

# 中国天然气发展报告

## (2019)

国家能源局石油天然气司

国务院发展研究中心资源与环境政策研究所

自然资源部油气资源战略研究中心

石油工业出版社

## 图书在版编目 ( CIP ) 数据

中国天然气发展报告. 2019 / 国家能源局石油天然气司, 国务院发展研究中心资源与环境政策研究所, 自然资源部油气资源战略研究中心编. —北京: 石油工业出版社, 2019. 8

ISBN 978-7-5183-3549-7

I. ①中… II. ①国… ②国… ③自… III. ①天然气工业—研究报告—中国—2019 IV. ①F426.22

中国版本图书馆CIP数据核字 (2019) 第174252号

---

出版发行: 石油工业出版社

(北京市朝阳区安华里二区 1 号楼 100011)

网 址: <http://www.petropub.com>

编辑部: (010) 64523546 图书营销中心: (010) 64523633

经 销: 全国新华书店

印 刷: 北京中石油彩色印刷有限责任公司

---

2019年8月第1版 2019年8月第1次印刷

787×1092 毫米 开本: 1/16 印张: 3.75

字数: 88千字

---

定 价: 50.00元

(如发现印装质量问题, 我社图书营销中心负责调换)

版权所有, 翻印必究

# 《中国天然气发展报告（2019）》编委会

（以下按姓氏笔画排序）

## 主 任：

王一鸣 李凡荣 凌月明

## 副 主 任：

刘德顺 顾 骏 高世楫 谢承祥

## 委 员：

王 晶 叶国标 李英华 李 铮

李继峰 张应红 武文来 郑和荣

郝 芳 郭焦锋 韩景宽 潘继平

## 总协调人：

郭焦锋

## 编写单位：

国家能源局石油天然气司

国务院发展研究中心资源与环境政策研究所

自然资源部油气资源战略研究中心

## 支持单位：

中国石油大学（华东）

住房和城乡建设部标准定额研究所

中国石油规划总院

中国石化石油勘探开发研究院

中海石油气电集团有限责任公司

上海石油天然气交易中心

## 出版和翻译单位：

石油工业出版社



# 前 言

2018 年是检验大力提升油气勘探开发力度、加快天然气产供储销体系建设见实效的元年，也是国内油气体制改革走向深入的关键之年。同时，国际局势和地缘政治风云变幻，世界能源形势继续发生深刻变革，考验着我国保障能源安全的能力和定力。

一年多来，各部门、各地方和油气企业不折不扣地贯彻落实党中央、国务院决策部署，以钉钉子的精神，迎难而上，加强顶层设计、抓实协同保障、完善政策支持、优化重大布局、推进重点项目，天然气产供储销体系建设取得阶段性进展，天然气年度消费增量创历史新高，冬季高峰期用气得到有效保障。

下一步，将着眼当前、谋划长远、直面问题、妥善应对，坚持天然气作为主体能源之一的战略定位，夯实产供储销体系根基，进一步推进天然气高质量发展，保障国家能源安全。



# 目 录

一、2018 年国内外天然气发展状况 .....	1
（一）世界天然气发展状况 .....	1
（二）中国天然气发展状况 .....	3
二、中国天然气发展面临的机遇与挑战 .....	7
（一）主要战略机遇 .....	7
（二）当前主要挑战 .....	9
三、推动中国天然气高质量发展 .....	11
（一）未来发展展望 .....	11
（二）谋划天然气产供储销体系建设重大布局 .....	11
（三）完善天然气产供储销体系配套政策 .....	13
结束语 .....	16





## 一、2018 年国内外天然气发展状况<sup>①</sup>

2018 年，受市场需求和技术创新双重拉动，北美地区在供需两端引领全球天然气稳步增长，国际天然气市场供需维持宽松态势。亚太特别是中国天然气消费快速增长态势不变，消费中心总体持续东移。国际液化天然气（以下简称 LNG）市场交易主体增多，亚太地区 LNG 现货贸易更加活跃。中国天然气产供储体系建设扎实推进，政策机制、重大布局、重点项目逐步落地，冬季高峰期用气得到有效保障。

### （一）世界天然气发展状况

2018 年，世界天然气资源供应能力持续增强。LNG 贸易空前活跃，加快推动世界市场一体化进程，“亚洲溢价”趋于缓和，贸易方式更加多元，合同更加灵活，为天然气资源引进提供更多有利条件。

世界天然气勘探不断取得突破，供应量持续较快增长。截至 2018 年底，世界天然气剩余可采储量为 197 万亿立方米，储采比为 51。海域和陆上深层天然气勘探继续获得突破，俄罗斯北极南喀拉海盆地、东地中海生物礁灰岩、南非深水浊积砂岩和阿曼陆上深层均获得重大天然气发现。2018 年，世

<sup>①</sup> 本节世界天然气储量、生产、消费和贸易的数量及增速主要来源于《BP世界能源统计》，天然气液化能力和项目的数据来自埃信华迈（IHS）；中国天然气储量数据来源于自然资源部《全国油气矿产储量通报（2018）》。中国天然气产量数据来源于国家发展和改革委员会（以下简称国家发展改革委）和国家统计局，天然气进出口数据来源于国家海关总署。



界天然气产量为 3.87 万亿立方米，同比增长 5.2%，增速同比提高 1.2 个百分点。其中，北美地区天然气产量为 10539 亿立方米，增长 9.6%；中东地区产量为 6873 亿立方米，增长 5.7%；俄罗斯—中亚地区产量为 8311 亿立方米，增长 5.3%。2018 年，世界天然气液化能力达 3.83 亿吨 / 年，同比增长 7.8%；世界有 5 个项目、7 条生产线投产，新增 LNG 产能 3115 万吨 / 年，主要集中在美国、俄罗斯和澳大利亚。

世界天然气消费持续增长，北美与亚太地区天然气需求旺盛。2018 年，世界天然气消费量为 3.85 万亿立方米，同比增长 5.3%。分地区看，北美天然气消费量为 1.02 万亿立方米，同比增长 9.3%。其中，美国受天气影响，供暖和制冷用气需求持续走强，消费量为 8171 亿立方米，同比增长 10.5%。欧洲冬季气候温和，加之风能和核电利用增加，天然气消费量为 5490 亿立方米，较 2017 年下降 2.1%。亚太地区受中国、韩国和印度等国家消费快速增长拉动，天然气消费量为 8253 亿立方米，同比增长 7.4%，增速提高 1.2 个百分点。

世界天然气贸易量持续快速增长，LNG 贸易持续活跃。2018 年，世界天然气贸易量达 1.24 万亿立方米，同比增长 9.0%，增速提高 3.1 个百分点；贸易量占世界天然气消费量的比例达到 32.1%，同比提高 1.2 个百分点。其中，管道气贸易量为 8054 亿立方米，同比增长 8.7%，增速提高 5 个百分点；LNG 贸易量为 4310 亿立方米，同比增长 9.4%，增速下降 0.5 个百分点。

从 LNG 出口看,卡塔尔 LNG 出口量为 1048 亿立方米,位居世界榜首,澳大利亚、马来西亚、美国和尼日利亚分列二至五位;澳大利亚、美国和俄罗斯占据世界 LNG 出口增量的前三位。从 LNG 进口看,日本、中国和韩国 LNG 进口量分列前三;进口增量前三的国家分别为中国、韩国和印度。

