

Copper Alloy Mesh: Improving Sustainable Aquaculture



CODELCO

COPPER

International Copper Association, Ltd

Codelco, promoting new uses of copper for worldwide aquaculture

智利国营铜业公司
开发铜的创新应用，助力全球水产养殖业

Víctor Pérez

Marketing Director of Codelco 智利国营铜业公司市场总监
Board President of EcoSea Farming S.A. 智利生态海公司董事总裁

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CODELCO

智利国营铜业公司



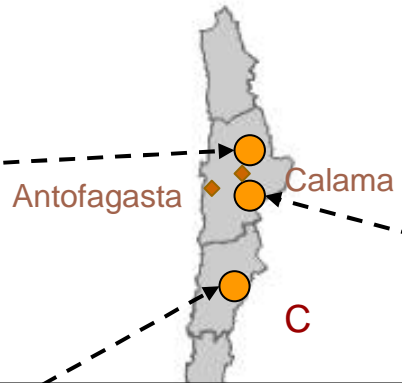
CODELCO 智利国营铜业公司

- Chile is the country with the largest copper reserves in the world.
智利拥有世界最大的铜储量。
- Codelco is a mining company owned by the state of Chile.
智利国营铜业公司Codelco是一家智利国有矿业公司。
- Codelco has the most copper resources and reserves known in the world.
智利国营铜业公司Codelco公司拥有世界上最大铜资源。
- Codelco is also the second largest molybdenum producer in the world.
Codelco公司亦是世界上第二大钼矿生产商。
- During 2009, Codelco increased its output by 15% and is responsible for more than 33% of copper production in Chile
在2009年，Codelco公司产出增加15%，占全智利铜产量的33%以上。
- Human Resources: 19,359 employees and 47,158 contractors.
人力资源：拥有19,359名雇员和47,158位承包商。



Codelco Norte Codelco

2009 figures	
Production (thousand tons)	
Copper	875
Molybdenum	13
Cash Cost (c/lb)	93.2
Resources (mill mft)	91.9



Gabriela Mistral

2009 figures	
Production (thousand tons)	
Copper	148
Cash Cost (c/lb)	93.3
Resources (mill mft)	4

Salvador

2009 figures	
Production (thousand tons)	
Copper	65
Molybdenum	1
Cash Cost (c/lb)	136.7
Resources (mill mft)	12

Production 2009: 2009年产量
1,78 Million Tons of copper
1,78万吨铜
1st copper producer in Chile 智利最大的铜生产商
12% of world production
占世界铜产量的12%

Andina

2009 figures 2009年数据	
Production (thousand tons)	
Copper	210
Molybdenum	2
Cash Cost (c/lb)	84.9
Resources (mill mft) 资源	5

