

# Research & Analysis

## Gases in the Analytical World

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Knivsta • 2018 March

Jonas Martinsson, Sales • Research & Analysis

INDUSTRIAL  
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# Agenda

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- Introduction
- Air Liquide - who are we?
- NWE Cluster & Nordics
- How do we make your gases?
- Feed your instrument with the right stuff - Impurities AAAAAARRGH!!!
- Use the right gas and equipment for the job

# Who we are...

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AIR LIQUIDE, THE WORLD LEADER IN GASES, TECHNOLOGIES AND SERVICES FOR INDUSTRY AND HEALTH

3

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Gases in the analytical world

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# The world leader in gases, technologies and services for Industry and Health

## 2017 key figures

~67,000  
EMPLOYEES

Present in  
80  
COUNTRIES

Revenue  
€ 20.3  
BILLION

Net profit  
€ 2.200  
BILLION

More than  
3 MILLION  
CUSTOMERS  
& PATIENTS

INDUSTRY

- wide range of industrial processes for customers:
  - energy, metals, food, chemicals, automotive, pharmaceuticals...

HEALTH

- hospitals
- patients at home
- hygiene and specialty ingredients

# NorthWest Europe Cluster



- 3x clusters in Western Europe:
  - **North West Europe**
    - Nordics, Benelux & UK
  - Central West Europe
    - Germany, Austria & Switzerland
  - South West Europe
    - France, Italy & Iberia