据国际天然气联盟(IGU)统计,2018 年世界 LNG 现货和短期交易量达 9930 万吨,交易气源增量主要来自美国和俄罗斯,主要流向亚太地区。普氏能源统计数据显示,2018 年亚太地区 LNG 现货交易发生次数约 350 次,较 2017 年(255 次)大幅增加,主要是中国和印度的终端用户大幅增加了 LNG 现货采购。IHS 等国际权威机构的预测结果表明,随着世界天然气液化能力的不断提升,国际天然气市场在未来若干年内仍将保持供需宽松格局。随着世界天然气加快向全球市场演进,全球天然气贸易特别是 LNG 贸易将持续活跃,洲际价格加快互动,国际市场价差有望逐步缩小。但考虑到亚太等地 LNG 终端顺价机制尚不完善,预计该地区 LNG 现货增长势头将放缓。

## (二) 中国天然气发展状况

2018 年,各部门、各地方和企业认真贯彻落实党中央决策部署,加快天然气产供储销体系建设,强化天然气发展顶层设计,大力提升勘探开发力度,完善重点地区基础设施布局,加快管网互联互通,补强储气能力短板,完善市场机制,强化督导协调,做实应急保障,天然气年度消费增量创历史



新高的同时，冬季高峰期用气得到有效保障。

天然气消费快速增长，日高峰用气量首次突破 10 亿立方米。2018 年，中国天然气表观消费量达 2803 亿立方米，同比增长 17.5%，在一次能源消费中占比达 7.8%，同比提高 0.8 个百分点；日最高用气量达 10.37 亿立方米，同比增长 20%。从消费结构看，工业燃料占比 38.6%，城镇燃气占比 33.9%，发电用气占比 17.3%，化工用气占比 10.2%，其中工业燃料和城镇燃气增幅最大，合计用气增量 351 亿立方米，占年度总增量的 84%。从区域消费看，各省天然气消费水平都有明显提升。2018 年，京津冀地区天然气消费量为 439 亿立方米，占全国天然气消费量的 15.6%。浙江、河北、河南、陕西四省的消费规模均首次超百亿立方米，全国天然气消费规模超过百亿立方米的省份增至 10 个。

大力提升勘探开发力度，国产气增量连续两年超百亿立方米。2018 年 7 月以来，各方深入贯彻落实党中央、国务院决策部署，石油企业切实承担油气增储上产主体责任，各部门和各级地方政府发挥协同保障责任，大力提升油气勘探开发力度取得阶段性进展。

2018 年，全国油气勘探开发总投入约 2667.6 亿元，同比增长 20.5%。新区新领域取得突破，塔里木盆地和准噶尔盆地深层油气、渤海海域天然气相继取得一批重大发现；渤中 19-6 气田天然气和凝析油储量均达亿吨级（油当量），是京津冀周边最大的海上凝析气田。2018 年，全国天然气新增探

明地质储量约 8312 亿立方米，技术可采储量约 3892 亿立方米；页岩气新增探明地质储量 1247 亿立方米，技术可采储量约 287 亿立方米；煤层气新增探明地质储量约为 147 亿立方米，技术可采储量约 41 亿立方米。2018 年，国内天然气产量约为 1603 亿立方米，同比增加 123 亿立方米，增速 8.3%，其中页岩气约 109 亿立方米，煤层气为 49 亿立方米，煤制气为 30 亿立方米。

天然气进口量进一步攀升，进口压力持续加大。据海关统计，2018 年中国天然气进口总量达 9039 万吨，同比增加 31.9%。其中管道气进口量为 3661 万吨，同比增长 20.3%，占进口总量的 40.5%；LNG 进口量为 5378 万吨，同比增长 40.5%，占进口总量的 59.5%。LNG 进口中，澳大利亚占比 42%，其次是卡塔尔、马来西亚、印度尼西亚等国。2018—2019 年采暖季，上游企业 LNG 现货采购、销售压力加大，货源抢购和到货压船现象并存，供气企业时段性亏损明显加大。

基础设施布局逐步完善，互联互通工作持续推进。国家发展改革委发布《关于加快推进 2018 年天然气基础设施互联互通重点工程有关事项的通知》（发改能源〔2018〕257 号）、《关于加快推进 2019 年天然气基础设施互联互通重点工程有关事项的通知》（发改办能源〔2018〕1103 号）、《重点地区应急储气设施建设中央预算内投资（补助）专项管理办法》（发改能源规〔2018〕1004 号），加快推动天然气基础设施互联互通和储气能力建设工作。各部门现场办公、大力协调，



石油企业真抓实干，重大项目规划选址、用地用海、环评安评等工作顺利推进，2018—2019 年供暖季，“南气北上”等互联互通工程实现了新增供气能力 6000 万立方米 / 天的目标，有力保障了华北地区天然气供应。截至 2018 年底，我国天然气干线管道总里程达 7.6 万千米，一次输气能力达 3200 亿立方米 / 年。2018—2019 年供暖季前，上游供气企业已建储气能力约 140 亿立方米，同比增长约 17 亿立方米。其中，地下储气库工作气量约 87 亿立方米，LNG 储罐罐容约 53 亿立方米。国家发展改革委、国家能源局印发《关于建立油气项目核准工作绿色通道有关事宜的通知》（发改办能源〔2019〕273 号），进一步缩短了项目办理时间。颁布 SY/T 7434—2018《液化天然气接收站能力核定方法》行业标准，按此核定的国内 LNG 接收站最大接收能力超过 9000 万吨 / 年，用气高峰期 LNG 接收站最大限度地发挥供气能力，调动了企业保供积极性。此外，积极推进 LNG 罐箱多式联运试点，2018 年 11 月，130 个 LNG 罐箱从海南洋浦港运至山东龙口港和辽宁锦州港。内河和铁路 LNG 罐箱运输试点也在积极推进中。



## 二、中国天然气发展面临的机遇与挑战

党中央、国务院对能源特别是油气行业发展高度重视。2014年6月,习近平总书记提出“四个革命、一个合作”能源安全新战略。当前,中央进一步对加快天然气产供储销体系建设、大力提升油气勘探开发力度、构建多元进口体系等作出系统部署,油气体制机制改革正在加快推进。中国天然气行业发展迎来了战略机遇。但应当看到,天然气产供储销体系建设还任重道远,行业发展不协调不充分的问题依旧突出,体制机制改革创新等方面仍然面临挑战。

### (一) 主要战略机遇

顶层设计和政策支持逐步完善。国务院《关于促进天然气协调稳定发展的若干意见》(国发〔2018〕31号)从加强产供储销体系建设和深化天然气领域改革两个方面,部署了加大国内勘探开发力度、健全多元化海外供应体系、理顺天然气价格机制等十条措施,构建了中国天然气协调稳定发展的总体框架。《关于加快储气设施建设和完善储气调峰辅助服务市场机制的意见》(发改能源规〔2018〕637号),进一步明确了储气能力核定、指标要求和各方责任分工。《可再生能源发展专项资金管理暂行办法》将致密气新纳入财政补贴范围。《关于规范城镇燃气工程安装收费的指导意见》(发改价格〔2019〕1131号)规范了城镇燃气工程安装行为,加



