information for major business decisions, we underline that the client would take such decisions on its own will keeping us harmless should any decision based on our conclusion create any type of damage to the client company.

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EXECUTIVE SUMMARY

PP GLOBAL MARKET REVIEW

A considerable wave of overcapacity is now a heavy burden in the PP market balance to which we have to add the melt down of market demand due to the collapse of the world economy .

The combination of the two factors are now creating beneficial delays in the startup schedule of new projects, also some beneficial shut down of older and uncompetitive units and the cancellation or postponement of new projects.

The drastic measures taken by several producers and the specific stimulus packages that several governments have taken to sustain employment and the growth of their domestic economy, are beginning to show positive results which are now mitigating the overall negative short term outlook.

It is relevant to mention that the overall negative scenario is not PP specific but more generally shared by the entire petrochemical and refining industry worldwide and if a difference should be made, PP is still among the best performers in the commodity thermoplastics arena. THE Supply demand oversupply is expected to last until late in 2010 or later depending on several factors such as the recovery of the economy and its related demand, the rate of cancellation of new projects (post 2011), the recovery in China and India and the performance in the USA and WE.

The recovery of demand, meaning the period when demand will stop its decline, is expected to start depending on the region between Q2 and Q4 2009. The recovery of economic margin may take a longer time; say middle or end of 2010, due to the current difficulty of converters to accept higher resin prices.

PROPANE AVAILABILITY AND SOURCING

The project contract includes a long-term supply agreement securing the propane raw material for the propane dehydrogenation (PDH) unit. The entire supply of propane will be secured via an 'off-take' agreement with United Gas Derivatives Company (UGDC) and Egyptian Natural Gas Company (GASCO), each supplying 70% and 30%, respectively, of the propane requirements. The EPPC PDH-PP complex will be located next to the UGDC gas separation facility in Port Said, while the GASCO facility is located at Ameriya near Alexandria, approximately 200 km from Port Said. The close proximity to the main propane supplier would eliminate the need for large propane storage facilities at the EPPC complex.

The risks associated with a secure raw material supply are lower for the EPPC project since GASCO is a shareholder in EPPC project and GASCO is also a shareholder of UGDC.

The current availability of propane in the Mediterranean and in the Middle East (GCC and Iran), suggests there is limited concern on the product supply. Long term strategic analysis linked to an accurate domestic country strategy may indicate that some of the countries like Saudi Arabia, Algeria, Iran may increase their attention and interest in developing their own captive propane based industry making the availability of product in the open market decline from the current basis. Even in the case of increasing domestic demand and declining exports, we still believe the international supply may be adequate to cover the project requirements.

After our preliminary review of propane supply we suggest it is more important to focus on the commercial terms for propane purchasing rather than its product availability.

PP PROJECT: IMPLICATIONS OF THE GLOBAL MARKET ON THE PLANNED PROJECT

The impact of the global trend on the Client project can only be negative: however on a relative basis, given the strong competitive cost position relative to higher cost producers in WE, the position of the Client plant become stronger. In fact, we have found that the higher the crude price the stronger is the competitive advantage of gas based projects (PDH included).

An increasingly more fierce competition will also occur among the off takers such as traders an d distributors as there is less margin available to share while the increasing risk of antidumping and countervailing duties will make the finding of export niches more complex and less evident.

A good factor influencing the project has been the decline of the global trade, which in the short term is having a beneficial effect on cargos availability and accordingly in lower freight rates, than planned two years ago. The dry bulk index in Rotterdam is considered lower than one year ago, reflecting substantial saving in freight rates but more so in the availability of carriers.

TARGET MARKETS AND END USES

The outlook for the Client Project is substantially unchanged in terms of product distribution by area or product slate. If anything on a strategically basis the need for impact may be lower that estimated two years ago, due to the negative influence of durable demand on the PP market mainly new cars, and less from construction (carpets and appliances, etc.). However the impact of economic margins on the project is less sensitive to the product grade slate.

COMPETITIVE PDH AND PP PRODUCTION ECONOMICS

We examine the competitiveness of the EPPC project against other PP producers that also supply product to Europe. After the Middle East, Europe would be the next most obvious export market for EPPC. Our analysis examines the economics of three competing representative PP producers in comparison with the EPPC project:

- EPPC PDH-PP project at Port Said, Egypt with start up in 2010.
- Saudi Arabian based PDH-PP plant.
- Saudi Arabian stand alone PP plant purchasing propylene at the domestic market price from naphtha/mixed feed cracker.
- European stand alone PP plant purchasing propylene at market price from a naphtha cracker.

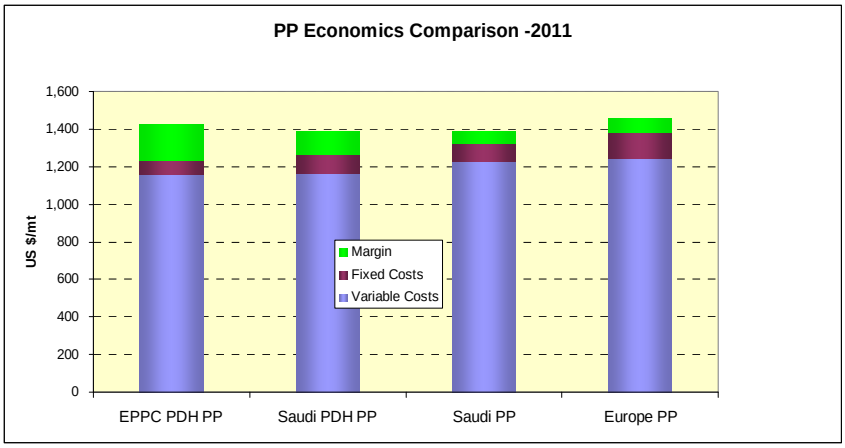
The economics for each of these options is calculated assuming a run rate of 100% for 400 thousand tons plants capacity in order to compare with the scale of the EPPC project. Costs and economics for all plants are provided for start up base year 2011 and for 2015, 2018. The EPPC costs and economics are from the project financial model adjusted for operating rate, that is, the EPPC plant operating at capacity producing PP homo polymer at 400 thousand tons of capacity.

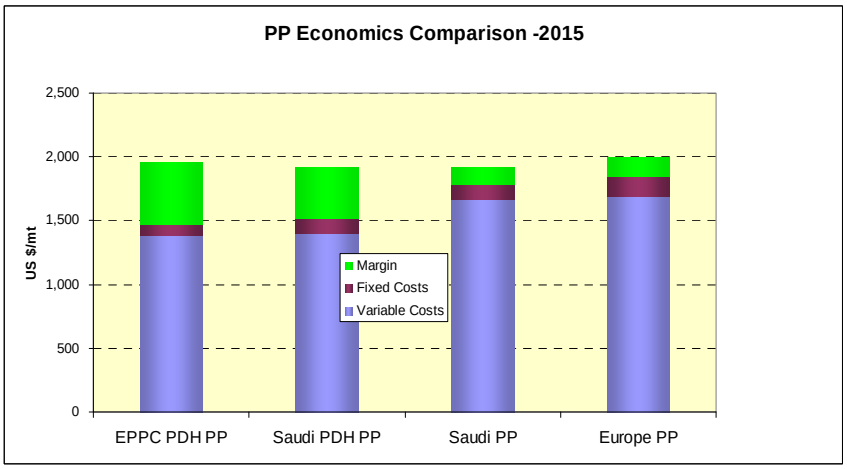
For each comparative location SRIC developed regionalized cost information reflecting differences in labor, energy prices, and the investment cost of the facility. The economics of producing propylene from PDH units was calculated for a Saudi Arabian producer, utilizing SRIC Process and Economics data and compared with normalized results from the financial analysis of the EPPC PDH-PP project in Egypt.

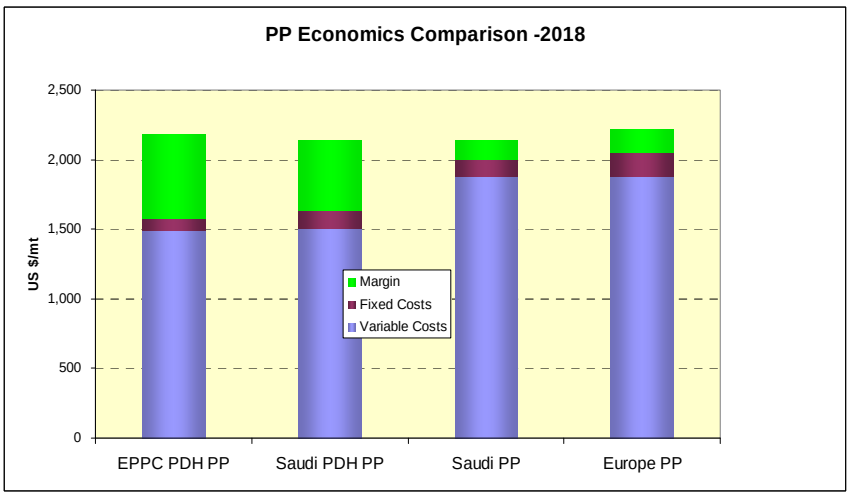
Integrated PDF/PP Vs. stand alone PP Economics

The polypropylene portion of the EPPC integrated plant comparisons utilize cost categories in the project financial analysis which are normalized to compare with those for a Saudi PDH-PP venture. The economics for the integrated EPPC and Saudi plants include propylene charged at cost of PDH production while propylene for the stand alone PP plants for Saudi Arabia/Europe is at local market. The four comparisons below – the integrated PDH-PP plants and the standalone PP comparisons- assume sale of PP homopolymer in Europe at spot prices which are net backed to the plant gate at appropriate a freight costs.

The comparison of the two PDH-PP and the non integrated PP units shown in the graphs for years 2011, 2015 and 2018 show that EPPC will have lower costs and higher margins when compared to the Saudi PDH-PP unit. As well both integrated PDH-PP plants should show substantially higher margin as compared to the stand alone PP units. For the integrated PDH-PP producers, the total average $500 per metric ton margins generated over 2015 through 2018 should be split about 70% for PDH propylene and 30% for PP. Integration thorough to PP adds to project desirability.


PP Economics Comparison -2011
US $/mt
1,600
1,400
1,200
1,000
800
600
400
200
0
Margin
Fixed Costs
Variable Costs
EPPC PDH PP
Saudi PDH PP
Saudi PP
Europe PP


PP Economics Comparison -2015
US $/mt
2,500
2,000
1,500
1,000
500
0
Margin
Fixed Costs
Variable Costs
EPPC PDH PP
Saudi PDH PP
Saudi PP
Europe PP


PP Economics Comparison -2018
US $/mt
2,500
2,000
1,500
1,000
500
0
Margin
Fixed Costs
Variable Costs
EPPC PDH PP
Saudi PDH PP
Saudi PP
Europe PP

PROJECT ECONOMICS AND SENSITIVITIES

EPPC project economics were evaluated using SRIC's knowledge of financial evaluations, inputs from EPPC, and specific assumptions by SRIC that have already been agreed to by the client (EPPC). Furthermore, the financial evaluations were done using a base case scenario and also a low case scenario, in which the low case had lower price forecasts for all prices including crude oil, naphtha, propane, and polypropylene; the low case also assumed lower GDP (%) changes, and lower consumer price inflation.

The following table summarizes the results of the IRR, NPV (at 6%) and cumulative cash flow (in 2028) calculations for the base case:

	Project	Discounted Project Cash Flows	Equity
IRR	14.2%	6.5%	18.0%
NPV @ 6% (MM USD)	$860	$29.4	$877
Cumulative Cash Flow (MM USD)	$2,900	$711	$2,733

The following table summarizes the results of the IRR, NPV (at 6%) and cumulative cash flow (in 2028) calculations for the low scenario case:

	Project	Discounted Project Cash Flows (CF)	Equity
IRR	13.8%	6.0%	17.3%
NPV @ 6% (MM USD)	$797	$0.93	$813
Cumulative Cash Flow (MM USD)	$2,748	$650	$2,580

Additionally, a sensitivity analysis was completed on the project (utilizing the base case financial model) in order to evaluate changes in the following four input variables: total fixed investment, propane feedstock costs, total product revenue and annual utilization rates. The output variables evaluated were: project IRR, project NPV (at 6%) and cumulative project cash flows (CF); the analysis was also done utilizing the discounted cash flows (CF) on the project. . The following table summarizes the changes (%) from the base case by decreasing the input variables by 20% (shown as '80%' in table) and by increasing the input variables by 20% (shown as '120%' in table):

IRR	Project		Discounted CF on Project	
	80%	120%	80%	120%
Total Fixed Investment	4%	-3%	4%	-3%
Propane Feedstock Costs	5%	-6%	5%	-6%
Utilization Rate	-4%	3%	-4%	3%
Total Product Revenue	-12%	8%	--	8%
NPV @ 6%	**Project**		**Discounted CF on Project**	
	80%	**120%**	**80%**	**120%**
Total Fixed Investment	23%	-23%	671%	-671%
Propane Feedstock Costs	77%	-79%	1154%	-1189%
Utilization Rate	-54%	54%	-791%	781%
Total Product Revenue	-138%	135%	-2081%	1986%
Cumulative Cash Flow	**Project**		**Discounted CF on Project**	
	80%	**120%**	**80%**	**120%**
Total Fixed Investment	8%	-8%	31%	-31%
Propane Feedstock Costs	51%	-51%	93%	-95%
Utilization Rate	-36%	36%	-65%	65%
Total Product Revenue	-91%	89%	-167%	162%

The sensitivity analysis indicates that the financial results are most influenced by (upward or downward) fluctuations in total product revenue, keeping the other variables fixed: the largest benefit would be from a 20% increase in product revenue and of the four negative scenarios, the largest (negative) impact would be from a 20% decrease in product revenue.

PLANT UTLIZATION RATE

As detailed in section 3.1.1 the utilization rate selected in the economic sensitivity is in the first 6 years, lower than advised by the client but still in very high level compatible with the state of the art technology selected by the Client.

We have conducted a sensitivity run to evaluate the impact on the project economics and found that as indicated in more details in the sensitivity analysis section.

The results are listed below are significantly indicating how relevant could be a faster economic recovery of the global PP markets, requiring a higher than predicted utilization rate. While we trust the ability of the client know how to successfully run the plant and of the technology to be utilized above average regional level, we have selected a slightly conservative approach to avoid to overlook the short term impact of the market glut.

Utilization Rate		
Year	**SRIC**	**Client**
2010	80%	80%
2011	85%	90%
2012	85%	100%
2013	90%	100%
2014	95%	100%
2015	95%	100%
2016	100%	100%

Financial Sensitivity		
Util. Rate Used:	**SRIC Utilization Rate**	**Client Utilization Rate**
Project IRR	14.2%	14.9%
DCF Project IRR	6.5%	7.1%
Equity IRR	18.0%	19.1%
Project NPV @ 6%, MM USD	$860	$914
DCF Project NPV @ 6%, MM USD	$29.4	$70.5
Equity NPV @ 6%, MM USD	$877	$930
**DCF = Discounted Cash Flow*		

COMMERCIAL AND STRATEGIC CONSIDERATIONS

In an era of increasing alliances, merge and acquisitions, bankruptcies of key market and technology historical leaders, divestures of large players from the entire business chain and the changing roles of sovereign funds and private equity groups, it is extremely difficult to strategize on what an existing company should or should not do in regard to improve its commercial and financial positions.

Isolation

The first issue that comes to mind is the risk of the effects of isolation: Joint ventures, market alliances in a downturn period could be viable entry strategies in markets difficult to penetrate. Several established producers would dream to have a state of the art integrated operation and may be willing to consider trading some of their existing capacity for a market share in their domestic markets.

This idea could work with producers East and west of Suez, although in each case the Client's competitive strength to be negotiated would be different and similarly the target partner would also be strategically different.

Product Off Takers

As indicated in earlier exchanges with the Client, to retain control of the plant profitability and its long term market position, the percentage of product allocated to off takers and traders should be minimized.

Although some of the volumes especially at start up would be beneficial to allocate to reputable off takers as the three mentioned by the Client, in the longer term it would be relevant to reduce such percentage off take to a minimum and operate sales with its own workforce.

OPC – EPPC management Agreement

Given the know how in marketing and operations of the parent company OPC, the current management agreement of how to jointly operate and /or share knowledge between the two operations should be implemented urgently.

Propane Price Formula

The formula does not have any provision for an “overrun”, i.e. should the formula get out of line with propane competitive market position: say for example that KSA would create a two tier pricing for propane, keeping the domestic price artificially low and the export price to third parties much higher.

LOGISTICS AND FREIGHT COSTS: PROPANE AND PP

The current lower volume of commodities traded suggests that this could be a good period to negotiate long term transportation contracts for the supply of GASCO propane as well as for the distribution of PP to key markets.

As indicated in the Propane section 7, the client should increase its direct or indirect “control” over the utilization of UGDC propane terminal as it may become a critical bottle neck in the operation of the plant under different competitive scenarios.

As for PP the focus is issues like:

- Promoting bulk containers use to large users, like in Western Europe, even if in some cases smaller consumers could be represent more profitable sales.
- Consider the creation of local warehouses in new market areas like Syria or Turkey, to allow for direct sales in those markets.

2. PP GLOBAL MARKET REVIEW

2.1 HIGHLIGHT

Approximately 22.5 mill tons of capacity addition coupled with poor demand in 2008 and 2009, will have a considerable impact on the product utilization rates even for a fast growing product as PP.

PP performance has suffered in 2008 two major events: the first is the considerable increase of propylene price in the first half of 2008, due to the escalation of naphtha prices. The second is the ethylene surplus in SEA region has sustained a lower ethylene price and higher propylene to ethylene price ratio. The economic downturn particularly in construction and automotive has had a negative and direct effect on consumer demand with a drop in areas like injection molding in NA of around 22 % compared to 2007.

Polypropylene remains one of the youngest commodity polymers: however its dependence on applications in the car sector makes the product very vulnerable to the current economic downturn.

The importance of the automotive sector has been recently increasing however its share is still lower than the one of the packaging sector (film and sheet, caps and closures, bottles and other IM applications). With the increasing erosion in the ABS applications and increase weight of plastics in cars, PP has gained considerable market shares in this market. However in 2008 the dramatic change in the economic scenario has forced car producing plants to shut down for an extended period of time their plants around the world to keep the inventory of unsold cars down. The sudden halt in car manufacturing is having a devastating effect on the demand for PP resin.

Approximately 16 mill tons of capacity addition by 2013, will have a considerable toll on the product utilization rates when compared to a market that by 2010 will have lost at least 1.5 to 2 years of growth. PP S/D cycle is similar to the one of the ethylene chain although with a milder trough hitting its minimum value by mid 2010. It is relevant to mention that the decline of the utilization rate in the case of PP has started already back in 2005 and rather than a sharp trough we have plotted a long period of lower than expected utilization rate.

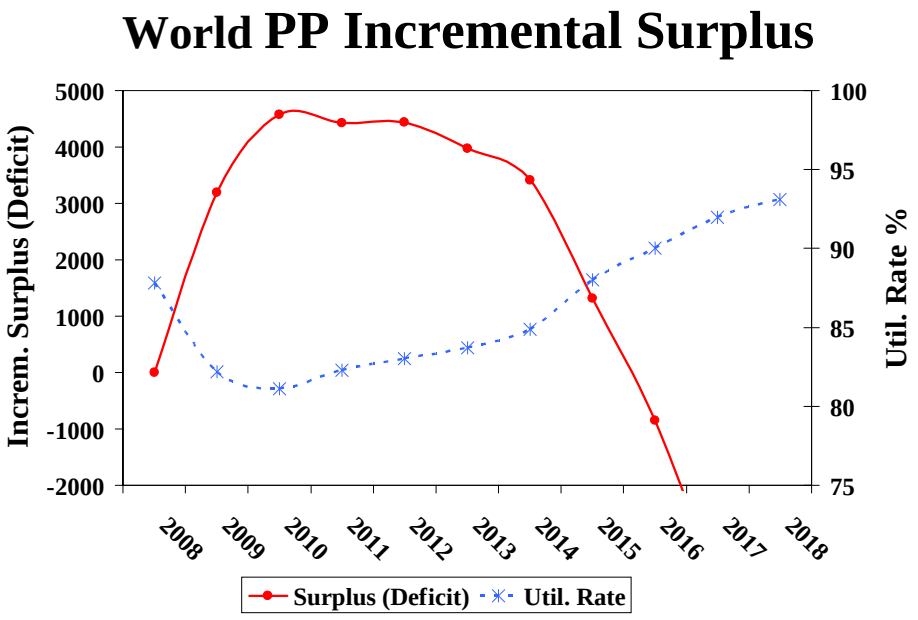
Moderate demand growth in Latin America, Brazil in particular and in India is expected to remain the main stays of PP demand in 2009. By the end of 2009 we expect that the new 4.5 million tons of capacity additions will have a relevant downward effect on the utilization rates.

Considering that in the short term we predict a decline of the propylene to ethylene price ratio and a softening of styrene price due to a considerable increase of capacity, we may expect PP to loose some market shares to ABS and HDPE, due to its higher price relative to the other two polymers. The premium for Block copolymer will remain in the 3 to 5 % range for few more years although in the long term we expect it to decline.

The outcome of metathesis and other ad hoc propylene supply technologies (PDH and MTO) will provide by 2009 – 2010 the answer on the possible tightness of propylene supply. Furthermore the uncertainty on the pricing formula that Saudi Arabia will adopt for the domestic propane price after 2011 could have a considerable impact on the competitivity of PP produced in the Kingdom relative to Western Europe and S.E. Asia.

Regarding propylene, it is our view that for the next 3 to 4 years such tightness will remain in place as ad hoc propylene will not be able to provide all the volumes that should be required to bring the C3/C2 price ratio to the historical 75 %. We predict that such price ratio in the short

term will remain high and at best close to 0.9-1.0 in EU on a contract basis and while slightly higher than 1.00 in SEA on a spot basis.



Incremental Surplus (Deficit) = Incremental Announced Capacity less Incremental Demand, based on 2006

2.2 DEMAND

A bit of background: Polypropylene is the third best commodity performer after PET and LLDPE, in terms of demand growth. The recent global economic slowdowns in 2002 – 2003, in 2005 (volume wise) and in 2008 - 2009 has affected its performance, similarly to the one of all the other polymers. During 2006 performance improved to 4.2 % above 2005 and again in 2007 4.8 % over 2006. This represents an improvement from the 2005 vs. 2004 performance of only + 2.6 % growth. A good portion of the slow recovery of demand was due to an almost flat performance in the USA, which in the first 8 months of 2006 had a demand equal to 2005. As this lack of performance in the USA follows a decline of demand during 2005, we believe that some of the responsibility lies in the negative effects of high crude prices on demand. In Europe 2007 has shown a substantial rebounding of around 4.6 % over 2006.

The current picture of PP market growth is quite different: a global growth of 6.5 % in 2007 has been followed almost by a flat performance in 2008 (+0.8) which we believe may be finalized to -1 to 0 over 2007, once all actual statistics will be published. The major drop in 2008 has been recorded in the USA, -8.6 % , while we estimate a – 4.0 % in W. Europe and only 2.8 % in China.

Our world average projection for 2008 - 2013 of 5.0 %/yr, is based on a growth in 2009 of only 3.1 % which may be optimistic given the market news in Q1 2009.

The increased propylene supply should also reduce the risk of price volatility as occurred during 2004 and 2005, when frequent disruptions to crackers operations in Europe have raised havoc in the raw material pricing with considerable escalations.

