

Topmotors training program "IEO" - Sino-Swiss (China): knowledge transfer and cooperation

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Overview

- Background
- Swiss training program
- Swiss demonstrator
- Chinese experience
- Chinese demonstrator and knowledge transfer

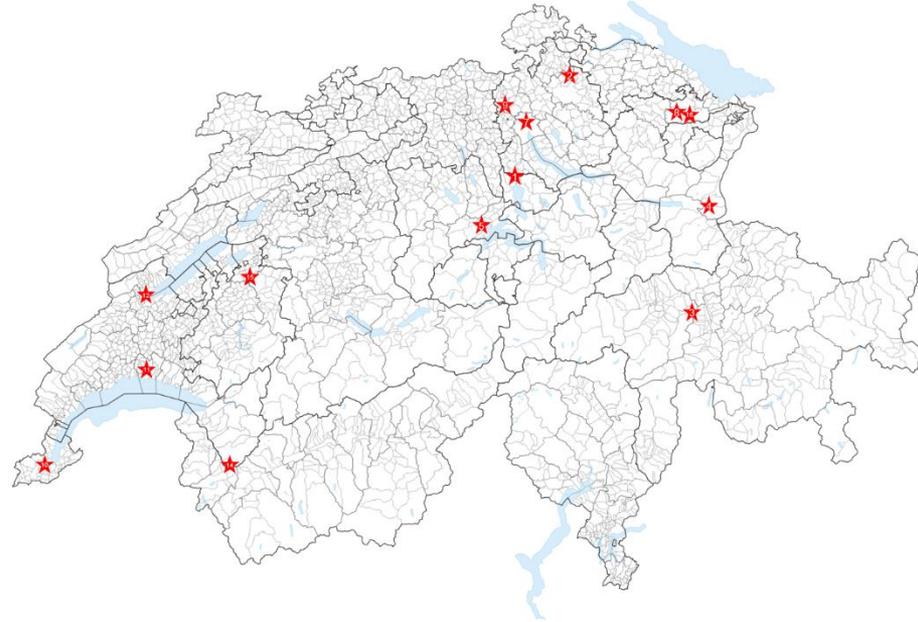


Background

- **Lack of knowledge in industry about energy efficient motor systems**
- No training with focus on "energy efficient electric motor systems" was available in Switzerland
- Industry service staff is motivated, but not able to implement energy efficiency projects on their own
- Energy efficiency projects are studied but not implemented: Risk, cost/benefit, no convincing advocate

Swiss training program - IEO

- 2015 - market study for demand of training and evaluation of technical universities
- 2016 - pilot course in Lucerne
- 11 Swiss training courses held to date (in 3 different schools, 7 in German, 4 in French)
- feedback from participants has been implemented
- training sequence and material improved after every course
- demonstrators have been developed for practical education and experiments: pumps, fans



ET&M Auswertung 09.07.2014

Swiss training program - IEO

- 6-days continuing education course
- focus on the System approach - not only components
- includes theory and practical practice on the most important components
 - electric motors
 - VFD
 - pumps
 - fan
 - compressors (cooling/air)
 - transmissions
- Includes an individual project with a real analysis
- Final test and presentation of individual project



Course documents

- Swiss course documents have been provided to China
- Copyright agreement
- No 1:1 translation possible
- Cultural differences cause adaptations to training materials