强了工程安装收费管理。《关于进一步明确矿业权出让收益征收管理有关问题的通知》（财综〔2019〕11号），为油气上游体制改革奠定了基础。油气项目用海预审环节取消，用海审查与环评改为并联审查，并明确了油气钻井等“先临时后永久”的用地政策。重大海洋油气勘探开发项目纳入环评审批绿色通道等。

**体制改革稳步推进。**国家发展改革委、商务部发布《外商投资准入特别管理措施（负面清单）（2019年版）》，取消了“石油、天然气（含煤层气，油页岩、油砂、页岩气等除外）的勘探、开发限于合资、合作”“50万人口以上城市的燃气管网建设、经营必须由中方控股”的限制。油气对外合作项目总体开发方案由审批制改为备案制。督促企业加快矿业权内部流转，打破企业属地界限，形成良性竞争，2018年以来，石油企业共完成矿业权内部流转18起，涉及矿权面积20.2万平方千米。打破企业壁垒，推动央企间开展“矿业权属不变、联合研究、合作分成”的合作模式创新；签署合作协议11个，涉及矿权面积近9万平方千米，在一些重大潜力区力争实现勘探“由点到面”的突破。《石油天然气管网运营机制改革实施意见》已审议通过，国家石油天然气管网公司组建进入实质性操作阶段。国家发展改革委、国家能源局、住房和城乡建设部、国家市场监督管理总局印发《油气管网设施公平开放监管办法》（发改能源规〔2019〕916号），强化了公平开放的制度基础、基本原则、解决方案和监管措施。



国家发展改革委印发《关于理顺居民用气门站价格的通知》(发改价格规〔2018〕794号),实现居民与非居民用气门站价格“并轨”。此外,上海、重庆石油天然气交易中心在国内天然气交易产品和交易模式创新方面进行了有益的探索。

**协同保障力度持续强化。**为落实党中央、国务院决策部署,各部门、各地方和各企业密切协作,共同推进天然气产供储销体系建设工作持续深入。天然气产供储销体系建设工作纳入煤电油气运保障工作部际协调机制加强统筹,国家发展改革委、国家能源局均成立了相应的工作机构,建立周例会机制,协调解决突出问题。地方政府主动担当,成立了省级协调机构,加大重点项目、重大问题的属地协调力度。相关企业承担主体责任,积极加快工程建设,全力保障天然气稳定供应。

## (二) 当前主要挑战

**天然气进口量持续攀升给能源安全保障带来压力。**2007—2018年,我国天然气消费量年均增长190.7亿立方米,天然气产量年均增长82.8亿立方米,供应缺口不断扩大,天然气进口量年均增长达107.9亿立方米。特别是2014年国际油价下降,导致国内勘探开发投入降低,更多需要依靠进口满足消费。

**生态保护对天然气高质量发展提出更高要求。**油气资源丰富集区与重要的生态功能区、生态环境敏感脆弱区客观上空间叠置,加之当前法规政策缺乏对环境敏感区内生产建设活动分级管控、分类施策的细化规定,环境敏感区内油气生产



建设活动受到限制。

**储气能力不足、市场机制不顺成为制约行业发展的两大短板。**随着天然气产供储销体系建设的加快推进和储气调峰领域政策文件的陆续出台，储气设施建设开始集中发力，但受制于地下储气库和 LNG 储罐较长的建设周期，预计储气能力按期达标存在较大压力。随着体制改革的逐步推开，天然气行业“快速发展期”和“改革阵痛期”双期叠加，加之配套政策不完善，上中下游市场主体博弈日趋激烈。

### 三、推动中国天然气高质量发展

把天然气发展成为中国主体能源之一，是建设清洁低碳、安全高效的能源体系的重要组成部分。我国将坚持以习近平总书记关于能源安全新战略的重要论述为根本遵循，大力提升勘探开发力度，以天然气管网建设、补足储气调峰短板、推进市场体制改革为重点，加快天然气产供储销体系建设，努力实现天然气高质量发展。

#### （一）未来发展展望

从国际趋势看，天然气在世界能源消费结构中占比23%，仍是未来唯一增长的化石能源，国际能源署（IEA）、BP等机构预测2035年左右天然气将超过煤炭成为第二大能源。从国内形势看，我国国民经济和社会稳步发展，将带动能源需求持续增长，天然气在我国能源革命中始终扮演着重要角色，预计2050年前我国天然气消费保持增长趋势。随着天然气消费市场的不断成熟，未来工业燃料、城市燃气、发电用气将呈现“三足鼎立”局面。

#### （二）谋划天然气产供储销体系建设重大布局

一是全力打造四川盆地天然气生产基地。四川盆地是常规气、非常规气“双富集”气区，资源量分别占全国的23%和26%。通过加大深层气、致密气和页岩气开发，未来四川盆地天然气生产占国内总产量三分之一左右，页岩气有望超



过常规气成为主力气源。四川盆地人口密集、生态敏感，需一揽子解决用地保障、部分油气产区与环境敏感区重叠等问题，并同步推动天然气外输通道规划建设。

**二是全力打造鄂尔多斯盆地、新疆地区天然气主产区。**鄂尔多斯盆地和新疆地区（以塔里木盆地为主）天然气资源量规模相当，分别占全国的 17% 和 21%。通过加大鄂尔多斯盆地致密气开发和突破陆相页岩气开发技术瓶颈，加大塔里木盆地深层超深层以及碳酸盐岩复杂油气藏勘探开发，未来产量有望再上新台阶。

**三是全力打造海上天然气生产基地。**我国海上天然气资源丰富，仅渤海、东海和南海北部资源量即占国内总资源量的 15.6%。受诸多因素制约，勘探开发进展缓慢。未来将加大协调推进力度，解决用海矛盾，进一步加快上产步伐。

**四是力争非常规天然气勘探开发“全面开花”。**目前，页岩气商业性开发仅限于四川盆地中浅层，四川盆地以外的页岩气开发获得突破后，预计产量有望再增加百亿立方米。煤层气未来将以山西沁水盆地、鄂尔多斯盆地为重点，加大煤系地层内气体资源综合勘探开发力度，力争尽早突破年产百亿立方米。

**五是加快区域地下储气库群建设。**我国现有储气能力相当于年消费量的 5.7%，与 12% ~ 15% 的世界平均水平尚有差距。当前储气设施建设面临规划选址难、用地难、盈利模式亟待突破等制约。下一步，拟围绕天然气产区和进口通道，

重点打造区域地下储气库群，解决重点储气库用地问题，同时抓紧建立完善相关市场机制，加大政策支持，使储气设施投资可回收、运营可持续。

**六是全力打造环渤海天然气供应保障体系。**在进一步完善环渤海地区管网体系的基础上，依托现有港区布局建设一批 LNG 接收站，增强北方地区特别是京津冀地区天然气多元保障及抗风险能力。该区域环保要求严，需在围填海及环保政策、用地用海保障等方面给予大力支持，确保项目按期落地实施。

**七是有序发展替代能源。**发展煤制气产业是立足国内能源资源禀赋国情，增强国内天然气供应能力的重要途径。在现有煤制气产能基础上，加大示范项目建设力度，推进战略技术储备和产能储备任务落实。重点支持北方农村地区发展生物天然气清洁供暖，力争生物天然气产量实现突破。