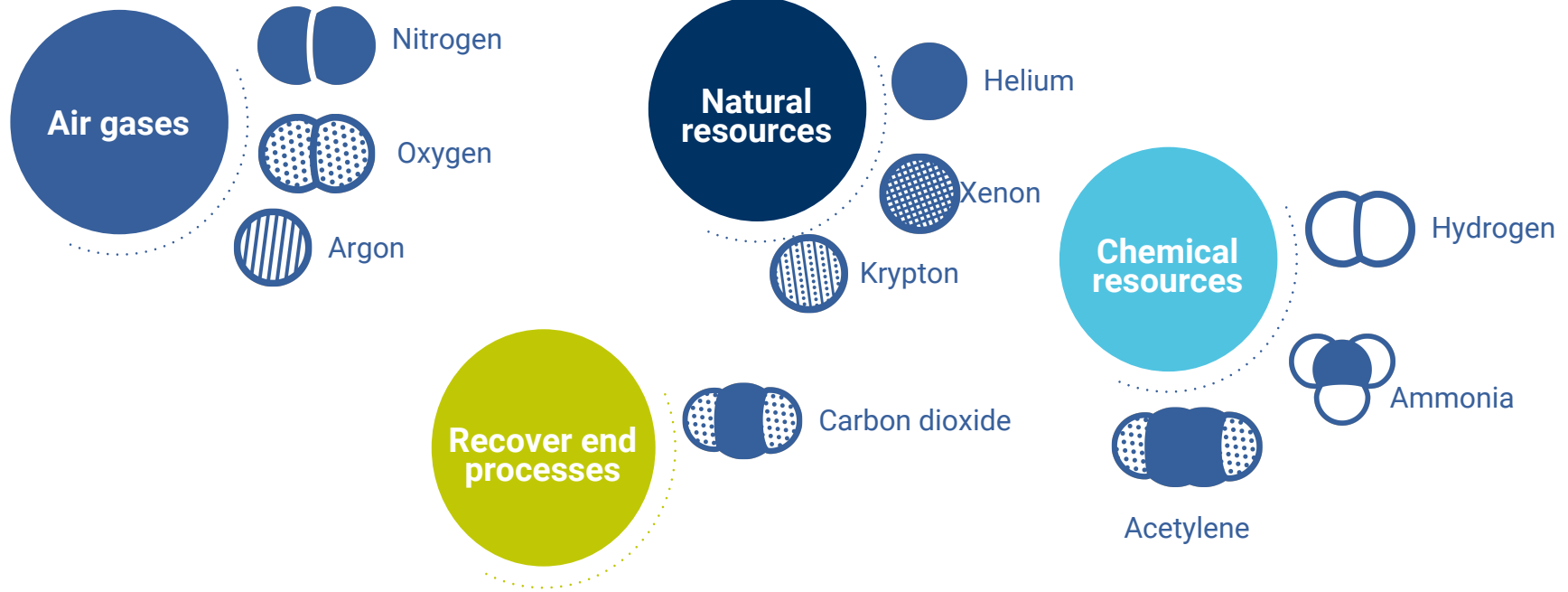
# NorthWest Europe Cluster - locations



# 2

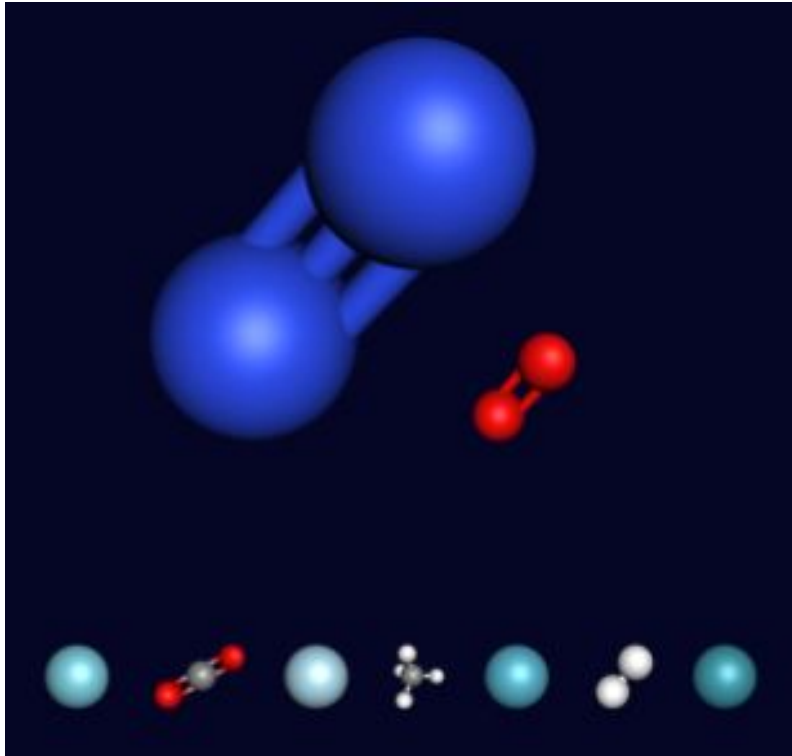
## The gases

# We explore the properties the gas molecules offer



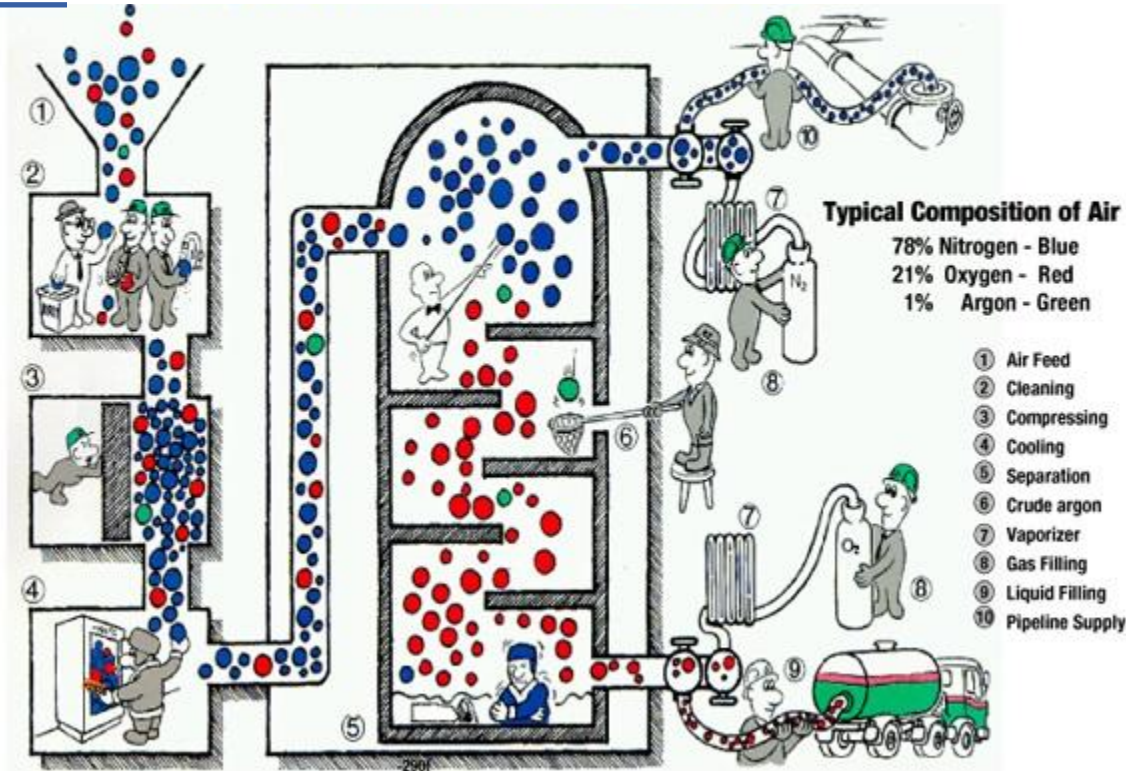


# Air



Gas	Formula	ppm in atmosphere	% in atmosphere
Nitrogen	N <sub>2</sub>	780 840	78,08
Oxygen	O <sub>2</sub>	209 460	20,95
Argon	Ar	9 340	0,93
Carbon dioxide	CO <sub>2</sub>	400	0,04
Neon	Ne	18,18	0,002
Helium	He	5,24	0,0005
Methane	CH <sub>4</sub>	1,745	0,0002
Krypton	Kr	1,14	0,0001
Hydrogen	H <sub>2</sub>	0,55	0,00006