Annual Demand Growth - Polypropylene

(%/yr)					
	94/05	**98/07**	**07/08**	**08/13**	**13/18**
Africa	13.6	10.8	4.4	4.0	3.8
Asia	12.2	7.7	7.6	5.1	5.1
Central East Europe	15.8	14.2	6.3	5.7	7.6
China	14.9	12.1	2.8	6.9	5.1
Central/South America	9.0	8.7	1.3	5.0	4.4
Japan	2.7	1.8	1.3	2.0	1.2
Middle East	14.0	9.8	3.4	6.7	5.7
North America	5.1	2.4	-6.0	3.8	3.1
Oceania	4.9	6.1	4.1	3.8	2.6
West Europe	3.9	3.2	-4.0	4.0	3.2
World	**7.9**	**6.3**	**0.8**	**5.0**	**4.4**

Global Demand - Polypropylene								
(ktons/yr)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	236	507	906	1,145	1,183	1,235	1,395	1,678
Asia	2,036	4,616	6,266	7,356	7,677	8,092	9,431	12,116
Central East Europe	301	762	1,451	2,085	2,237	2,355	2,751	3,959
China	1,911	4,831	8,260	10,450	11,097	11,929	14,612	18,762
Central/South America	883	1,354	1,996	2,430	2,552	2,680	3,105	3,851
Japan	2,218	2,641	2,725	2,791	2,878	2,929	3,082	3,267
Middle East	631	1,240	2,113	2,716	2,898	3,094	3,751	4,947
North America	4,816	7,206	7,920	7,396	7,445	7,730	8,933	10,384
Oceania	182	223	313	365	380	395	440	500
West Europe	5,384	6,906	7,900	8,133	7,922	8,515	9,876	11,563
World	**18,598**	**30,285**	**39,850**	**44,867**	**46,269**	**48,955**	**57,376**	**71,028**

In the table below we report regional per capita demand. It is noticeable how per capita demand in PRC doubles in the forecast while in Japan remains almost flat. In Japan the flat demand trend can be explained by an increasing import of finished or semi- finished products while the domestic demand of pellets remains flat or declines. Asian and Latin American (Brazil in particular) demand was growing fairly well until the middle of 2008, leaving the impact of the December 2004 disaster (SEA) and the fall 2005 Hurricanes in the USA, behind. Since the middle of 2008 demand dropped substantially in all regions with few exceptions as in India. In North America for example, the actual figures report 2008 domestic demand closing at 8.6 % below 2007 (we report -6 % in our tables, prepared in Q4 2008).

Per Capita Demand - Polypropylene								
(kg/per capita)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	0.3	0.6	1.0	1.2	1.2	1.2	1.3	1.4
Asia	1.1	2.4	3.0	3.4	3.5	3.7	4.1	5.0
Central East Europe	0.7	1.6	3.0	4.3	4.6	4.8	5.6	7.9
China	1.6	3.7	6.2	7.6	8.0	8.6	10.2	12.6
Central/South America	2.4	3.4	4.7	5.5	5.7	5.9	6.7	7.8
Japan	17.7	20.8	21.5	22.0	22.7	23.1	24.4	25.9
Middle East	3.5	6.1	9.4	11.2	11.7	12.2	13.9	16.5
North America	13.0	17.9	19.7	18.4	18.5	19.2	22.2	25.8
Oceania	8.7	9.7	13.2	15.1	15.6	16.1	17.6	19.4
West Europe	14.1	18.1	20.7	21.3	20.7	22.3	25.9	30.3
World	**3.3**	**5.0**	**6.3**	**6.8**	**7.0**	**7.3**	**8.3**	**9.7**

End Use Applications - PP											
Ktons/yr	**1990**	**1995**	**2000**	**2005**	**2007**	**2008**	**2009**	**2010**	**2013**	**2018**	**% B'down - 2008**
Blow molding	184	254	944	1,395	1,554	1,598	1,737	1,849	2,247	2,901	3.6
Fibers	1,789	4,003	8,912	12,244	14,381	14,456	14,786	15,686	18,567	23,086	32.2
Film and sheet	2,062	3,429	5,366	7,250	7,942	8,029	8,303	8,777	10,321	12,884	17.9
Injection molding	4,414	6,206	10,045	12,631	13,683	13,746	14,208	15,028	17,453	21,080	30.6
Other	2,612	4,707	5,019	6,329	6,967	7,037	7,235	7,615	8,789	11,076	15.7
Consumption Total	**11,060**	**18,598**	**30,285**	**39,850**	**44,527**	**44,867**	**46,269**	**48,955**	**57,376**	**71,028**	100.0

World Demand Growth by Application – PP					
(%/yr)	**94/05**	**98/07**	**07/08**	**08/13**	**13/18**
Blow molding	16.7	10.0	2.8	7.0	5.2
Fibers	11.4	7.4	0.5	5.1	4.5
Film and sheet	8.0	6.4	1.1	5.1	4.5
Injection molding	7.4	5.2	0.5	4.9	3.8
Other	3.2	5.5	1.0	4.5	4.7
Average	**7.9**	**6.3**	**0.8**	**5.0**	**4.4**

The chart below reports the incremental demand and incremental capacity over the reference year 2008.

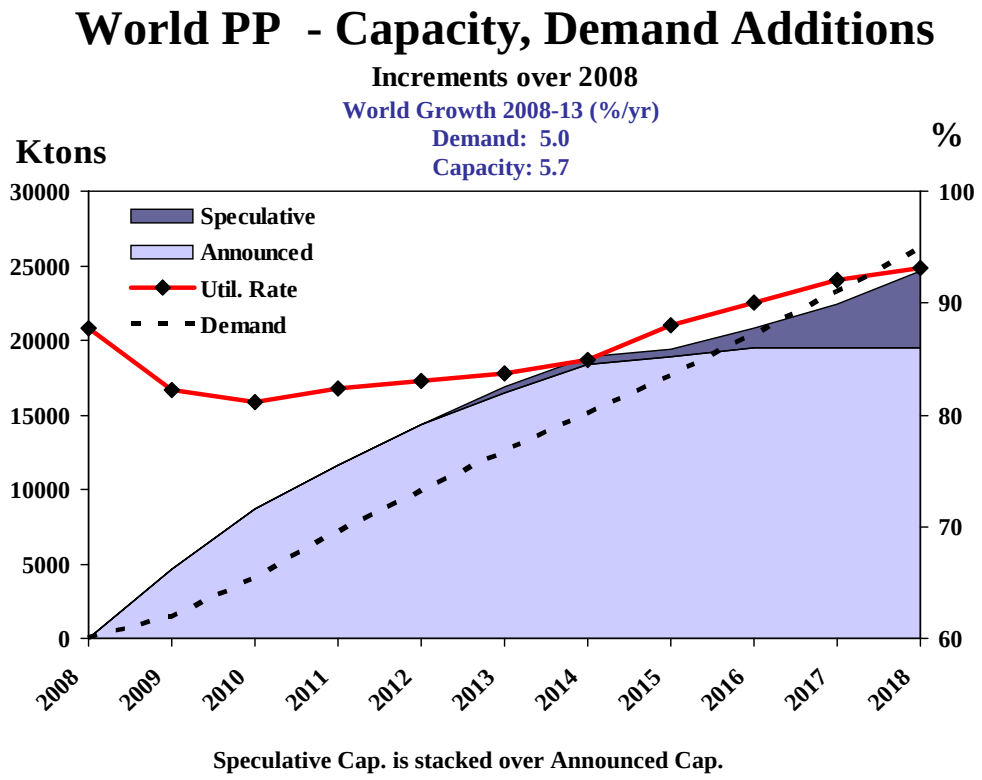
In the 2004, 2005 and 2006 editions of this Outlook we reported an increasing supply gap between a demand growing faster and a capacity lagging behind. Since 2007 the considerable amount of new capacity announced has filled for the short term until 2012 -2013, the deficiency gap and the supply demand projection looks in the short and medium term oversupplied. While in our past projections the supply demand gap expressed as difference of growth rate, between demand and capacity was in the order of 2.2 points %/yr (demand at 6.7 and capacity at 4.5), in this 2009 edition of the outlook the oversupply is by -0.7 %/yr, indicating that by 2013 capacity will be grown by 0.7 points percentage/yr above demand. What is more relevant is that in the interim period, capacity additions are considerably higher on an annual basis than demand additions.

An increasingly important application of PP is becoming the automotive sector, more so than general packaging. With increasing erosion in the ABS applications and increase weight of plastics per car, PP has gained considerable market shares in this market. Unfortunately the automotive sector in Q4 2008 has crashed at rates in the 20 to 40 %.

Demand growth is led by Blow Moulding and Fibres applications, which in the next five years should out-perform the average product growth of 5.0 %/yr, particularly in the Raffia related applications. Filament yarn, although representing a more modest market size, is also expected to expand above 5.0 %/yr. Second in terms of growth but not in size are film and sheets and injection molding sectors. Blow molding applications show a considerable potential due to new developments in new applications using a combination of clarity, flexibility and gases barrier for best product conservation.

Until 2007, PP demand had recovered from the poor performance in 2003 and 2005. During 2008 and the short term expectations, PP will perform better than average but at much lower values than projected in the past. The sustained propylene to ethylene price ration in SEA and other regions is also not helping the competitive position of PP.

In Asia the market has reached its own almost independent (from the USA) performance sustained by low Dollar value helping the local cost of feedstock. Contrary to what suggested in the last two years, the expected decline of the propylene to ethylene price ratio may increase the PP demand relative to the other polymers such as ABS, PS and HDPE in the limited applications in which they overlap. More recently since mid 2008, the economic downturn has raised havoc in almost all regions due to the drop in consumer demand.



Speculative Cap. is stacked over Announced Cap.

	Ktons	Share %

2.3 CAPACITY

Between 2008 and 2009 4.5 million tons of new PP capacity will be added, 52 % in the Middle East, 31 % in China and 25 % in Asia. By 2013, the new capacity increments based on 2008 as base year will reach 19.5 million tons.

Although demand is projected to increase at 5.0 %/yr in the next five years, the short term appears with a considerable oversupply which will be absorbed only after 2010 and depending on the recovery of demand and the amount of shut downs and delays of new capacity.

In the first half of 2008, the increase of crude oil price has boosted a large number of new ad hoc propylene units in the Middle East primarily (PDH and Metathesis) which has in turn boosted the announcements of new propylene plants, particularly in China and Middle East.

Based on the developments of the economic crisis, we expect that some of the post 2011 projects will be delayed.

Announced Capacity additions will bring an annual increment of 5.7 %/yr which corresponds to around 6 new plants built each year with a capacity of 350 kt/yr, for a period of five years.

The average capacity addition growth rate in the 2008-2013 time frame will be 3.2 million tons/yr. **PP**

Capacity Additions 2008-2018

(units: ktons)			Current	Changes				
Country	**Company**	**City**	**2007**	**2008-9**	**2010-11**	**2012-13**	**2014-18**	**Total**
Brazil	Braskem	Paulinia	--	350	--	--	--	350
	Comperj	Itaborai	--	--	--	213	212	425
	Comperj	Itaborai	--	--	--	213	212	425
Canada	Basell Canada	Varennes	193	-193	--	--	--	-193
	Basell Canada	Corunna	189	-189	--	--	--	-189
China	Dalian Shide Petrochemical	Dalian	--	--	--	--	500	500
	Formosa Polypropylene	Ningbo	--	450	--	--	--	450
	Fujian Integrated Project	Quanzhou	--	200	200	--	--	400
	Inner Mongolia Xilingele Company	Xilingele	--	--	500	--	--	500
	Panjin Ethylene	Panjin	--	220	--	--	--	220
	PetroChina Daqing Petrochemical	Daqing	--	300	--	--	--	300
	PetroChina Dushanzi Petrochemical	Dushanzi	--	138	412	--	--	550
	PetroChina Fushun Petrochemical	Fushun	--	--	--	300	--	300
	PetroChina Guangxi Petrochemical	Qinzhou	--	200	--	--	--	200

Country	Company	City	2007	2008-9	2010-11	2012-13	2014-18	Total
	PetroChina Jinxi Petrochemical	Huludao	--	150	--	--	--	150
	PetroChina Ningxia Petrochemical	Yinchuan	30	--	-30	--	--	-30
	PetroChina Ningxia Petrochemical	Yinchuan	--	--	100	--	--	100
	PetroChina Sichuan Petrochemical	Pengzhou	--	--	--	400	--	400
	Shaanxi Xinxing Coal & Olefins	Yulin	--	--	--	--	500	500
	Shaanxi Yanchang Petroleum	Luochuan County	--	150	50	--	--	200
	Shanghai Chemical Industry Park	Caojing	--	--	--	--	250	250
	Shenhua Baotou Coal Chemical	Baotou	--	--	300	--	--	300
	Shenhua Ningxia Coal Chemical	Yinchuan	--	--	500	--	--	500
	Sinopec Beijing Yanhua Petrochemical	Beijing	--	--	--	--	380	380
	Sinopec Kuwait Nansha Ethylene Project	Guangzhou	--	--	--	--	600	600
	Sinopec Qingdao Petrochemical	Qingdao	70	30	--	--	--	30
	Sinopec Shanghai Petrochemical	Shanghai	--	--	--	125	125	250
	Sinopec Tianjin Ethylene Project	Dagang District	--	--	225	225	--	450
	Sinopec Wuhan SK Ethylene	Wuhan	--	--	--	400	--	400
	Sinopec Yangzi Petrochemical	Nanjing	--	--	--	350	--	350
	Sinopec Zhenhai Refining & Chemical	Ningbo	--	--	300	--	--	300
	Sinopec Zhongyuan Petrochemical	Puyang	--	--	--	120	--	120

Country	Company	City	2007	2008-9	2010-11	2012-13	2014-18	Total
	Zhejiang Shaoxing Fuling Plastic	Shaoxing	--	--	300	--	--	300
Czech Republic	Unipetrol RPA	Litvinov	250	25	--	--	--	25
Egypt	Egyptian Propylene and Polypylene	Port Said	--	--	400	--	--	400
Finland	Borealis Polymers	Porvoo	180	40	--	--	--	40
France	Ineos Manufacturing France	Sarralbe	270	-160	-45	--	--	-205
Germany	Borealis Polymere	Burghausen	--	--	330	--	--	330

PP Capacity Additions 2008-2018 (Concluded)

(units: ktons)			Current	Changes				
Country	**Company**	**City**	**2007**	**2008-9**	**2010-11**	**2012-13**	**2014-18**	**Total**
India	Haldia Petrochemicals	Haldia	280	40	--	--	--	40
	Indian Oil	Panipat	--	--	300	--	--	300
	Indian Oil	Panipat	--	--	300	--	--	300
	Reliance Industries	Jamnagar	--	450	--	--	--	450
	Reliance Petroleum	Jamnagar	--	450	--	--	--	450
Indonesia	Tri Polyta	Cilegon	--	--	100	--	--	100
Iran	Jam Polypropylene	Assaluyeh	--	300	--	--	--	300
	Marun Petrochemical	Bandar Imam	--	300	--	--	--	300
	Rejal Petrochemical	Bandar Imam	--	--	80	--	--	80
Israel	Carmel Olefins	Haifa	125	125	--	--	--	125
Japan	Japan Polypropylene	Kashima	145	-145	--	--	--	-145
	Japan Polypropylene	Kashima	75	225	--	--	--	225
Kazakhstan	Kazakhstan Petrochmical Industries	Karabatan	--	--	--	500	--	500
Korea, South	LG Chem	Daesan, Seosan-Kun	250	120	--	--	--	120

Country	Company	City	2007	2008-9	2010-11	2012-13	2014-18	Total
	Lotte Daesan Petrochemical	Daesan, Seosan-Kun	--	300	--	--	--	300
	Samsung Total Petrochemicals	Daesan, Seosan-Kun	75	225	--	--	--	225
Kuwait	PIC	Shuaiba	120	40	--	--	--	40
Malaysia	Titan PP Polymers	Pasir Gudang	140	100	--	--	--	100
Mexico	Indelpro	Altamira	--	420	--	--	--	420
Netherlands	Basell Benelux	Rotterdam-Pernis	65	**-65**	--	--	--	-65
	Sabic Europe	Beek-Geleen	--	350	--	--	--	350
Pakistan	Engro Chemical Pakistan	Port Qasim	--	--	--	--	100	100
Portugal	Repsol Polimeros	Sines	--	--	300	--	--	300
Qatar	Qatar Petrochemicals Complex	Mesaieed	--	--	--	700	--	700
Romania	Petrotel	Teleajen	--	30	30	--	--	60
Russia	Stavrolen	Budennovsk	90	30	--	--	--	30
	Tobolsk Polimer	Tobolsk	--	--	--	500	--	500
Saudi Arabia	Advanced Polypropylene	Al Jubail	--	450	--	--	--	450
	Al Waha Petrochemical	Al Jubail	--	450	--	--	--	450
	IBN RUSHD	Yanbu	--	--	--	525	--	525

Country	Company	City	2007	2008-9	2010-11	2012-13	2014-18	Total
	IBN ZAHR	Al Jubail	--	450	--	--	--	450
	Petro-Rabigh	Rabigh	--	350	--	--	--	350
	Petro-Rabigh	Rabigh	--	350	--	--	--	350
	Saudi Kayan Petrochemicals	Al Jubail	--	--	175	175	--	350
	Saudi Polyolefins	Al Jubail	180	220	--	--	--	220
	Saudi Polyolefins	Al Jubail	270	50	--	--	--	50
	Teldene	Yanbu	--	420	--	--	--	420
	YANSAB	Yanbu	--	400	--	--	--	400
Singapore	ExxonMobil Chemical Singapore	Pulau Ayer Chawan	--	--	225	225	--	450
Thailand	HMC Polymers	Map Ta Phut	--	75	225	--	--	300
	Thai Polypropylene	Rayong	--	--	400	--	--	400
United Arab Emirates	Borouge	Ru Wais	--	--	400	--	--	400
	Borouge	Ru Wais	--	--	400	--	--	400
United States	Dow Chemical	Norco	227	-227	--	--	--	-227
	Equistar	Morris	127	-127	--	--	--	-127
	Ineos Americas	Deer Park	376	-236	--	--	--	-236
Venezuela	Polipropileno del Sur	Jose	--	--	450	--	--	450
Vietnam	Petro Vietnam	Dung Quat	--	--	150	--	--	150
Total			**3727**	**7631**	**7077**	**4971**	**2879**	**22558**

Global Capacity Polypropylene								
Announced (ktons/yr)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	302	445	772	1,072	1,087	1,442	1,482	1,482
Asia	3,556	7,166	8,787	10,513	11,663	12,588	13,588	13,688
Central East Europe	1,024	1,241	1,961	2,660	2,690	2,720	3,720	3,720
China	1,509	3,137	5,220	7,731	9,179	11,091	13,956	16,311
Central/South America	1,074	1,693	2,162	2,870	3,065	3,290	3,940	4,365
Japan	2,555	2,960	3,102	3,366	3,330	3,330	3,330	3,330
Middle East	550	1,133	2,118	4,119	6,529	7,009	8,809	8,984
North America	5,858	8,586	9,262	9,124	8,547	8,519	8,519	8,519
Oceania	357	305	271	310	310	310	310	310
West Europe	5,880	8,633	9,961	9,913	9,875	10,043	10,500	10,500
World	**22,664**	**35,296**	**43,617**	**51,678**	**56,274**	**60,342**	**68,154**	**71,209**

Global Capacity Polypropylene								
Speculative and Announced (ktons/yr)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	302	445	772	1,072	1,087	1,442	1,902	1,902
Asia	3,556	7,166	8,787	10,513	11,663	12,588	13,588	15,688
Central East Europe	1,024	1,241	1,961	2,660	2,690	2,720	3,720	3,720
China	1,509	3,137	5,220	7,731	9,179	11,091	13,956	16,311
Central/South America	1,074	1,693	2,162	2,870	3,065	3,290	3,940	4,365
Japan	2,555	2,960	3,102	3,366	3,330	3,330	3,330	3,330
Middle East	550	1,133	2,118	4,119	6,529	7,009	8,809	10,234
North America	5,858	8,586	9,262	9,124	8,547	8,519	8,519	9,469
Oceania	357	305	271	310	310	310	310	310
West Europe	5,880	8,633	9,961	9,913	9,875	10,043	10,500	11,000
World	**22,664**	**35,296**	**43,617**	**51,678**	**56,274**	**60,342**	**68,574**	**76,329**

In the table below we report the speculative capacity additions we expect could be added: such additions are judged on the basis of feedstock's availability, net trade imbalances and product cost competitivity. Rather than focus on the individual country where such plants may be located, we try to send a message on the regions which may more than others host preferentially new capacity. In few cases, some of the speculative capacity listed reflects some projects not yet confirmed but expected to be built in the close future. As in this edition of the outlook we have reported a large amount of announced capacity, the list of speculative capacity is rather limited compared to our predictions in 2007.

Speculative Capacity – Polypropylene							
(ktons/yr)							
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Africa	--	420	420	420	420	420	420
Asia	--	--	--	--	600	1,500	2,000
Central East Europe	--	--	--	--	--	--	--
China	--	--	--	--	--	--	--
Central/South America	--	--	--	--	--	--	--
Japan	--	--	--	--	--	--	--
Middle East	--	--	--	--	--	--	1250
North America	--	--	--	--	250	750	950
Oceania	--	--	--	--	--	--	--
West Europe	--	--	--	--	--	200	500
World	--	**420**	**420**	**420**	**1,270**	**2,870**	**5,120**

Incremental Capacity - PP

Cumulative Increments (Announced And Speculative) based on 2008												% B'down
(ktons/yr)	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2013**
Africa	--	15	370	370	400	830	830	830	830	830	830	4.9
Asia	--	1,150	2,075	2,850	3,075	3,075	3,075	3,075	3,775	4,675	5,175	18.2
Central East Europe	--	30	60	60	560	1,060	1,060	1,060	1,060	1,060	1,060	6.3
China	--	1,448	3,360	4,305	5,580	6,225	7,580	8,080	8,580	8,580	8,580	36.8
Central/South America	--	195	420	645	645	1,070	1,495	1,495	1,495	1,495	1,495	6.3
Japan	--	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-0.2
Middle East	--	2,410	2,890	3,465	4,165	4,690	4,865	4,865	4,865	4,865	6,115	27.8
North America	--	-578	-605	-605	-605	-605	-605	-605	-355	145	345	-3.6
Oceania	--	--	--	--	--	--	--	--	--	--	--	--
West Europe	--	-38	130	588	588	588	588	588	588	788	1,088	3.5
World	**--**	**4,596**	**8,663**	**11,641**	**14,371**	**16,896**	**18,851**	**19,351**	**20,801**	**22,401**	**24,651**	100.0

In the capacity listing table we find several shut downs of older units in the least competitive regions. We expect more to be announced as competitive plants like Indelpro in Mexico and the long list of new units in the Middle East will be running by 2009.

The very long list of new additions is a clear indication of the increasing pressure in the market place on older units and considering a market growth of only 3 % in 2009.

2.4 PRODUCTION

Preliminary estimates for 2008 World production indicate an increase over 2007 of 1.6 %. This number is particularly lower than its historical average of 6 to 8%/year of the last 15 years. Since a strong growth of 5.5 % in 2007, 2008 has recorded a dramatic decline in Q4: in North America despite a weak dollar sustaining exports, production closed 13 % below 2007 while our estimates for WE are for 3.2 below 2007.

Our projections to 2013 are for a 4.8 %/yr growth recovering in the last part of the period. Capacity additions in the short term suggest a growth of 5.7 % in the next five years, with the consequence of lowering the utilization rate by around 6 points percentage by 2010.

The consequent reduction of the utilization rate will reach its minimum point in the order of 81 % in 2010. Although it is very difficult to ascertain the real level of the world average utilization rate due to the complexity of calculating the effective capacity of each producer, we expect that the decline of utilization rate will force existing producers in the least cost competitive regions to operate their plants on-off on a campaign basis depending on the market performance and waiting for the recovery which should commence from the end of 2010.