IEO timetable 2019

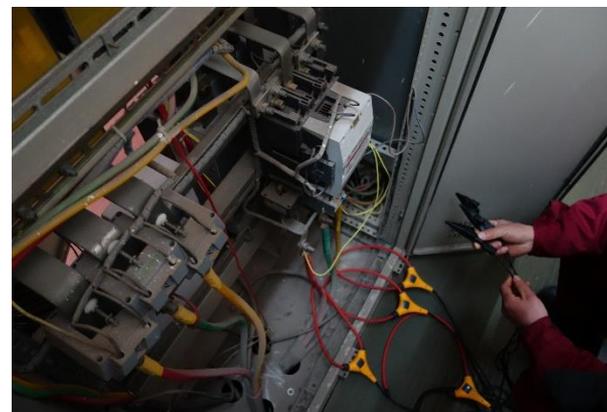
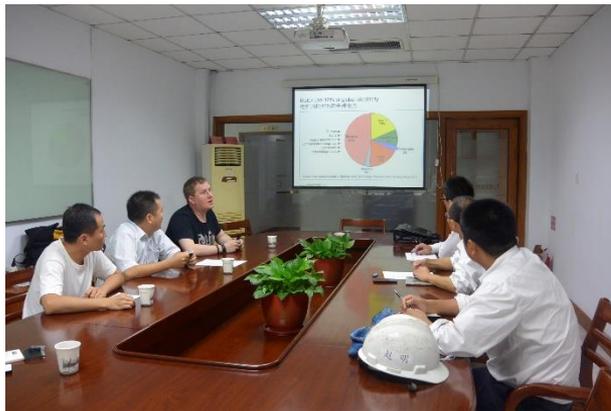
IEO D5-2019		1		personal analysis	3		personal analysis	5		6	
		friday	saturday		friday	saturday		friday	saturday		
		10 may 2019	11 may 2019		24 may 2019	25 may 2019		28 june 2019	29 june 2019		
09:15	10:00	welcome, introduction	modul 1: motors, lesson	modul 3: Fans, lesson and experiments	lesson: compressed air systems	Modul 5: energie-management and communication	final exam				
10:15	11:00	swiss energy Law, MEPS									
11:15	12:00	Motor-Systems-Check Method	modul 2: VFD, lesson	modul 4: pumps, lesson	presentation: personal analysis						
12:15	13:00										
13:15	14:00	Lunch		Lunch		Lunch					
14:15	15:00	Motor-Systems-Check Tools	modul 1&2: Motors & VFD, experiments	modul 3: Fans, experiments	modul 4: pumps, experiments	Modul 6: cooling systems, lesson & experiments	presentation: personal analysis				
15:15	16:00										
16:15	17:00							feedback			
17:15	18:00	personal analysis Q&A	personal analysis Q&A	personal analysis Q&A	personal analysis Q&A	closing					

Sino-Swiss Topmotors Zhenjiang project experience

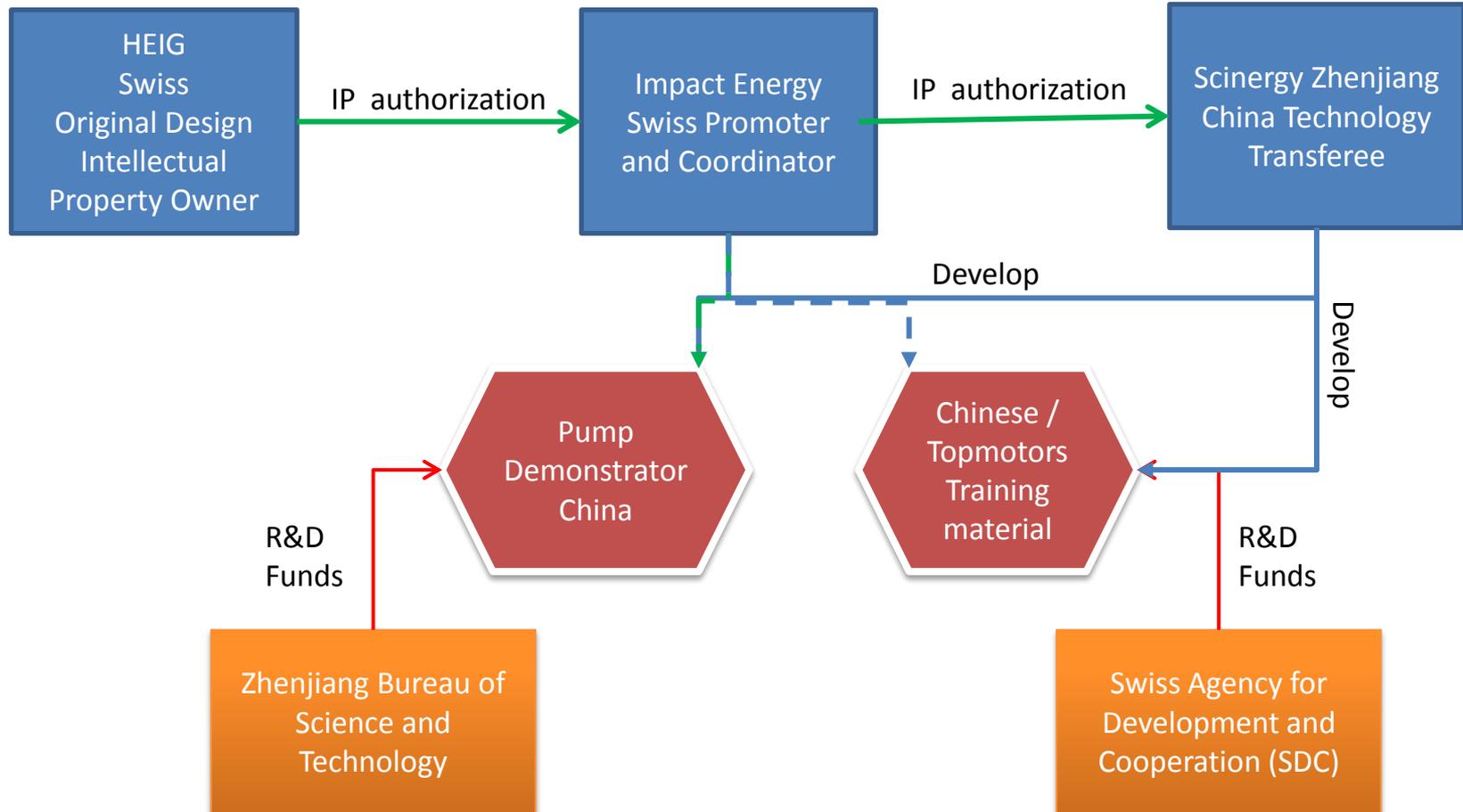
- Visited more than 70 factories
- Tested more than 20 motor systems
- Conducted on-site factory training and classroom training
- The experience learned from this project:
 - Huge energy savings potential exists but are not easy to explore
 - Training is important and essential to cut cost and motivate changes in factory
 - But training needs to be practical and innovative