**八是合理布局进口气源和通道。**加快推进天然气进口国别（地区）、运输方式、进口通道、合作模式以及参与主体多元化。鼓励企业“走出去”，积极参与国际资源勘探开发和 LNG 项目投资与运营。

### **（三）完善天然气产供储销体系配套政策**

**一是加大增储上产政策支持力度。**研究取消石油特别收益金或提高起征点；研究设立油气风险勘探基金；推动延续稠油、高凝油、高含硫天然气、三次采油等领域资源税减免的优惠政策；推动出台储气库垫底气支持政策。



**二是深化油气体制改革。**加强勘探开发领域市场竞争，实行勘查区块竞争出让制度，公开公平向符合条件的各类市场主体出让相关矿业权。加强全国天然气管网统一规划，加快基础设施建设步伐。压缩供气层级，合理确定管输价格，推行季节性差价。

**三是加大科技攻关力度。**着眼关键技术和前沿技术，围绕非常规、海洋及陆上深层勘探开发、新一代油气地质理论与勘探风险评价、提高采收率等领域，加大自主攻关力度，注重引进消化吸收国际前沿技术和经验，提升技术装备水平，发挥科技创新的支撑作用。

**四是改善资源开发地的营商环境。**统筹解决好生态环境保护、耕地保护、生态红线划定与油气勘探开发、储气库、管道等国家重大工程建设间关系。在实施严格保护措施的前提下，按照“区分固体矿与油气、勘探与开发、石油与天然气、保护区在前和矿权在前、不同保护区类型”等“五个区分”的工作原则，推动环境敏感区内油气勘探开发相关工作。

**五是合理优化用气结构。**在确保民生用气的基础上，工业领域用气按照“可中断用户优先、稳步推进‘车船用气’、适度发展发电、从严控制化工用气”的要求执行。在天然气发电上，近期发展调峰、分布式项目，中远期发展热电联产和多能互补。积极推行供暖热值计量，发展建筑节能，加强对节约用气的宣传和引导。

**六是推动天然气价格市场化改革。**逐步放开天然气领域

竞争性环节的价格，降低企业用能成本。加快完善监管规则和信息公开制度。推广季节性差价、可中断气价等差别化价格政策，促进削峰填谷，引导企业增加储气和淡旺季调节能力。加强天然气输配环节价格监管，切实降低过高的省级区域内输配价格。逐步构建运行高效的天然气市场体系。





## 结 束 语

2019 年是落实习近平总书记“四个革命、一个合作”能源安全新战略五周年，是天然气产供储销体系建设的关键之年。中国天然气仍将保持较快增长，预计 2019 年表观消费量达 3100 亿立方米左右，同比增长约 10%。天然气行业将以习近平总书记关于能源安全新战略的重要论述为根本遵循，发扬新时代石油精神，勠力同心、迎难而上，扎实推进各项工作，将天然气产供储销体系建设和大力提升勘探开发力度工作不断推向深入，推动天然气行业高质量发展。

期待《中国天然气发展报告（2019）》的发布，进一步激发行业讨论交流，共商天然气行业发展大计，共同推动天然气改革更好服务经济社会发展大局。

诚挚感谢各相关部门、研究机构、行业学会、企业、国际机构及众多专家的大力支持和帮助。

感谢以下人员（按姓氏笔画排序）对《中国天然气发展报告（2019）》提出修改建议及在成稿过程中作出的贡献：

王连生 王国力 王晓庆 王 婕 田 瑛 史云清  
刘明磊 孙 智 孙 慧 李 伟 李 雷 杨建红  
沈 鑫 陈进殿 金淑萍 周淑慧 周 鹏 姜向强  
高安荣 唐永祥 唐金荣



# **China Natural Gas Development Report (2019)**

Oil and Gas Department, National Energy Administration

Institute for Resources and Environmental Policies, Development  
Research Center of the State Council

Center for Oil and Gas Resource Strategies, Ministry of Natural  
Resources

**Petroleum Industry Press**

# **China Natural Gas Development Report (2019)**

## **Editorial Board**

**(in the order of surname by number of strokes)**

### **Chairpersons:**

WANG Yiming LI Fanrong LING Yueming

### **Deputy Chairpersons:**

LIU Deshun GU Jun GAO Shiji XIE Chengxiang

### **Committee Members:**

WANG Jing YE Guobiao LI Yinghua LI Zheng

LI Jifeng ZHANG Yinghong WU Wenlai ZHENG Herong

HAO Fang GUO Jiaofeng HAN Jingkuan PAN Jiping

### **Coordinator:**

GUO Jiaofeng

### **Principal Institutions:**

Oil and Gas Department, National Energy Administration

Institute for Resources and Environmental Policies, Development


Research Center of the State Council

Center for Oil and Gas Resource Strategies, Ministry of Natural

Resources

### **Supporting Institutions:**

China University of Petroleum (Huadong)

Institute for Standards and Quota  Ministry of Housing and Urban-Rural Development

China Petroleum Planning and Engineering Institute

Sinopec Petroleum Exploration and Production Research Institute

CNOOC Gas & Power Group Ltd.

Shanghai Petroleum & Natural Gas Exchange Center

**Publishing and Translation:**

Petroleum Industry Press

## **Preface**

2018 is the first year to witness the effectiveness of vigorously enhancing oil & gas exploration, and of accelerating the construction of systems for the production, supply, storage and marketing of natural gas. It is also the key year for deepening the reform of domestic oil & gas system and mechanism. Meanwhile, the year of 2018 witnessed avolatile international geopolitical situation and development. The world energy landscape continues to undergo profound changes, which tests our capability and determination to safeguard national energy security.

Over the past year, all departments, local governments and oil & gas enterprises have faithfully implemented the decisions and deployment of the Central Committee of the Party and the State Council. They have resolved problems with force and tenacity as a hammer drives a nail and come up against difficulties to reinforce top-level design, strengthen common energy guarantees, enhance policy support, optimize major industry landscape and promote key projects. The construction of the system of natural gas production, supply and storage have reached a new stage. The annual consumption of natural gas has

again reached an all-time high, and gas consumption during the peak period in winter has been effectively guaranteed.

For the next step, we will focus on the present, plan for the long-term, face the problems directly and deal with them properly, adhere to the strategic positioning of natural gas as one of the main energy sources, consolidate the foundation of the production, supply, storage and marketing system, promote the high quality and stable development of natural gas, and ensure national energy security.

# CONTENTS

1. Global Natural Gas Development Status in 2018 .....	1
(1) Development Status of Natural Gas in the World.....	2
(2) Development Status of Natural Gas in China.....	5
2. Opportunities and Challenges for China's Natural Gas Development .....	12
(1) Major Strategic Opportunities .....	13
(2) Current Major Challenges .....	17
3. Promoting High Quality Development of Natural Gas in China .....	19
(1) Prospects of Natural Gas Development in the Future.....	19
(2) Plot Major Layouts for the Construction of Natural Gas Production, Supply, Storage and Marketing System.....	20
(3) Strengthen Supporting Policies and Measures and Build a Complete Natural Gas Production, Supply, Storage and Marketing System .....	24
Concluding Remarks .....	28

# 1. Global Natural Gas Development Status in 2018<sup>①</sup>

Driven by market demand and technological innovation, North America led the steady growth of global natural gas at both supply and demand in 2018, while the supply and demand of the international natural gas market remained to be loose. Natural gas consumption in the Asian-Pacific region, especially in China, has consistently increased, and the overall consumption center has continued to move eastward. The number of dominant entities in the international liquefied natural gas(LNG) exchange market has increased, and the spot trading of LNG in the Asia-Pacific region has become more active. The construction of China's natural gas production, supply and storage system has been steadily promoted. Policy mechanism, major industry landscape and key projects have been implemented gradually. The demand of gas during the peak period in winter has been effectively guaranteed.