Global Production - Polypropylene

(ktons/yr)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	195	256	625	870	880	950	1,400	1,710
Asia	3,146	6,066	8,356	9,540	9,330	9,985	11,520	14,953
Central East Europe	538	916	1,192	1,850	2,028	2,130	2,535	3,115
China	1,021	3,201	5,230	7,587	7,900	8,400	10,846	15,600
Central/South America	893	1,371	1,966	2,083	2,330	2,385	2,760	3,090
Japan	2,450	2,721	3,063	3,000	2,800	2,850	3,000	3,100
Middle East	476	731	1,749	3,435	4,796	5,920	7,875	9,725
North America	5,206	7,335	8,339	7,869	7,580	7,680	7,970	9,400
Oceania	227	223	264	280	280	280	280	280
West Europe	5,270	7,605	9,140	8,847	8,345	8,375	9,190	10,055
World	**19,422**	**30,424**	**39,924**	**45,361**	**46,269**	**48,955**	**57,376**	**71,028**

Global utilization Rates - Polypropylene								
(Percentage of name plate)								
	1995	**2000**	**2005**	**2008**	**2009**	**2010**	**2013**	**2018**
Africa	64.6	57.6	81.0	81.2	81.0	65.9	73.6	89.9
Asia	88.5	84.7	95.1	90.7	80.0	79.3	84.8	95.3
Central East Europe	52.6	73.8	60.8	69.5	75.4	78.3	68.1	83.7
China	67.7	102.1	100.2	98.1	86.1	75.7	77.7	95.6
Central/South America	83.1	81.0	90.9	72.6	76.0	72.5	70.1	70.8
Japan	95.9	91.9	98.7	89.1	84.1	85.6	90.1	93.1
Middle East	86.5	64.5	82.6	83.4	73.5	84.5	89.4	95.0
North America	88.9	85.4	90.0	86.2	88.7	90.2	93.6	99.3
Oceania	63.6	73.0	97.3	90.3	90.3	90.3	90.3	90.3
West Europe	89.6	88.1	91.8	89.3	84.5	83.4	87.5	91.4
World	**85.7**	**86.2**	**91.5**	**87.8**	**82.2**	**81.1**	**83.7**	**93.1**

2.5 TRADE

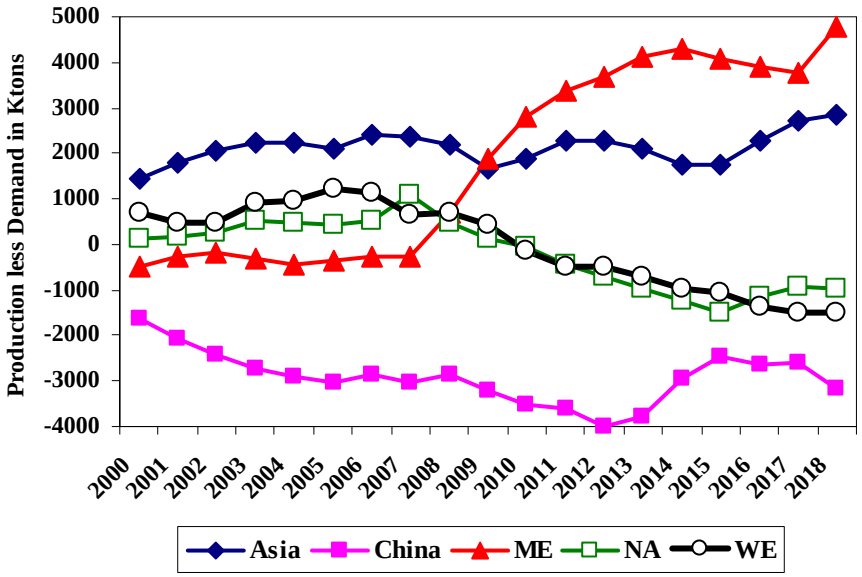
As predicted in the last few years, the trend showing an increasing net export in the Middle East and an increasing net import in China, West Europe and North America continues with a more definite increase from the Middle East due to the considerable announcements PP plants supported by new and ad hoc propylene supply like metathesis and PDH plants aside from the joint refinery-Petrochemical complexes in Rabigh and in the future Ras Tanura in Saudi Arabia and similarly in Oman. In addition, net exports from Asia (ex Japan and PRC) are projected to remain stable in the approx 2.0 million ton range. West Europe and North America net trade is projected to decline from the current level and become negative after 2009.

A key factor in the evaluation of this chart is the likely relative value of the US currency against the Euro and other currencies. The US will be able to sustain foreign competitivity and continue to export PP in a weak dollar scenario, while vice versa in a strong dollar environment a considerable portion of its export competitivity may be hard to sustain.

The net trade chart reported below has to be evaluated in conjunction with our forecast of regional speculative capacity: if some of the announced new capacity will be delayed the volume of inter regional trade may change accordingly, resulting in a different net trade outlook.

As most of the propylene capacity developments in the Middle East is based on alternative and new technology still to be proven commercially, it is possible that the real outlook will differ from our forecast.

PP Regional Net Trade



Global Net Trade - Polypropylene

(Data represent the difference between production and demand.) (ktons)

	1995	2000	2005	2008	2009	2010	2013	2018
Africa	-41	-251	-281	-275	-303	-285	5	32
Asia	1,110	1,450	2,090	2,184	1,653	1,893	2,089	2,837
Central East Europe	237	154	-259	-235	-209	-225	-216	-844
China	-890	-1,630	-3,030	-2,863	-3,197	-3,529	-3,766	-3,162
Central/South America	10	17	-30	-347	-222	-295	-345	-761
Japan	232	80	338	209	-78	-79	-82	-167
Middle East	-155	-509	-364	719	1,898	2,826	4,124	4,778
North America	390	128	419	473	135	-50	-963	-984
Oceania	45	-0	-49	-85	-100	-115	-160	-220
West Europe	-114	699	1,240	714	423	-140	-686	-1,508
World	**824**	**139**	**74**	**494**	**--**	**-0**	**-0**	**-0**

2007 Summary Trade Matrix – PP

Importers

Exporters	USA	Can	Mex	SA	WE	EE	ME	AF	Japan	China	Other Asia	India-Pak	Austral-NZ	Total Exports	Imp.-Exp.
United States	--	410	652	311	118	7	139	147	14	178	110	21	10	**2,116**	**1,815**
Canada	237	--	23	--	2	4	6	2	2	1	--	--	--	**278**	**-138**
Mexico	3	--	--	92	2	--	--	--	--	2	--	--	--	**99**	**-613**
South America	14	--	12	--	55	19	23	42	7	29	--	--	--	**199**	**-312**
Western Europe	39	2	15	45	--	858	745	104	11	135	40	21	5	**2,021**	**726**
Eastern Europe	--	--	--	--	430	--	132	18	--	2	--	14	--	**595**	**-338**
Middle East	1	--	--	--	572	1	--	114	4	244	78	206	67	**1,288**	**-100**
Africa	--	--	--	19	64	12	50	--	--	36	--	--	--	**182**	**-469**
Japan	0	4	--	1	8	--	3	1	--	257	105	7	1	**388**	**242**
China	1	--	--	--	--	3	1	--	3	--	11	4	--	**23**	**-3,034**
Other Asia	4	--	9	22	18	29	224	204	103	2,021	--	160	54	**2,849**	**2,309**
India-Pakistan	--	--	--	22	24	--	65	19	--	124	169	--	--	**422**	**-17**
Oceania	1	--	--	--	2	--	--	--	--	28	27	8	--	**66**	**-72**
Total Imports	**300**	**416**	**712**	**512**	**1,295**	**933**	**1,387**	**651**	**146**	**3,057**	**540**	**440**	**137**	**10,525**	

2.6 PRODUCERS

Until the end of 2003, downward economic pressures on PP margins kept pressures on companies for possible merges or divestures, although PP seemed to have suffered less than other polymers as PP outperformed the other thermoplastics with exception of PET.

During 2004 the sudden increase of raw material and product price brought in some fresh wind of profitability, although as producers are squeezed between an increasing raw material price and an economy lagging behind, they could not recover margins by the same extent as PP prices did not increase by the same amount as propylene. The increase of the margins may have delayed the interest and pressure on the laggard producers to divest from the business, at least until the wave of higher economics lasts.

During 2005 however the fast escalation of crude oil price and consequently of the entire product chain with the inability of converters of accepting adequate polymer price increases to keep producer margins at least at cash costs levels have again increased the pressure on producers in high feedstock costs areas.

In 2006 the scenario changed further: On the supply demand side lack of new capacity has made the market particularly tight making it a sellers market to the advantage of producers. On

the price side, further increases of oil prices has made it very difficult to not integrated producers to sustain profitability based on the high cost of spot propylene.

Despite PP remains a very attractive product its recent profitability makes upstream integration a fundamental prerequisite for the business sustainability. Since the 2005 change of ownership at Basell acquired by the Access group, BP then Innovene and then acquired by the INEOS group and Atofina who restructured its portfolio into Total Petrochemicals and Arkema, no substantial major portfolio switches have occurred. In Brazil, Braskem acquired Ipiranga Petroquimica.

In 2007 the sustained propylene to ethylene high price ratio and the high level of naphtha prices have hurt to some extent the profitability of PP as not all propylene price increases have been transferred to PP. In addition, the increasing competition of finished products from China and other lower cost Asian areas have been hurting converters in developed economies.

A considerable number of new entrants are finalizing construction of new plants in China and Middle East which will be all on stream by 2010. Given the relevant numbers of new players in the business we expect an increase of the M&A activity in the short term particularly in the new regions: Just to name a few in Saudi Arabia the list of start ups is rather long: NatPet, Petro-Rabig, SPC - Tasnee, Yansab, Al Waha.

From 2010-11 onward in the Middle East we will see the entrance of new players such as Qatar Petroleum, Kayen, APPC, Saudi Aramco and few others: The arrival of new players will create different dynamics in the product competitiveness.

Basell in 2007, has joined forces with Lyondell in the USA becoming the world leader polyolefin producer: however it is important to notice that Lyondell had only a minor presence in PP through their 100% subsidiary Equistar. However, in January 2009 they have filed for bankruptcy protection under chapter 11 in the USA.

Reliance, Sabic, NPC Iran and few other large concerns remain on the hunt for acquisition targets.

The large asset shares of the product Leader, LyondellBasell with 10.5 % of the world capacity remain far ahead of the no. 2 producer CPC with only 6.8 % of the world capacity share. If we combine the top three producers, they own 22.5 % of the world PP assets.

There are 127 owners of PP plants around the world of which we list below the top 20 in 2008.

Top 20 Producers in 2008 – Polypropylene		
(Ranking by Ownership)		
	Ktons	**Share %**
LyondellBasell Industries	5,401	10.5
China Petrochemical Corporation	3,502	6.8
Total	2,540	4.9
Ineos	2,475	4.8
China National Petroleum	2,240	4.3
SABIC	2,051	4.0
Exxon Mobil Corporation	1,863	3.6
Formosa Plastics Group	1,835	3.6
Reliance Industries	1,770	3.4
Borealis	1,555	3.0
Sunoco	1,111	2.2
Braskem	1,003	1.9
Dow Chemical Company	860	1.7
Mitsui Chemicals	831	1.6
Honam Petrochemical	780	1.5
Mitsubishi Corporation	634	1.2
Repsol YPF	610	1.2
UNIPAR	551	1.1
Sasol Limited	530	1.0
Koch Industries	501	*1.0*
Subtotal	**32,642**	**63.2**
World Total	**51,678**	**100.0**

3. POLYPROPYLENE PROJECT

3.1 IMPACT OF THE PP GLOBAL TREND AND TARGET MARKET

3.1.1 Impact of the PP global trend

Since SRIC report to EPPC in February 2007 there have been few but substantial changes that have altered the present market conditions and short term outlook:

- The predicted wave of overcapacity is now reaching the market since the end of 2008
- An unpredicted economic downturn has lowered the current market demand in an amount comparable to the expected capacity increases.
- The sudden increase of crude oil prices in 2008 and the decline in the second part of 2008 have reduced the profitability of the petrochemical chain as a whole from crude to consumers.

However some of the fundamentals of the PP market have remained firm:

- PP product flexibility and attractiveness: applications ranging from fibers(woven, non woven, etc.) to IM and BM, film (cast, BOPP, multilayer, etc..) .
- Demand Growth higher than other commodity polymers with exceptions of PET (although PP remains more attractive due to a better supply demand balance).
- Relatively shorter propylene supply relative to ethylene, despite the considerable ad hoc capacity addition such as PDH and metathesis.
- Critical need of PP producers to be upstream integrated

Overcapacity Wave:

AS indicated in Section 2, the overcapacity expected is much larger than estimated in 2007 due to the market collapse at the end of 2008. If we calculate the overcapacity as net surplus above the increase in demand, we reach an indicative volume of 4 to 4.5 million tons in 2009 and 2010. This volume represents approximately 8 % of PP global capacity of 56 million tons in 2009: this implies that if demand will perform as SRIC predicts and capacity additions will be on stream as predicted with no shut downs of older and less efficient units, the average world utilization rate will drop by 8 % in 2009 and 2010.

Given a considerable rearrangement of new projects resulting in delays, extended turn around and in ultimate some shut downs, we expect that the industry will perform better than envisaged in our forecast presented in this report.

In the following chart the demand growth rate line is compared to the drop of demand, in the yellow bars. Most of the demand drop in 2008 and 2009 is related to the durable industry: primarily cars and carpets in new construction. The consumer market such as appliances and film is less affected by the downturn. In the short term in 2009, we expect however that the stimulus package in the countries like China will provide a better recovery to the durable segmentation.

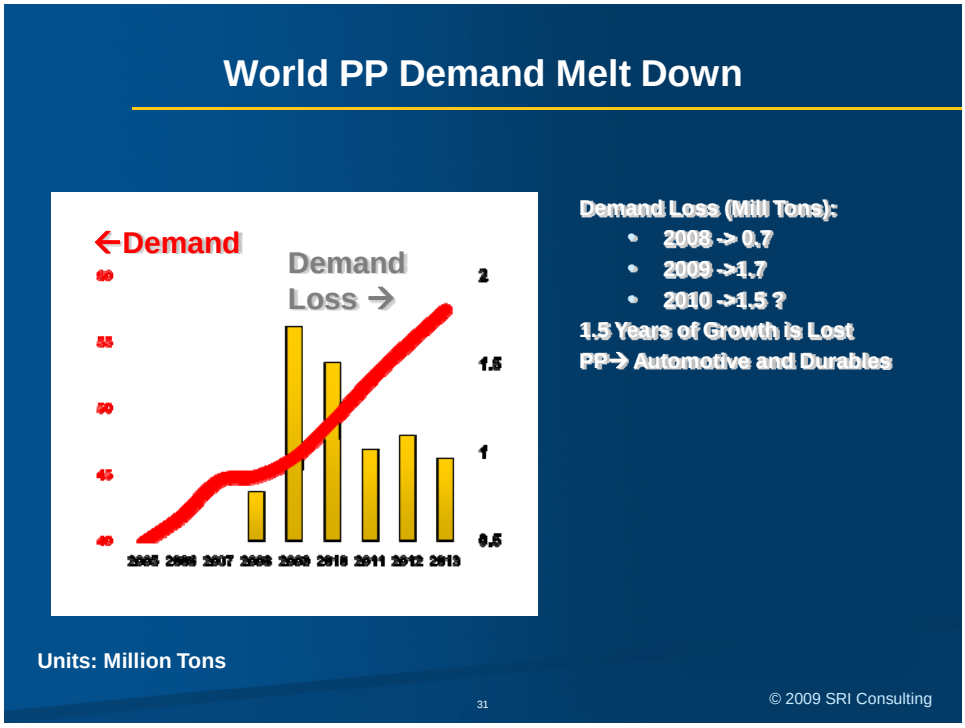
One of the aspects we have taken into consideration in our project evaluation is the average utilization rate (See table below) for the world, the Middle Eastern Region and the Client's plant. While we have penalized considerably lower costs areas such as Europe, China, Japan and the USA, we have treated the Client's plant as a plant with strong competitive cost advantage and as such "run" the unit at an utilization rate above the regional average. It is worth mentioning that the Middle East for SRI Consulting includes Iran, which explains the reason of a lower than 100 % rate.

In the project's economic analysis we have used the column marked "SRIC" while the Client had suggested a more optimistic start up loading factor. After running some sensitivities we have found as indicated in the executive summary that the impact on the project economics is minimal.

Lower Margins

The increased need of upstream integration derives from the squeezed margins between a higher crude price (from the era of the 30-40 $/bbl) and an economic downturn not allowing the converters to raise the price of their final product and in turn accept higher polymer prices.

To some extent during 2009 we have experienced some small price increases for the polymers but still not sufficient to provide relief to the producers.



PP Plant Utilization Rate				
	EPPC		Average	
Units: %	**Client**	**SRIC**	**ME**	**World**
2010	80	80	84.5	81.1
2011	90	85	87.9	82.3
2012	100	85	87.1	83
2013	100	90	89.4	83.7
2014	100	95	91.8	84.9
2015	100	95	92.3	88
2016	100	100	92.9	90
2017	100	100	94.3	92
2018	100	100	95	93.1
2019	100	100	95.1	94.1
2020	100	100	95.6	94.6
2021	100	100	95.4	94.7
2022	100	100	95.7	95
2023	100	100	95.3	94.5
2024	100	100	95.4	95.1
2025	100	100	95.8	95.1
2026	100	100	95.8	95.8
2027	100	100	95.8	95.9
2028	100	100	97.2	96

3.1.2 Target market, Sales mix and Product Grades

SRIC has applied its standard methodology to calculate the target market for the product and the results are very similar from what presented in the former study, with the exception of a different supply demand balance.

To estimate the market needs and potential penetration for the new PP plant, we have evaluated the net trade of PP by country in potential export destination areas. Based on the countries showing a net deficit position we have estimated a reasonable market penetration that in time can be achieved by the Client Company.

The above methodology is quite standard in SRI Consulting and it represents only a first and rough indication of reasonable volumes of sales that could be reached. The results of this first approach are then reported in below and compared to the Client's estimates and with the ability of the technology selected to provide the grade mix resulting from the market analysis.

Other factors such as possible off take agreements, the competitive cost position of the Client plant are considered when comparing the result of the market analysis and the client input

to be used in the model: in case of a discrepancy not justified we will indicate our recommendation.

After some conversation with the Client's management we have concluded their interest in focusing in addition to the domestic market needs, also on the European and Mediterranean countries. We have therefore excluded from our analysis SE Asia and near East markets such as Pakistan, Iran, India and GCC countries. We agree with EPPC's management in their choice based on few aspects such as:
Proximity and low cost access to the European Markets

- Lower landed cost competitivity in the GCC and Near East Countries once the Suez tariff is added.
- Already established sales channels in Europe through the sister company OPC.
- Strong competitive landed cost position against European producers due to upstream integration, economy of scale and selected technology. In particular the selected technology is widely accepted in Europe

In the table below we report the indicative projections of net trade obtained by the difference between production and demand. The negative values in red indicate a net deficit and a potential market to be fulfilled by exporters, such as if and where cost competitive, the Client Company. The assumptions behind the net trade reported in the table are provided in Section 2. Modifications of the supply demand outlook, due to delays or cancellations of new projects or shut downs of existing ones are discussed in Section 5.2.

Net Trade - PP UNITS: KTONS *Units: KtonsUnits: Ktons*											
		2007	**2008**	**2009**	**2010**	**2012**	**2015**	**2018**	**2020**	**2026**	**2028**
AF	Algeria	-68	-71	-74	-78	-85	251	284	274	239	225
AF	Egypt	-183	-190	-201	-164	-45	14	-53	-99	-258	-319
AF	Nigeria	-84	-87	-85	-79	-99	-114	-139	-153	-202	-220
AF	Other Africa	-192	-210	-215	-225	-227	-245	-291	-316	-354	-374
AF	South Africa	143	283	272	261	238	210	230	212	159	141
ME	Iran	-189	28	102	152	160	70	335	327	170	2
ME	Israel	-35	-4	20	44	50	37	17	6	-25	-25
ME	Kuwait	82	89	106	113	105	95	85	79	57	48
ME	Other Middle East	55	111	117	261	775	772	763	724	1891	1839
ME	Qatar	-7	-8	-10	-12	-17	527	651	645	1527	1520
ME	Saudi Arabia	1006	1667	2823	3626	4180	4509	5231	6373	6660	6774
ME	Turkey	-1171	-1165	-1261	-1358	-1569	-1914	-2305	-2555	-3368	-3654
WE	Austria	201	197	189	189	180	191	180	168	136	128
WE	Benelux	1477	1405	1265	1166	1087	965	770	791	569	1190
WE	Finland	66	70	83	74	67	59	39	28	6	2
WE	France	538	487	315	247	182	162	38	888	888	888

WE	Germany	190	288	339	267	213	154	521	537	1177	1176

Net Trade - PP (Concluded) UNITS: KTONS											
		2007	**2008**	**2009**	**2010**	**2012**	**2015**	**2018**	**2020**	**2026**	**2028**
WE	Italy	-930	-871	-820	-929	-1096	-1244	-1434	-1557	-1798	-1876
WE	Norway	91	103	24	-58	-64	-70	-77	-80	-88	-91
WE	Other Western Europe	-197	-192	-187	-230	-278	-357	-458	-516	-685	-737
WE	Portugal	-125	-120	-118	-126	118	118	103	97	85	82
WE	Spain	130	104	68	53	24	-27	-72	-123	-225	-260
WE	Sweden	-137	-132	-128	-136	-154	-170	-187	-198	-221	-225
WE	Switzerland	-111	-109	-107	-112	-129	-142	-155	-163	-177	-178
WE	United Kingdom	-525	-515	-500	-545	-634	-708	-776	-835	-992	-1006

The net trade reported in the table above is then aggregated in a regional summary table shown in the table below.

The considerable net export volume resulting in the Middle East as expected, will be balanced by a combination of factors:

- Exports to Asia, Europe and Africa.
- Rationalization of older and less cost competitive units in Europe, China, S.Korea and North America.

In SRI Consulting views, the new plants in the GCC and in Iran, will not entirely target their PP resin to Asia and will direct a considerable volume also westbound to Europe, Africa, South America and North America.

The magnitude of such exports to the west, will depend on several factors primarily the rate of the economic recovery in Asia and secondarily in Western Countries.

PP Regional Net Trade Summary Units: Ktons										
	2007	**2008**	**2009**	**2010**	**2012**	**2015**	**2018**	**2020**	**2026**	**2028**
Africa	-383	-275	-303	-285	-218	115	32	-82	-416	-547
Middle East	-259	719	1898	2826	3683	4097	4778	5599	6911	6505
W.Europe	668	714	423	-140	-484	-1071	-1508	-962	-1324	-907
Sub Total	26	1158	2018	2400	2980	3141	3301	4555	5171	5051

We have grouped the countries on the basis of market price and delivery costs similarities and defined three market regions as defined in the following two tables, below.

Target Market Zones	
1	N.W. Europe
2	West and Central Mediterranean
3	East Mediterranean
4	Egypt

Based on the above net trade deficits, we have calculated a reasonable amount of sales volume that could be shipped to the individual countries and regions indicated below. In the table, we have averaged the volumes for the period 2012 to 2028. Each target country has been grouped in market zones based as indicated above, on similarities of freight and price range.

Although not accurate, this methodology allows for the simplification of the economic analysis.

The results are in line with the Client's indications of domestic sales (80 to 100 ktons) as well as in line with the two MOA related to product off take. It is our view that sales to Western Europe could be higher.

Sales to closer markets like Syria and Giordan in particular but also Lebanon, indicated as other Middle East, could be increased depending on the agreements to be reached in the offtake agreements.

The total average sales does not reach 400 ktons due to the initial phase in of plant loading that reached 100 % of utilization after few years from start up. Reagrding utilization rates also refer to Section 3.1.1

PP Sales Volumes			
Average 2012 - 2028 – Ktons			
Region	**Country**	**Annual Sales**	
		Ktons	**%**
Egypt		94	24
NW Europe			
	Poland	6.0	2
	UK	10.3	3
Mediterranean (West and Central)			
	Algeria	1	0
	Italy	55	14
	Other Africa	49	12
	Portugal	3	1

	Spain	7	2
	Switzerland	4	1

Middle East			
	Other EE	3	1
	Other ME	12	3
	Other WE	11	3
	Turkey	138	35
Regional Summary			
NW Europe		16	4
Med (west and central)		120	31
Med (East)		163	42
Egypt		94	24
Total Sales		394	100

3.1.3 Sales Mix and Product Grades

The evaluation of the product slate to recommend is based on two separate approaches: this first is the standard review of the market segmentation in the target markets and on a weighted average obtain the product slate acceptable in the target markets. This approach is based on the assumption that the Client future product slate will be comparable to the destination market segmentation.