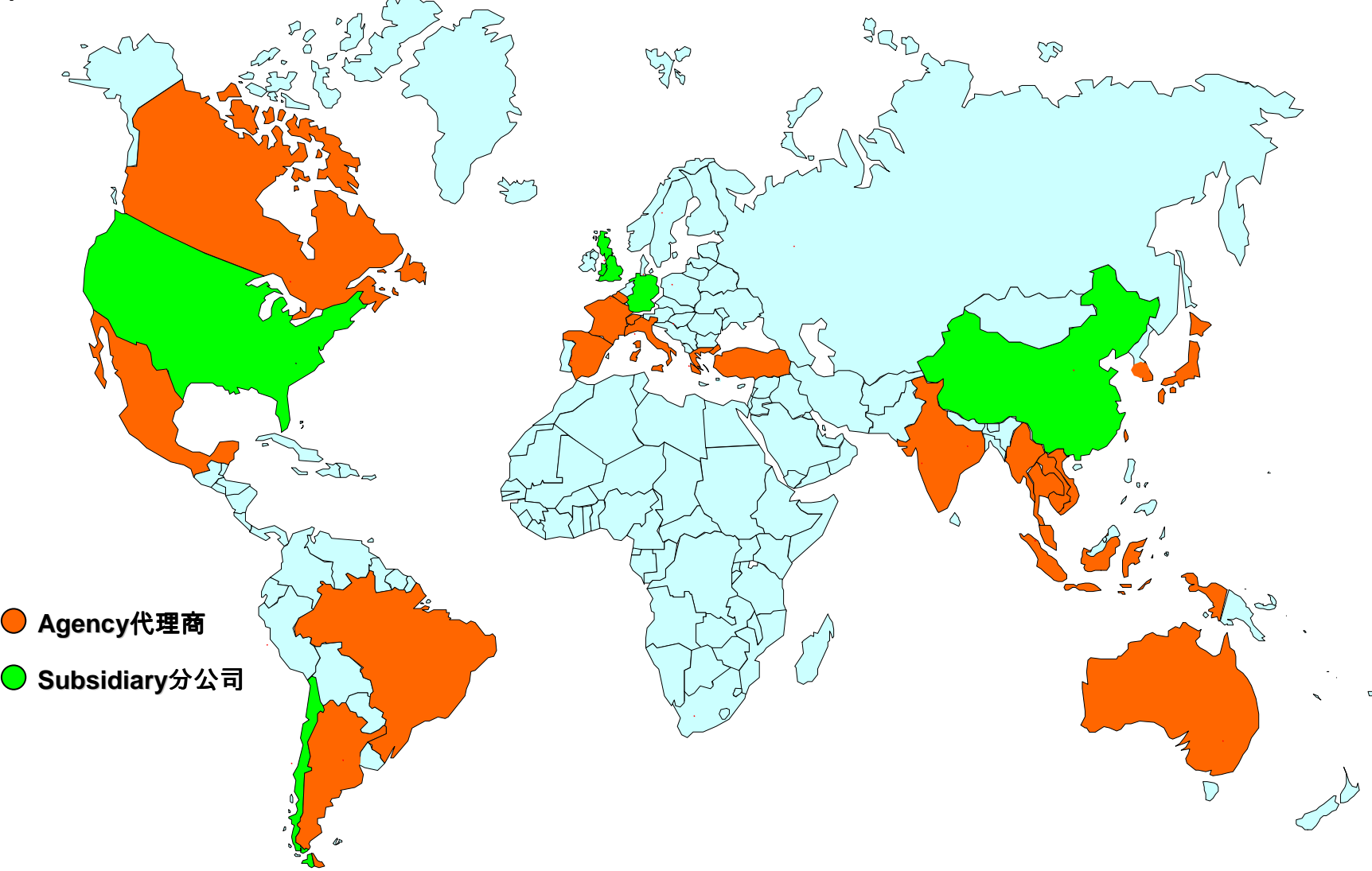
El Teniente

2009 figures	
Production (thousand tons)	
Copper	404
Molybdenum	5
Cash Cost (c/lb)	83.3
Resources (mill mft)	94



CODELCO's agents and subsidiaries

代理商和分公司



CODELCO and Market Development 市场发展

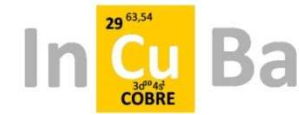
- Market development is one of the 7 strategic guidelines of Codelco.
市场开发是Codelco公司的七大战略指导方针之一。
- Codelco actively supports International Copper Association (ICA) market development initiatives.
Codelco公司积极支持国际铜业协会 (ICA) 的市场发展倡议。
- Codelco promoted the ICA technology initiative, generating a business model that invites third parties to invest in opportunities for new copper uses.
Codelco公司积极推广ICA创新研发，开发一种商业模式，邀请第三方参与投资铜的新应用
- In 2007, ICA developed the “Copper Applications Technology Roadmap” which is a guide for technology innovation in new copper applications.
2007年，国际铜业协会 (ICA) 制定“铜应用技术路线图”，为铜应用的技术创新提供了正确的导向准则。

CODELCO and Market Development 市场发展

- The scenario in 2007 also included: 此方案还包括：
 - economic support of the promotion of Copper and Molybdenum international associations, ICA e IMOA respectively, for market development projects in Chile .
为铜和钼的国际协会(分别为国际铜业协会ICA和国际钼业协会IMOA)提供经济支持，以协力其在智利的市场发展项目。
 - support from Visión País (Country Vision) through CORFO Innova and CONICYT (governmental agencies) to co-finance market development activities in Chile.
通过CORFO Innova和CONICYT (政府机构) 得到 Visión País (Country Vision)的支持合作，为智利市场发展活动提供资金。
 - international experience in business and innovation models of Codelco's Market Development team.
Codelco公司市场和发展团队在商业和创新模式上的国际经验。

CODELCO and its subsidiary INCuBA

Codelco公司及其子公司INCuBA



- In December 2008, Codelco, in its effort to develop new markets for copper, formed its subsidiary INCuBA.