---

① The reserves, production, consumption and trade volume data in this chapter are mainly from the *BP Statistical Review of World Energy*. The natural gas liquefaction capacity and project data come from IHS. The domestic natural gas reserves data are from the *National Oil and Gas Reserves Bulletin (2018)* of the Ministry of Natural Resources. The domestic natural gas production data come from the National Development and Reform Commission and the National Bureau of Statistics. The natural gas import data are from the General Administration of Customs.



## (1) Development Status of Natural Gas in the World

In 2018, the supply of natural gas in the world continued to grow rapidly. LNG trade has been more than ever to promoting the integration of world markets in an accelerated pace. The “Asian premium” is tending to ease. The trade patterns have become more diversified with more flexible contracts, which has provided more favorable conditions for the import of natural gas resources.

**The world natural gas exploration continued to make breakthrough with fast growth in gas supply.** By the end of 2018, the remaining recoverable reserves of natural gas globally were 197 trillion cubic meters, with a reserve-production ratio of 51. Great breakthroughs were reached in the exploration of offshore and onshore deep natural gas. There were significant natural gas discoveries in the Russian Arctic South Kara Sea Basin, Eastern Mediterranean reef limestone, South African deep-water turbidite sandstone, and Oman onshore deep layers. In 2018, world natural gas production reached 3.87 trillion cubic meters, up 5.2% year-on-year, and the growth rate increased by 1.2 percentage compared to last year. North American natural gas production was 1053.9 billion cubic meters, up 9.6%; Middle East production was 687.3 billion cubic meters, up 5.7%;



Russia-Central Asia production was 831.1 billion cubic meters, up 5.3%. In 2018, the liquefaction capacity of natural gas in the world was 383 million tons per year, an increase of 7.8% year-on-year. Five projects and seven production lines were put into operation in the world, which accounts for an additional LNG capacity of 31.15 million tons per year, mainly concentrated in the United States, Russia and Australia.

**Global natural gas consumption was growing rapidly, and demand for natural gas in North America and the Asia-Pacific region were high.** In 2018, global natural gas consumption was 3.85 trillion cubic meters, an increase of 5.3% year-on-year. Regionally, natural gas consumption in North America was 1.02 trillion cubic meters, a 9.3% increase year-on-year. Under the influence of weather, the demand for heating and refrigerating gas in the United States continued to rise. In 2018, the consumption of natural gas in the United States was 817.1 billion cubic meters, up by 10.5% year-on-year. Because of the mild winter climate and the increased use of wind energy and nuclear power, the consumption of natural gas in Europe was down by 2.1% from 2017 to 549 billion cubic meters. The Asia-Pacific region was mainly driven by the rapid growth of consumption in China, South Korea and India, resulting a 7.4% year-on-year increase in natural gas consumption to reach 825.3



billion cubic meters, up by 1.2 percentage points in the growth rate.

**The world natural gas trade continued to grow rapidly and LNG trade continued to be active.** In 2018, the volume of global natural gas trade was 1.24 trillion cubic meters, up by 9.0% year-on-year and 3.1 percentage in the growth rate. The proportion of trade in total global natural gas consumption reached 32.1%, up by 1.2 percentage year-on-year. Among them, pipeline gas trade volume was 805.4 billion cubic meters, up by 8.7% year-on-year and the growth rate increased by 5 percentage; LNG trade volume was 431 billion cubic meters, up by 9.4% year-on-year, and the growth rate slightly decreased by 0.5 percentage points compared to last year.

Regarding the LNG export, Qatar's LNG export volume was 104.8 billion cubic meters, ranking the first in the world, followed by Australia, Malaysia, the United States and Nigeria with ranking of second to the fifth places; Australia, the United States and Russia were the top three in terms of increase in LNG export. From the perspective of LNG imports, Japan, China and South Korea ranked the top three in imports, and the top three countries in increase in imports were China, South Korea and India.

International Gas Union (IGU) statistics has revealed that

the global LNG spot and short-term trading volume in 2018 were 99.3 million tons. The increment of source gas was mainly accounted by the United States and Russia, largely flowing to the Asia-Pacific region. According to Platt's energy statistics, there were about 350 LNG spot transactions in the Asia-Pacific region in 2018, a number that is significantly higher than it in 2017 (255), which was mainly driven by substantial increase in LNG spot purchases by end-users in China and India. The forecasting results from IHS and other international authorities have shown that, with the increasing liquefaction capacity of natural gas around the world, the international natural gas market will maintain oversupply in the next few years. As the world's natural gas accelerates towards the international market, the global natural gas trade will remain active, especially the LNG trade, accelerating the intercontinental price interaction, and hopefully reducing the price gap in the international market. However, due to the incomplete price pass through mechanism of LNG terminals in Asia-Pacific and other places, the growth trend of LNG spot price will be slowing down.

## (2) Development Status of Natural Gas in China

In 2018, all departments, local governments and enterprises earnestly implemented the developing decisions of the Central



Committee of the party, strengthening the top-level design of natural gas development and accelerating the construction of the natural gas production, supply, storage and marketing system. China is vigorously enhancing exploration and development efforts, improving infrastructure layout in key areas, accelerating the interconnection of pipeline networks, working hard to overcome the shortcoming in gas storage capacity, improving the market mechanism, strengthening supervision and coordination, and ensuring emergency response. Annual natural gas consumption increase reached a new record high, while the gas demand in the winter peak period was effectively guaranteed.

**Natural gas consumption grew rapidly, and the daily peak exceeded 1 billion cubic meters for the first time.** In 2018, the apparent value of consumption of natural gas in China was 280.3 billion cubic meters, with an increase of 17.5% year-on-year growth rate, accounting for 7.8% of primary energy consumption which is 0.8% higher than previous year; the daily maximum consumption of natural gas was 1.037 billion cubic meters, with an increase of 20% year-on-year growth rate. From the perspective of consumption structure, industrial consumption accounted for 38.6%; urban gas consumption accounted for 33.9%, gas used for power generating accounted for 17.3%

and chemical industry gas consumption accounted for 10.2%. Among these, industrial and urban gas consumption accounted for the largest increase, with a total increase of 35.1 billion cubic meters, accounting for 84% of the total annual increase. From the perspective of regional consumption, the level of natural gas consumption in all provinces has significantly increased. In 2018, the consumption of natural gas in Beijing, Tianjin and Hebei Province was 43.9 billion cubic meters, accounting for 15.6% of the national natural gas consumption. For the first time, the consumption scale of Zhejiang, Hebei, Henan and Shaanxi provinces exceeded 10 billion cubic meters, while the number of provinces with a consumption level of over 10 billion cubic meters increased to 10.