# Air separation unit



# Air separation unit - Eggborough

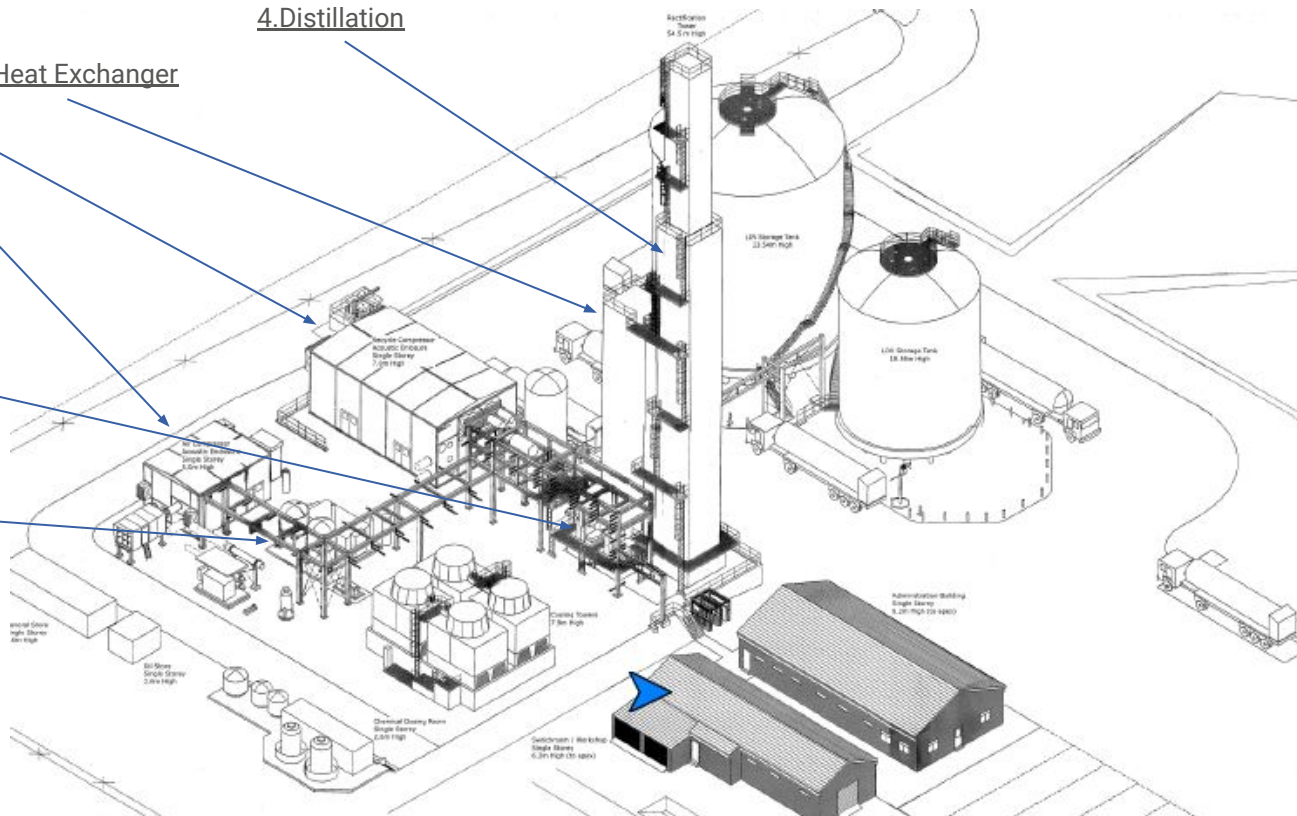
1.Compression

4.Distillation

3.Heat Exchanger

5.Cold Production

2.Purification



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# The equipment is big



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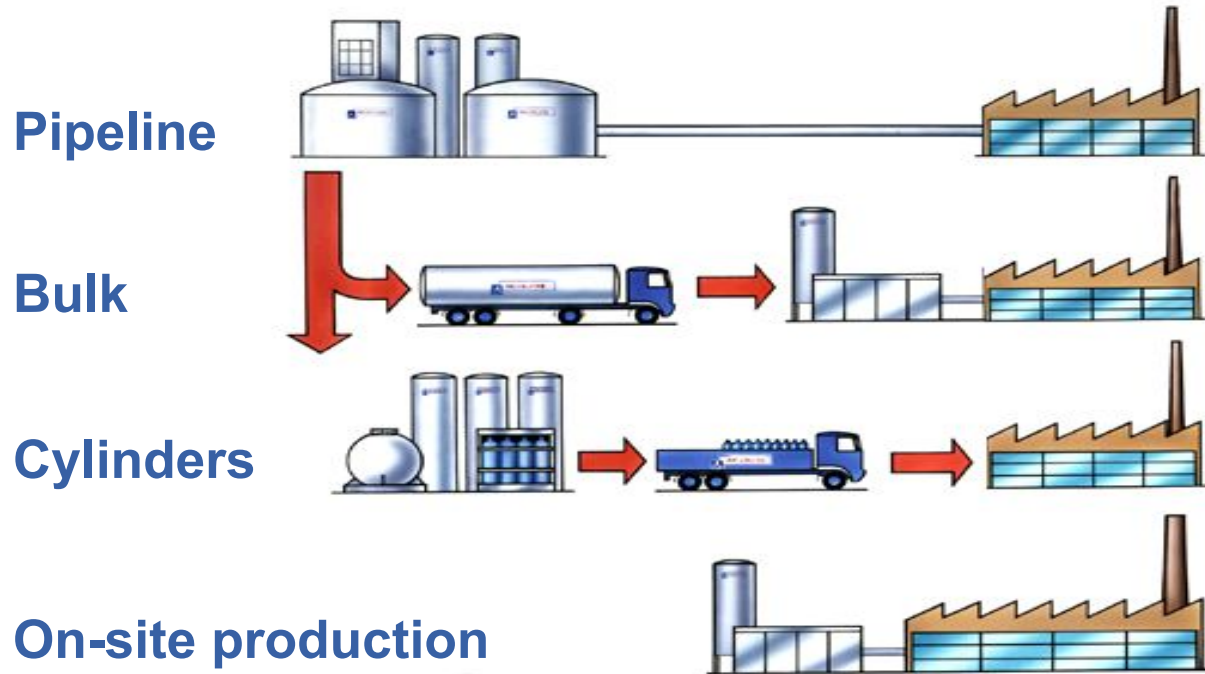
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Gases in the analytical world