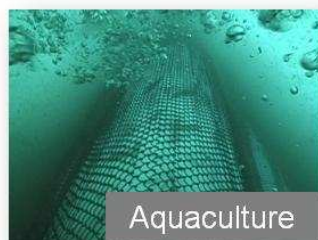
2008年12月，Codelco公司创建子公司INCuBA，大力发展铜的新市场。

- INCuBA is the investment vehicle to develop projects with impact in copper and molybdenum demand, ensuring market sustainability and viability of the copper business.

INCuBA是项目发展的有效投资工具，它可影响铜与钼的市场需求，并确保铜业市场的可持续性和可行性。

- INCuBA is working in innovations that solve the needs of important economic sectors of Chile and the World, placing the country in the lead in terms of new developments on copper uses with great impact in demand.

INCuBA不断追求创新，以满足智利以及世界重要的经济部门的需要，使智利国家在铜的创新应用上处于领先地位。



INCuBA in Aquaculture

INCuBA在水产养殖业中的贡献

- Chile is the second largest producer of salmon
智利是世界第二大三文鱼生产国
- Issues are high maintenance costs, big losses due to sealion attacks or escapes, poor sanitary conditions, etc.
三文鱼养殖问题包括:维修费用高昂,海狮捕食,鱼类逃逸带来的损失,卫生条件欠佳等
- Copper alloy cages offer no fouling, an antimicrobial effect, resistant mesh, and are a recyclable product
铜合金网箱可有效防止生物附着,抑制病菌,坚固耐用,可回收利用



EcoSea, the vehicle of INCuBA in aquaculture

生态海公司, INCuBA在水产业的利器

EcoSea was formed in 2007 when an innovative project teamed experts with the objective of expanding the availability of copper systems in the worldwide aquaculture industry.

EcoSea诞生于2007年的一个创新项目。此项目中,来自水产业的各位专家纷纷聚首,以期扩大铜系统在全球水产养殖业中的应用。

INCuBA is the the main partner of EcoSea Farming S.A. (47%) followed by the International Copper Association (20%)

INCuBA是南美生态海公司(47%)的主要合伙人,紧跟其后的是国际铜业协会(20%)



EcoSea
Innovaciones Acuícolas

EcoSea, the vehicle of INCuBA in aquaculture

The value proposal of EcoSea for the fish farming includes:

生态海公司对渔业养殖的宝贵建议：

- Better conversion rates (less food to get the same growth)
更高的转换率（用较少的食物获得同样的生长率）
- Better growth rate
更快的生长速度
- Fewer losses due to predator attacks or escapes
减少由于捕食动物的攻击或养殖鱼类逃逸而带来的损失
- Healthier fish → Higher productivity → Higher profit
更健康的鱼类→更高的产量→更高的利润