**Vigorously enhancing exploration and development ability, the annual growth of domestic gas exceeded 10 billion cubic meters for the second year.** Since July 2018, all parties have thoroughly implemented the decisions and deployment of the Central Committee of the Party and the State Council. Oil enterprises have earnestly assumed the main responsibility of increasing oil and gas reserves and production. Various departments and local governments at all levels have provided synergies to vigorously enhance the abilities of oil and gas exploration & development and have made phased progress.



In 2018, China's total capital investment in oil and gas exploration & development was about 266.76 billion RMB, with an increase of 20.5% year-on-year growth rate. Strategic breakthroughs have been made in new areas of new regions. There were a number of major discoveries of deep oil and gas in Tarim and Junggar basins as well as natural gas in Bohai Sea. The Natural gas and condensate reserve in Bozhong 19-6 gas field are both over 100 million tons(oil equivalent), which is the largest gas condensate field near Beijing, Tianjin and Hebei. In 2018, China witnessed an increase of about 831.2 billion cubic meters of proven natural gas reserves, of which 389.2 billion cubic meters were technically minable, 124.7 billion cubic meters of proven shale gas reserves, of which 28.7 billion cubic meters were technically minable, and 14.7 billion cubic meters of newly proven coal bed methane reserves, of which about 4.1 billion cubic meters were technically recoverable. In 2018, China's natural gas production reached about 160.3 billion cubic meters, an increase of 12.3 billion cubic meters year-on-year at a growth rate of 8.3%. Among them, there were 10.9 billion cubic meters of shale gas, 4.9 billion cubic meters of coal bed methane and 3 billion cubic meters of coal-produced gas.

**The volume of natural gas import have further increased, and import pressure has continued to rise.**

Customs statistics show that China's natural gas imports totaled 90.39 million tons in 2018, with an increase of 31.9% year-on-year growth rate. Among them, the import volume of pressurized natural gas was 36.61 million tons, up by 20.3% year-on-year, accounting for 40.5% of the total import volume; the import volume of LNG was 53.78 million tons, up by 40.5% year-on-year, accounting for 59.5% of the total import volume. Australia accounted for 42% of LNG source of imports, followed by Qatar, Malaysia, Indonesia and other countries. In the heating season of 2018-2019, LNG spot purchasing and selling pressure of upstream enterprises unprecedentedly increased, with rush purchasing of goods and stockpiling, which led to an increase in period loss for the gas supply enterprises.

**The infrastructure layout has been gradually improved, and the work of connectivity has been continuously promoted.** The National Development and Reform Commission issued *Notice on Accelerating the Promotion of Key Interconnection Projects of Natural Gas Infrastructure in 2018* (No. 257 [ 2018 ] of National Development and Reform Commission) and *Notice on Accelerating the Promotion of Key Interconnection Projects of Natural Gas Infrastructure in 2019* (No. 1103 [ 2018 ] of National Development and Reform Commission) and *Special Measures for the Management of*



*Investment (Subsidy) in the Central Budget for the Construction of Emergency Gas Storage Facilities in Key Areas*(No. 1004 [ 2018 ] of the National Development and Reform Commission),accelerating the interconnection of natural gas infrastructure and capacity-building for gas storage. All departments worked on the spot and coordinated vigorously. The petroleum enterprises were hard-working and down to earth. Major projects planning and site selections were made. The problems of land use, sea use, environmental impact assessment and safety assessment have been advancing effectively. During the heating season of 2018-2019, the goal of adding 60 million cubic meters per day for the “northward transportation of southern Gas project” and other connection projects has been achieved, which effectively guaranteed natural gas supply in North China. By the end of 2018, the overall length of natural gas trunk line has reached 76,000 kilometers, with a capacity of 320 billion cubic meters per year. Before the heating season of 2018-2019, the upstream gas suppliers had built up the gas storage capacity of about 14 billion cubic meters, an increase of about 1.7 billion cubic meters year-on-year. Among them, the working gas volume of underground gas storage was about 8.7 billion cubic meters, and the capacity of the LNG storage tank was about 5.3 billion cubic meters. The National



Development and Reform Commission and the National Energy Administration issued *Notice on Establishing Green Channel for Oil and Gas Project Approval* (No. 273 [ 2019 ] of National Development and Reform Commission) further shortened the project processing time. The industry standard of SY/T 7434—2018 *Approval Method of LNG Receiving Station Capacity* was promulgated. According to this standard, the capacity of the largest domestic LNG receiving station exceeded 90 million tons per year. During the peak period of winter gas consumption, LNG receiving stations maximized their gas supply capacity and aroused the enthusiasm of enterprises to ensure supply. In addition, multimodal transport of LNG tankplots was actively promoted. By November 2018, 130 LNG tanks were transported from Yangpu Port in Hainan to pilots in Longkou Port in Shandong Province and Jinzhou Port in Liaoning Province. Tank transportation by domestic rivers and railways was also actively promoted.



## **2. Opportunities and Challenges for China's Natural Gas Development**

The Central Party Committee and the State Council attach great importance to the development of the energy, especially the oil and gas industry. In June 2014, General Secretary Xi Jinping proposed a new energy security strategy of “four-revolution and one-cooperative”. At present, the central government has further systematically deployed to accelerate the construction of natural gas production, supply, storage and marketing system, vigorously enhance oil and gas exploration & development, and build a multi-import system. The reform of oil and gas system and mechanism is also accelerating. The development of China's natural gas industry is facing an important period of strategic opportunities. However, it should be noted that the construction of natural gas production, supply, storage and marketing system still has a long way to go, and the problem of insufficient industrial coordination is still prominent. It still faces serious challenges in the reform and innovation of system and mechanism.

## (1) Major Strategic Opportunities

**Top-level design and policy support are gradually improved.** From the two aspects of strengthening the construction of the production, supply, storage and marketing system and deepening the reform of the natural gas sector, the State Council's *Several Opinions on Promoting the Coordinated and Stable Development of Natural Gas* (No. 31 [ 2018 ] of the State Council) has deployed 10 measures, including strengthening domestic exploration & development, improving diversified overseas supply system, and straightening out the price mechanism of natural gas, and constructed the overall framework for the coordinated and stable development of natural gas in China. The *Opinions on Accelerating the Construction of Gas Storage Facilities and Improving the Market Mechanism for Gas Storage and Peak Regulation Auxiliary Services* (No. 637 [ 2018 ] of National Development and Reform Commission and National Energy Administration) further clarified the verification of gas storage capacity, the requirements for indicators and the division of responsibilities among all parties. *Notice on the Interim Measures for the Administration of Special Funds for the Development of Renewable Energy* brought tight gas into the scope of financial subsidies. The *Guiding Opinions on Regulating the Installation*



*Charges for Urban Gas Projects* (No. 1131 [ 2019 ] of National Development and Reform Commission, Ministry of Housing and Urban-Rural Development, and State Administration for Market Regulation) standardized the installation of urban gas projects and strengthened the administration of project installation charges. The *Circular on Providing Further Clarity on Issues Concerning Collection and Administration of Income from the Transfer of Mining Rights* (No. 11 [ 2019 ] of the Ministry of Finance) laid the foundation for the reform of the upstream oil and gas system. The pre-trial of marine use for oil and gas projects was canceled. The marine use review and environmental impact assessment were consolidated to a parallel review, with clarified land use policy of “first temporary then permanent” for oil and gas drilling, etc. Major offshore oil and gas exploration & development projects have been included in the green channel for environmental assessment and approval.