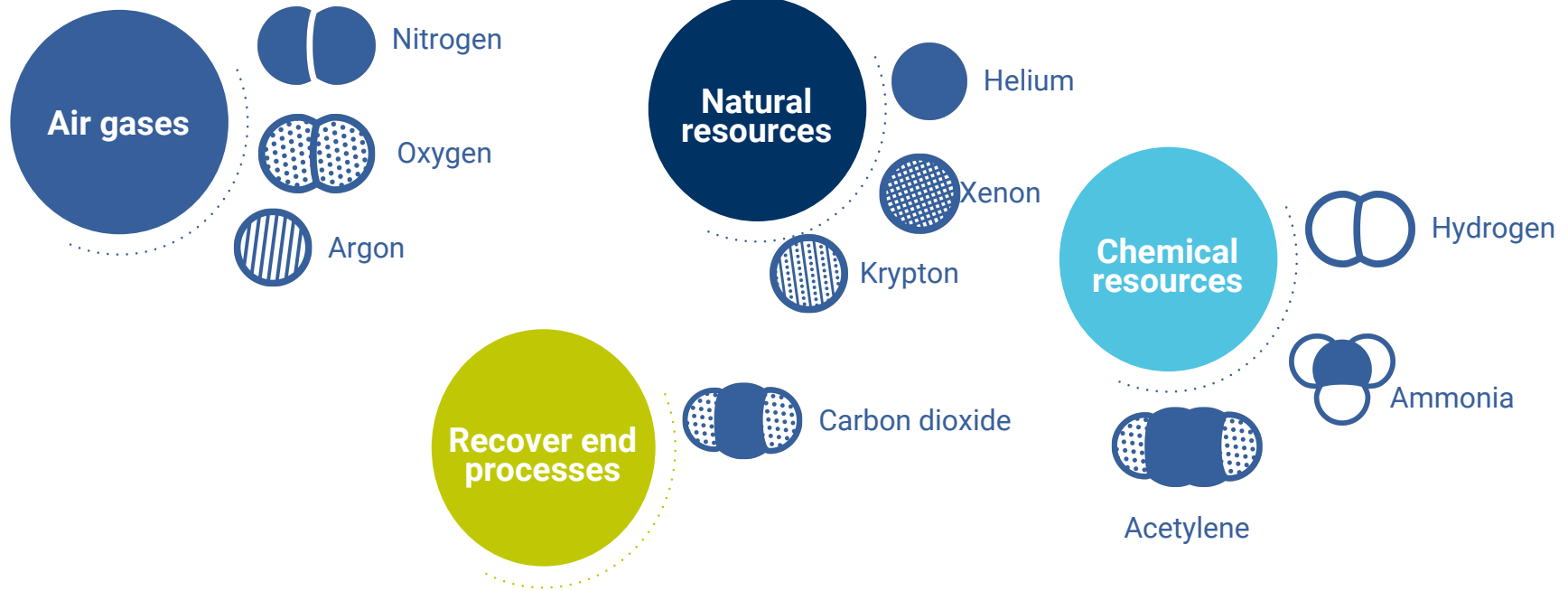
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# Appropriate modes of supply