Recyclability of copper

铜的可回收性

Recyclability of copper 铜的可回收性

33% of the copper used comes from recycled material
33%的铜消费使用废杂铜

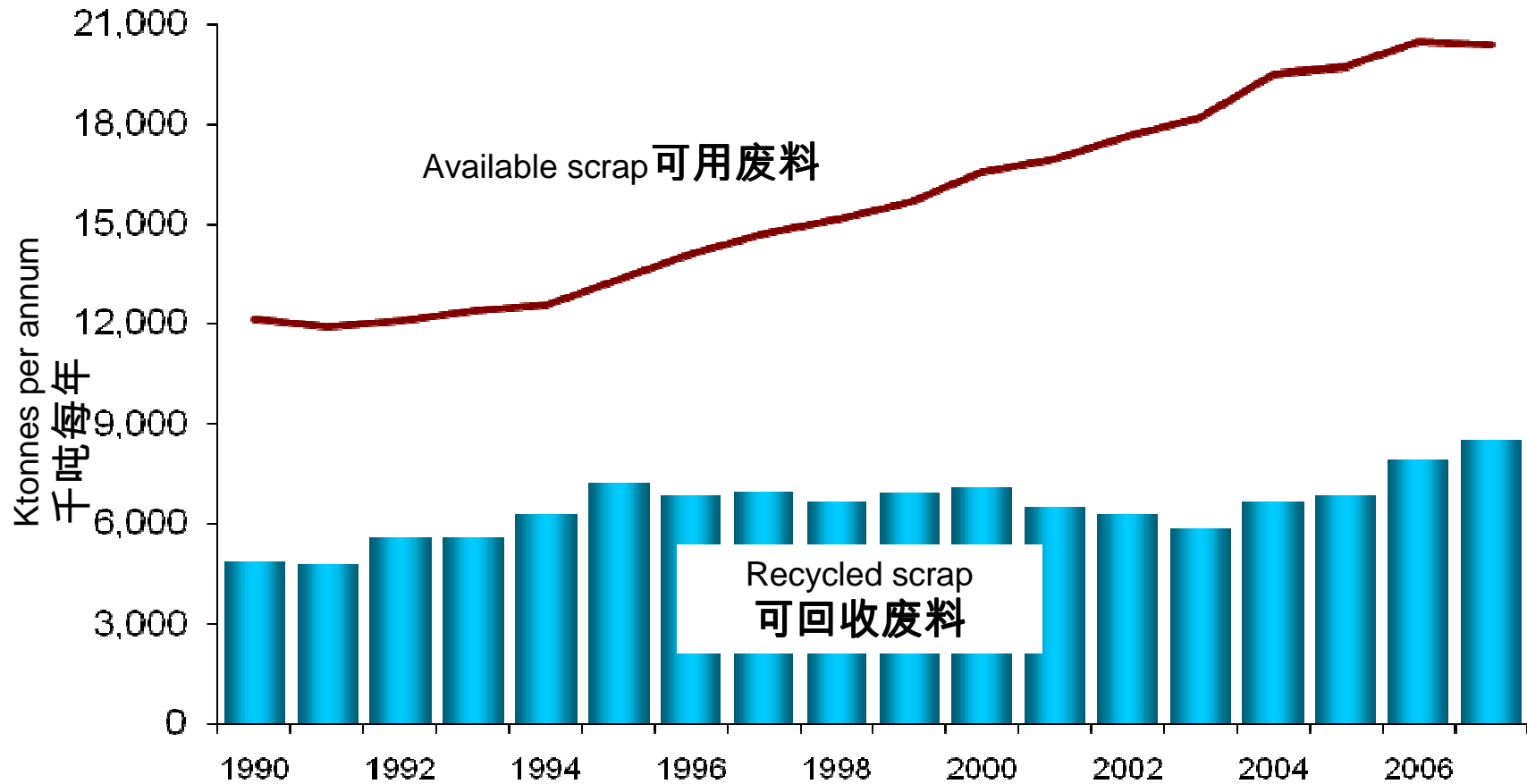


Consumption origin 消费来源	Million Tons 万吨	%
Mine production 矿山生产	16	66,6
Old scrap 旧废料	2	8,3
TOTAL refined copper 精炼铜总计	18	75
New scrap 新废料	6	25
TOTAL of copper in semis 铜总量	24	100

Scrap/Total copper in semis = $8/24=33,3\%$
废杂铜/总铜比率=8/24=33.3%

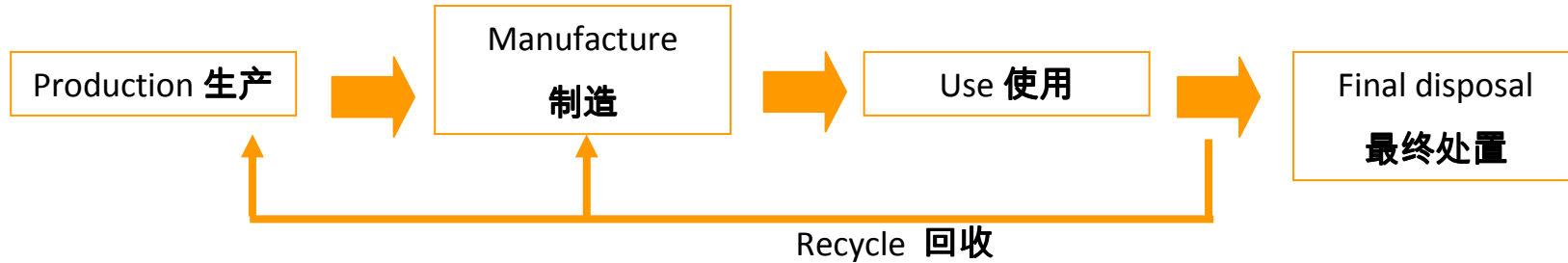
Gap between available scrap and recycled scrap