**The institutional reform has progressed steadily.** The National Development and Reform Commission and the Ministry of Commerce promulgated the *Special Management Measures (Negative List) for the Access of Foreign Investment (2019)*, abolishing the constraints of “only joint ventures and cooperation are allowed for the exploration & development of oil and gas (including coal bed methane, excluding oil

shale, oil sand, shale gas, etc.)” and “gas pipeline network construction and operation must be controlled by the Chinese side in cities with a population of over 500,000”. The review and approval system for oil and gas field development projects with foreign cooperation has been changed to the recordation system. To urge enterprises to speed up the internal circulation of mining rights, break the territorial boundaries of enterprises, and form a benign competition, the oil and gas companies have completed 18 internal circulation of mining rights, involving an area of 202,000 square kilometers since 2018. To break down corporative barriers and promote cooperation innovation among central enterprises in the mode of “keeping mining right with joint research, cooperation and sharing”, 11 cooperation agreements have been signed, covering a mining area of nearly 90,000 square kilometers, with efforts to strive for breakthrough in scaled up explorations in some key regions with great potential. The Central Committee has reviewed and approved the *Opinions on the Reform and Implementation of the Operation Mechanism of Oil and Gas Pipeline Networks*. The establishment of state-owned oil and gas pipeline network company with diversified investment entities has entered the substantial operational phase. The *Measures for the Supervision and Administration of Fair Opening of Oil and Gas Pipelines*



*Network Facilities* (No. 916 [ 2019 ] of Development and Reform Commission, Ministry of Housing and Urban-Rural Development, State Administration of Market Supervision, and National Energy Administration) was issued to reinforce the institutional foundation, basic principles, solutions, and regulatory measures for fairness and openness. The National Development and Reform Commission issued the *Notice on the Rationalization of Gate Price of Residential Gas* (No. 794 [ 2018 ] of National Development and Reform Commission) realized the gate price “consolidation” of residential and non-residential gas. In addition, Shanghai Petroleum and Gas Exchange and Chongqing Oil and Gas Exchange have actively carried out relevant innovations in domestic natural gas trading products and trading modes.

**The coordinated and stable development will continue to be strengthened.** In order to implement the decision and plan deployed by the Central Party Committee and the State Council, departments, localities and enterprises have cooperated closely to promote the continuous and in-depth construction of the natural gas production, supply, storage and marketing system. The construction of natural gas production, supply, storage and marketing system should be integrated into the inter-ministerial coordination mechanism of coal, electricity, oil and gas

transportation and guarantee to strengthen the overall planning. The National Development and Reform Commission and The National Energy Administration organized special workshop and established a coordination mechanism for weekly meetings to discuss and solve major problems. Local governments at all levels have taken the initiative to set up provincial coordinating bodies to strengthen the coordination of major projects and issues. Related enterprises assume the responsibility, actively accelerate the construction of the project and make every effort to ensure the stable supply of natural gas.

## (2) Current Major Challenges

**The rising natural gas import puts pressure to energy security.** In 2007-2018, China's natural gas consumption grew at an average annual rate of 19.07 billion cubic meters, and natural gas production grew at an average annual rate of 8.28 billion cubic meters. The supply gap continued to expand, and natural gas imports grew at an average annual rate of 10.79 billion cubic meters. In particular, the decline in international oil prices in 2014 has led to a decline in domestic exploration and development investment, and more needs to rely on imports to fulfill consumption.

**Ecological protection puts higher demands on the**



**high quality development of natural gas.** The oil & gas resource rich areas, the important ecological function areas and ecologically sensitive and fragile areas have subjectively spatial overlap. In addition, the current regulations and policies lack the detailed regulations on the classified controls and measures over production and construction activities in environmentally sensitive areas. The oil & gas production activities in environmentally sensitive areas are restricted.

**Insufficient gas storage capacity and unsmooth market mechanism have become two major shortcomings restricting the development of the industry.** With the accelerated construction of natural gas production, supply, storage and marketing system and the issuance of policy documents on gas storage and peaking, the construction of gas storage facilities has begun to form concentrated force. However, due to the long construction cycle of underground gas storage and LNG storage tanks, it is expected that meeting the natural gas storage capacity will continue to be under pressure. With the gradual opening of the system reform, the “rapid development stage” and “painful reform stage” of the natural gas industry are overlapping, in addition with the imperfect supporting policy, resulting fiercer and fiercer game of interest among the upstream, midstream and downstream sectors.



### **3. Promoting High Quality Development of Natural Gas in China**

Developing natural gas into one of China's main energy sources is a crucial part of the national energy strategy of building a clean, low-carbon, safe and efficient energy system. China will adhere to the exposition of the implementation of General Secretary Xi Jinping's new strategy on energy security as the fundamental principle to promote the exploration and development. Emphasizing on constructing natural gas pipeline networks, remedying the shortcomings of gas storage during peak loads and speeding up the reform of the market system, China will promote the construction of natural gas supply, storage and marketing system, and strive to achieve coordinated, stable and high-quality development of natural gas.

#### **(1) Prospects of Natural Gas Development in the Future**

From the international trend, natural gas accounts for 23% of the world's energy consumption structure, and will continue to be the only fossil energy source to grow in the future. International Energy Agency (IEA), BP and other organizations



predict that natural gas will surpass coal to become the second largest energy source in around 2035. Based on the domestic situation, China's economy and society has developed steadily, driving the continuous growth of energy demand. Natural gas always plays an important role in China's energy revolution. It is estimated that China's natural gas consumption will continue to grow by 2050. With the continuous maturity of natural gas consumption market, the future industrial fuel, urban gas and power generation gas will be the three major pillars.

## (2) Plot Major Layouts for the Construction of Natural Gas Production, Supply, Storage and Marketing System

**First, efforts should be contributed in building a base for natural gas production in Sichuan Basin.** Sichuan Basin is a “double enrichment” gas area of conventional and unconventional gas, and they account for 23% and 26% of the whole country, respectively. By increasing the exploitation of deep gas, tight gas and shale gas, natural gas production will account for about one third of the total domestic production in the future, and the shale gas may surpass the conventional gas to become the main gas source. As Sichuan Basin has dense population and sensitive ecology environment, it is necessary to

solve problems like how to safeguard the land, and ensure the security of exploitation while some production areas overlap with environmentally sensitive areas. Meanwhile, China will ensure the planning and layout of natural gas transmission channels in Sichuan Basin.

**The second is to make every effort to forge the natural gas production areas in Ordos Basin and Xinjiang.** The Ordos Basin and Xinjiang (mainly Tarim Basin) have similar natural gas reserves, accounting for 17% and 21% of the country total gas reserve respectively. By strengthening the exploitation of tight gas and breaking through the technical bottleneck of Lacustrine shale gas development in Ordos Basin as well as promoting the exploration and development of deep and ultra-deep reservoirs and complex carbonate reservoirs in the Tarim Basin, the future production will hopefully reach a new level.

**The third is to make every effort to forge offshore natural gas production bases.** The gas resources in the Bohai Sea, the East China Sea and the northern South China Sea alone account for 15.6% of the total domestic resources. Restricted by many factors, the progress of the exploitation and development is slow. In the future, the coordination and promotion will be strengthened to resolve conflicts of offshore exploitation and further accelerate the pace of production.