In the second approach we have compared the results indicated above with the client's inputs and found only modest differences which we consider acceptable.

A third and more detailed review should consider the analysis of the selected technology slate capability, the market positioning of the off takers and their ability to provide technical support and the likely synergy with the existing clientele of OPC.

Given the complexity of market segmentation, the new and changing competitive forces of market shares, off take arrangements and short term overcapacity, we suggest that a more in depth review of the market positioning involving the client company and its parent OPC, should be considered in line with the signing of the off take agreements.

In regard to impact copolymer, in our analysis we refer to the medium-impact (broad rubber phase content 6-20 wt% or ethylene content below 19 wt%). Accordingly, also price premium of the impact copolymer will be in the medium level for impact copolymers rather than on the high side of the 20 to 40 wt% of rubber content.

The two following tables provide our estimates of the regional breakdown by end use. The breakdown by product grade has been obtained by the estimates of the grades required for each end use.

In Africa, we do not have historical data on blow moulding. However we do not exclude that to some extent, some fabrication is in place.

REGIONAL BREAKDOWN BY END USE: AFRICA, MIDDLE EAST AND W. EUROPE (1) UNITS: KTONS											
		2007	**2008**	**2009**	**2010**	**2012**	**2015**	**2018**	**2020**	**2026**	**2028**
AFRICA	BM	0	0	0	0	0	0	0	0	0	0
	Fiber	343	362	382	404	453	511	575	617	761	818
	F&S	38	40	42	45	50	56	64	69	85	90
	IM	159	167	176	184	203	224	247	262	308	323
	Other	495	514	538	560	623	707	794	845	998	1051
		1034	1083	1138	1193	1329	1499	1678	1792	2151	2282
Middle East	BM	25	30	36	49	67	84	99	109	135	146
	Fiber	717	763	816	868	994	1222	1462	1614	2133	2332
	F&S	377	393	413	429	467	540	619	674	853	930
	IM	820	868	908	953	1050	1229	1452	1584	2071	2252
	Other	256	278	302	328	388	471	568	635	871	961
		2196	2332	2474	2627	2966	3546	4199	4616	6063	6622

REGIONAL BREAKDOWN BY END USE: AFRICA, MIDDLE EAST AND W. EUROPE (1) (CONCLUDED) UNITS: KTONS											
		2007	**2008**	**2009**	**2010**	**2012**	**2015**	**2018**	**2020**	**2026**	**2028**
W.Europe	BM	192	196	206	211	223	241	260	272	301	309
	Fiber	2066	2134	2172	2224	2361	2542	2738	2858	3161	3238
	F&S	1660	1705	1760	1831	1970	2110	2268	2360	2599	2669
	IM	4046	4196	4380	4533	4831	5284	5682	5921	6516	6704
	Other	1019	1061	1091	1138	1243	1335	1451	1515	1666	1707
		8984	9292	9608	9937	10627	11512	12397	12926	14242	14626
Total	BM	217	226	241	260	290	325	358	381	436	455
	Fiber	3126	3259	3370	3495	3808	4276	4774	5089	6054	6388
	F&S	2076	2138	2216	2305	2487	2707	2950	3102	3536	3689
	IM	5024	5231	5463	5671	6083	6737	7380	7767	8895	9279
	Other	1770	1853	1931	2025	2254	2513	2812	2995	3535	3719
		12214	12707	13221	13756	14922	16557	18275	19334	22456	23530

(1) Regions are defined in appendix A

We have considered the regional average grade mix (homo, random and impact or etherophasic copolymer) and calculated the following summary tables on a weighted average basis. Although the calculation is not precise, it provides an indication of the possible demand breakdown by polymer grade.

The last table in the series, reporting the total grade mix, indicates the market average segmentation in the target market.

REGIONAL BREAKDOWN BY PRODUCT GRADE: AFRICA, MIDDLE EAST AND W. EUROPE (1)
UNITS: KTONS

			2007	2008	2009	2010	2012	2015	2018	2020	2026	2028
Africa	Homo	%	73	73	73	73	73	74	74	74	74	75
	Random	%	13	13	13	13	13	13	13	13	13	13
	Impact	%	14	14	14	14	13	13	13	13	13	13
	Total	%	100	100	100	100	100	100	100	100	100	100
			1034	1083	1138	1193	1329	1499	1678	1792	2151	2282
Middle East	Homo	%	49	49	50	50	50	51	52	52	53	53
	Random	%	22	22	22	23	22	22	22	22	21	21
	Impact	%	28	28	28	28	27	27	26	26	26	26
	Total	%	100	100	100	100	100	100	100	100	100	100
			2196	2332	2474	2627	2966	3546	4199	4616	6063	6622
West Europe	Homo	%	40	40	39	39	39	39	39	39	39	39
	Random	%	26	26	26	26	26	26	26	26	26	26
	Impact	%	34	34	35	35	34	35	35	35	35	35
	Total	%	100	100	100	100	100	100	100	100	100	100
			8984	9292	9608	9937	10627	11512	12397	12926	14242	14626

REGIONAL BREAKDOWN BY PRODUCT GRADE: AFRICA, MIDDLE EAST AND W. EUROPE (1) (CONCLUDED)
UNITS: KTONS

			2007	2008	2009	2010	2012	2015	2018	2020	2026	2028
Total	Homo	%	44	44	44	44	45	45	45	46	46	46
	Random	%	24	24	24	24	24	24	24	24	23	23
	Impact	%	31	31	31	31	31	31	31	31	30	30
	Total	%	100	100	100	100	100	100	100	100	100	100
			12214	12707	13221	13756	14922	16557	18275	19334	22456	23530

(1) Regions are defined in appendix A

We have then compared the average grade split calculated above for the target market, 44/24/31 for Homo, random and Impact respectively in 2009, with the sales plan as proposed by the client: 75/5/25:

Our first consideration is that the technology (Univation) used by the parent company OPC, and the end use driven by the fiber applications, explain a preference to the homopolymer application. In line with such preference we have modified the input assumptions for the financial model to reflect such market preference.

However given the fact that the selected technology, Spheripol is particularly well suited for random and impact copolymers, we feel that in the long term some adjustments could be made to the product slate to increase the production of copolymers and reduce the homopolymer grades.

Therefore we have modified our market input to match the Client's plans and the weighted average for the 2012 to 2028 period is reported in the following table.

AS suggested in the introduction to this section, a more detailed optimization of product grades required by the selected technology (Spheripol technology) would also dictate the optimum product mix, which will have to be blended and optimized with this market estimate.

The following table reports a twenty years average breakdown by region. At plant start up, the production will be initially focused on homo-polymer with random and impact to follow a few months afterward.

Average Polymer Grade Breakdown 2012-2028				
Units: %	**Homo**	**Random**	**Impact**	**Total**
NW Europe	60	5	35	**100**
Medit. West/Central	70	10	20	**100**
Medit. East	80	7	13	**100**
Egypt	60	8	32	**100**
Average	**71**	**8**	**21**	**100**

The calculation of operating cost and revenues are based on the above product grade breakdown.

3.2 DISTRIBUTION COSTS

Distribution costs for the Client's project are allocated in several parts of our analysis. In the economic model we consider GS&A annual costs. In addition we consider that the product distribution has specific costs which we address in this section. We have developed a different distribution cost assessment to each market destination:

3.2.1 Domestic Sales – Freight Cost

Sales in Egypt will be charged land freight cost from the plant, a minimum charge for local warehousing and no fee for possible distribution as we expect that sales will be done directly from the marketing team.

Domestic shipments will use 25 kg. bags on 1000 kg. pallets and flat bed trucks or 500 kg. jumbo bags again on trucks.

Although very cost effective, we expect in the short term, very limited if any tank truck bulk shipments.

The above consideration is based on the assumptions that domestic sales will be based on a product delivered basis (instead of FOB Works).

In conclusion, for domestic sales we have used a domestic price and a domestic inland freight charge.

3.2.1 Export Sales – Freight Costs

Based on Client's input, we have considered that all the export sales will be based on FOB port of origin basis. In addition, all export sales will be allocated to the two off take agreements indicated by the Client.

The cost of sales and distribution are then limited to land freight to domestic port and the distributor marketing fee.

To take into consideration the ocean freight to the export destinations, we have calculated the price net back from the destination market to the port of origin. We expect in so doing we have not double counted the freight costs.

PP for exports will be moved to the ports of Alexandria or Port Said or Damitta by truck and from there loaded into containers and shipped. The freight rate indicated below from Alexandria to export destination should be inclusive of container loading. Containers will loaded with 100 kg pallets holding 40 25 kg bags.

On a trial and very limited basis Europe is beginning to receive bulk containers where a internal lining allows the loading of bulk pellets. The use of bulk containers allows for a considerable reduction of packaging costs.

The table below provides an indication of the freight rates used in our economic analysis.

Freight Costs US$/mt – 2009			
	Gemel to:	Domestic	Export
Land	Egypt (1)	15	
	Alexandria		10
Ocean	NW Europe		30
	Mediterranean West		26
	Mediterranean East		20
(1) Includes Warehousing			

The economic model takes into account the weighted average of the freight costs based on the volumes of sales to each specific route as defined in the target market sections above.

3.2.1 Distributors

Polypropylene sales will be directed by EPPC marketing team which will benefit from several years experience and knowhow of OPC.

We envisage that primarily the domestic sales will be conducted directly by EPCC while export sales will be allocated to third party off takers, such as MB Barter in Switzerland, Polymed in Dubai. Several others are available and discussions are being conducted for example with LyondellBasell who among several would be willing to off take volumes from EPPC.

From the MOA submitted to SRI Consulting we have calculated the possible percentage allocation of sales by region which are reported below:

PP Offtakers: Sales Breakdown			
	Range	*Adjusted*	
	Ktons	Ktons	%
MB Barter	120-150	120	**30**
Polymed	80-100	80	**20**
Lyndell Basell	200-250	100	**25**
Direct	80-100	100	**25**
Total		**400**	**100**

Sales breakdown: Direct vs. Off Takers - 2010						
Sales %	Total	Egypt	N.W. Europe	Mediterranean		East Africa
				West,Central	East	And Other
Direct	25	25				
Distributors A	5		5			
Distributors B	25			25		
Distributors C	45			25	15	5
Sub Total Distributors	**75**	**0**	**5**	**50**	**15**	**5**
Total	**100**	**25**	**5**	**50**	**15**	**5**

The marketing strategy remains as indicated in the past to reduce the presence of off takers and increase or strengthen the in house marketing and sales force in order to reduce third party costs but also to increase a direct responsibility on the future of the company marketing position.

Therefore we envisage the 75 percentage of sales allocated to off takers in 2010, will be substantially reduced in the first 5 years.

Regarding the expected cost of distribution, we have calculated an average of 4 % on the FOB price for the 75 % of the sales. This distributor fee will be calculated on the weighted average price related to the sales areas.

Distributor's fees depend greatly from the terms of sales which include elements such as credit risk, insurance, technical support to client, availability of local warehousing, possible need of trans shipment and/or product repackaging and so on. Therefore it is difficult to generalize on a MOA which at this point does not include all the details on the term of sales. The average range of distributor fees is between 30 and 40 $/MT in Europe.

3.3 POLYMER PRICING AND ECONOMIC MODEL INPUT METHODOLOGY

The polymer prices selected for the project economics have been grouped according to the market areas, consistently with the four zones selected for the target market.

The prices selected have been based on the Q1 2009 quotations and are listed below. The fundamental assumption is that we use as a reference price an artificial FOB value in NW Europe, based on a 5 % discount from the domestic contract price. We have a preference in such type of reference as the spot prices fluctuate greatly with the market supply demand and are a less reliable reference.

If we use Q1 2009 as a reference, the fob reference value is 1050 $/MT based on a 0.703 €/US$. The value we use in our model is 1002 $/MT as average for the year for homo polymer PP.

In SRI Consulting methodology we consider a homo-polymer price and a premium for random and Impact (medium) copolymers as detailed in the next section.

Similarly we have defined a premium or delta, depending on the market location and calculated the weighted average of FOB destination port prices. Prices in Europe are freight equalized, i.e. same price regardless the destination. However locations like East Meditetrranean as Turkey or Syria, due to lack of relevant local suppliers, aside from a small unit at Petkim and the plant in Israel, sustain prices generally substantially higher than in continental Europe.

Each individual price related to product grades (Homo, random and impact) and market areas, is averaged on the basis of the sales volume by grade and by destination and the resulting number provides the unit revenues (US$/mt) to be used for the project.

A snapshot of the PP price by target market and grade premium selected is listed in the table below.

2009 PP Premium US$/mt [(1)]		
Random	15	
Impact [(2)]	75	
2009 Homopolymer, PP Prices US$/MT		
NW Europe and Mediterranean [(3)]		1002
East Med – Turkey	FOB	1052
Egypt Domestic	Contract	1105
(1) Premium for NW Europe Export Price, over Homo-polymer		

(2) Lower Ethylene Content
(3) This is the reference price, FOB.

3.3.2 Copolymers Grade Price Premium

Regarding the price premium for PP copolymers, random and impact copolymers, we have assumed that such premiums remain constant in the life of the project. In fact the price premium of random depends on the ethylene market relative to propylene: when the ethylene market is long, such premium is lower, perhaps below US$ 10 per metric ton (MT); when the ethylene market is tighter, the price premium of random grade can exceed the US$ 15/mtT. As the short term market outlook on ethylene appears particularly long, we have considered a steady US$ 15/mt premium for random copolymer.

The premium for impact copolymer is US$ 75/mt.

The random and impact copolymer premium are indicated in the table above for 2009. As there is a wide range of Impact copolymers, based on the ethylene content and the application, have referred to a low and medium grade of impact copolymer. Similarly for the price premium for random polymer we have selected and average among the grades for film, Injection Molding and Blow Molding.

4. PROJECT ECONOMICS

4.1 PRICE PROJECTIONS TO 2028

Price forecasts were developed as a basis for the financial evaluation of the proposed EPPC project. The entire prices forecasts for both upstream and downstream products, as well as macroeconomic indicators, are presented on sheet 'Price Frcst' of the financial models provided to EPPC, both the base case and the low case.

The following table presents a summary of the base case price forecasts and indicators for selected years from 2008 to 2028:

Price Forecast and Microeconomics – Base case

	Units	2008	2009	2010	2013	2016	2019	2022	2025	2028
World Real GDP (PPP Basis)	% change	3.4	0.3	2.9	5.0	4.6	4.4	4.3	4.3	4.3
World Price Consumer Inflation	% change	6.1	2.9	3.5	3.9	3.7	3.6	3.6	3.5	3.5
Crude Oil-Brent	USD/Bbl	97.5	61.0	73.5	96.8	104.5	112.2	121.9	132.6	145.3
Crude Oil-Dubai	USD/Bbl	94.3	60.8	71.5	95.9	103.5	111.1	120.8	131.5	144.2
NW Europe Naphtha Spot	USD/mton	790	470	622	871	946	1022	1113	1213	1332
Naphtha Spot Singapore	USD/mton	839	480	632	871	943	1016	1106	1206	1324
EU Natural Gas	USD/mmbtu	13.4	8.0	8.9	11.6	12.5	13.5	14.9	16.7	18.8
Wtd. Average Propane Price (dlvrd. to Egypt)	USD/mton	769	479	623	879	956	1034	1128	1231	1353
NW Europe Contract Ethylene	USD/mton	1613	831	1044	1475	1614	1762	1925	2096	2296
NW Europe PG Propylene Contract	USD/mton	1404	706	939	1446	1646	1815	1983	2159	2365
NW Europe Contract H.P. Polypropylene	USD/mton	1786	1055	1282	1908	2187	2398	2602	2816	3059
NW Europe FOB Homopolymer PP	USD/mton	1697	1002	1218	1813	2078	2278	2472	2675	2906
Egypt Ethylene price	USD/mton	1586	884	1078	1474	1608	1750	1905	2069	2258
Egypt Propylene price	USD/mton	1457	797	1020	1509	1707	1876	2043	2219	2424
SE Asia Ethylene Spot	USD/mton	1150	762	1014	1493	1639	1763	1908	2063	2244
SE Asia PG Propylene Spot	USD/mton	1291	762	953	1433	1656	1868	2051	2248	2479
SE Asia Spot Raffia Polypropylene	USD/mton	1469	928	1132	1741	2057	2313	2533	2768	3038

The following table presents a summary of the low case price forecasts and indicators for selected years from 2008 to 2028:

Price Forecast and Microeconomics – Low Case										
	Units	**2008**	**2009**	**2010**	**2013**	**2016**	**2019**	**2022**	**2025**	**2028**
World Real GDP (PPP Basis)	% change	3.4	0.3	2.6	4.5	4.1	4.0	3.9	3.9	3.9
World Price Consumer Inflation	% change	6.1	2.5	3.0	3.2	3.1	3.0	3.0	2.9	2.9
Crude Oil-Brent	USD/Bbl	97.5	57.6	69.3	89.6	95.6	100.3	107.3	115.0	125.0
Crude Oil-Dubai	USD/Bbl	94.3	57.3	67.3	88.9	94.9	99.6	106.7	114.4	124.5
NW Europe Naphtha Spot	USD/mton	790	442	585	807	868	917	985	1058	1153
Naphtha Spot Singapore	USD/mton	839	452	595	807	865	911	978	1051	1145
EU Natural Gas	USD/mmbtu	13.4	7.7	8.4	10.8	11.6	12.2	13.3	14.6	16.3
Wtd. Average Propane Price (dlvrd. to Egypt)	USD/mton	769	449	585	813	875	927	996	1072	1169
NW Europe Contract Ethylene	USD/mton	1613	783	982	1372	1490	1598	1723	1852	2014
NW Europe PG Propylene Contract	USD/mton	1404	666	884	1344	1520	1646	1775	1907	2074
NW Europe Contract H.P. Polypropylene	USD/mton	1786	1012	1224	1803	2055	2222	2386	2553	2757
NW Europe FOB Homopolymer PP	USD/mton	1697	962	1163	1713	1953	2111	2267	2426	2619
Egypt Ethylene price	USD/mton	1586	840	1021	1379	1492	1597	1717	1839	1993
Egypt Propylene price	USD/mton	1457	758	967	1411	1583	1710	1839	1971	2137
SE Asia Ethylene Spot	USD/mton	1150	718	954	1389	1514	1600	1710	1824	1969
SE Asia PG Propylene Spot	USD/mton	1291	718	897	1333	1530	1696	1838	1988	2176
SE Asia Spot Raffia Polypropylene	USD/mton	1469	882	1072	1637	1926	2134	2311	2497	2723

4.2 FINANCIAL MODEL FOR INTEGRATED PROJECT

Using the basis and assumptions explained in Appendix D, two thorough financial analyses of the EPPC project were completed using a (MS Excel) model, one for the base case scenario, and one for the low case scenario; these were also provided to EPPC for further evaluation. The economics of the project were studied utilizing a 3-year pre-production period (2007 to 2009) plus a 19-year production time line (2010 to 2028). The model also contained a 'cost component' sheet explaining the calculations for the average feedstock and PP resin costs used for the cash flow analysis, as well as other factors used in the model. These calculations are further explained in Appendix D. Project Competitive Analysis

5.1 COMPETITIVE PP COST ANALYSIS

In this section, we examine the competitiveness of the EPPC project against other PP producers that also supply product to Europe. After the Middle East, Europe would be the next most obvious export market for EPPC. Our analysis examines the economics of three competing representative PP producers in comparison with the EPPC project:

- EPPC PDH-PP project at Port Said, Egypt with start up in 2011.
- Saudi Arabian based PDH-PP plant.
- Saudi Arabian stand alone PP plant purchasing propylene at the domestic market price from naphtha/mixed feed cracker.
- European stand alone PP plant purchasing propylene at market price from a naphtha cracker.

The economics for each of these options is calculated assuming a run rate of 100% for 400 thousand tons plants capacity in order to compare with the scale of the EPPC project. Costs and economics for all plants are provided for base year 2011 and for 2015, 2018. The EPPC costs and economics are from the project financial model adjusted for operating rate, that is, the EPPC plant operating at capacity producing PP homo polymer at 400 thousand tons of capacity.

For each comparative location SRIC developed regionalized cost information reflecting differences in labor, energy prices, and the investment cost of the facility. The economics of producing propylene from PDH units was calculated for a Saudi Arabian producer, utilizing SRIC Process and Economics data and compared with normalized results from the following analysis (Section 6) of the EPPC PDH-PP project in Egypt.

5.1.1 Relative PDH Economics

The following table presents the comparative economics for the years 2011, 2015 and 2018.

Assumptions

The propane price used in the Saudi PDH propylene competitive cost model is a calculated spot value determined from a West Mediterranean propane price, freight adjusted back to a Saudi Arabian delivery point. EPPC propane value is the blended value used in the following financial model calculations. In the EPPC cost comparison, direct factory costs including plant overhead and taxes and insurance as well as depreciation costs for the PDH-PP project were split 65% for PDH propylene manufacturing economics and 35% for PP according to the relative ratios of total fixed investment. On the other hand all G&A overhead costs for both the integrated Saudi and EPPC PDH-PP projects were assigned only to the PP manufacturing economics comparison portion of the PDH/PP integrated analysis. As in the financial model EPPC is assumed to operate at less than 100% during the start up year 2011, but to be at near 100% thereafter.

Analysis of PDH economics

As forecast for the 2011 through 2018 period indicated in the chart below:

A) Saudi Arabia enjoys a 2% PDH propane feed advantage which lowers the Saudi PDH propylene variable costs compared to EPPC.

B) However, this advantage is more than offset by lower allocated EPPC total plant fixed costs. This results in total plant gate costs of propylene from the EPPC PDH plants which are marginally lower than that those for the Saudi plant for 2011, 2015, and 2018.

C) Moreover, when operating at full capacity the EPPC facility should produce propylene at a cost which is US$ 325/mt to $ 403/mt below forecasted imported prices of propylene to Egypt.

COST OF PRODUCING PROPYLENE VIA PDH

(CURRENT US$/MT)

	Base Year 2011			Year 2015			Year 2018	
	EPPC	Saudi		EPPC	Saudi		EPPC	Saudi
Capacity, kta	400	400		400	400		400	400
Catalyst & Chemicals	17	16		15	15		15	14
Utilities	69	69		67	67		71	71
Propane	925	906		1,158	1,139		1,257	1,237
Total Variable Cost	1,012	991		1,241	1,220		1,343	1,321
Total Plant Fixed Costs	26	38		25	42		26	45
Plant Taxes & Insurance	*	16		*	18		*	19
Total Cash Cost Propylene	1,037	1,046		1,266	1,280		1,369	1,386
Depreciation	54	47		48	47		48	47
Total Cost of Production (COP)	1,091	1,094		1,314	1,328		1,418	1,433
Propylene @ Market price	1,224			1,639			1,821	
Delta: Dlvd Propylene -COP	133			325			403	
* Included in Plant Fixed Costs								

SRIC concludes that EPPC PDH propylene unit will be competitive with the most efficient plants throughout the world including the very economical units in Saudi Arabia.

5.1.2 Integrated PDF/PP Vs. stand alone PP Economics

The above PDH costs for propylene production were used to develop the relative cost of producing polypropylene homo polymer via an integrated EPPC PDH-PP plant. These were compared to a similar integrated PDH-PP plant in Saudi Arabia (see two left hand columns in table below). Also, two non-integrated PP plants in Europe and Saudi Arabia based on local

purchased propylene were compared to the EPPC/Saudi PDH-PP facilities (see two right hand columns in table below):

Assumptions

The polypropylene portion of the EPPC integrated plant comparisons utilize cost categories in the project financial analysis which are normalized to compare with those for a Saudi PDH-PP venture. The economics for the integrated EPPC and Saudi plants include propylene charged at cost of PDH production while propylene for the stand alone PP plants for Saudi Arabia/Europe is at local market. The four comparisons below – the integrated PDH-PP plants and the standalone PP comparisons- assume sale of PP homopolymer in Europe at spot prices which are net backed to the plant gate at appropriate a freight costs.