practical experiences



Multi-parties cooperation and promotion



Swiss pump demonstrator

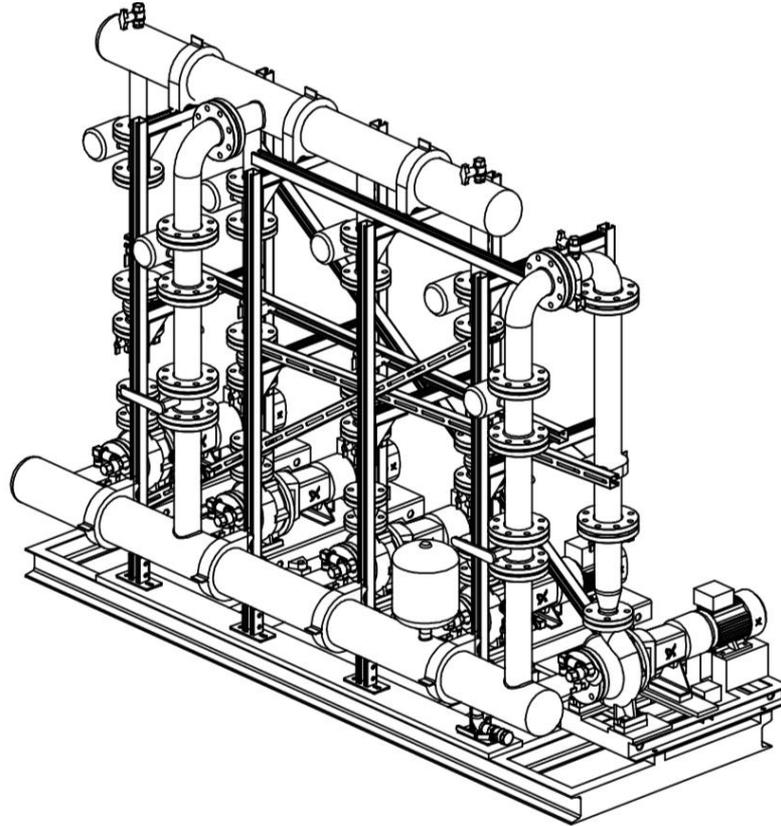


Communication and negotiation



Hu Bo, Scinergy Christoph Besson, HEIG-VD

China Pump Demonstrator Design



China Pump Demonstrator under construction



New features of China pump demonstrator

- Smart meters with digital communication protocol
- On-site data sampling system to collect and send data
- Cloud server receives on-site operation monitoring data
- Cloud server data publishes data
- Visual client program to subscribe data and show the monitoring result in dashboard and dynamic curves

Promotion plan

- Integrate with China “Industrial Energy Efficiency Diagnosis Service Action Plan” initiated by Ministry of Industry and Information Technology
- Work with provincial and municipal energy conservation centers which have close connection with factories
- Work with Technical Universities to provide practical training for students from China and other countries
- Work with other international and regional stakeholders to promote internationally.

Conclusion

1. Lack of knowledge about efficient motor systems
2. Continuous education focused on efficient motor systems is an important part of energy efficiency in industry
3. Knowledge transfer generates synergies for both sides

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