**The fourth is to strive for a thriving situation in unconventional natural gas exploration and development.** At present, the commercial exploitation of shale gas is limited to the middle and shallow layers of Sichuan Basin. Breakthroughs in the exploration and development of shale gas outside Sichuan Basin can contribute to an increase in the shale gas production by around 10 billion cubic meters. In the future, the focus will be on the Qinshui Basin in Shanxi Province and Ordos Basin to enhance the effort of coal bed gas resource exploration and development, striving to break through the annual production of coal bed methane by 10 billion cubic meters as soon as possible.

**The fifth is to accelerate the construction of regional underground gas storage clusters.** China's existing gas reserve is equivalent to 5.7% of annual consumption while the world average level is 12%-15%. At present, building gas storage facilities is constrained by many factors, such as the difficulty in location planning, land use, and attaining a breakthrough in the profit model. The next step is to focus on building regional underground gas storage clusters around natural gas production areas and import channels, in order to solve the problem of land use for key gas storage, and at the same time, to establish and improve relevant market mechanisms and gain more policy support, so as to make the investment of gas storage facilities

have reasonable returns and sustainable operation.

**The sixth is to build LNG gas supply guarantee system in the Bohai rim region.** On the basis of further improving the pipe network system in the Bohai Rim region, a number of LNG terminals will be built based on the existing port area layout to enhance the multi-source protection and anti-risk capability of natural gas in the northern region, especially in the Beijing-Tianjin-Hebei region. The environmental protection requirements of the region are strict, and it is necessary to give strong support in the aspects of reclamation and environmental protection policies, and land use and sea security to ensure that the project will be implemented on schedule.

**The seventh is to develop alternative energy sources in an orderly manner.** Developing coal-produced gas industry is an important way to enhance domestic natural gas supply based on domestic energy resources and national conditions. On the basis of the current coal-produced gas production capacity, efforts should be put in strengthening the supervision for the construction of demonstration projects included in the plan and promote the implementation of strategic technical reserves and capacity reserves. The support is focused on developing clean heating mechanisms using biogas in rural areas of northern China, striving to achieve breakthroughs in the national



production of biogas.

**The eighth is to rationally distribute import gas sources and channels.** Effort will be put on accelerating the promotion of natural gas importing countries (regions), transportation modes, import channels, cooperation models and participation of entities. Enterprises are encouraged to “go abroad” and actively participate in the exploitation and development of international gas resources and the investment and operation of international LNG liquefaction projects.

### (3) Strengthen Supporting Policies and Measures and Build a Complete Natural Gas Production, Supply, Storage and Marketing System

**The first is to increase the policy support for increasing reserves and production.** The special petroleum proceeds should be abolished or the threshold should be raised, and oil and gas exploration risk fund should be continued. Preferential policies of resource tax reduction and exemption should be continued in the areas of heavy oil, hyper-freezing point crude oil, high sulfur natural gas, and tertiary oil recovery, etc. Supported policies for the base gas of gas storage should be implemented.

**The second is to deepen the reform of the oil and gas**

**system.** Market competition in the area of exploration and development should be strengthened. A system of competitive transfer of exploration blocks need to be implemented. Relevant mining rights transfer should be open to eligible market entities, publicly and fairly. Unified planning of national natural gas pipeline network will be reinforced, with accelerated infrastructure construction. Determine the tariff of pipeline transportation reasonably and reduce the intermediate links of gas supply. Seasonal price differential policy will be promoted.

**The third is to intensify efforts to tackle key scientific and technological problems.** Focusing on the current and frontier technology related to unconventional, offshore and land-deep exploration and development, next generation of oil and gas geological research and exploration risk assessment, and enhanced oil recovery, independent research should be intensified along with the introduction, digestion and absorption of international cutting-edge technology and experience, to give full play to the supporting role of science and technology in oil and gas exploration and development.

**The fourth is to improve the business environment in the resource development areas.** The relevant regions should increase support for facilitating the approvals of enterprise projects. Guidance and coordination should be put forward in



relevant regions to solve the contradictions between ecological environment protection, cultivated land protection, ecological red line delimitation and oil and gas development as a whole for major state projects such as oil and gas exploration and development, gas storage, pipelines, etc. Through the working principles of “five distinctions” such as “distinguishing solid ore from oil & gas, exploration from development, oil from natural gas, protection area first from mineral right first, and different protection types”, the related work of oil and gas exploration and development in environmentally sensitive areas will be promoted.

**The fifth is to rationally optimize the gas consumption structure.** On the basis of guaranteeing gas supply for people’s livelihood, industrial gas usage should be implemented in accordance with the requirements of “interruptible consumers first, steadily advancing ‘vehicle and ferry gas usage’, moderately developing power generation and strictly controlling chemical gas consumption”. Differentiation should be emphasized in natural gas power generation, promoting peak shaving and distributed projects in the near future, and cogeneration and multi-energy complementarity in the medium and long term. Heat calorific value measurement will be actively promoted with development in building energy conservation,



and strengthened propaganda and guidance on gas saving.

**The sixth is to promote the market-oriented reform of natural gas prices.** The price of the competitive links of natural gas sector will be gradually liberalized to reduce the cost of energy usage of enterprises. The improvement of regulation and supervision will be accelerated with information disclosure system. Differentiated pricing policies such as seasonal price differentials and interruptible gas prices will be implemented to promote peak cutting and valley filling, and guide enterprises to increase their capacity for gas storage and seasonal adjustment in low and peak seasons. The price supervision in natural gas transmission and distribution links will be strengthened to effectively reduce the excessively high transmission and distribution prices in provincial areas, to gradually build a highly efficient natural gas market system.



## Concluding Remarks

2019 is the fifth anniversary of the implementation of General Secretary Xi Jinping's new energy security strategy of "four-revolution and one-cooperative". It is also the key year for the construction of natural gas production, supply, storage and marketing. China's natural gas will keep being in a period of rapid development for 2019. It is estimated that the apparent consumption will be around 310 billion cubic meters, an increase of around 10% year-on-year. We must adhere to General Secretary Xi Jinping's important exposition on the new strategy of energy security, carry forward the spirit of petroleum in the new era, work with one heart and one mind to meet difficulties and advance all kinds of work in a solid manner, to continuously push forward the construction of natural gas production, supply, storage and marketing system and the vigorous enhancement of exploration and development work for high quality development of natural gas.

We look forward to the release of the *China Natural Gas Development Report (2019)* that will hopefully stimulate discussion and exchange of ideas on the development plan of natural gas industry, and jointly promote the natural gas reform

to better serve the overall economic and social development.

Here, we sincerely thank all the relevant departments, research institutes, industry associations, enterprises, international organizations and many experts for their strong support and help.

Thanks to the following people (sorted by surname and strokes) for suggestions on the revision of the *China Natural Gas Development Report (2019)* and contributions made during the drafting process:

WANG Liansheng	WANG Guoli	WANG Xiaoqing
WANG Jie	TIAN Ying	SHI Yunqing
LIU Minglei	SUN Zhi	SUN Hui
LI Wei	LI Lei	YANG Jianhong
SHEN Xin	CHEN Jindian	JIN Shuping
ZHOU Shuhui	ZHOU Peng	JIANG Xiangqiang
GAO Anrong	TANG Yongxiang	TANG Jinrong