The majority of propylene is produced throughout the world including Europe and Saudi Arabia as a co product of naphtha feedstock ethylene cracking. Although a large percentage of propylene is manufactured via PDH in Saudi Arabia; Jubail Chevron Phillips, Jubail United, Kemya, Petrokemya, Sharq and Saudi Ethylene and Polyethylene and Yanpet produce propylene as co product from mixed feedstock ethylene crackers. Petrokemya sells propylene in Al Jubail to IBN ZAHR and SAMAD both of whom are Sabic joint venture companies with multi-national partners.

Analysis of integrated PDH-PP economics

As indicated for the forecast over 2011, 2015 and 2018 the table following:

A) The integrated EPPC PDH project is able to produce Propylene/PP at a total cost of production which is about $50 per metric ton lower than that of the Saudi Arabian integrated facility and more than $300 per metric ton lower than that of the non integrated PP producers in either Saudi Arabia or Europe.

B) The comparison of the PDH-PP units shows that EPPC will have marginally lower variable costs but the advantage increases due to significantly lower EPPC allocated plant fixed and general and administrative costs than for the Saudi Arabian PDH-PP unit.

C) The EPPC PDH-PP Integrated margin is a significant $75-80 per metric ton larger when the logistics advantage for sales to a hypothetical European homopolymer PP customer is considered. The netback price for EPPC is larger since freight to a hypothetical spot customer in Europe is much less than in the Saudi case.

D) Overall, about 65% of the EPPC margin advantage over 2015/2018 owes to lower allocated plant fixed costs in the integrated plant with 35% due to lower freight to the European spot markets.

Analysis of non integrated Naphtha/PP producers

A) The Saudi naphtha-PP producer's economics are based on purchased propylene in the Saudi domestic market. This price is assumed to be the average of Southeast Asian (SEA) spot and West European contract propylene. The non integrated European PP producer's economics are based on purchased propylene in Europe at contract market price. The analysis also assumes any profit from merchant priced propylene produced from naphtha ethylene cracking in Europe or Saudi Arabia is netted back to reduce ethylene cracking costs and thus does not enter into this comparison economics.

B) Freight and tariffs for PP to be sold into European markets are estimated at US $70 per metric ton for Saudi Arabia and none for the home market European case.

C) Although the total product costs for the Saudi plant are $55-60 per metric ton lower due to lower utility and general administrative costs, the higher freight cost to market more than offset that advantage. As a result margins for Saudi stand alone PP over 2015 through 2018 are equal to or lower than those in Europe.

The comparison of the two PDH-PP and the non integrated PP units shows that EPPC will have lower costs and higher margins when compared to the Saudi PDH-PP unit. As well both integrated PDH-PP plants should show substantially higher margin as compared to the stand alone PP units. For the integrated PDH-PP producers, the total average $500 per metric ton margins generated over 2015 through 2018 should be split about 70% for PDH propylene and 30% for PP. Integration thorough to PP adds to project desirability.

The results of both the integrated PDH/PP and the standalone comparisons are shown in the following graphics and table.

UNIT COST OF PRODUCING PP HOMO-POLYMER

(CURRENT US$/MT)

		Base Year 2011			
		PDH/PP		Naphtha/PP	
		EPPC	Saudi	Saudi	WE
Capacity, kta		400	400	400	400
Catalyst & Chemicals		22	22	32	32
Propylene**		1102	1105	1156	1163
Utilities		37	37	37	49
Total Variable Cost		1161	1163	1225	1244
Total Plant Fixed Costs		14	31	31	38
Total Cash Cost PP		1206	1232	1266	1295
G&A (Corporate Overhead)		31	28	28	51
Depreciation		29	33	33	33
Total Cost of Production		1235	1265	1327	1379
Margin		180	126	64	76
Plant Net Back		1415	1391	1391	1456
Freight to Europe		41	65	65	0
European price		1456	1456	1456	1456

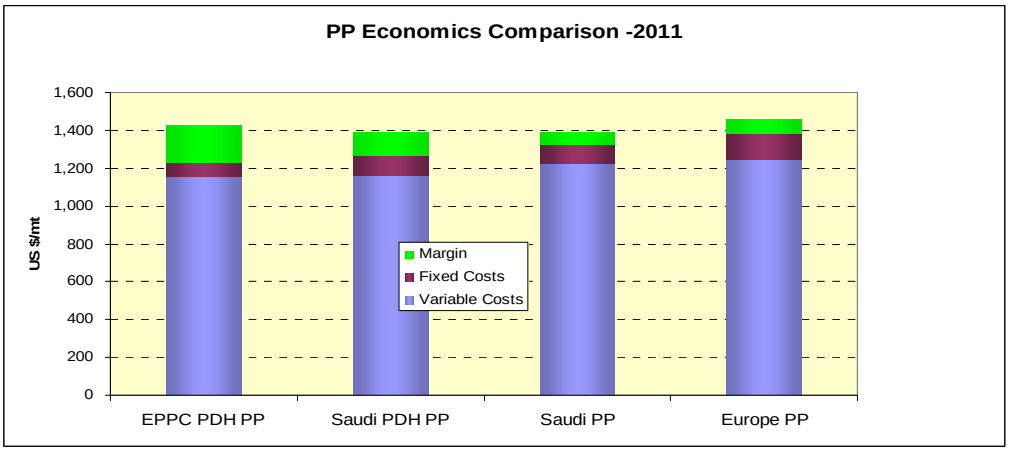
** Propylene for PDH/PP charged at total cost; for Naphtha/PP at market price

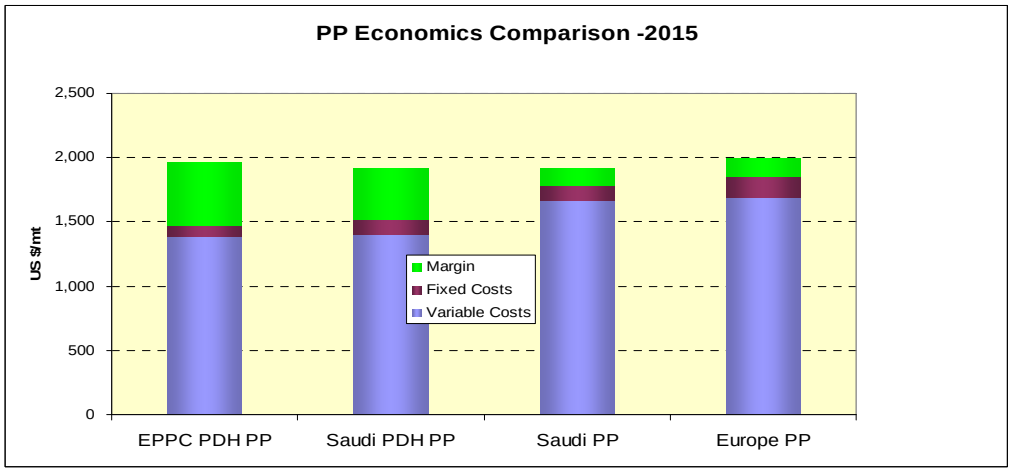
UNIT COST OF PRODUCING PP HOMO-POLYMER (Concluded)(Current US$/mt)

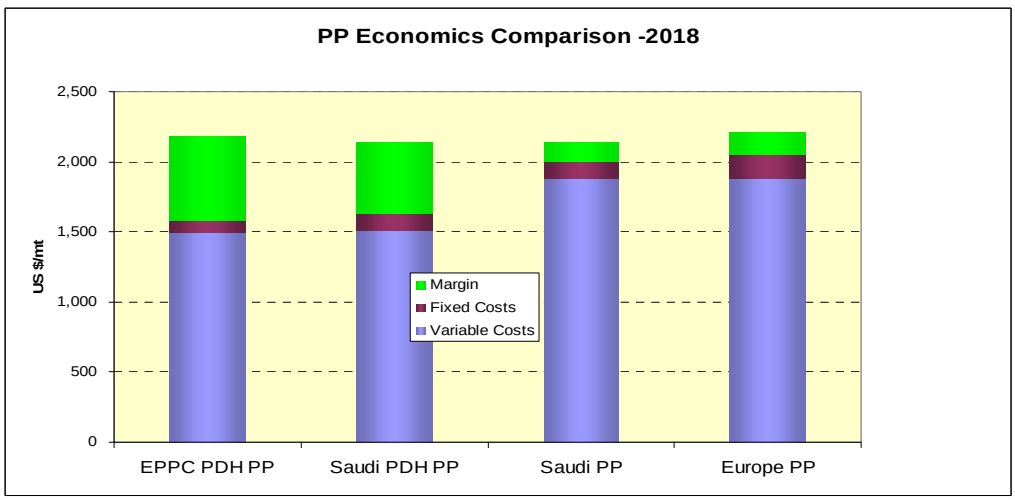
		Base Year 2015			
		PDH/PP		Naphtha/PP	
		EPPC	Saudi	Saudi	WE
Capacity, kta		400	400	400	400
Catalyst & Chemicals		22	22	36	36
Propylene**		1327	1341	1589	1593
Utilities		36	36	36	61
Total Variable Cost		1385	1399	1661	1689
Total Plant Fixed Costs		13	34	34	42
Total Cash Cost PP		1441	1483	1706	1746
G&A (Corporate Overhead)		43	39	39	70
Depreciation		26	33	33	33
Total Cost of Production		1467	1516	1778	1848
Margin		478	403	141	142
Plant Net Back		1945	1919	1919	1990
Freight to Europe		45	71	71	0
European price		1990	1990	1990	1990
** Propylene for PDH/PP charged at total cost; for Naphtha/PP at market price					

		Year 2018			
		PDH/PP		Naphtha/PP	
		EPPC	Saudi	Saudi	WE
Capacity, kta		400	400	400	400
Catalyst & Chemicals		23	23	38	38
Propylene**		1432	1448	1802	1778
Utilities		38	38	38	66
Total Variable Cost		1493	1508	1878	1882
Total Plant Fixed Costs		14	36	36	45
Total Cash Cost PP		1554	1601	1926	1943
G&A (Corporate Overhead)		48	45	45	78
Depreciation		26	33	33	33
Total Cost of Production		1580	1634	2004	2053
Margin		586	504	134	161
Plant Netback		2166	2138	2138	2214

Freight to Europe	48	76	76	0
Europe Price	2214	2214	2214	2214
** Propylene for PDH/PP charged at total cost; for Naphtha/PP at market price				



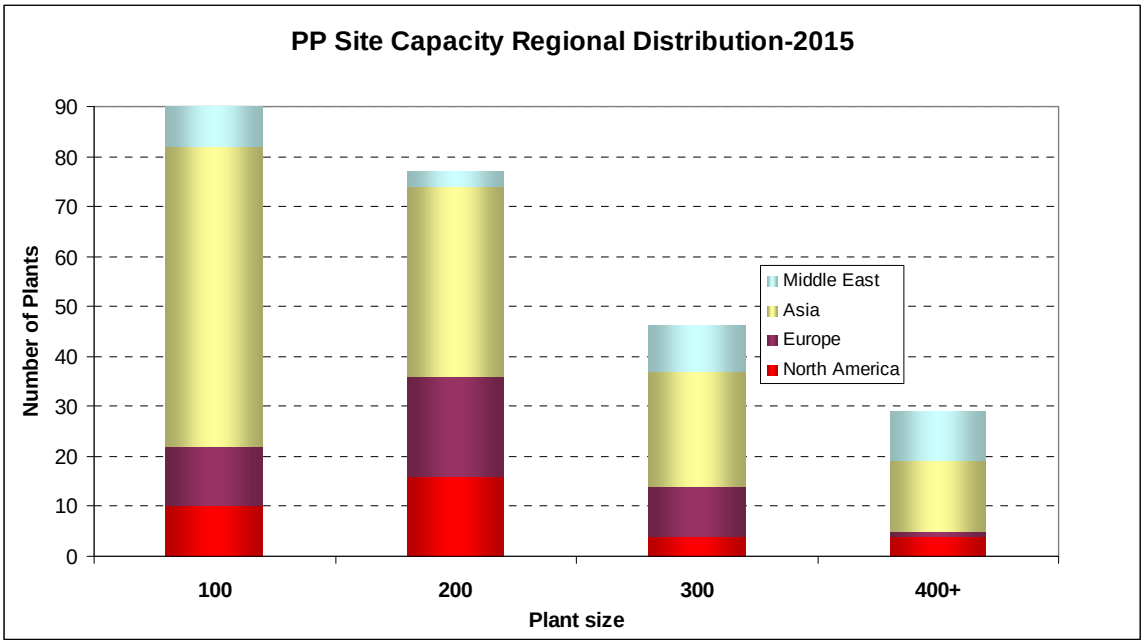




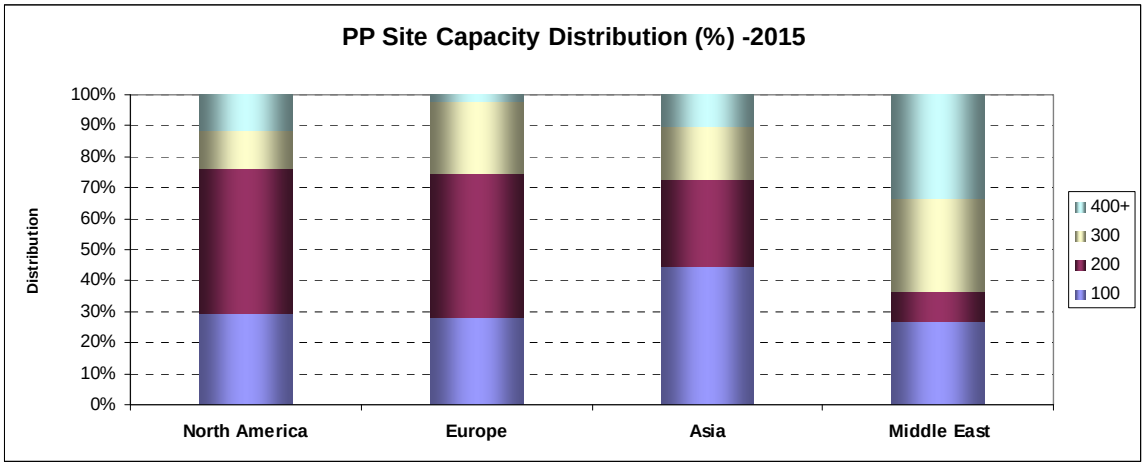
5.1.3 Other Factors Impacting Competitiveness

Plant scale

The above analysis has focused only on producers that have facilities with plant capacities similar to the proposed project's capacity. As shown in the following figures, the majority of the plants producing PP have capacities substantially lower than the EPPC or Saudi plants in our comparison. Based on current announcements the majority of capacity that will be in place by 2015 will have capacities lower than 300,000 MT per year. This is particularly true in Europe and Asia as shown in the chart below.



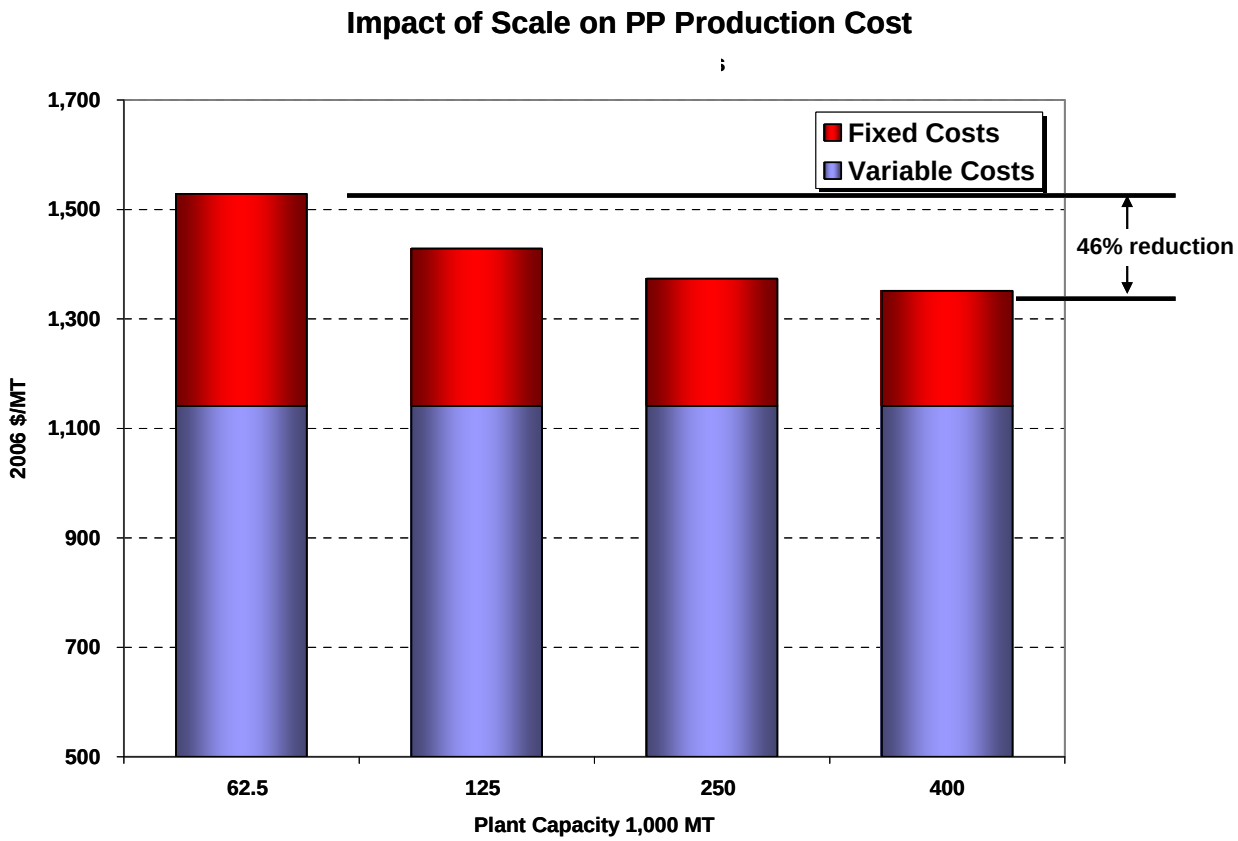
The 2015 Capacity Distribution (%) chart shows plant size distribution for the four regions compared. Note that the Middle East is the only region that will have 65% of its anticipated capacity with scale in excess of 300 KT per year. The Middle East average PP plant size will be nearly 285 KT per year. Out of 30 plants operating by 2015, 19 will be above 300KT per year in size. This underscores the fact that the Middle East per se will be a very competitive manufacturing platform in the future.



The mature regions of North America, Europe and Asia will have only 25% equal to or in excess of the 300KT per year scale. The average plant size in Europe by 2015 will be 200 KT per year with approximately 42 operating lines. Out of these 32 will be 200 KT per year or smaller capacity and 12 will be below 200 KT in size. Thus Europe has a number of smaller plants some of which are at risk of shut down.

SRI Consulting believes that plants sized above 300 KT per year are the most likely to survive the fierce PP competition expected in 2009-2013 period almost regardless of the cost competitiveness of propylene supply. As a result SRI Consulting expects that plants with size below 150 KT will be dismantled in the next ten years while plants of 200 KT size will have only a mediocre level of competitiveness.

Current PP plant capacities range between 350 and 450 KT for single line. The may utilize one or more reactors depending on the technology selected and the polymer grades planned for production. Because large fixed costs are associated with PP production, scale has a significant impact on relative plant economics. The following figure presents the idealized cost of producing PP for four different plant capacities. As shown, the difference in fixed cost attributed to each unit of production declines by 46% as the plant's capacity increases from 63,000 MT to 400,000 MT per year. The larger economies of scale from a 400,000 MT plant help to further widen EPPC cost advantage over other producers that have lower plant capacities.


Impact of Scale on PP Production Cost
1,700
1,500
1,300
1,100
900
700
500
2006 $/MT
Fixed Costs
Variable Costs
46% reduction
62.5
125
250
400
Plant Capacity 1,000 MT

5.2 PP COMPETITORS

We will analyse the competition for the client's domestic and export market by producing area:

5.2.1 Domestic Market - Egypt

Egypt imports approximately 125 to 135 of homopolymer, primarily from Saudi (over 80 ktons), Kuwait (14 ktons), Spain (4 ktons) Belgium and the UK at 3000 kt each.

The 28 to 30 ktons of Imports of copolymers derive from Korea and the USA (9 and 8 ktons each respectively) and to a minor extent Saudi Arabia (3 ktons) and several other countries.

As a result the major and most relevant players are the Saudi also due to the duty free allowance they benefit up to the established quota.

In addition to the current players in Saudi the new comers in 2008 are APPC (product is traded by Vinmar), and in 2009, Yansab, Sumitomo-Saudi Aramco, Ibn Zahr and Al Waha (marketed 75 % by Lyondell Basell).

The producers competitive disadvantage is aside from the production cost examined in section 5.1, the freight logistics either through Suez which in our opinion is in the order of at least 30 $ /ton including the 16 $/ton of Suez tariff.

While in our view, Vinmar and Sumitomo may have prevailing interests to develop their presence in Asia, APPC, Sabic (Ibn Zahr and Yansab) and Lyondell basell may look at sales eastbound.

Among the last one above, Yansab and Sumitomo Rabigh are the one located in Yanbu and with a slightly closer freight charge.

In conclusion, Sabic – Yansab, Al WAHA – through Lyondell Basell could be the wild card to consider as possible new exporters in Egypt.

In the area of PP copolymer, APPC, Sumitomo Rabigh and Al Waha could have volumes available for the Egyptian market.

In the longer term, Abu Dhabi Borouge new 800 ktons unit in middle 2010 could have spare volumes to deliver in Egypt although it may be substantially cheaper to target to Near and far east instead. Borouge may consider displacing some of the current volumes exported by the PIC into Egypt.

A specific mention should be done to Qatar as the Honam – QP project (800 kt of PP) is currently on hold. This project as in the case of Sumitomo's Rabigh, is based on Honam interest in taking product back to Asia and so we expect the jv interest's in markets west of Suez could be limited.

5.2.2 Export Markets -

Turkey

Turkey imports have reached over 870 ktons of homopolymers in 2007 and level at 800 ktons in 2008 while imports of copolymers are around 320 ktons.

Such a large market attracts imports from all origins aside from the surrounding Iran, Saudi Arabia and Israel. Among all exporters in Turkey, Iran is the smallest in 2008 with approximately 20 ktons: we expect those volumes to increase with the start up of Jam, Aria Sasol and Maroon.

Saudi, Iran and Israel may be shipping volumes primarily by truck reducing the freight costs to maximum 50 $/ton, aside from the risks. Iranian new producers have expressed interest in developing their presence in the Turkish market. However given the slower than expected market entry due to a number of technical, commercial and financial constraints we expect that this threat may occur only in the longer term. On the contrary the Iranian entry may represent a more serious threat of market price disruption due to extensive use of less scrupulous traders.

Saudi may displace some volumes from the Europeans and from Israel in Turkey and increase their market shares. In turn such volumes displaced from Turkey may create more pressure in Egypt: but this is a speculative consideration.

Again in Turkey the main and key competitors would be besides the Europeans, Saudis producers based in Jubail.

Europe and North Africa

The biggest threat in North Africa and Europe could be represented by the new unit in Tarragona, Spain, the Sonatrach-Basell PP; based on PDH from Sonatract and the recently announced developments in Algeria (announcements by Total). Egypt pays a price of propane similar to Sonatrac, therefore Egypt could be at a disadvantage on a landed cost basis in Spain, compared to the Tarragona Basell Unit due only to its transportation cost (around US$ 20 to 25/mt) of PP into Europe.

The new plant in Algeria will be on stream in late 2013 so it is only a limited threat for now and I expect it may be part of a scrap and rebuild internal strategy of Total.

6. FINANCIAL EVALUATION

6.1 PROJECT AND EQUITY FINANCIAL RESULTS ON THE EPPC PDH-PP COMPLEX

Using both a base case and low case scenario, the IRR (internal rate of return), NPV (net present value of cash flows at 6% interest), and cumulative cash flow were calculated using the financial model on both the project and equity portions using the actual projected cash flows; additionally, the project IRR, NPV and cumulative cash flow were calculated using discounted (project) cash flows calculated with the discount factors as estimated by SRIC. The NPV and IRR calculations were done using a 2007 to 2028 time frame.