# We explore the properties the gas molecules offer



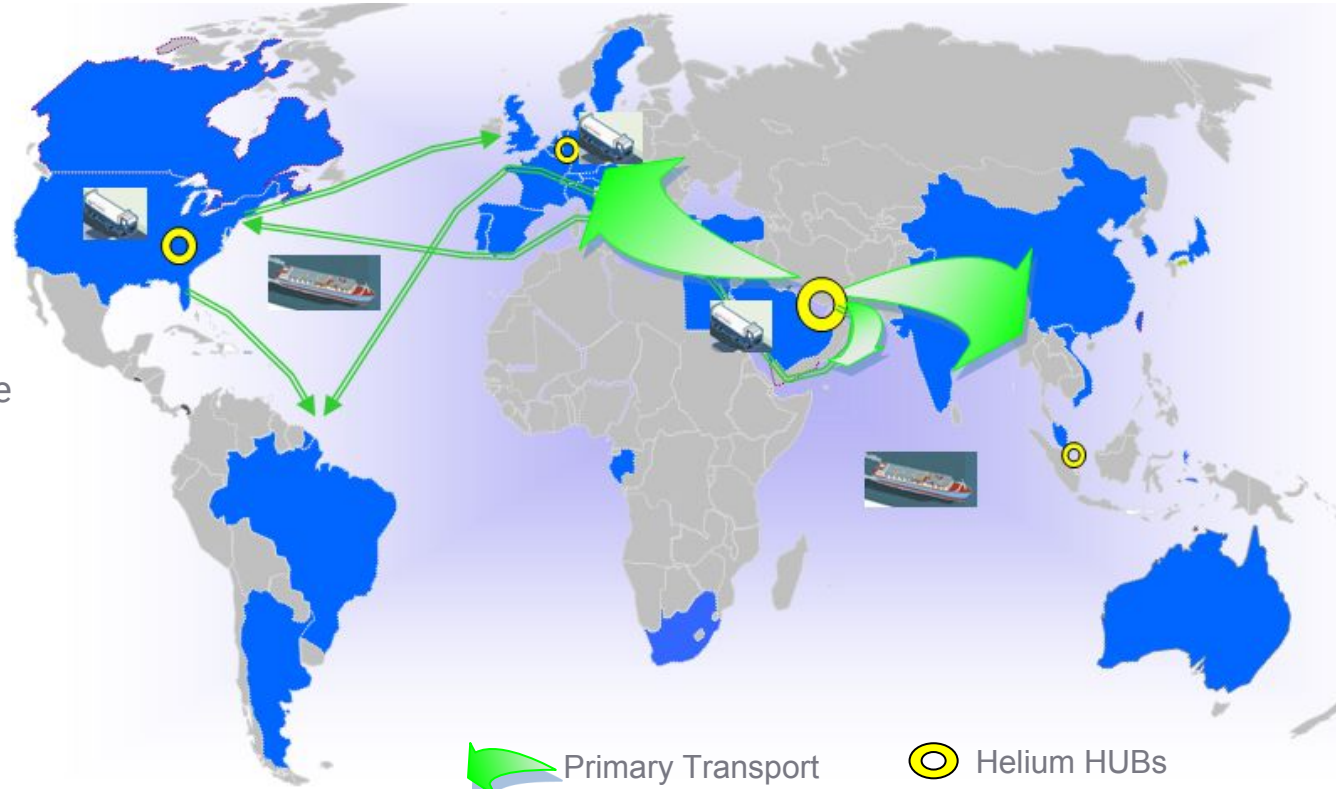
# Helium logistic hubs : a worldwide presence

4 Hubs

Over 300 Liquid Containers

Over 30 transfills WW

Full secondary logistics in more than **30 countries** (gaseous tube trailers, liquid dewars, bundles, cylinders)



 Primary Transport

 Helium HUBs

# Helium transfilling in Taastrup/ Copenhagen





# Helium - main applications

## MRI & NMR

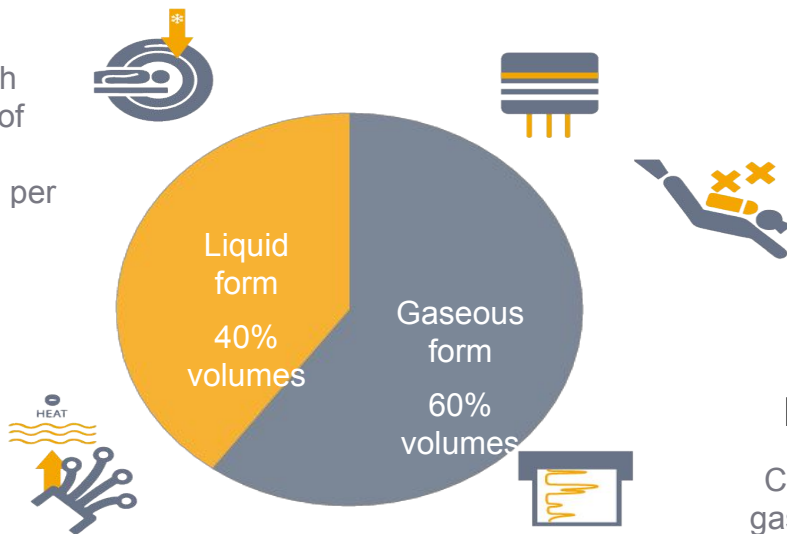
- Today MRI scanners are using helium for service and if quench should occur. New generation of MRI scanner requires approximately 500 ltr of helium per 5 year)