可用废料与可回收废料之间的差距



Secondary offer → Lower environmental burden

辅助提供 → 减少环境负担

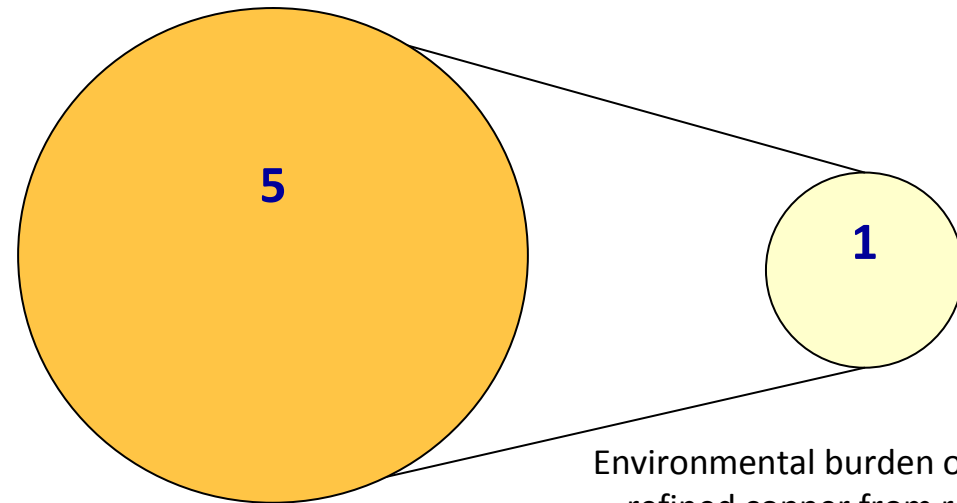


“From the cradle to the grave”

Generation of the higher environmental burden

“铜的一生”产生较高的环境负担

(80%-90%)



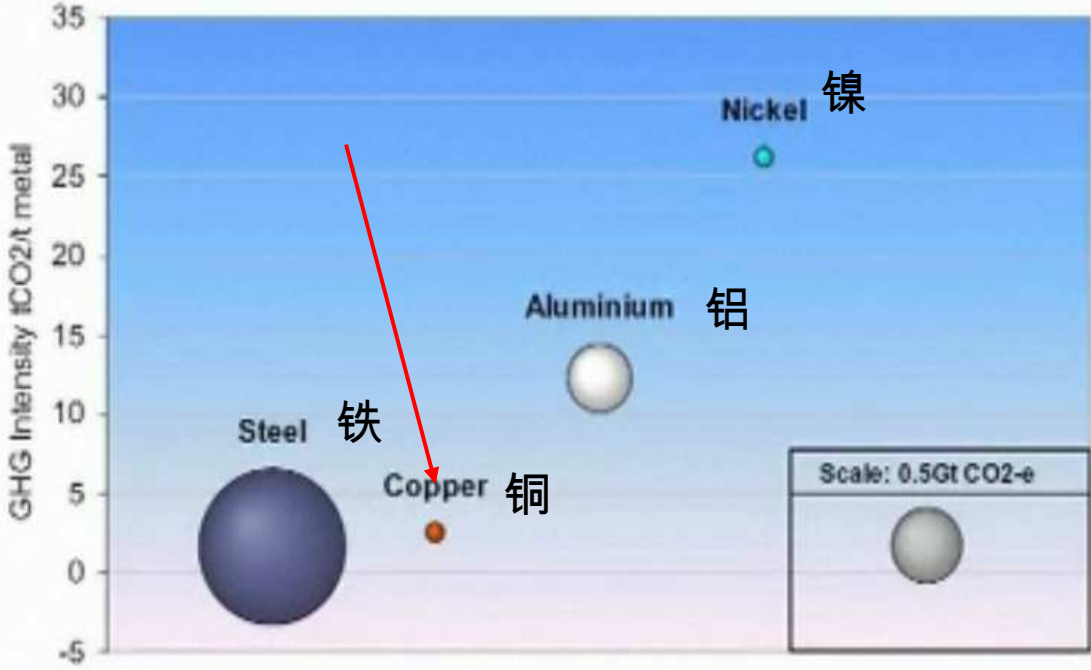
Environmental burden of 1 ton of refined copper from copper cathode
精炼1吨阴极铜所带来的环境负担