The following table summarizes the results of the IRR, NPV (at 6%) and cumulative cash flow (in 2028) calculations for the base case:

	Project	Discounted Project Cash Flows	Equity
IRR	14.2%	6.5%	18.0%
NPV @ 6% (MM USD)	$860	$29.4	$877
Cumulative Cash Flow (MM USD)	$2,900	$711	$2,733

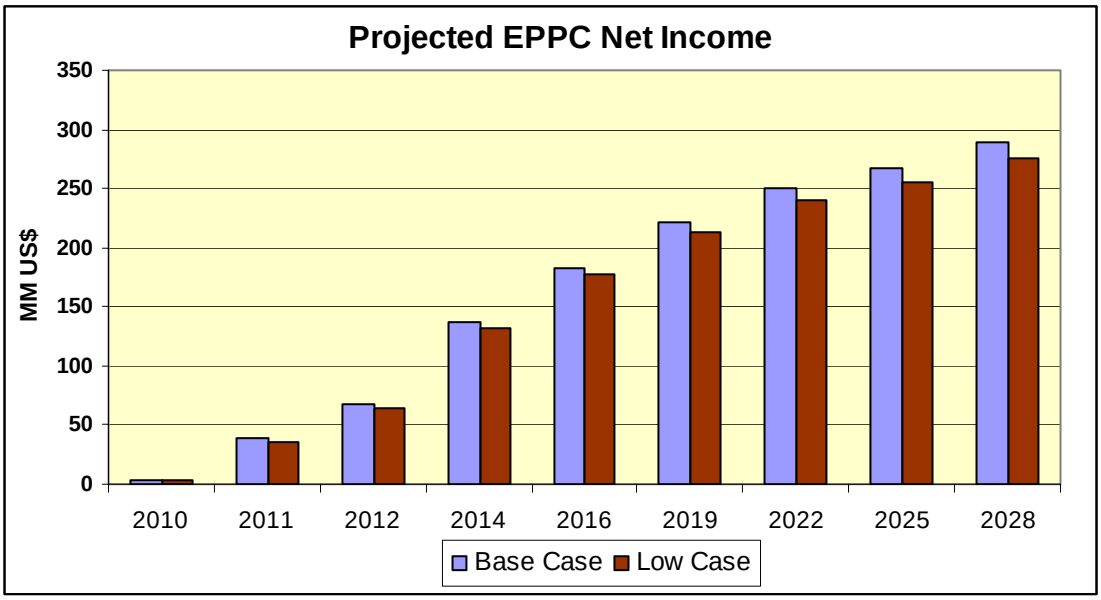
The following table summarizes the results of the IRR, NPV (at 6%) and cumulative cash flow (in 2028) calculations for the low scenario case:

	Project	Discounted Project Cash Flows	Equity
IRR	13.8%	6.0%	17.3%
NPV @ 6% (MM USD)	$797	$0.93	$813
Cumulative Cash Flow (MM USD)	$2,748	$650	$2,580

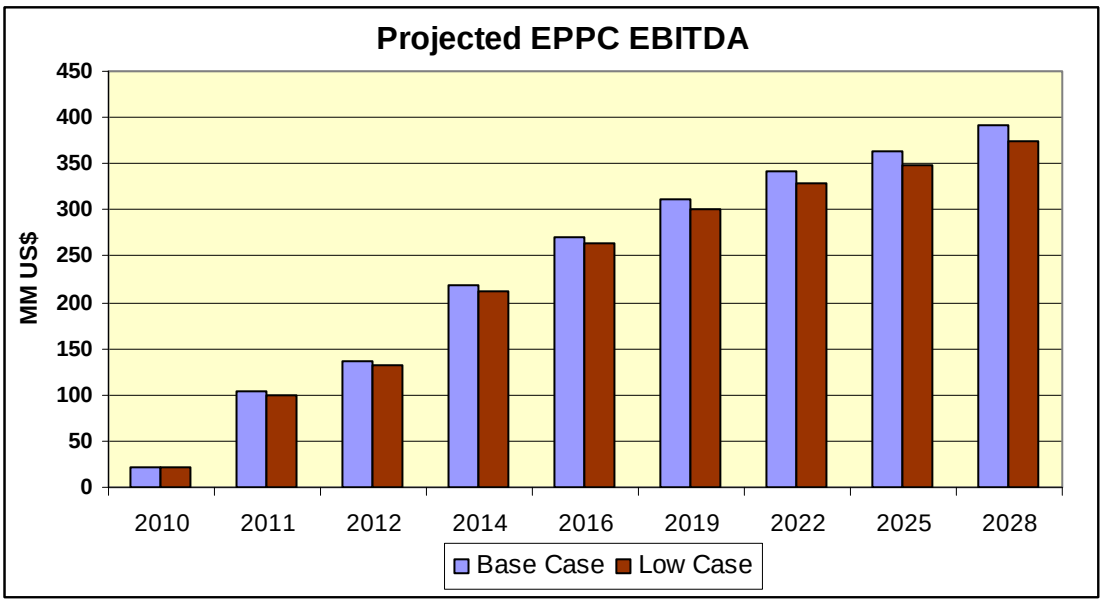
The fact that the IRR for the entire project even on a discounted cash flow (CF) basis was 6% reflects a relatively attractive investment. The discount factors used were relatively aggressive and considerably larger than the yearly decline in prices based on the world consumer inflation factors (provided). Thus, if for example, the discount factors for the low case scenario analysis were changed to match the year-on-year consumer inflation factors, the discounted CF project IRR for the low case scenario would increase to 9.8% from 6.0%.

6.2 PROJECTED CASH FLOW ANALYSIS

A projected cash flow analysis was completed for the operation of the polypropylene unit supplied by the propylene from the propane dehydrogenation unit. The assumptions used in the development of this analysis are described in detail in appendix D. For the base case, the projected net income (after taxes) in 2010 will only be $4 million due to partial production (7 months), but will increase to $38.6 million in 2011. The following chart summarizes the projected income for selected years comparing the base case and the low case, in millions of US dollars:



The earnings before interest, taxes, depreciation and amortization (EBITDA) were also calculated for both cases and are summarized for selected years in the following chart:



As the charts indicate, the differences in cash flows for the two cases are not considerable, but the differences do increase with time. This can be explained by the fact that the differences in revenue increase slightly faster than the differences in costs, and thus the difference in earnings gradually increase.

6.3 COMPARISON OF AVERAGE PROJECTED POLYPROPYLENE PRODUCTION COSTS

Although the base case scenario has higher net income and EBITDA than the low case, the total PP production costs for the base case are actually higher than for the low case. For the period 2010 to 2028, the average annual PP production cost (before interest) was determined to be $1,642 per ton of PP for the base case, and $1,494 per ton of PP for the low case, a 9% decline.

In a scenario where the propane feedstock costs increase at a faster rate than PP resin prices, the effect on net income would be detrimental even if the unit was running at full utilization rates.

The sensitivity analysis (described below) analyzed the potential effects of four key variables on NPV (at 6%), IRR, and cumulative cash flows.

6.4 DEBT SERVICE

7 According to EPPC (client), the project financing will be serviced in two portions: a Euro (€325MM) portion and an Egyptian Pound (L.E. 140MM) portion. The financial analysis uses the exchange rates provided by EPPC: 1.4 US$/€ and 5.6 L.E./US$. When these loan values are converted to US dollars, the loan from the banks totals $480MM. However, according to EPPC, the total debt is comprised of the long-term loan ($449.9MM), the capitalized debit interest ($41.9MM) and additional financing ($26.9MM), totaling $518.7MM. The repayment period for both loans is for 10 years in 19 equal installments, two per year from 2011 to 2019 and one additional payment in 2020. Thus, in 2020, there will still be a remaining debt of $38.7MM ($518.7MM-$480MM). The project must seek additional financing to cover this discrepancy unless exchange rates change such that the financing amount in USD increases, or some of the projected capital costs (not yet spent) can be reduced.

6.5 SENSITIVITY ANALYSIS ON PROJECT VARIABLES

Using the base case scenario financial model, a sensitivity analysis was completed on the project using changes in the following input variables: total fixed investment, propane feedstock costs, total product revenue and utilization rates; the output variables were: project IRR, project NPV (at 6%) and project cumulative cash flows (CF); the analysis was also done utilizing the discounted project cash flows (CF). The results of the sensitivity analysis indicate changes to only the variable in question, keeping all other variables fixed.

The following table summarizes the changes (%) from the base case by decreasing the input variables by 20% (shown as ‘80%’ in table) and by increasing the input variables by 20% (shown as ‘120%’ in table). For example, the table indicates that a 20% reduction in propane feedstock costs would result in a 5% increase in project IRR, a 77% increase in project NPV and a 51% increase in cumulative cash flow. Similarly, a 20% reduction in product revenue would result in a negative IRR on the discounted project CF (thus no % change calculation was possible), a 2081% decrease in discounted CF project NPV and a 167% decrease in discounted cumulative project CF. The changes in the table which are less than -100% (for example, -167%) indicate where the variable has turned from positive to negative. For example, in the case of a

20% decline in total product revenue, the project NPV (at 6%) would decline from $860MM to -$330MM, representing a 138% decline in NPV, as shown in the table.

IRR	Project		Discounted CF on Project	
	80%	120%	80%	120%
Total Fixed Investment	4%	-3%	4%	-3%
Propane Feedstock Costs	5%	-6%	5%	-6%
Utilization Rate	-4%	3%	-4%	3%
Total Product Revenue	-12%	8%	--	8%
NPV @ 6%	**Project**		**Discounted CF on Project**	
	80%	**120%**	**80%**	**120%**
Total Fixed Investment	23%	-23%	671%	-671%
Propane Feedstock Costs	77%	-79%	1154%	-1189%
Utilization Rate	-54%	54%	-791%	781%
Total Product Revenue	-138%	135%	-2081%	1986%
Cumulative Cash Flow	**Project**		**Discounted CF on Project**	
	80%	**120%**	**80%**	**120%**
Total Fixed Investment	8%	-8%	31%	-31%
Propane Feedstock Costs	51%	-51%	93%	-95%
Utilization Rate	-36%	36%	-65%	65%
Total Product Revenue	-91%	89%	-167%	162%

The sensitivity analysis indicates that the financial results are most influenced by (upward or downward) fluctuations in total product revenue, keeping the other variables fixed. Of the four positive scenarios (20% increase in revenue, 20% increase in utilization rate, 20% decrease in total fixed investment, or a 20% decrease in propane feedstock costs), the largest benefit would be from a 20% increase in product revenue: project IRR would increase from 14% to 22%; project NPV would increase from $860MM to $2.02 billion; and cumulative cash flow would increase from $2.9 billion to $5.5 billion. Similarly, of the four negative scenarios (20% decrease in revenue, 20% decrease in utilization rate, 20% increase in total fixed investment, or a 20% increase in propane feedstock costs), the largest (negative) impact would be from a 20% decrease in product revenue: project IRR would decrease from 14% to 2%; NPV would decrease from $860MM to negative $330MM, and cumulative cash flow would decrease from $2.9 billion to $271MM.

The complete results of this analysis are presented on the ‘Sensitivity analysis’ sheet of the (base case) financial model provided to EPPC, including charts depicting the variable sensitivities.

7 PROPANE COMMERCIAL CONSIDERATIONS AND PRICING

7.1 PROPANE INTRODUCTION

The project contract includes a long-term supply agreement securing the propane raw material for the propane dehydrogenation (PDH) unit. The entire supply of propane will be secured via an 'off-take' agreement with United Gas Derivatives Company (UGDC) and Egyptian Natural Gas Company (GASCO), each supplying 70% and 30%, respectively, of the propane requirements. The EPPC PDH-PP complex will be located next to the UGDC gas separation facility in Port Said, while the GASCO facility is located at Ameriya near Alexandria, approximately 200 km from Port Said. The close proximity to the main propane supplier would eliminate the need for large propane storage facilities at the EPPC complex.

The risks associated with a secure raw material supply are lower for the EPPC project since GASCO is a shareholder in EPPC project and GASCO is also a shareholder of UGDC.

7.2 PROPANE COMMERCIAL CONSIDERATIONS

The two propane supply agreements with UGDC and GASCO have already been signed on November 13 and 16, 2006 respectively. The following comments and observations can only be used as a guideline for possible amendments or as strategic considerations to keep viable options open in the near future.

Under the current views it is expected that UGDC will supply at least 80 % of the EPPC requirements of propane but not less than a minimum volume of 300 tkons. It is envisaged according to the Client, that UGDC will supply up to 97 % of the required propane volumes from 2011(SRIC's opinion) onward: this increase of supply compared to the contractual agreement signed in 2006, is based on a capacity increase that UGDC has in place since 2009. Based on this increase, UGDC will be in a position to supply according to the Client, 95 % of the required PDH plant need in the first 2 years or 350 to 370 ktons.

7.2.1 Propane Supply Agreements -

1. GASCO has a 13 % interest participation in EPPC asset although they are not the main supplier of propane. If UGDC defaults their supply, GASCO has to do its best to fill the supply gap. However if GASCO defaults its propane supply, will UDGC has the reciprocating duty to do its best to supply propane?
2. The contractual supply quantities of propane supply are:
3. UGDC 280-350 ktons
4. GASCO 50 – 130
5. Total: 330 – 480
    i. The expected need of propane for a 400 ktons PP unit, taking into consideration 6 to 20 ktons of ethylene for copolymerization, could reach 480 – 490 ktons per year. Under this circumstance, the minimum range indicated in the two contracts could be low.
6. The two propane supply contracts need to be already closely administered by a purchasing group, as of 18 months prior start up of propane supply: As this is expected to

be April 1st, 2010, such administrative structure should already be in place since October 2008. Given that the maximum delay in the start up date, allowed in the supply contracts, is of October 1, 2010, and that the plant is expected to start in April 1, 2010, there is a maximum of 4 months of allowed delay after which the penalty of take or pay will kick in.

7. Ten year term for two supply contracts is far too short: Given the high volatility of crude oil and the possibility although remote that propane could become increasingly more attractive, a ten year term with a one year notice for renewal (no indication by when such notice to renew should be accepted), is far too short. Gas or liquids supply contracts go for far longer terms in the 20 + years range.
8. KSA Propane price formula post 2011: It is our expectations that the revised formula cannot be substantially different from the existing one as there is a far too large asset built on PDH capacity in the Kingdom. However the propane supply price formula with UGDC and GASCO, has no ceiling or link to a possible propylene average price as floor and ceiling price for mutual protection of the parties.
9. The delivered price of propane to the EPPC plant from the two suppliers does not differ much. As a result, should EPPC find attractive vessel agreement for the Alexandria to Gemeel shipment, it could find itself in the situation where the prime supplier becomes less economically convenient.
10. GASCO: Price + 19 $/MT
11. UGDC: Price + 3 $/MT + Import Utilization fee of around 2.8 to 3.6 $/MT (1 MM $/yr)
12. Size of the propane and propylene storage facility: To operate the Damietta receiving end, the minimum Propane storage size has to be greater than 5100 MT is required to unload vessels. As an indication, to operate a 7 day operation at 500,000 MT of propane per year for 360 days, will require storage of 6900 MT.
13. OPC PDH expansion project is the future propane supply from the two EPPC suppliers going to be altered and have an effect on the EPPC unit?

7.2.1 Propane Supply Agreements - UGDC

1. Who are the Owners of UGDC and is there any possible interest to develop their own derivative project or be acquired by companies like Sonatrac with a different strategic aim than a supply to EPPC?
2. Section 11.4.1: The import facility Utilization fee of 9 $/MT or a minimum of one million $ for the duration of the contract, may in the long term be quite onerous to EPPC.
3. EPPC option to export propylene using UGDC terminal: In case of EPPC considering such option, if UGDC should at the same time desire to use the propane import facility, how to solve the dispute?
4. EPPC does not own the propane import facility: however EPPC is obliged to pay a minimum annual fee. GASCO owning 33 % of UGDC and 13 % of EPPC has a limited control over the terminal use. The multiple functionality of the terminal (EPPC import of GASCO propane; imports of temporary propane make up in case of UGDC disruptions; possible EPPC exports of propylene, could end up in legal disputes over the priorities. EPPC may need to strengthen its ownership of such terminal either

directly or indirectly via GASCO's or any of the two other UGDC Owners (33 % AGIP and 33 % British Petroleum).

7.3 PROPANE PRICING METHODOLOGY

For the financial evaluation of the EPPC contract, an FOB "basket" propane price forecast was developed based on a weighted average (1/3 each) of West Mediterranean FOB, Saudi Arabia FOB, and Algeria FOB propane price forecasts.

The formula for determining propane pricing used in the financial calculations is listed below and contains three international bench mark price quotations published in the Platts and Argus Petroleum pricing newsletters.

Propane Price Formula

1/3 x (West Mediterranean FOB Ex-refinery/storage, low/high average for propane quotes)
+ 1/3 x (FOB Algeria at Bethioua propane posted price)
+ 1/3 x (Spot FOB AG Saudi CP Proxy Value)

The project financials assume that there will be no import tariff on propane.

Based on a number of historical correlations between natural gas, naphtha and propane it is SRI Consulting thinking that in the long term propane will correlate to naphtha as it competes in the heating value market particularly in the winter season (large exports from Algeria and other supplying countries to Turkey).

Accordingly we have linked the long term propane price forecast to naphtha with some correction factors:

- Based on recent data, the ratio of West Mediterranean FOB ex-refinery/storage average propane price to the spot NW Europe naphtha price used to calculate the West Mediterranean FOB ex-refinery/storage average propane prices in the forecast is 1.025 (from 2010 onward).
- The Spot FOB AG Saudi CP proxy price is calculated by taking the West Mediterranean FOB ex-refinery/storage average propane price minus US$30/mt that is the rounded up recent historical price differential.
- The Spot FOB Algeria at Bethioua propane price is calculated by taking the Spot FOB AG Saudi CP proxy propane price minus US$ 10/mt that is the rounded up recent historical price differential.

The delivered propane prices used in the financial model are then adjusted for freight from the geographical propane supply locations listed below:

A weighted average freight and terminal cost for the propane was determined using $19 per ton for propane from GASCO and $3 per ton for propane from UGDC, with 30% and 70% weights, respectively, from each source. The FOB "basket" price is added to the weighted average freight and terminal costs to calculate the weighted average propane price delivered to

the Port Said site. The propane freight/terminal costs were escalated at ½ of world consumption price inflation.

APPENDICES

APPENDIX A

World Regional Grouping

Africa	Algeria		**CE**	Czech Republic		EU 25			**NA**	Canada		
	Egypt			Hungary		EU 25				Mexico		
	Nigeria			Poland		EU 25				United States	Puerto Rico + Vrg Isl.	
	South Africa			Slovak Republic		EU 25						
	Other Africa	British Indian Ocean										
		French Southern Islands	**EE**	Romania					**WE**	Austria	Eu 15	
		Kenya		CIS	Azerbajan					Benelux (B+NL+Lu	Eu 15	
		Lesotho			Belarus					Finland	Eu 15	
		Lybia			Estonia	EU 25				France	Eu 15	
		Morocco			Kazakstan					Germany	Eu 15	
		St.Helena			Kyrgystan					Italy	Eu 15	
		Tunisia			Latvia	EU 25				Norway		
		Western Sahara			Lituania	EU 25				Portugal	Eu 15	
		Zambia			Russia					Spain	Eu 15	
		Zimbabwe			Ukraine					Sweden	Eu 15	
				Other Eastern Europe	Albania					Switzerland		
					Bulgaria					United Kingdom (U	Eu 15	
					Former Yugo	Bosnia/Herzegovina				Other Western Eur	Denmark	Eu 15
						Croatia					Cyprus	EU 25
Asia	India					Macedonia					Greece	Eu 15
	Indonesia					Serbia					Greenland	
	Korea, South					Slovenia	EU 25				Iceland	
	Malaysia										Ireland	Eu 15
	Pakistan										Liechtenstein	
	Philippines		**SA**	Argentina							Luxemburg	
	Singapore			Brazil							Malta	EU 25
	Taiwan			Chile								
	Thailand			Colombia								
	Other Asia-Pacific	Bangladesh		Venezuela								
		Cambodia		Other Latin America	Bolivia							
		Korea, North			Ecuador				**ME**	Iran		
		Laos			Paraguay					Israel		
		Mongolia			Peru					Kuwait		
		Myanmar			Uruguay					Qatar		
		Vietnam								Saudi Arabia		
			CA	Bahamas (1)						Turkey		
China	China			Bermuda						Other Middle East	Iraq	
	Hong Kong			Caribbean							Jordan	
				Costa Rica							Lebanon	
Japan	Japan			Cuba							Oman	
				Dominican R.							Syria	
Oceania	Australia			El Salvador							UAE	
	New Zealand			Guatemala							Yemen	
	Other Oceania	Pacific Islands		Guyana								
		Papua		Guyana French								
		Samoa		Nicaragua								
				Panama								

In each region, the first column indicated the breakdown available in the database.