## Rockets & Satellites

- Systems cooling & fuel pressurizing

## Fiber Optics

- Highly purified glass preform creation & fiber cooling



## Electronics

Production cooling <

## Breathing Atmospheres

Faster, easier and safer decompression <

## Chromatography & Laboratory Applications

Carrier gas & purge gas, zero gas or neutral atmosphere gas <

## Balloon

Balloon inflation <

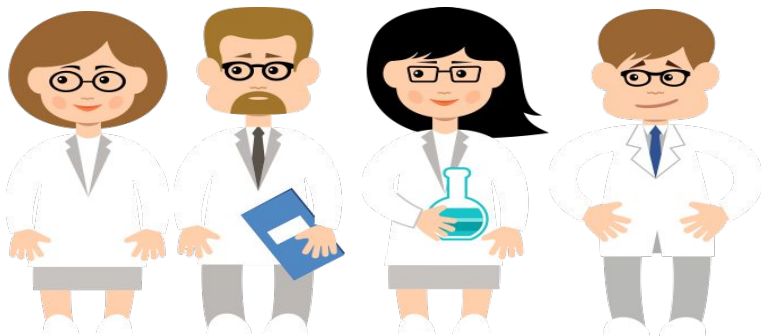
Helium is a key molecule in many applications **airships, airbags, welding...**

# 3

Feed me...

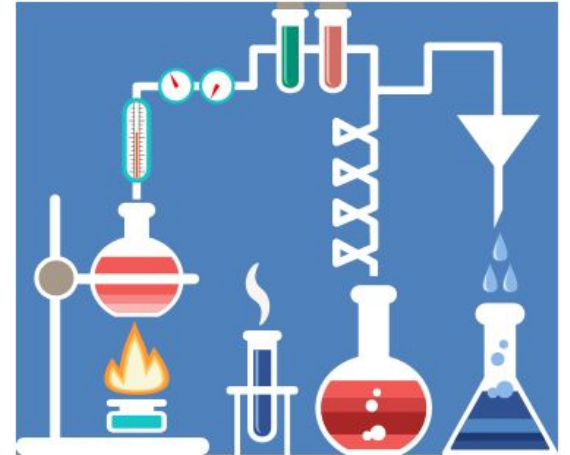
# Good nutrients = good analysis

- Analytical equipment is sensitive
- The very nature of the analysis you do requires it to be so
- You can't measure to ppb levels with confidence without being sure of the instrument
- However the instrument is only as good as
  - The operator - you - will take that as being ok
  - The gases being used to facilitate the analysis
- In other words
- Rubbish in = Rubbish out



# Give them what they like...

- As we have said Rubbish in = Rubbish out
- It's often not the level of purity of the gases you do want but rather the levels of the impurities of the gases you don't
  - What hurts your instrument?
  - H<sub>2</sub>O
  - HCs
  - Sulphur
  - Etc...
  - Your gases must be pure enough so that the impurities  
...and there are always some
    - ✓ Don't interfere with your analysis or damage your equipment
    - ✓ Part of your selection should be to check key impurities  
...not solely on the basis of total purity



# Give them what they like...

- Analytical equipment likes
  - Pure uncontaminated gas
  - No impurities - impossible
  - Repeatable quality
  - Regularity of use
- And hates
  - Impurities - dirty gas
  - Unreliable service



Little Shop of Horrors 1986 Warner Bros

# Give them what they like...or else

- Failed test results
  - In highly regulated sectors this can be very costly
  - Money
  - Reputation
  - Eg engine emissions testing
- Repeat testing
- Down time for repairs / recalibrations
- Money - extra expense in buying replacement parts
- etc...



# Give them what they like...or else

- Sometimes it is appealing to purchase gases from a supplier because the prices are cheap
- Cheap gases can come at a price...they are cheap for a reason
- Gases are often the Cinderella of the analytical world
  - That new ICP-MS or GC takes all the glory
  - But without good quality gases it won't perform



# Give them what they like...or else

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- Gases should be purchased from a supplier who has the capability/expertise/knowledge
  - Knows the applications
  - They have gases expertise and know what and why you need it
  - Not simply selling you the gas - selling you their expertise
- So buy good quality, high purity gases to feed your labs and remember to think...

It's often not the level of purity of the gases you do want but rather the levels of the impurities of the gases you don't



- Helium
- Hydrogen
- Nitrogen
- Zero air
- Argon



- Stable Isotope Ratio Reference Gases

Thank you...any questions???

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