Environmental burden of 1 ton of refined copper from recycled copper

精炼1吨回收铜的环境负担

Carbon Footprint of copper and product eco-labelling

铜的碳足迹和产品生态标签



Bubble size represents total industry estimated GHG emissions



working with the Carbon Trust



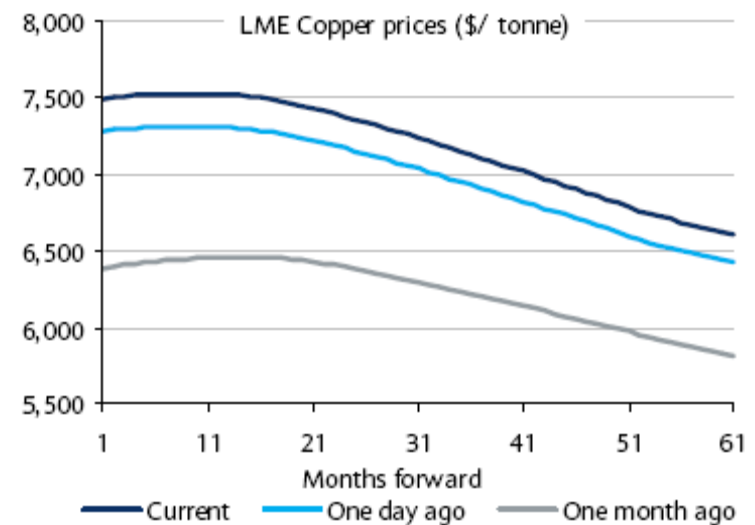
Recyclability of copper, an advantage for copper alloy cages

铜的可回收利用性,以及铜合金网箱的优势

- Copper is recyclable 铜可回收利用
- Copper-zinc alloy is recyclable 铜锌合金可回收利用
- It keeps 100% of its properties 其属性100%不会流失
- Thus, copper is a financing colateral 因此,铜具有融资担保性
- There are copper price curves for the next 61 months

图为未来61个月的铜价格曲线

Figure 4: Copper



Business model of EcoSea- Rent a cage

生态海公司租借网箱的商业模式

“Rent a cage”租借网箱

- 5 years rental of aquaculture system 根据水产养殖系统, 租用5年
- Components of the system 系统构成
 - Copper alloy mesh 铜合金网箱
 - Steel platform and auxiliary flotation tube → minimizes risk because there is the possibility of relocating the system in other site
钢制平台和辅助浮选管 → 最大限度地减少风险, 因为可能需要移动网箱系统.
 - The rental service includes: 租借服务包括
 - Installation 安装
 - Structure inspection and maintenance services 结构检测及维修服务
 - Uninstallation 卸载
- At the end of the 5th year, systems are removed and recycled.
在第5年末, 铜网将被卸载并回收。
- To ensure the cash flow at the end of the contract, upon signing, a hedge for copper price at the end of the mesh life cycle is made.
为了确保合同到期时的现金流, 在签订合同时, 需要计算出铜合金网箱使用寿命到期时铜的价格套期