APPENDIX B – PP CAPACITY LISTING

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	Argentina	Petroken	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP gas phase)	Argentina	Petroquimica Cuyo	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP gas phase)	Australia	Basell Australia	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP slurry)	Australia	Basell Australia	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	Austria	Borealis	135	135	135	135	135	135	135	135	135	135	135	135
Polypropylene from propylene (PP slurry)	Austria	Borealis	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	Belgium	Borealis Kallo	310	310	310	310	310	310	310	310	310	310	310	310
Polypropylene from propylene (PP slurry)	Belgium	Borealis Polymers	149	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP bulk)	Belgium	Borealis Polymers	230	240	240	240	240	240	240	240	240	240	240	240
Polypropylene from propylene (PP slurry)	Belgium	Ineos Polyolefins	210	shut										
Polypropylene from propylene (PP gas phase)	Belgium	Ineos Polyolefins	290	290	290	343	500	500	500	500	500	500	500	500
Polypropylene from propylene (PP gas phase)	Belgium	Ineos Polyolefins	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP unclassified)	Belgium	Total Petrochemicals Feluy	150	150	150	150	150	150	150	150	150	150	150	150

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Belgium	Total Petroch. Feluy	280	280	280	280	280	280	280	280	280	280	280	280
Polypropylene from propylene (PP unclassified)	Belgium	Total Petrochemicals Feluy	380	380	380	380	380	380	380	380	380	380	380	380
Polypropylene from propylene (PP bulk)	Brazil	Braskem			350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP bulk)	Brazil	Braskem	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	Brazil	Braskem	260	260	260	260	260	260	260	260	260	260	260	260
Polypropylene from propylene (PP bulk)	Brazil	Braskem			180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP gas phase)	Brazil	Comperj							213	425	425	425	425	425
Polypropylene from propylene (PP gas phase)	Brazil	Comperj							213	425	425	425	425	425
Polypropylene from propylene (PP bulk)	Brazil	Ipiranga Petroquimica	180	180	tran									
Polypropylene from propylene (PP bulk)	Brazil	Petroquimica Paulinia		263	tran									
Polypropylene from propylene (PP slurry)	Brazil	Quattor Petroquimica		125	125	125	125	125	125	125	125	125	125	125
Polypropylene from propylene (PP bulk)	Brazil	Quattor Petroquimica		388	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP bulk)	Brazil	Quattor Petroquimica		405	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP slurry)	Brazil	Suzano Petroquimica	125	merg										
Polypropylene from propylene (PP bulk)	Brazil	Suzano Petroquimica	200	merg										
Polypropylene from propylene (PP bulk)	Brazil	Suzano Petroquimica	360	merg										
Polypropylene from propylene (PP slurry)	Bulgaria	Lukoil Neftochim	80	80	80	80	80	80	80	80	80	80	80	80

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP slurry)	Canada	Basell Canada	189	95	shut									
Polypropylene from propylene (PP bulk)	Canada	Basell Canada	193	48	shut									
Polypropylene from propylene (PP bulk)	Chile	Petroquim	150	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP bulk)	China	CNOOC - Shell Petrochemical Company	240	240	240	240	240	240	240	240	240	240	240	240
Polypropylene from propylene (PP unclassified)	China	Changzhou Petrochemical Factory	15	15	15	15	15	15	15	15	15	15	15	15
Polypropylene from propylene (PP slurry)	China	China Bluestar Tianjin Petrochemical	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP unclassified)	China	Dalian Shide Petrochemical									500	500	500	500
Polypropylene from propylene (PP bulk)	China	Dalian West Pacific Petrochemical	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP unclassified)	China	Daqing Huake	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP gas phase)	China	Formosa Polypropylene		225	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP gas phase)	China	Fujian Integrated Project			200	400	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP slurry)	China	Guangzhou Yinzhu Polypropylene	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP unclassified)	China	Harbin Refinery Factory	80	80	80	80	80	80	80	80	80	80	80	80
Polypropylene from propylene (PP bulk)	China	Hebei Zhongjie Petrochemical	60	60	60	60	60	60	60	60	60	60	60	60

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP gas phase)	China	Inner Mongolia Xiling. Company				500	500	500	500	500	500	500	500	500
Polypropylene from propylene (PP bulk)	China	Maoming Petrochemical Shihua	150	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP bulk)	China	Nanjing Hongye Industrial	80	80	80	80	80	80	80	80	80	80	80	80
Polypropylene from propylene (PP slurry)	China	Panjin Ethylene	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP bulk)	China	Panjin Ethylene			55	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP bulk)	China	PetroChina Dalian Petrochemical	20	20	20	20	20	20	20	20	20	20	20	20
Polypropylene from propylene (PP slurry)	China	PetroChina Dalian Petrochemical	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP bulk)	China	PetroChina Dalian Petrochemical	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	China	PetroChina Dalian Petrochemical	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP slurry)	China	PetroChina Daqing Petrochemical	10	10	10	10	10	10	10	10	10	10	10	10
Polypropylene from propylene (PP bulk)	China	PetroChina Daqing Petrochemical	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP bulk)	China	PetroChina Daqing Petrochemical			300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	China	PetroChina Daqing Refining	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	China	PetroChina Dushanzi Petrochemical			138	550	550	550	550	550	550	550	550	550
Polypropylene from propylene (PP bulk)	China	PetroChina Dushanzi Petrochemical	140	140	140	140	140	140	140	140	140	140	140	140

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	China	PetroChina Fush. Petrochemical	90	90	90	90	90	90	90	90	90	90	90	90
Polypropylene from propylene (PP gas phase)	China	PetroChina Fushun Petrochemical						300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	China	PetroChina Guangxi Petrochemical			200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	China	PetroChina Hohhot Petrochemical	20	20	20	20	20	20	20	20	20	20	20	20
Polypropylene from propylene (PP bulk)	China	PetroChina Huabei Petrochemical	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP unclassified)	China	PetroChina Huabei Petrochemical	5	5	5	5	5	5	5	5	5	5	5	5
Polypropylene from propylene (PP bulk)	China	PetroChina Jinxi Petrochemical		150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP slurry)	China	PetroChina Jinxi Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	China	PetroChina Jinzhou Petrochemical	25	25	25	25	25	25	25	25	25	25	25	25
Polypropylene from propylene (PP bulk)	China	PetroChina Lanzhou Petrochemical	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP slurry)	China	PetroChina Lanzhou Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP slurry)	China	PetroChina Lanzhou Petrochemical	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP other)	China	PetroChina Liaoyang Petrochemical	shut											

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP unclassified)	China	PetroChina Liaoyang Petrochemical	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	China	PetroCh. Ningxia Petrochemical	30	30	30	30	shut							
Polypropylene from propylene (PP unclassified)	China	PetroChina Ningxia Petrochemical					100	100	100	100	100	100	100	100
Polypropylene from propylene (PP unclassified)	China	PetroChina Qianguo Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	China	PetroChina Qingyang Petrochemical	15	15	15	15	15	15	15	15	15	15	15	15
Polypropylene from propylene (PP unclassified)	China	PetroChina Sichuan Petrochemical						400	400	400	400	400	400	400
Polypropylene from propylene (PP bulk)	China	PetroChina Urumqi Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	China	Petrochina Karamay Petrochemical	10	10	10	10	10	10	10	10	10	10	10	10
Polypropylene from propylene (PP bulk)	China	Petrochina Qinghai Geermu Refinery	20	20	20	20	20	20	20	20	20	20	20	20
Polypropylene from propylene (PP unclassified)	China	Petrochina Yumen Oilfield	10	10	10	10	10	10	10	10	10	10	10	10
Polypropylene from propylene (PP unclassified)	China	Shaanxi Xinxing Coal & Olefins										500	500	500
Polypropylene from propylene (PP bulk)	China	Shaanxi Yanchang Petroleum			150	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	China	Shaanxi Yanlian Petrochemical	100	100	100	100	100	100	100	100	100	100	100	100

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Polypropylene from propylene (PP bulk)	China	Shandong Dongming Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	China	Shandong Hengxiang Chemical	80	80	80	80	80	80	80	80	80	80	80	80
Polypropylene from propylene (PP bulk)	China	Shandong Hengyuan Petrochemical	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP unclassified)	China	Shanghai Chemical Industry Park								250	250	250	250	250
Polypropylene from propylene (PP gas phase)	China	Shanghai Secco Petrochemical Co.	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP gas phase)	China	Shenhua Baotou Coal Chemical				150	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP unclassified)	China	Shenhua Ningxia Coal Chemical				500	500	500	500	500	500	500	500	500
Polypropylene from propylene (PP unclassified)	China	Sinopec Anqing Company	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	China	Sinopec Baling Petrochemical	65	65	65	65	65	65	65	65	65	65	65	65
Polypropylene from propylene (PP other)	China	Sinopec Beijing Yanhua Petrochemical	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP slurry)	China	Sinopec Beijing Yanhua Petrochemical	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP unclassified)	China	Sinopec Beijing Yanhua Petrochemical								380	380	380	380	380
Polypropylene from propylene (PP unclassified)	China	Sinopec Cangzhou Company	31	31	31	31	31	31	31	31	31	31	31	31

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	China	Sinopec Changling Refi. Chemical	125	125	125	125	125	125	125	125	125	125	125	125
Polypropylene from	China	Sinopec Fujian	120	120	120	120	120	120	120	120	120	120	120	120

propylene (PP bulk)		Refining & Chemical												
Polypropylene from propylene (PP slurry)	China	Sinopec Guangzhou Company	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP slurry)	China	Sinopec Guangzhou Company	105	105	105	105	105	105	105	105	105	105	105	105
Polypropylene from propylene (PP bulk)	China	Sinopec Hainan Refining & Chemical	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP unclassified)	China	Sinopec Jiangsu Oilfield	15	15	15	15	15	15	15	15	15	15	15	15
Polypropylene from propylene (PP unclassified)	China	Sinopec Jinan Company	10	10	10	10	10	10	10	10	10	10	10	10
Polypropylene from propylene (PP bulk)	China	Sinopec Jinan Company	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	China	Sinopec Jingmen Company	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP unclassified)	China	Sinopec Jinling Company	64	64	64	64	64	64	64	64	64	64	64	64
Polypropylene from propylene (PP bulk)	China	Sinopec Jiujiang Company	100	100	100	100	100	100	100	100	100	100	100	100
Polyprope from propylene (PP unclassified)	China	Sinopec Kuwait Nans.Ethylene ct								600	600	600	600	600
Polypropylene from propylene (PP slurry)	China	Sinopec Luoyang Petrochemical	78	78	78	78	78	78	78	78	78	78	78	78
Polypropylene from propylene (PP bulk)	China	Sinopec Luoyang Petrochemical	18	18	18	18	18	18	18	18	18	18	18	18

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	China	Sinopec Maoming Refining & Chemical	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP bulk)	China	Sinopec Maoming Refining & Chemical	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from	China	Sinopec Qilu	76	76	76	76	76	76	76	76	76	76	76	76

propylene (PP bulk)		Petrochemical												
Polypropylene from propylene (PP bulk)	China	Sinopec Qingdao Petrochemical	70	85	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	China	Sinopec Shanghai Petrochemical	78	78	78	78	78	78	78	78	78	78	78	78
Polypropylene from propylene (PP bulk)	China	Sinopec Shanghai Petrochemical	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	China	Sinopec Shanghai Petrochemical	192	192	192	192	192	192	192	192	192	192	192	192
Polypropylene from propylene (PP bulk)	China	Sinopec Shanghai Petrochemical							125	250	250	250	250	250
Polypropylene from propylene (PP bulk)	China	Sinopec Shijiazhuang Refinery Plant	30	30	30	30	30	30	30	30	30	30	30	30
Polypropylene from propylene (PP bulk)	China	Sinopec Tianjin Ethylene Project					225	450	450	450	450	450	450	450
Polypropylene from propylene (PP bulk)	China	Sinopec Wuhan Company	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP slurry)	China	Sinopec Wuhan Company	35	35	35	35	35	35	35	35	35	35	35	35
Polypropylene from propylene (PP unclassified)	China	Sinopec Wuhan SK Ethylene							400	400	400	400	400	400
Polypropylene from propylene (PP slurry)	China	Sinopec Yangzi Petrochemical	220	220	220	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP gas phase)	China	Sinopec Yangzi Petrochemical	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP gas phase)	China	Sinopec Yangzi Petrochemical						350	350	350	350	350	350	350

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP unclassified)	China	Sinopec Zhenhai Refining & Chemical	37	37	37	37	37	37	37	37	37	37	37	37
Polypropylene from propylene (PP bulk)	China	Sinopec Zhenhai Refining & Chemical	200	200	200	200	200	200	200	200	200	200	200	200

Polypropylene from propylene (PP bulk)	China	Sinopec Zhenhai Refining & Chemical				300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	China	Sinopec Zhongyuan Petrochemical	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP bulk)	China	Sinopec Zhongyuan Petrochemical							120	120	120	120	120	120
Polypropylene from propylene (PP bulk)	China	Tianjin Botian Chemical	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP bulk)	China	Xinjiang Dushanzi Tianli High Tech	30	30	30	30	30	30	30	30	30	30	30	30
Polypropylene from propylene (PP gas phase)	China	Yanshan Petrochemical	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	China	Zhejiang Shaoxing Fuling Plastic				300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	China	Zhejiang Shaoxing Fuling Plastic	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	Colombia	Polipropileno del Caribe	175	190	190	190	190	190	190	190	190	190	190	190
Polypropylene from propylene (PP gas phase)	Colombia	Polipropileno del Caribe	175	190	190	190	190	190	190	190	190	190	190	190
Polypropylene from propylene (PP gas phase)	Czech Republic	Chemopetrol	tran											
Polypropylene from propylene (PP gas phase)	Czech Republic	Unipetrol RPA	250	275	275	275	275	275	275	275	275	275	275	275

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	Egypt	Egyptian Propylene and Polypropylene				400	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP gas phase)	Egypt	Oriental Petrochemicals	160	160	160	160	160	190	200	200	200	200	200	200
Polypropylene from	Egypt	Oriental						100	200	200	200	200	200	200

propylene (PP gas phase)		Petrochemicals												
Polypropylene from propylene (PP bulk)	Finland	Borealis Polymers	180	180	220	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP bulk)	France	Appryl	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	France	Basell Polyolefines	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP bulk)	France	ExxonMobil Chemical Polymeres	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP gas phase)	France	ExxonMobil Chemical Polymeres	185	185	185	185	185	185	185	185	185	185	185	185
Polypropylene from propylene (PP bulk)	France	Ineos Manufacturing France	270	270	110	65	65	65	65	65	65	65	65	65
Polypropylene from propylene (PP gas phase)	France	Polychim Industrie	220	220	220	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP bulk)	France	Total Petrochemicals	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP unclassified)	Germany	Basell Polypropylen	270	270	270	270	270	270	270	270	270	270	270	270
Polypropylene from propylene (PP gas phase)	Germany	Basell Polypropylen	335	335	335	335	335	335	335	335	335	335	335	335
Polypropylene from propylene (PP gas phase)	Germany	Basell Polypropylen	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP bulk)	Germany	Borealis Polymere	240	240	240	240	240	240	240	240	240	240	240	240

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	Germany	Borealis Polymere			83	330	330	330	330	330	330	330	330	330
Polypropylene from propylene (PP bulk)	Germany	Dow Olefinverbund	210	210	210	210	210	210	210	210	210	210	210	210
Polypropylene from propylene (PP gas phase)	Germany	Dow Olefinverbund	265	265	265	265	265	265	265	265	265	265	265	265

Polypropylene from propylene (PP gas phase)	Germany	Sabic Deutschland	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP gas phase)	Germany	Sabic Deutschland	325	325	325	325	325	325	325	325	325	325	325	325
Polypropylene from propylene (PP bulk)	Greece	Hellenic Petroleum	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP bulk)	Hungary	Tiszai Vegyi Kombinat	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	Hungary	Tiszai Vegyi Kombinat	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP bulk)	India	Haldia Petrochemicals	280	320	320	320	320	320	320	320	320	320	320	320
Polypropylene from propylene (PP bulk)	India	Indian Oil				150	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	India	Indian Oil				150	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	India	Indian Petrochemicals	90	merg										
Polypropylene from propylene (PP slurry)	India	Indian Petrochemicals	40	merg										
Polypropylene from propylene (PP bulk)	India	Indian Petrochemicals	120	merg										
Polypropylene from propylene (PP gas phase)	India	Reliance Industries	390	390	390	390	390	390	390	390	390	390	390	390
Polypropylene from propylene (PP gas phase)	India	Reliance Industries	260	260	260	260	260	260	260	260	260	260	260	260
Polypropylene from propylene (PP gas phase)	India	Reliance Industries	260	260	260	260	260	260	260	260	260	260	260	260

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP gas phase)	India	Reliance Industries			450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP gas phase)	India	Reliance Industries	350	350	350	350	350	350	350	350	350	350	350	350
Polypropylene from	India	Reliance		90	90	90	90	90	90	90	90	90	90	90

propylene (PP bulk)		Industries												
Polypropylene from propylene (PP slurry)	India	Reliance Industries		40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	India	Reliance Industries		120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP gas phase)	India	Reliance Petroleum			450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP slurry)	Indonesia	Pertamina	45	45	45	45	45	45	45	45	45	45	45	45
Polypropylene from propylene (PP bulk)	Indonesia	Polytama Propindo	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Indonesia	Tri Polyta	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP bulk)	Indonesia	Tri Polyta	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP bulk)	Indonesia	Tri Polyta	160	160	160	160	160	160	160	160	160	160	160	160
Polypropylene from propylene (PP bulk)	Indonesia	Tri Polyta				50	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	Iran	Arak Petrochemical	75	75	75	75	75	75	75	75	75	75	75	75
Polypropylene from propylene (PP slurry)	Iran	Basparan Bandar Imam	50	50	50	50	50	50	50	50	50	50	50	50
Polypropylene from propylene (PP bulk)	Iran	Jam Polypropylene		150	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP unclassified)	Iran	Marun Petrochemical		225	300	300	300	300	300	300	300	300	300	300

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP unclassified)	Iran	Navid Zar Chimie	160	160	160	160	160	160	160	160	160	160	160	160
Polypropylene from propylene (PP unclassified)	Iran	Polynar	50	50	50	50	50	50	50	50	50	50	50	50

Polypropylene from propylene (PP unclassified)	Iran	Rejal Petrochemical				80	80	80	80	80	80	80	80	80
Polypropylene from propylene (PP bulk)	Israel	Carmel Olefins	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Israel	Carmel Olefins	125	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP bulk)	Italy	Basell Poliolefine Italia	260	260										
Polypropylene from propylene (PP bulk)	Italy	Basell Poliolefine Italia	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP bulk)	Italy	Basell Poliolefine Italia	150	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP bulk)	Italy	Basell Poliolefine Italia	240	240	240	240	240	240	240	240	240	240	240	240
Polypropylene from propylene (PP gas phase)	Japan	Japan Polypropylene	210	210	210	210	210	210	210	210	210	210	210	210
Polypropylene from propylene (PP slurry)	Japan	Japan Polypropylene	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP gas phase)	Japan	Japan Polypropylene	145	36	shut									
Polypropylene from propylene (PP slurry)	Japan	Japan Polypropylene	201	201	201	201	201	201	201	201	201	201	201	201
Polypropylene from propylene (PP gas phase)	Japan	Japan Polypropylene	75	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP slurry)	Japan	Japan Polypropylene	228	228	228	228	228	228	228	228	228	228	228	228
Polypropylene from propylene (PP unclassified)	Japan	Japan Polypropylene	102	102	102	102	102	102	102	102	102	102	102	102

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP unclassified)	Japan	Japan Polypropylene	78	78	78	78	78	78	78	78	78	78	78	78
Polypropylene from propylene (PP gas phase)	Japan	Prime Polymer	110	110	110	110	110	110	110	110	110	110	110	110

Polypropylene from propylene (PP slurry)	Japan	Prime Polymer	140	140	140	140	140	140	140	140	140	140	140	140
Polypropylene from propylene (PP gas phase)	Japan	Prime Polymer	150	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP unclassified)	Japan	Prime Polymer	224	224	224	224	224	224	224	224	224	224	224	224
Polypropylene from propylene (PP unclassified)	Japan	Prime Polymer	96	96	96	96	96	96	96	96	96	96	96	96
Polypropylene from propylene (PP unclassified)	Japan	Prime Polymer	350	350	350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP gas phase)	Japan	Sumitomo Chemical	166	166	166	166	166	166	166	166	166	166	166	166
Polypropylene from propylene (PP gas phase)	Japan	Sumitomo Chemical	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP gas phase)	Japan	Sumitomo Chemical	150	150	150	150	150	150	150	150	150	150	150	150
Polypropylene from propylene (PP unclassified)	Japan	Sun Allomer		127	127	127	127	127	127	127	127	127	127	127
Polypropylene from propylene (PP gas phase)	Japan	Sun Allomer	218	218	218	218	218	218	218	218	218	218	218	218
Polypropylene from propylene (PP unclassified)	Japan	Tokuyama Polypro	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Japan	Ube Polypropylene	90	90	90	90	90	90	90	90	90	90	90	90
Polypropylene from propylene (PP unclassified)	Japan	Ukishima Polypro	127	tran										

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP gas phase)	Kazakhstan	Kazakhstan Petrochmical Industries							500	500	500	500	500	500
Polypropylene from	Korea, North	State Complexes	20	20	20	20	20	20	20	20	20	20	20	20

propylene (PP unclassified)		(North Korea)												
Polypropylene from propylene (PP gas phase)	Korea, South	GS Caltex	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP bulk)	Korea, South	Honam Petrochemical	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP bulk)	Korea, South	Honam Petrochemical	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP slurry)	Korea, South	Honam Petrochemical	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP slurry)	Korea, South	Hyosung Ltd.	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP gas phase)	Korea, South	Hyosung Ltd.	138	138	138	138	138	138	138	138	138	138	138	138
Polypropylene from propylene (PP slurry)	Korea, South	Korea Petrochemical Industry	350	350	350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP bulk)	Korea, South	LG Chem	250	370	370	370	370	370	370	370	370	370	370	370
Polypropylene from propylene (PP bulk)	Korea, South	Lotte Daesan Petrochemical	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP bulk)	Korea, South	Lotte Daesan Petrochemical		150	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	Korea, South	PolyMirae	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	Korea, South	PolyMirae	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	Korea, South	PolyMirae	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP bulk)	Korea, South	PolyMirae	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP bulk)	Korea, South	SK Corporation	150	150	150	150	150	150	150	150	150	150	150	150

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	Korea, South	SK Corporation	190	190	190	190	190	190	190	190	190	190	190	190

Polypropylene from propylene (PP slurry)	Korea, South	Samsung Total Petrochemicals	270	270	270	270	270	270	270	270	270	270	270	270
Polypropylene from propylene (PP bulk)	Korea, South	Samsung Total Petrochemicals	75	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	Kuwait	PIC	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP gas phase)	Libya	Rasco	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP gas phase)	Malaysia	Polypropylene Malaysia	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	Malaysia	Titan PP Polymers	140	215	240	240	240	240	240	240	240	240	240	240
Polypropylene from propylene (PP bulk)	Malaysia	Titan PP Polymers	240	240	240	240	240	240	240	240	240	240	240	240
Polypropylene from propylene (PP bulk)	Mexico	Indelpro	230	230	230	230	230	230	230	230	230	230	230	230
Polypropylene from propylene (PP bulk)	Mexico	Indelpro		315	420	420	420	420	420	420	420	420	420	420
Polypropylene from propylene (PP bulk)	Netherlands	Basell Benelux	65	shut										
Polypropylene from propylene (PP gas phase)	Netherlands	Domo Polypropylene	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP gas phase)	Netherlands	Sabic Europe	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP slurry)	Netherlands	Sabic Europe	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle
Polypropylene from propylene (PP slurry)	Netherlands	Sabic Europe	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle
Polypropylene from propylene (PP gas phase)	Netherlands	Sabic Europe	350	350	350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP gas phase)	Netherlands	Sabic Europe		263	350	350	350	350	350	350	350	350	350	350

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from	Nigeria	EPC	80	80	95	100	100	100	100	100	100	100	100	100

propylene (PP bulk)														
Polypropylene from propylene (PP bulk)	Nigeria	NNPC	37	37	37	37	37	37	37	37	37	37	37	37
Polypropylene from propylene (PP bulk)	Norway	Borealis	175	sold										
Polypropylene from propylene (PP bulk)	Norway	Ineos Bamble		175	88									
Polypropylene from propylene (PP gas phase)	Oman	Oman Polypropylene	340	340	340	340	340	340	340	340	340	340	340	340
Polypropylene from propylene (PP unclassified)	Pakistan	Engro Chemical Pakistan										100	100	100
Polypropylene from propylene (PP gas phase)	Philippines	JG Summit Petrochemical	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP gas phase)	Philippines	Petrocorp	160	160	160	160	160	160	160	160	160	160	160	160
Polypropylene from propylene (PP bulk)	Poland	Basell Orlen Polyolefins	400	400	400	400	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP bulk)	Portugal	Repsol Polimeros					300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	Qatar	Qatar Petrochemicals Complex							525	700	700	700	700	700
Polypropylene from propylene (PP slurry)	Romania	Petrotel	idle	idle	30	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP slurry)	Romania	Rompetrol Petrochemicals	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP bulk)	Russia	Irtyshpolymer	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP bulk)	Russia	Moscow Refinery	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP bulk)	Russia	Nizhnekamskneftekhim	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP gas phase)	Russia	Stavrolen	90	30	90	120	120	120	120	120	120	120	120	120

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Polypropylene from propylene (PP bulk)	Russia	Taneko					200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Russia	Titan Group	180	180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP bulk)	Russia	Tobolsk Polimer						500	500	500	500	500	500	500
Polypropylene from propylene (PP slurry)	Russia	Tomskneftekhim	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP bulk)	Russia	Ufaorgsyntez	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Advanced Polypropylene		338	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Al Waha Petrochemical		113	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP bulk)	Saudi Arabia	IBN RUSHD						525	525	525	525	525	525	525
Polypropylene from propylene (PP gas phase)	Saudi Arabia	IBN ZAHR	320	320	320	320	320	320	320	320	320	320	320	320
Polypropylene from propylene (PP gas phase)	Saudi Arabia	IBN ZAHR	330	330	330	330	330	330	330	330	330	330	330	330
Polypropylene from propylene (PP gas phase)	Saudi Arabia	IBN ZAHR		113	450	450	450	450	450	450	450	450	450	450
Polypropylene from propylene (PP bulk)	Saudi Arabia	NatPet			315	420	420	420	420	420	420	420	420	420
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Petro-Rabigh			350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Petro-Rabigh			350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP bulk)	Saudi Arabia	Saudi Kayan Petrochemicals					175	350	350	350	350	350	350	350
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Saudi Polyolefins	180	345	400	400	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP gas phase)	Saudi Arabia	Saudi Polyolefins	270	308	320	320	320	320	320	320	320	320	320	320
Polypropylene from propylene (PP gas phase)	Saudi Arabia	YANPET	260	260	260	260	260	260	260	260	260	260	260	260