Price hedge 价格套期

Year 0 首年

Year 5 第五年

Purchase of copper and zinc 购买铜和锌

Hedge of copper price five years forward 五年后套期铜价



Rental contract with an EcoSea client for 5 years 与生态海客户签订5年的租赁合同

Recovery of material and metal value 回收的材料和金属价值

Or 或者

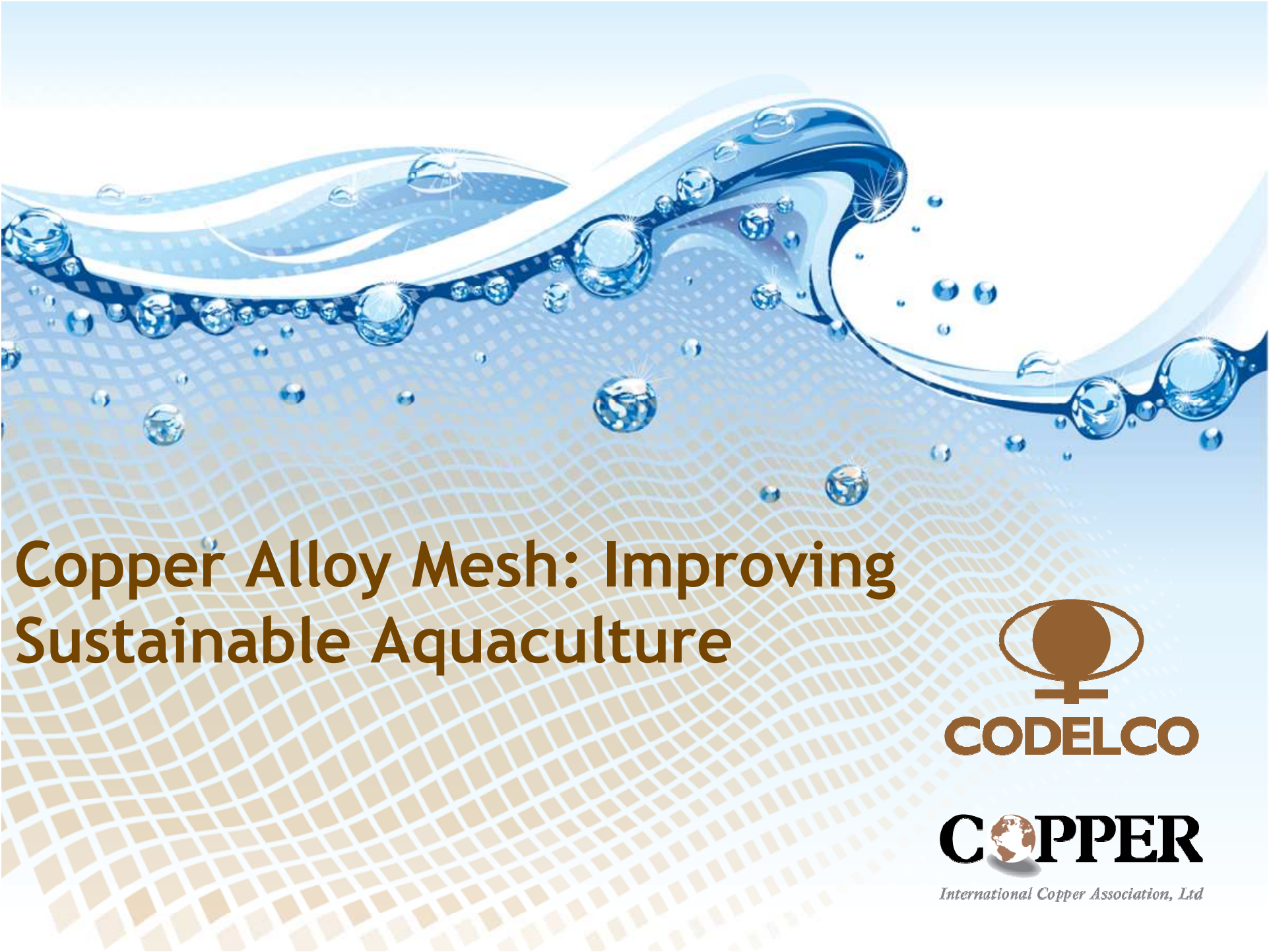
Renew the renting contract and replicate the business model 续订租赁合同, 移用商业模式

Financial model for business growth

业务增长的财务模型

- INCuBA has financed, through bank credit, the investment of the first EcoSea contracts for 56 cages. However, INCuBA will not finance the investment needed for the explosive growth of the business (about 400 cages for the next 4 years, approximately USD 100 Million, full cost).
INCuBA通过银行信贷，为EcoSea第一笔56箱的投资合同提供资金。然而，INCuBA不会为爆炸性增长的业务投资提供资助（据估计，在未来4年内，将有400箱的需求，总价值约为100万美元）。
- The formation of a private equity fund with third parties investment is needed to leverage the finance model based on the rent of copper.
需要与第三方投资形成一个的私募基金，形成以租用铜为基础的融资模式。
- During the next 12 months we will focus our efforts in evaluating and structuring this private equity fund with the objective of launching it at the end of next year.
在未来12个月中，我们将集中精力评估并构建这种私募基金，争取在明年年底正式面世。
- In case this business model proves to be success, we would replicate the private equity fund in China and Norway in 2012.
如果实践证明，这种商业模式是成功的，我们将于2012年在中国和挪威启用这种私募基金模式

THANK YOU
谢谢!



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