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Polypropylene from propylene (PP gas phase)	Saudi Arabia	YANSAB			300	400	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP slurry)	Serbia	HIP - Petrohemija	40	40	40	40	40	40	40	40	40	40	40	40
Polypropylene from propylene (PP bulk)	Singapore	ExxonMobil Chemical Singapore	275	275	275	275	275	275	275	275	275	275	275	275
Polypropylene from propylene (PP bulk)	Singapore	ExxonMobil Chemical Singapore					225	450	450	450	450	450	450	450
Polypropylene from propylene (PP gas phase)	Singapore	The Polyolefin Company Singapore	60	60	60	60	60	60	60	60	60	60	60	60
Polypropylene from propylene (PP gas phase)	Singapore	The Polyolefin Company Singapore	140	140	140	140	140	140	140	140	140	140	140	140
Polypropylene from propylene (PP gas phase)	Singapore	The Polyolefin Company Singapore	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP gas phase)	Singapore	The Polyolefin Company Singapore	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP slurry)	Slovak Republic	Slovnaft	shut											
Polypropylene from propylene (PP slurry)	Slovak Republic	Slovnaft	shut											
Polypropylene from propylene (PP gas phase)	Slovak Republic	Slovnaft	tran											
Polypropylene from propylene (PP gas phase)	Slovak Republic	Slovnaft Petrochemicals	270	275	275	275	275	275	275	275	275	275	275	275
Polypropylene from propylene (PP bulk)	South Africa	Dow Plastics	sold											
Polypropylene from propylene (PP bulk)	South Africa	Safripol	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP gas phase)	South Africa	Sasol Polymers	230	230	230	230	230	230	230	230	230	230	230	230

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Polypropylene from propylene (PP gas phase)	South Africa	Sasol Polymers	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	Spain	Basell Poliolefinas Iberica	260	260	260	260	260	260	260	260	260	260	260	260
Polypropylene from propylene (PP slurry)	Spain	Repsol Quimica	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP bulk)	Spain	Repsol Quimica	160	160	160	160	160	160	160	160	160	160	160	160
Polypropylene from propylene (PP bulk)	Spain	Repsol Quimica	210	210	210	210	210	210	210	210	210	210	210	210
Polypropylene from propylene (PP bulk)	Spain	Repsol Quimica	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP slurry)	Sudan	Khartoum Chemical Industry	25	25	25	25	25	25	25	25	25	25	25	25
Polypropylene from propylene (PP gas phase)	Taiwan	Formosa Chemicals & Fibre	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP gas phase)	Taiwan	Formosa Chemicals & Fibre	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP gas phase)	Taiwan	Formosa Chemicals & Fibre	170	170	170	170	170	170	170	170	170	170	170	170
Polypropylene from propylene (PP slurry)	Taiwan	Formosa Plastics	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP gas phase)	Taiwan	Formosa Plastics	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP gas phase)	Taiwan	Formosa Plastics	130	130	130	130	130	130	130	130	130	130	130	130
Polypropylene from propylene (PP slurry)	Taiwan	Formosa Plastics	70	70	70	70	70	70	70	70	70	70	70	70
Polypropylene from propylene (PP bulk)	Taiwan	Lee Chang Yung Chemical		200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Taiwan	Lee Chang Yung Chemical		200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Taiwan	Taiwan Polypropylene	200	sold										

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from	Taiwan	Taiwan	200	sold										

propylene (PP bulk)		Polypropylene												
Polypropylene from propylene (PP bulk)	Thailand	HMC Polymers	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	Thailand	HMC Polymers	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP gas phase)	Thailand	HMC Polymers			75	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP gas phase)	Thailand	IRPC Polyol	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP gas phase)	Thailand	IRPC Polyol	100	100	100	100	100	100	100	100	100	100	100	100
Polypropylene from propylene (PP slurry)	Thailand	IRPC Polyol	270	270	270	270	270	270	270	270	270	270	270	270
Polypropylene from propylene (PP gas phase)	Thailand	Thai Petrochemical Industry	tran											
Polypropylene from propylene (PP gas phase)	Thailand	Thai Petrochemical Industry	tran											
Polypropylene from propylene (PP slurry)	Thailand	Thai Petrochemical Industry	tran											
Polypropylene from propylene (PP slurry)	Thailand	Thai Polypropylene	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP slurry)	Thailand	Thai Polypropylene	120	120	120	120	120	120	120	120	120	120	120	120
Polypropylene from propylene (PP slurry)	Thailand	Thai Polypropylene				200	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP slurry)	Turkey	Petkim Petrokimya	144	144	144	144	144	144	144	144	144	144	144	144
Polypropylene from propylene (PP bulk)	Turkmenistan	Turkmenneftagas	90	90	90	90	90	90	90	90	90	90	90	90
Polypropylene from propylene (PP bulk)	Ukraine	Linos	100	100	100	100	100	100	100	100	100	100	100	100

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP slurry)	United Arab Emirates	Borouge				200	400	400	400	400	400	400	400	400
Polypropylene from propylene (PP slurry)	United Arab Emirates	Borouge				200	400	400	400	400	400	400	400	400
Polypropylene from	United	Basell Polyolefins	220	220	220	220	220	220	220	220	220	220	220	220

propylene (PP bulk)	Kingdom	UK												
Polypropylene from propylene (PP gas phase)	United Kingdom	Basell Polyolefins UK	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	idle	Idle
Polypropylene from propylene (PP bulk)	United Kingdom	Ineos	280	280	280	280	280	280	280	280	280	280	280	280
Polypropylene from propylene (PP bulk)	United States	Basell USA	230	230	230	230	230	230	230	230	230	230	230	230
Polypropylene from propylene (PP bulk)	United States	Basell USA	300	300	300	300	300	300	300	300	300	300	300	300
Polypropylene from propylene (PP bulk)	United States	Basell USA	220	220	220	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP bulk)	United States	Basell USA	220	220	220	220	220	220	220	220	220	220	220	220
Polypropylene from propylene (PP bulk)	United States	Basell USA	244	244	244	244	244	244	244	244	244	244	244	244
Polypropylene from propylene (PP gas phase)	United States	Bayway Polypropylene	350	350	350	350	350	350	350	350	350	350	350	350
Polypropylene from propylene (PP bulk)	United States	Dow Chemical	249	249	249	249	249	249	249	249	249	249	249	249
Polypropylene from propylene (PP bulk)	United States	Dow Chemical	227	shut										
Polypropylene from propylene (PP gas phase)	United States	Dow Chemical	136	136	136	136	136	136	136	136	136	136	136	136
Polypropylene from propylene (PP gas phase)	United States	Epsilon	181	181	181	181	181	181	181	181	181	181	181	181
Polypropylene from propylene (PP gas phase)	United States	Epsilon	181	181	181	181	181	181	181	181	181	181	181	181
Polypropylene from propylene (PP gas phase)	United States	Equistar	127	95	shut									
Polypropylene from propylene (PP bulk)	United States	ExxonMobil Chemical	275	275	275	275	275	275	275	275	275	275	275	275

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP bulk)	United States	ExxonMobil Chemical	508	508	508	508	508	508	508	508	508	508	508	508
Polypropylene from propylene (PP bulk)	United States	ExxonMobil Chemical	240	240	240	240	240	240	240	240	240	240	240	240

Polypropylene from propylene (PP gas phase)	United States	Flint Hills Resources		180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP gas phase)	United States	Flint Hills Resources		180	180	180	180	180	180	180	180	180	180	180
Polypropylene from propylene (PP slurry)	United States	Flint Hills Resources		86	86	86	86	86	86	86	86	86	86	86
Polypropylene from propylene (PP bulk)	United States	Flint Hills Resources		55	28	shut								
Polypropylene from propylene (PP gas phase)	United States	Formosa Plastics USA	345	345	345	345	345	345	345	345	345	345	345	345
Polypropylene from propylene (PP gas phase)	United States	Formosa Plastics USA	355	355	355	355	355	355	355	355	355	355	355	355
Polypropylene from propylene (PP gas phase)	United States	Huntsman	180	sold										
Polypropylene from propylene (PP gas phase)	United States	Huntsman	180	sold										
Polypropylene from propylene (PP slurry)	United States	Huntsman	86	sold										
Polypropylene from propylene (PP bulk)	United States	Huntsman	55	sold										
Polypropylene from propylene (PP slurry)	United States	Ineos Americas	205	205	205	205	205	205	205	205	205	205	205	205
Polypropylene from propylene (PP gas phase)	United States	Ineos Americas	136	136	136	136	136	136	136	136	136	136	136	136
Polypropylene from propylene (PP gas phase)	United States	Ineos Americas	286	286	286	286	286	286	286	286	286	286	286	286
Polypropylene from propylene (PP gas phase)	United States	Ineos Americas	200	200	200	200	200	200	200	200	200	200	200	200
Polypropylene from propylene (PP bulk)	United States	Ineos Americas	376	376	140	140	140	140	140	140	140	140	140	140
Polypropylene from propylene (PP slurry)	United States	Phillips Sumika Polypropylene	227	227	227	227	227	227	227	227	227	227	227	227

Product	Country	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Polypropylene from propylene (PP gas phase)	United States	Phillips Sumika Polypropylene	153	153	153	153	153	153	153	153	153	153	153	153

Polypropylene from propylene (PP gas phase)	United States	Pinnacle Polymers	204	204	204	204	204	204	204	204	204	204	204	204
Polypropylene from propylene (PP gas phase)	United States	Pinnacle Polymers	204	204	204	204	204	204	204	204	204	204	204	204
Polypropylene from propylene (PP bulk)	United States	Sunoco	181	181	45	shut								
Polypropylene from propylene (PP bulk)	United States	Sunoco	205	205	205	205	205	205	205	205	205	205	205	205
Polypropylene from propylene (PP slurry)	United States	Sunoco	113	113	113	113	113	113	113	113	113	113	113	113
Polypropylene from propylene (PP bulk)	United States	Sunoco	250	250	250	250	250	250	250	250	250	250	250	250
Polypropylene from propylene (PP slurry)	United States	Total Petrochemicals	1066	1066	1066	1066	1066	1066	1066	1066	1066	1066	1066	1066
Polypropylene from propylene (PP slurry)	Venezuela	PROPILVEN	110	110	110	110	110	110	110	110	110	110	110	110
Polypropylene from propylene (PP unclassified)	Venezuela	Polipropileno del Sur						450	450	450	450	450	450	450
Polypropylene from propylene (PP unclassified)	Vietnam	Petro Vietnam				150	150	150	150	150	150	150	150	150
Total			**48614**	**51309**	**55569**	**60315**	**62772**	**66047**	**68253**	**70207**	**70707**	**71307**	**71307**	**71307**

APPENDIX C

EPPC PROJECT DESCRIPTION

- EPPC (Egyptian Propylene and PP Company) will be located in Al Gemel, Port Said – Free Economic Zone
- Propylene will be fed by p/l from the adjacent PDH unit
- Original Capital 625 mm$ (200 equity and 425 financed)

EPPC Shareholders		
Shareholder		Share %
EChem		13
OWG		21
OPC		5
Egyptian Gas Co. GASCO		13
Hayel Saied Group/Al Muhaidab/Al Zamil Consortium		23
Amwal Al Haleej	Based in UAE	15
The Arab Investment Company (TAIC)		10

OPC is owned 37 % by the Egyptian Government. Basell and IFC were considering or could be a potential partner

The technology is provided by UHDE for the PDH Star Process and by Basell for the PP Spheripol Process.

PP Capacity is planned at 350 ktons/yr. However a typical Spheripol process can produce up to 400 to 450 ktons/yr of PP.

Comemrcial start up date is expected in June 1st 2010. Licensors testing will start on April 1st, 2010.

• OPC Shareholder	
• Shareholder	• Share %
• Oriental Weavers Group	• 29
• Apicorp	• 14
• National Bank Of Egypt	• 9
• Misr Insurance Co.	• 9
• Elshrank Insurance Co.	• 9
• International Co. For Invest.	• 5
• Egyptian Petrochem. Co.	• 6
• Export Development Bank	• 5
• Others	• 14

APPENDIX D

ASSUMPTIONS & BASIS USED IN EPPC FINANCIAL ANALYSIS

REVENUE COMPONENTS

1. SRIC developed a homopolymer PP Contract delivered N.W. Europe price forecast, which is based on SRIC's (N.W. Europe) forecast for ethylene, propylene, naphtha, and (Brent) crude oil. A N.W. Europe FOB PP price forecast was determined using the aforementioned contract price forecast and discounting it by 5%. These are displayed on the "Price Frcst" sheet.
2. SRIC also provided a projected breakout of sales to different regions: N.W. Europe, West & Central Mediterranean, East Mediterranean (Turkey), and domestic Egypt markets.
3. From the N.W. Europe FOB homopolymer PP price series, the 2009 price was used as a 'basis' price for homopolymer PP. The West & Central Mediterranean price was estimated equal to the this basis price (no freight differential); the East Mediterranean (Turkey) price was estimated $50 over the basis price; and the domestic Egypt price was estimated at 5% premium over the East Mediterranean price. Using the projected regional distribution of PP product, a weighted average homopolymer PP (2009 basis) price was calculated for 2010 to 2028.
4. The time-adjusted homopolymer PP price forecast basis was determined using the previous weighted average price and adjusted by a factor determined by the % change from 2009 to year X in the price forecast above. For example, if the 2015 PP price in the base forecast is 200% of the 2009 price, the weighted average PP price in 2015 would be multiplied by 200%. This is all indicated on "cost components" sheet.
5. Ocean and land freight costs to each of the market regions were determined and provided by SRIC. There were all escalated from 2010 onward at ½ of world consumption price inflation. A weighted average ocean and land freight cost was determined using the costs to each region and multiplying by the respective sales volume to each region.
6. Weighted average distribution costs were determined and provided by SRIC and escalated from 2011 onward at ½ of world consumption price inflation.
7. The homopolymer PP netback price was determined by taking the average adjusted homopolymer PP price calculated in 6. and subtracting out the weighted average ocean/land freight costs and distributions costs for each year.
8. The corresponding average impact copolymer and random copolymer netback prices were determined by using the homopolymer PP netback price and adding SRIC's estimate of the two PP grade premiums. These premiums are escalated at ½ of world consumption price inflation from 2010 onward. This is also shown on "cost components" sheet.

9. The breakout of projected sales by PP grade were provided by EPPC: 75% homopolymer, 20% impact copolymer, and 5% random copolymer (for all years). Production for each grade was determined by multiplying the capacity times the utilization rate times the percentage of total project sales for the respective grade (for example, 20% for impact copolymer).

10. The PP utilization rates were determined by SRIC to be: 80% (of the prorated capacity) for 2010, 85% for 2011 and 2012, 90% for 2013, 95% for 2014 and 2015 and 100% for 2016 onward. The prorated capacity for 2010 was determined assuming 7 months of production (June 1, 2010 start-up).

OPERATING COST COMPONENTS

11. The average Egypt propane price forecast used in the production costs of the proposed propane dehydrogenation unit was based on a weighted average (1/3 each) of West Mediterranean FOB, Saudi Arabia FOB, and Algeria FOB propane price forecasts. This "basket price" was added to the weighted average terminal and freight cost from the GASCO supplier and UGDC supplier, where GASCO supplies 30% of the required propane (at $19 per ton freight/terminal cost) and UGDC supplies 70% of the required propane (at $3 per ton freight/terminal cost). The propane freight/terminal costs were escalated at ½ of world consumption price inflation.

12. The West Mediterranean FOB price forecast was based on the N.W. Europe naphtha price forecast multiplied by a fixed factor of 1.025 (from 2010 onward); the Saudi Arabia FOB price forecast was determined by taking US$30 per ton off of the West Mediterranean price; and the Algeria FOB price was assessed at US$10 per ton off of the Saudi Arabia FOB price forecast.

13. In order to determine the propane feedstock costs, a unit consumption factor of 1.25 tons of propane per ton of propylene was used (as provided by EPPC). For determining the propylene required for PP production, the propylene to polypropylene consumption factors used were 1.003 for homopolymer, 0.978 for random copolymer, and 0.918 for impact copolymer (tons of propylene per ton of PP resin).

14. The Egypt ethylene price forecast used in the production costs of random copolymer and impact polymer PP resins were determined using the N.W. Europe contract delivered ethylene forecast prices minus 10% discount (to bring to a 'net of contract' ethylene basis), plus a freight surcharge of US$ 130 per ton, escalated at ½ of world consumption price inflation.

15. Fixed costs:

    a. Maintenance: as per EPPC, 2% of Plant & Equipment costs (US$230MM), escalated at ½ of world consumption price inflation beginning in year 2 of operation (2011).

    b. Labor: as per EPPC, 340 personnel at US$10,000 per year cost = US$ 3.4 MM (year 1); escalated at ½ of world consumption price inflation beginning in year 2 of operation (2011).

    c. Direct Overhead: as per EPPC, 50% of labor costs.

    d. Factory Overhead (indirect overhead): as per EPPC, 50% of labor plus maintenance.

    e. Total fixed costs in year 1 (2010) were prorated for 7 months of production (June 1, 2010 start-up).

16. Variable Costs:

a. Prices for power and fuel gas were provided by EPPC; prices escalated at ½ of world consumption price inflation from 2011 onward. Conversion factors used for these costs were also provided by EPPC. Utilities (fuel gas and power) were allocated 65% to PDH costs and 35% to PP costs.

b. Total cost of chemicals were provided by EPPC; prices escalated at ½ of world consumption price inflation from 2011 onward. Cost of chemicals was allocated 65% to PDH costs and 35% to PP costs.

c. The annual cost of the PDH reaction catalyst was determined by using a prorated amount based on a useful life of four years. The periods used to determine these costs were: 2010-2013, 2014-2017, 2018-2021, 2022-2025, and 2026-2028. The first purchase of catalyst (US$23.585MM) was considered part of the owner's costs and capitalized. Subsequent catalyst purchases were considered as separate production expenditures (once every four years).

d. Ethylene costs for PP random and impact copolymers were determined using consumption factors of 0.03 tons ethylene per ton of PP, and 0.12 tons ethylene per ton of PP for random copolymer and impact copolymer, respectively.

e. PP extruder additive costs: as per EPPC, US$1.5MM per year, and escalated at ½ of world consumption price inflation from 2011 onward.

f. PP catalyst costs: as per EPPC, $9.50/ton PP, $11.00/ton PP, and $8.50/ton PP for homopolymer, impact copolymer and random copolymer resins, respectively.

17. Royalties on PP production: as per EPPC, PP royalties were comprised of an initial lump sum payment of $11.025MM (included in the EPC costs ($563.3)), and a deferred payment of $24.48MM, divided by ten equal yearly installments ($2.448MM) beginning in 2011.

18. Administrative overhead: 2.0% of total sales revenue.

OTHER COST COMPONENTS

19. Depreciation on capital: As per EPPC, depreciation is straight-line for 20 years and based on depreciable assets: EPC contract ($563.3MM), land ($2.5MM) and electrical power station (21MM) for a total depreciable asset amount of $586.8MM. Depreciation in year 1 of production (2010) is prorated based on 7 months of production. However, since the cash flow analysis is only through 2028 (19 years after start of production), the assets are not fully depreciated by the end of the cash flow period.

20. Financial interest: As per EPPC, financial interest prior to start up is 'debit interest capitalized' and totals $41.9MM. From 2011 onward, financial interest is based on interest accrued on both portions of loan: the Egyptian pound (L.E.) and the Euro portions.

21. The total cost of PP production (on a $ per metric ton of PP) is indicated in row 53 of "PP,PDH Econ.analysis" sheet. However, this total cost does not include financial interest.

CAPITAL COSTS

22. As per EPPC, total capital investment of $742.337 is comprised of:

a. EPC contract - $563.3MM

b. Debit interest capitalized - $41.901MM (this was lowered by $99,200 from $42.0MM due to calculation later provided by EPPC in "debt run off" sheet.)

C. Total owner's costs - $137.136MM; this includes first purchase of dehydrogenation catalyst, land and fixed assets and several other items.

LOAN AND DEBT SERVICE

23. As per EPPC, the project will be financed by:
    a. Equity capital - $255MM
    b. Credit interest - $10.5MM
    c. Long-term loan - $449.901MM
    d. Additional financing - $26.936MM
24. The total debt at the start of production (2010) will be $449.9MM + $41.9MM + $26.9MM = $518.7MM. Loan repayment will begin in 2011.
25. As per EPPC, each loan repayment will be comprised of 19 equal semiannual payments: one occurring in 2011 and two each year from 2012 to 2020.
26. As per EPPC, for purposes of financing the project, the loan will be comprised of two parts: a Euro –based loan, €325MM, and an Egyptian pound (L.E.) –based loan, L.E.140MM. The exchange rates used in the financial model were 1.4 US$ per € and 5.6 L.E. per US$; thus, the total loan amount when converted to US$ will be $480MM, leaving a debt of $38.7MM ($518.7MM-$480MM) by the end of the repayment period (2020).
27. Interest rates: As per EPPC, interest on Euro portion of loan will be EURIBOR (1.56%) + 3.4% for 2011 to 2014, and EURIBOR (1.56%) + 3.65% for 2015 onward; interest on L.E. portion of loan will be CBE rate (11.75%) + 1.5% for 2011 to 2014 and CBE rate (11.75%) + 1.75% for 2015 onward.
28. Short-term loan is comprised only of disbursement requirement for bank overdraft amount in year 1 of production and the interest paid on this, which is based on 3% interest rate.

WORKING CAPITAL REQUIREMENTS

29. Raw material inventory: 7 days of propane feedstock costs.
30. Finished product inventory: 28 days of fixed + variable costs.
31. Accounts receivable: 30 days of total sales revenue.
32. Cash on hand: 15 days of fixed + variable costs.
33. Accounts payable: 30 days of propane feedstock costs.

FINANCIAL EVALUATION

34. The financial analysis for EPPC was done under the following premise: Polypropylene (PP) and propane dehydrogenation (PDH) units start simultaneously on June 1, 2010. The total PP capacity would be 400,000 tons per year; and a propane de-hydrogenation unit would make just enough propylene feedstock for PP production such that no additional propylene is purchased and no extra propylene would be sold.
35. Gross profit is defined as operational margin minus royalties paid on PP production minus cost of finance.

36. Tax rate on gross (taxable) profit is 20%.
37. Earnings before interest, taxes, depreciation and amortization (EBITDA) is indicated on row 126 of “PP,PDH Econ.analysis” sheet.
38. Projected cash flows were determined using SRI Consulting’s price forecasts for all products utilized in the analysis.
39. Bank overdraft value in year 1 of production (2010) is determined such that ‘excess cash’ that year is 0.
40. The ‘payback period’ was determined by number of years after start of production that the cumulative cash flow turns positive. For example, if it turns positive in year 2015, and first year of production is 2010, payback period is five years.
41. The net present value (NPV) calculation assumed a 6% interest rate.
42. The ‘present value of free cash flows’ (row 198) were determined by multiplying the ‘free cash flows’ by the discount factors. The discount factors are indicated on row 197 of “PP,PDH Econ.analysis” sheet of the financial analysis model.

SENSITIVITY ANALYSIS:

43. The complete results of the sensitivity analysis are presented in the “Sensitivity Analysis” sheet of the (base case) financial model.
44. The input variables for the sensitivity analysis on financial results of project were: total fixed investment, propane feedstock costs, total product revenue and annual utilization rates.
45. The output variables analyzed for the sensitivity analysis were IRR, NPV (at 6%) and cumulative cash flow (CF) on the project, and IRR, NPV (at 6%) and cumulative cash flow using discounted project CF.
46. In the “PP, PDH Econ.analysis” sheet of the financial model, the “100%” values next to the input variables are used for the sensitivity analysis and should not be changed.
47. The analysis was done by making adjustments to the variables: 20% decline, 10% decline, 10% increase and 20% increase.
48. In the “Sensitivity Analysis” sheet, cells B10 through B14 contain the values used for the % changes from the base case: 80% indicates a 20% decline from base case; 90% is a 10% decline; 100% is the base case; 110% is a 10% increase over the base case; and 120% is a 20% increase over the base case. If the user wants to study the effect of lowering the variables by 25%, the 80% would be changed to 75%. Between rows 26 and 45, there are two tables summarizing the results of the sensitivity analysis.